

H₂O ops

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BETTER SAFE: THE WELLHEAD PROTECTION ISSUE

MARCH 2018

WELLHEAD PROTECTION AREAS: KEEPING YOUR WATER CLEAN

The best way to maintain high quality drinking water is to prevent contaminants from reaching drinking water sources. A prevention program to guard against contamination is considerably more cost effective than paying the costs associated with contamination. About 65 percent of Washington's residents use groundwater as their source of drinking water. In some areas, dependency on groundwater approaches 100 percent. To minimize the possibility that land uses will contaminate the groundwater they use, Group A systems must delineate wellhead protection areas for each source.

A wellhead protection area is the surface and subsurface area surrounding a well or well field that a water system must manage to prevent contaminants from reaching groundwater. Wellhead protection areas are divided into four zones representing the time it would take a particle of water to travel from the zone boundary to the well. Land-use planners use the zones to determine where it is safe to locate future "high risk"

and "medium risk" potential contaminant sources. Agencies also rely on these zones to determine which potential contaminant sources might pose a risk to safe drinking water. Higher risk areas may require increased regulatory attention and technical assistance, with an emphasis on pollution prevention and risk reduction.

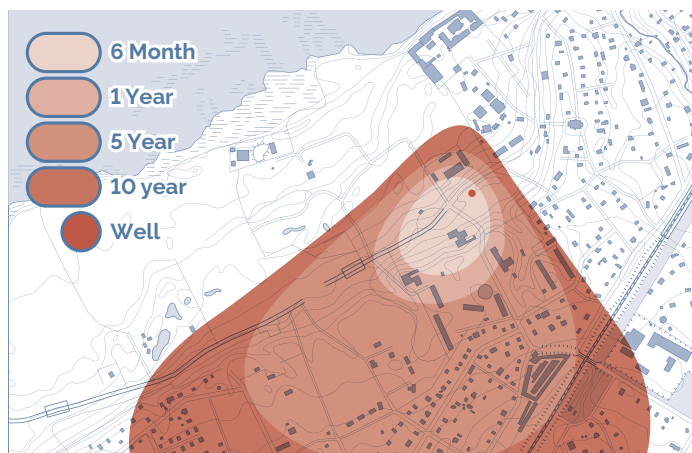
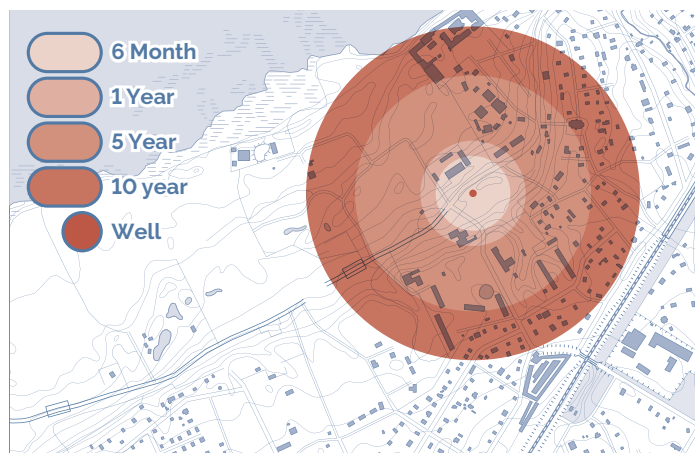
In the early days of the Wellhead Protection Program, most systems chose a calculated fixed radius (CFR) method to determine the 6-month, 1-, 5- and 10-year time of travel. This method draws circular protection areas for each zone, based on a simple volumetric flow equation. A major drawback of this method is that groundwater rarely behaves this simply. As a result, using a CFR method may result in protecting areas that don't need protection, or ignoring areas that might pose a threat (see example below).

To safeguard drinking water supplies by increasing the reliability of your wellhead protection area, you might consider using a delineation method other than CFR. These more advanced methods:

- ◆ Reduce the chance of contamination.
- ◆ Help to protect areas that actually need protecting.
- ◆ Provide greater accuracy for planners making land use decisions.
- ◆ Are more appropriate than CFRs for most geologic settings in Washington State.
- ◆ Help you tell your customers where their water comes from.

The cost of upgrading to analytical modeling or hydrogeologic mapping can be low. The U.S. Geologic Survey (USGS) already created numerical models for many areas of Washington. Using USGS models can greatly reduce the cost of switching to a numerical model.

We created a tool and guidance to help you determine the best delineation method(s) for your system, which you can find along with other resources at doh.wa.gov/SourceWaterProtection. More resources are available from the U.S. Environmental Protection Agency at epa.gov/SourceWaterProtection. ◆



TOOLS FOR EFFECTIVE WELLHEAD PROTECTION

A Wellhead Protection Program requires water systems to assess their sources' vulnerability to contamination and create a zoned protection area based on the time it takes for a particle of water to travel from the zone to the well.

Whether you are developing a new wellhead protection plan or completing a two-year update, here are tools to make your effort easier and more effective.

Delineation

To complete a basic wellhead delineation (calculated fixed radius, or CFR), you need to know the pumping rate of the well and the length of the well opening (often screen length), and the aquifer porosity and time. Guidance defines both the time and porosity.

Well log: Your well log will help you determine the susceptibility of your source and the length of the well opening (screen). There should be a copy of your well log in your planning documents. If not, you can find it on Department of Ecology's website (search for "Well report (log) viewer").

Susceptibility Assessment: Your assessment should be in your water system planning document. However, if anything with your source changed it may be out of date. If your assessment is out of date, submit an update to your regional office source monitoring staff.

Source Water Assessment Program (SWAP) mapping application: Visit our SWAP website to review our record for your current wellhead delineation.

Contaminant Inventory

There are multiple tools you can use when developing or updating a contaminant inventory. Choosing the right tools will depend on the location of your source and the type of activities that occur within your wellhead protection area.

Sources in rural or agricultural areas: A windshield survey and aerial maps or SWAP review may provide adequate information for the contamination inventory.

Sources in urban or industrial areas: Permitted activities are more likely to affect these sources, so you may need to review additional resources to identify contami-

nant risks. You will need extra care and review for highly susceptible sources.

SWAP mapping application: Visit our website to find two layers (Active and Inactive Ecology Potential Contaminants) you can use to identify existing sources of contamination in your wellhead protection area.

Water quality atlas: Visit Ecology's website to find multiple layers you can use to identify potential risks. It includes information you can find on our SWAP mapping application.

GIS tools: Search your county's website for GIS tools that will help you understand what is occurring within your wellhead protection area.

Local ordinances: Local government must review and permit land use activities. Some of these activities can pose risk to drinking water sources. Utilities must ensure local ordinances, like critical aquifer recharge areas, identify and protect their protection areas for wellhead protection to be effective. You can find local county or city ordinances at library.municode.com/wa. ♦

KEYS TO SUCCESSFUL WATERSHED FUNDING

In Washington, utilities are seeing changes in their watershed that are causing the water they depend on to become less reliable. Whether this is a result of land-use activities, changes in weather patterns, or a combination of many factors, utilities are starting to take action. When considering how to protect sensitive portions of their watershed, some utilities decided land purchase is the best long-term solution, like Skagit PUD (their story features as the High 5 award).

One of the biggest challenges for utilities looking to purchase land within their watershed is finding funding. If you are looking to purchase land in your watershed, where should you start?

Be prepared: You can't recommend solutions without knowing what the problems are. A source water protection plan can help identify problems.

Complete a science-based watershed assessment: This will help identify potential contaminant sources and threats, sensitive areas or zones within the source area, and information gaps.

Develop an action plan: Based on the findings from the watershed assessment, identify and prioritize potential solutions for enhancing, restoring and protecting your source area. For best results, create the action plan with stakeholder and expert input.

Identify partners: Often watershed improvement or conservation benefit more than just drinking water. Partners can provide letters of support, technical services, and, in some circumstances, matching funding. They can also help you as you develop your action plan. The Source Water Collaborative has resources to help you get started with this process.

Get buy-in: Get your governing body and community involved. You can accomplish this as you develop your watershed plan and establish partners. It takes money to purchase land. Are your community and governing body willing to pay?

Develop a good application: Dedicate resources and get the expertise needed to develop a good application. The appli-

cation is your one opportunity to highlight your project and explain why it is important. Steps 1–3 will provide the foundation for your application.

In 2015, Skagit PUD applied for a loan from the Clean Water Act State Revolving Fund. Their application ranked 7 out of 152 projects on the funding list. The application ranked high because of multiple water quality and environmental benefits, the district developed a watershed control plan that identified the subject property as critical to water quality protection, commissioners were willing to take on a loan and pass that expense onto the ratepayers, and the partners that supported the project.

The successful application also allowed the PUD to qualify for 25 percent loan forgiveness (grant) from the green projects reserve. Only two or three projects a year receive this forgiveness.

If you need assistance getting started we can help. Check out the funding article on page 4 to see if a source water protection grant is right for you. ♦

HIGH 5 AWARD: SKAGIT PUD PROTECTS SOURCE WATER

Our High 5 goes to Skagit Public Utility District for success securing 250 acres of forested land around their watershed. The property will protect drinking water quality far into the future.

For years, Skagit Public Utility District looked for a way to improve water quality protection for its source water. Skagit PUD provides drinking water to over 65,000 people in Skagit County, and serves three cities as well as suburban and rural areas. Thanks in part to a Source Water Protection grant from the Office of Drinking Water and a loan from the Department of Ecology, Skagit PUD recently was able to purchase and protect 250 acres of critical watershed area in perpetuity for its customers.

The Gilligan Creek area of the Cultus Mountain Watershed provides 45 percent of the PUD's source water for its Judy Reservoir Water System. Until recently, timber companies and the Department of Natural Resources owned all of the property around Gilligan Creek. In 2012, Skagit PUD comprehensively updated its watershed control program and determined that finding a way to protect the quality of this stream was critical to the success of the Judy System. Recent increases in the rates of logging and road construction led to the concept that buying land near the area



where water is withdrawn for the water system would work wonders to protect the long-term success of the Judy System.

Over the next several years, Skagit PUD staff began a search for partners and funding sources for this idea. This was no easy feat as there is great competition for the limited funding available from state and federal agencies. One of the first partners discovered was the Department of Health Office of Drinking Water. ODW provided a Source Water Protection Grant to allow for an appraisal of the property early in the process. Knowing the approximate value of the property helped staff begin discussing the property purchase

with the Skagit PUD board of commissioners. Local conservation groups were also brought into the conversation, and representatives of Skagit Land Trust brought up ideas for other funding sources.

A well-established relationship with the landowner helped Skagit PUD start the complicated negotiations to buy the property in the spring of 2017. They struck the \$1.5 million deal by September, and Skagit PUD took ownership of the property in December. After five years of hard work, this 250-acre forest at Gilligan Creek will be used to protect the quality of drinking water for Skagit PUD's customers for many years to come. ♦

RISK FROM CLIMATE VARIABILITIES

Public water systems face uncertain and unprecedented challenges from the combined effects of changing climate, population growth, and growing demands on water resources. The effects of climate change can include changes in water availability and demand, more flooding and drought, and rising sea levels.

A successful adaptation strategy for public water systems will rest on effective planning, prevention, preparation and mitigation to reduce the negative consequences of projected impacts. To adapt, utilities need to integrate actions into their operations and long-term planning, including improved drought planning, enhancing water use efficiency, and relocating vulnerable water sources, storage or treatment facilities. Programs already in place, like water use efficiency, source water protection, emergency preparedness, and drought

management, can get utilities closer to climate change adaptation.

To help utilities evaluate their source vulnerability relative to climate change, we developed assessment questions. While it is difficult to specifically quantify risk, answering "yes" to a question indicates higher risk.

- ◆ Has your part of the state experienced historic droughts when local water demands could not be met?
- ◆ If your source is a spring, was there a decrease in flow during previous droughts?
- ◆ Are wildfires a concern near or up basin from your source?
- ◆ Has the area near your source experienced coastal erosion, either currently or in the past several decades?
- ◆ Has land subsidence occurred within your source or facilities?
- ◆ Has saltwater intrusion been

a problem in the past for wells in your region?

- ◆ Is your source located in an area where snowpack typically accumulates in an average winter?
- ◆ Is your source located in the foothills of the Olympics or Cascade ranges or in the northern portion of eastern Washington?
- ◆ Does your well experience large seasonal variations in water level?
- ◆ Are crops being grown near your water system that require large amounts of irrigation?

For more information on becoming climate ready, visit EPA's Climate Resilience Evaluation and Awareness website at epa.gov/crwu, and their resilience training and exercises for drinking water at epa.gov/waterresilience. If you have concerns about your source climate resilience, please contact the ODW Source Water Protection Program. ♦

A GRANT PROGRAM TO HELP YOU PROTECT YOUR SOURCE WATER

Did you know that the Department of Health has a source water protection grant program? Every year, the Source Water Protection Program sets aside about \$200,000 for utilities or local governments to improve source water protection. Utilities can apply for up to \$30,000 to better protect water quality or quantity. Funding is available to nonprofit Group A systems or local governments proposing regional projects.

Eligible projects

Enhanced Delineation

Complete, update, or refine the drinking water source assessment delineation using new or additional site-specific information as part of a more comprehensive protection strategy.

Enhanced Assessment

- ◆ Improve existing potential contaminant source inventories by expanding or updating the inventory of land use or existing and potential contaminant sources.
- ◆ Establish a water quality monitoring project to evaluate existing and potential threats to water quality, including evaluating and prioritizing potential threats (or protection activities) based on new or more detailed information (hydro evaluation).

Source Protection Planning

Planning documents that identify appropriate protection measures, which, when implemented, would result in reduced risk to a drinking water source(s), such as:

- ◆ Comprehensive source water protection plans.
- ◆ Educational materials and projects.
- ◆ Best management practices (BMPs) plans for reducing pollutants that directly affect a drinking water source.
- ◆ Developing local source water protection ordinances.
- ◆ Developing restoration or conservation plans that intend to improve source water quality.
- ◆ Evaluating source catchment areas for future easement or land acquisition.

- ◆ Evaluate replacing a surface water source with a protected groundwater source.
- ◆ Evaluating a source with a known contaminant that exceeds the trigger level or federal established lifetime health advisory level.
- ◆ Local governments (counties, cities, incorporated towns, and special purpose districts) may use these funds to carry out source water protection projects to better protect Group A sources.

Implementation

Eligible activities will reduce risks within the source water area or contribute to a reduction of contaminant concentration within the drinking water source(s), such as:

- ◆ BMP projects that reduce pesticide application rates and loading in source water protection areas.
- ◆ Closing high-risk abandoned or unused (private or irrigation) wells close to a supply well.
- ◆ Reforestation or replanting projects in sensitive or riparian areas.
- ◆ Installing signs at boundaries of zones or protection areas.
- ◆ Projects to decommission onsite systems and connect homes to existing sewer lines, and to address a water quality issue or sanitary control area violation.
- ◆ Seismic spill prevention or inspection project in proximate areas for high-risk sources.
- ◆ Properly decommission inadequately constructed private wells within the source water protection area one-year time of travel.
- ◆ Structures to divert contaminated storm water runoff affecting the source water protection area.
- ◆ Installing fencing to protect sensitive riparian source water protection areas.
- ◆ Implementing pollution prevention or waste reduction projects identified in an approved source water protection plan.
- ◆ Restoration or conservation projects within the drinking water source water protection area.

- ◆ Developing conservation easements to protect sensitive source water protection areas.
- ◆ Implementing a drinking water source protection ordinance (municipality).
- ◆ Establishing management plans for easements or lands purchased within source water protection areas.
- ◆ Setting up an ecosystem services project in a watershed to fund preservation areas.
- ◆ Developing public education materials.
- ◆ Studies to evaluate long-term quality or quantity of a regional or local supply.
- ◆ Negotiations for future land purchases in source water protection areas.

Security

Projects implement security measures to reduce the risk of contamination to the source water protection area, intake or well, such as:

- ◆ Fencing around sensitive area near wells or intake.
- ◆ Gates for access roads.
- ◆ Alarms, signs, cameras, locks and lights.

All security measures must protect highly sensitive source water areas, not just facilities or equipment.

The funding source requires grant recipients to comply with environmental and cultural review requirements for groundbreaking activities. Due to the limitations of funding available for each grant, projects should focus on activities that don't break ground.

We accept applications year-round until we use up funding. We award projects on a first come, first served basis. However, if applications exceed available funding, we will prioritize projects based on the criteria in the **Local Assistance Grant Program Guidelines (331-552)**.

Past grantees used these funds to improve watershed delineation, evaluate and delineate critical aquifer recharge areas, prepare for watershed acquisition, prepare watershed plans, complete additional monitoring to evaluate effectiveness of water quality regulations, improve wellhead protection plans, and for public outreach and education. ◆

TAKE CARE DELINEATING WELLHEAD PROTECTION AREAS R. SCOTT POLLOCK, P.E.

Delineating wellhead protection areas can get complicated. In concept, it's straightforward: find the zones where groundwater takes one, five, and 10 years to travel to the well in normal use. In practice, accurate zone delineation requires information about subsurface geology and water flow that can be very hard to get.

The Washington State Wellhead Protection Guidance Document describes four ways to delineate a wellhead. Of those, the calculated fixed radius (CFR) method is commonly used when limited information about the aquifer is available. CFR delineation is not as accurate as other methods, but it's a simple way to help a system manage risk by indicating where surface contaminants can affect a well and serve the purpose of informing affected people about the possibility of contamination.

Common difficulties using the CFR method

The first thing to consider is whether the CFR method will give you a meaningful result for the well under consideration. CFR is most suitable for flat areas with uniform geology where the well draws groundwater equally from all directions. You should use other methods for wells in complicated geologic settings or if groundwater likely comes from one direction. If the information or resources you need for the other methods isn't available, contact our Source Water Protection Program for guidance.

Second, the CFR method uses the aquifer's porosity to estimate the amount of water in a given volume of aquifer material. Aquifer porosity is difficult to obtain because most well drilling processes disrupt the material as they remove it. Overestimating porosity produces a protective area that is too small, which defeats the purpose of wellhead protection.

If you have access to good porosity information, you probably also have access to other information that makes using one of the other more accurate methods a better choice than CFR. If you don't have dependable information on porosity, use the default value in the wellhead guidance document.

Third, CFR zones for wells near one another might overlap. That would indicate that more than one well withdraws the same water, which is physically impossible. It also misrepresents the wellhead protection zone as too small. If your CFR zone includes overlapping wells, contact the Source Water Protection Program.

CFR is inexpensive and uses minimal data to calculate a wellhead protection area. However, groundwater rarely behaves simply. In areas with complicated geology or unidirectional groundwater flow, other delineation models will yield better results. Contact the Source Water Protection Program for help selecting the method best suited for your system. ♦

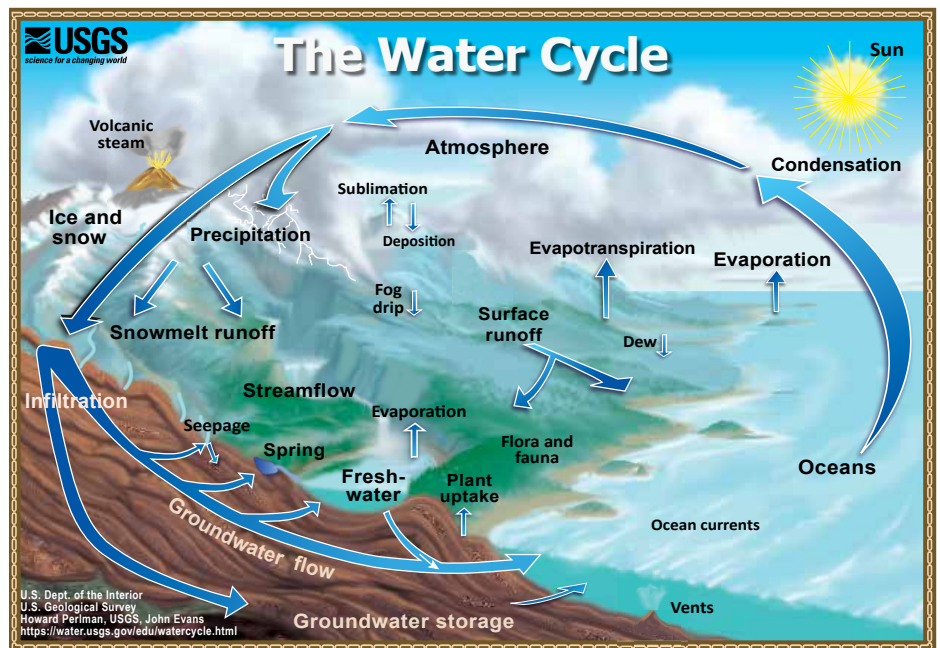
THE HYDROLOGIC CYCLE

Water can flow through many different environments and encounter various contaminants before a water system withdraws it from a well. Natural and human factors can influence the quality of a water source and various environments can change the transport of chemicals, nutrients and biological contaminants. Climate variations and increased water demands can also affect drinking water systems.

The way these factors influence drinking water depends on the source involved. The processes that affect source water are complex. Understanding the conditions that may affect the quality and reliability of a water source beyond the well's circularity zone of contribution can provide valuable insight to help safeguard drinking water.

The hydrologic cycle, also known as the water cycle, is a conceptual tool that will help you understand and anticipate the affect to a well's source. The hydrologic cycle describes the continuous movement of water on, above, and below the surface of the earth.

An operator can prepare and plan for changes to a drinking water well by knowing how each component of the cycle influences the water source. Individual compo-



nents of the hydrologic cycle may vary significantly and the cycle can be complex.

Even a basic understanding of the components in a smaller scale hydrologic cycle can provide information to make appropriate responses for day-to-day operations of a drinking water supply well. This is important because the hydrologic cycle shows how quantities of precipitation, infiltration and underground water

flow influences the amount of groundwater available to a well. The quality of a water supply may vary considerably because of fluctuating influences such as hydrological events, climatic changes and periodic human activity.

For information on the hydrologic cycle and details of the components that make up the hydrologic cycle, visit The Water Cycle webpage at the U.S. Geological Survey. ♦

HOW PARTNERSHIPS MAKE SOURCE WATER PROTECTION POSSIBLE

BY CATHY KELLON, WORKING WATERS DIRECTOR AT GEOS INSTITUTE

During weekends and the summer, the City of Leavenworth's population often swells from 2,000 to 30,000. Tourists come to this picturesque mountain community for special events like Oktoberfest, and nearly as many people visit en route to nearby recreational destinations.

Icicle Creek is the lifeblood of this local tourist economy. From high alpine lakes to city parks, the creek is an outdoor playground. It just so happens that Icicle Creek is also a major source of Leavenworth's drinking water.

Protecting drinking water at its source is the first line of defense in a multi-barrier approach to ensuring safe drinking water. But like most other small drinking water providers, Leavenworth does not have staff dedicated solely to source water protection. Operators are busy treating water to regulatory standards and keeping it flowing in its pipes. Fortunately, there are other local entities with a stake in Icicle Creek.

Recognizing that demands from all user groups would only continue growing, the Cascadia Conservation District initiated a project with the City of Leavenworth and the Okanogan-Wenatchee National Forest to educate visitors on ways they can help to protect Icicle Creek.

In 2018, with a grant from the Drinking Water Providers Partnership, they will survey threats to water quality, educate backpackers about proper waste disposal, and post signs at trailheads and along access roads. This outreach would not happen if the key groups hadn't realized their shared objectives.

Most towns don't have the regulatory authority or means to take on source water protection alone, but they do have the potential to build source water protection partnerships. We're lucky in the Pacific Northwest to have many groups that can provide the critical services needed to plan and implement source water protection activities.

Finding the right partners depends on your in-house capacity and the strategies you wish to pursue in protecting your drinking water source. Take stock of your local situation. Is water drawn from a well, reservoir, or creek? What are the predominant land use activities

in the source protection area and are there many different landowners?

For example, turbidity is often a major challenge for water systems that use water drawn from streams coming off forests.

Upstream river and land restoration actions that reduce erosion and landslide risks, like replacing under-

sized culverts, can lower suspended and dissolved solids in the raw water. Citizen and nonprofit conservation organizations may be able to help. For example, your local watershed council may already have a working relationship with landowners or have the administrative capacity to secure grants and manage permits needed to undertake projects like culvert replacements.

Soil and Water Conservation Districts can work with local farmers to encourage best management practices that improve soil health and water quality. A land trust can help you explore land acquisition options or negotiate formal agreements with landowners to preserve highly sensitive areas.

User groups like fishers, hunters, and birders are especially interested in healthy watersheds and often have volunteer initiatives to provide in-kind materials or services to conservation projects. If your source area includes publicly managed

lands, you have fish biologists, hydrologists, foresters, and other specialists who can extend your scientific capacity, which is particularly helpful if you need technical help or to fill information gaps.

To make the most of any partnership, it's important to have a game plan. While you can proceed without a source water protection plan, a science-based road map will help you increase your impact and facilitate partnerships. You can't do everything, so it's good to know what to do first to improve water quality. When you have a clear set of priorities, others can more readily see how working together might further their own goals.

The most important thing is to start. Source water protection is an ongoing activity. Begin by talking with others who also benefit from clean rivers, lakes, and groundwater. For example, get to know landowners and talk with groups that have a mandate or mission to protect or enhance open spaces, farmland, forests, rivers, and fish and wildlife habitat. Ask what they're working on, about their priorities, and where they need help. Share your hopes for the area and be honest about your needs and capacity. You're building relationships and looking for places where your goals overlap or complement one another.

Where you find alignment, there is potential to leverage one another's skills, energy, data, expertise, and more to do good work for people, fish, and wildlife.

Still not sure how to start? Contact the DOH Source Water Protection Program. And, if you visit Leavenworth, enjoy a glass of tap water and look for the new signs about protecting Icicle Creek. ♦

Cathy Kellon coordinates the Drinking Water Providers Partnership, a public-private grant award program for environmental conservation and restoration projects in municipal watersheds across the Northwest.

Groups collaborate when they can achieve more together than alone. Consider the land uses and values within your source area to identify groups that may have incentives to protect or restore water quality and supply.

Every organization has its own interests and talents. Consider your ability to carry out a process or project. Do you need help fundraising, designing erosion-control measures, or managing subcontractors? Who is willing and able to do those things and what are you offering in return?

DOES YOUR WELL MEASURE UP?

The *Old Farmer's Almanac* has been making long-range weather forecasts since 1792. Traditionally, it's 80 percent accurate! This year, the Almanac's winter forecast for the Pacific Northwest calls for slightly colder than normal temperatures with near to below-normal snowfall. Summer is to be warmer and wetter than normal. Forecasts can be very helpful for planning purposes. Combining forecasts with water level data can be extremely helpful in keeping water systems operating safely.

It is very important to measure the water level in your well on a regular basis. All public water systems using wells should measure and record the static and pumping water levels in their groundwater wells at least monthly. Watch for changes in the measurements. Over time, pumping and static water levels can help you identify and diagnose well-production issues before serious problems occur, such as water outages and pump damage.

Water level information will help you decide whether your well is operating properly. If the static water levels are consistent and not dropping, chances are that aquifer depletion is not a problem. However, if the static water levels are steady and the pumping water level

has decreased, you may have a well-plugging problem. If you don't deal with it quickly, it may result in reduced yield or a progressive decline in the pumping level.

Groundwater level measurements also provide important information about where groundwater shortages could exist, and where you need more data. Areas with relatively low groundwater levels may be more vulnerable to groundwater shortages in dry years. In addition, areas or regions with declining groundwater levels may be susceptible to groundwater shortages in the future.

Remember that water levels in a groundwater well fluctuate naturally during the year. Spring measurements typically depict the highest groundwater elevations for the year, when groundwater levels rebound with winter precipitation and snowmelt. Natural groundwater levels usually reach their lowest point in late September or October. Given this natural cycle of groundwater, most problems with wells tend to occur late in summer or early fall when groundwater levels naturally reach their lowest levels.

Not sure how to measure the water level in your well? Contact Evergreen Rural Water of Washington at 360-462-9287 or www.erwow.org. They can help you iden-



In 2009, Todd Shepherd, water quality specialist for Tacoma Water, uses an electric water level probe to measure the water level in Well 6B. Photo courtesy of Tacoma Water.

tify well access, types of water level measuring equipment available, and proper measuring techniques. You also can get additional information in our fact sheet, **Measuring Water Levels in Wells (331-428)**.

Let's hope the Farmer's Almanac forecast for the summer of 2018 is 100 percent accurate and it is wetter than normal. Just in case, take monthly water level measurements so you can plan, prepare, and respond to changes in your supply before serious problems occur. 💧

COORDINATING STORMWATER MANAGEMENT AND SOURCE WATER PROTECTION

BY JACKI MASTERS, GENERAL MANAGER OF MT. VIEW-EDGEWOOD WATER COMPANY

To protect their sources from potential contamination, water systems should coordinate with local governments about stormwater management and wellhead protection areas.

The Clean Water Act requires local governments to manage and control stormwater runoff so it doesn't pollute downstream waters. Just as Group A water systems must have a Comprehensive Water System Plan, local governments must have a Stormwater Management Program.

"Water systems should at least have a seat at the table," says Jay Krauss, general manager of Sammamish Plateau Water and Sewer District. When local governments update their stormwater programs, water systems should be a part of the process, comment on the proposed plan, and get involved.

Wellhead protection programs help prevent groundwater contamination. They require water systems to assess their sources' vulnerability to contamination. The plan creates a zoned protection area based on the time it takes for a particle of water to travel from the zone to the well.

Most jurisdictions allow developers to install underground injection control (UIC) systems to convey stormwater below ground. Ecology's Guidance for UIC Wells that Manage Stormwater sets the design, construction, and operation and maintenance require-

ments. These systems could discharge contaminants into the ground where they could eventually impact groundwater sources if not properly designed, managed and maintained.

In 2008, Sammamish Plateau Water and Sewer District detected fecal coliform in a monitoring well located between a UIC system the City of Issaquah operated and one of the district's main water sources. Hydrologic studies indicated that coliform entered the monitoring well because of an inadequate filtering layer between the UIC and the well. To resolve this problem, the city and the district signed an inter-local agreement. In it, Issaquah agreed to abandon the UIC permanently and to use alternative ways to manage stormwater.

Another system is negotiating a UIC system requirement with a school district to ensure the protection of the area's water sources. The school district plans to have a 16-well injection field. The system wasn't aware of the planned UIC wellfield until the driller requested an underground utility location.

Ecology's Guidance for UIC Wells that Manage Stormwater sets the design, construction, and operation and maintenance requirements for UIC wells. Coordination between stormwater UIC applicants, local governments, and water system owners is essential to safeguard a water system's source and limit potential effects a UIC system could have on groundwater. 💧



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NEW AND IMPROVED SWAP MAPPING APPLICATION

We updated the Source Water Assessment Program (SWAP) GIS mapping application to make it more user friendly and mobile compatible. It provides a graphical representation of drinking water source protection areas that will help utilities protect their sources from unintended contamination. The site also provides information about known or potential contaminants, helping users determine whether their activity could affect a drinking water source.

The new application gives users more options to control how data displays, and includes more base maps and options for reducing the quantity of data displayed for a particular area. It also provides both interactive help and a static tutorial through a link next to the “help” button.

We designed the application to benefit multiple users, including utilities, local governments, consultants and the public.

Please let us know if you find errors in our data source location or protection areas data. You can send corrections to Corina Hayes, Source Water Protection Program manager, at 360-236-3114 or corina.hayes@doh.wa.gov. If you have digital maps or shape files, please follow the guidelines in **Collecting Water System Data Electronically (331-391)**.

Send corrections to Department of Ecology’s contamination data to gis@ecy.wa.gov. ♡

