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Drinking water protection in Oregon

*by Oregon's Drinking Water Protection Team **

Introduction and overview

A public water system's goal of having a safe drinking water source can largely be accomplished through "drinking water protection" efforts. Drinking water protection does not mean prohibiting other land use activities within a watershed or groundwater recharge area. Rather it means identifying the highest risks that could potentially impact water quality and seeking to reduce those risks. Drinking water protection has the potential of not only reducing the risk of contamination, but also reducing the cost of treatment, and reducing the risk of local health impacts from contaminants that cannot be removed through standard treatment.

Public water system purveyors have relied almost exclusively upon chemical and mechanical technologies to treat water and to provide an expected level of safety for the public that relies on the systems. Water treatment plants and chlorination are critical treatment processes used to provide safe drinking water. However, multiple and diverse land use activities on land used as sources of drinking water, microbial pathogens resistant to chlorination, and the proliferation of new synthetic chemical compounds, can challenge the effectiveness of treatment technology. There is widespread recognition that reliable drinking water supplies are dependent upon whole systems that include healthy source water areas, in addition to well-maintained and operated treatment systems and distribution networks.

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Special issue on drinking water protection!

In this issue of the PIPELINE, we celebrate the completion of a huge project started in 1998. That project was to assess all of the drinking water sources used by public water systems throughout Oregon. The project team is a close partnership between the Oregon Department of Human Services and the Oregon Department of Environmental Quality. Staff from the two agencies used their respective skills and talents to complete the source water assessments and reports, including in each a delineation of the source water protection area, an inventory of potential contaminant sources, and a determination of the susceptibility of the drinking water quality to contamination.

The team is now ready to move beyond source assessments to actually assisting communities to protect their water sources. In this PIPELINE issue, prepared by the project team, you will learn about the results of the source water assessment project, what we learned, and where we go from here and how.

Congratulations to the project team for an outstanding effort!

Dave Leland, Manager
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Public water supplies are facing new challenges to providing safe drinking water with the continual development and production of new chemical compounds developed as medications and for industrial purposes. These chemical compounds, which include antibiotics, prescription drugs, nonprescription drugs, hormones and steroids, and household and industrial compounds, have found their way into surface water and groundwater resources as a product of human wastes. Recent national reconnaissance studies *(http://epa.gov/nerlesd1/chemistry/pharma/index.htm and http://toxics.usgs.gov/regional/emc/index.html)* indicate that many compounds commonly used in everyday life are turning up at very low concentrations in streams and groundwater across the country. Examples of some of the compounds found to date include acetaminophen (headache medication), caffeine, cholesterol, codeine (narcotic for pain relief), cotinine (nicotine metabolite), 17b-estradiol (hormone), and sulfamethoxazole (antibiotic). Although at low concentrations, generally less than one part-per-million, their presence in water indicates that a pathway exists between a contaminant source and the drinking water supply. Standard treatment technologies of coagulation/flocculation and chlorination are not successful in removing all of these compounds. These are important reasons to prevent the source water contamination in the first place as an effective tool in providing safe drinking water.

The 1996 Federal Safe Drinking Water Act (SDWA) Amendments provide the means to protect drinking water at its source. In developing these amendments, the US Congress recognized the need to go beyond the traditional emphasis on treatment and monitoring to address the new challenges to provide safe drinking water. The SDWA amendments mandated that states conduct "source water assessments" for all federally defined public water systems, i.e., community, non-transient noncommunity and transient noncommunity systems. The purpose of these assessments is to provide public water systems with the information that they would need to develop drinking water protection strategies that are tailored to the individual water system so that they reduce the specifically identified risks to that water system.

The summer of 2005 marked the transition in Oregon from conducting Source Water Assessments to the implementation of Drinking Water Protection strategies for public water systems. Since 1998, the respective Drinking Water Protection efforts by the Department of Environmental Quality's Drinking Water Protection Program and the Department of Human Service's Drinking Water Program have been focused on completing the Source Water Assessments for Oregon's public water systems. By the end of the summer of 2005, approximately 2,400 individual assessments had been completed in Oregon.

Over the years we have had numerous discussions with water system operators about Drinking Water Protection in general and their respective Source Water Assessment Reports. A number of clarifying questions have been asked as well as several concerns expressed. In this article, we have collected these questions and concerns and attempt to answer them all in one place.

Source water assessments: What are they and why were they done?

The 1986 Amendments to the Safe Drinking Water Act introduced the Wellhead Protection Program designed to provide directions in protecting groundwater supplies from wells. States were required to develop guidance to public water systems on how to put together a Wellhead Protection Program. Oregon's USEPA-approved guidance *(www.deq.state.or.us/wq/WhpGuide/Frontpage.htm)* was developed by a Citizen's Advisory Team representing a wide array of stakeholders.

The concept of Wellhead Protection Programs represented one of the first efforts nationally to prevent contamination instead of regulating the event after it took place. States developed detailed instructions through their Guidance Manuals on

how to accomplish that prevention. The problem was that most public water systems did not have the resources to gather the data needed to develop the plan. Specifically, the water systems needed

- What area is it that I am supposed to protect?
- What are the potential risks to water quality within that area?
- How do I spend my limited resources in a way that gives the biggest protection for the buck?

The federal government realized the limited resource problem and in the 1996 Amendments to the Safe Drinking Water Act directed the states to provide, through the Source Water Assessment Program, the data needed by communities and other water systems to develop Source Water Protection Plans (Oregon refers to these as Drinking Water Protection Plans). The USEPA approved Oregon's Source Water Assessment Plan *(www.deq.state.or.us/wq/dwp/SWAPCover.htm).* The plan addresses both groundwater and surface water drinking water sources and focuses on the following three elements:

- Delineating the Source Water Protection Area (in Oregon the Drinking Water Protection Area [DWPA]), i.e., the area overlies the aquifer supplying the well or spring or the watershed that drains to a stream along which a public water supply intake occurs. In addition, areas where the water supply is most sensitive to contamination were identified.
- Inventory the DWPA for potential sources of contamination
- Determining the susceptibility of the drinking water quality to the potential sources of contamination.

Oregon's Source Water Assessment Program addressed approximately 2,400 community, nontransient noncommunity and transient noncommunity water systems. Each system received a report that provides a map of the DWPA, location of the potential sources of contamination within the area and the susceptibility of the water system to these pollution sources. The report provides the data needed by the water system to develop a protection plan tailored to their specific location and conditions.

How is the Drinking Water Protection Area (DWPA) determined?

The DWPA is the area where the drinking water originates. It is the source area for the water systems drinking water supply. The determination of the DWPA is a fundamental aspect of the assessment of a public water supply.

For surface water supplies, the DWPA delineation process begins by identifying the watershed or catchment basin of a stream or lake that supplies the drinking water *(see http://www.deq.state.or.us/wq/dwp/DWPAreaDelineationsSW.htm).* The outer boundary of this watershed is the drainage divide formed by surrounding ridges and hills. The surface water DWPA includes the entire watershed area upstream of the public water system intake. For larger watersheds, the DWPA was limited to an 8-hour travel time for water moving from upstream to the intake.

After delineating the watershed, the "sensitive areas" within the watershed were identified. Sensitive areas are regions on the surface where, because of either natural conditions or human modifications, the potential for a contaminant to reach the drinking water source is higher. For surface water systems, the following are considered sensitive areas:

- Setbacks. Because of proximity to the stream or lake, all areas within 1000 feet of the water body and tributaries.
- High Soil Erosion Potential. Areas where the combination of slope and easily eroded soil increase the likely delivery of surface contaminants, including soil itself (turbidity).

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Drinking Water Protection Area (DWPA) — continued

- High soil permeability. Areas where water from the surface can rapidly infiltrate to groundwater supplying base flow to the stream.
- High runoff potential. Areas where low permeability soils allow rainfall to rapidly flow to the stream.
- Other areas. High rainfall areas, transient snow zones and landslide or debris flow areas.

Figure 1 below illustrates a delineated surface water DWPA and designated (diagonal ruled) sensitive areas.

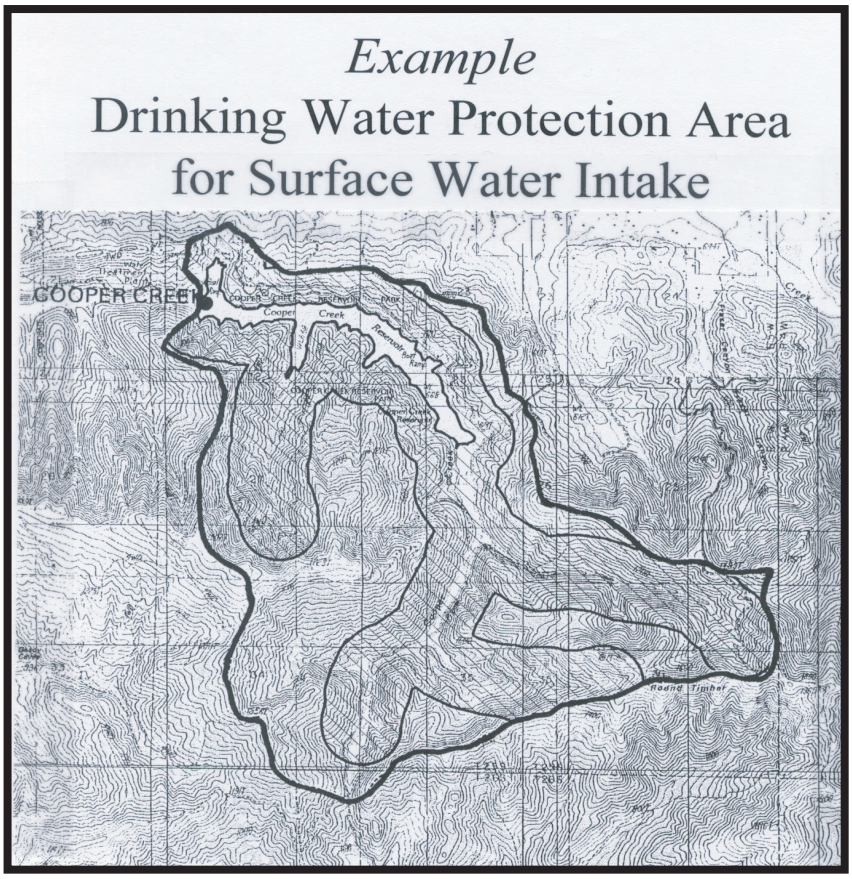

Figure 1.

For groundwater supplies, the DWPA is based on site-specific information regarding the nature of the aquifer and the pumping or discharge characteristics of the well(s) or spring(s) *(www.dhs.state.or.us/publichealth/dwp/delfact.cfm* and www.deq.state.or.us/wq/dwp/SWAPSec4.pdf). Aquifer characteristics are derived from area well reports and geologic maps and reports where available. Average daily pumping rates are based on population for small systems and actual water use data submitted to the Water Resources Department *(http://apps.wrd.state.or.us/apps/wr/wateruse/wu_report.php)* for governmental entities. Groundwater flow directions and gradient, where needed, were derived from hydrogeologic reports, field measurements, or were based on the general hydrogeologic setting. Delineations vary from simple volumetric calculations to more sophisticated models requiring computer support, e.g., analytical, analytic element, and numerical. The results from an analytical model is shown in Figure 2.

Importantly, every delineation is based on data collected for the specific well or spring in question. No two delineations are the same, each is representative of the location and operation of the water system being assessed.

After the delineation, the sensitivity of the aquifer was evaluated. Aquifer sensitivity determination is based on the following parameters:

- Aquifer character. Unconfined and highly permeable aquifers, e.g., gravel dominated, are considered sensitive.
- Aquifer depth. Shallow (<100 feet) aquifers may be considered sensitive depending on their character.
- Chemical or coliform detections at the source. Contaminant detections at the wellhead, even if they are below the maximum contaminant levels, still indicate that a pathway exists between a contaminant source and the aquifer.
- Inadequate well construction. Wells are designed to withdraw water from an aquifer, however, if improperly constructed the can serve as a conduit from the surface to the aquifer.

An example of a delineated DWPA for a groundwater source and identified sensitive areas (patterned) is illustrated in Figure 2 below:

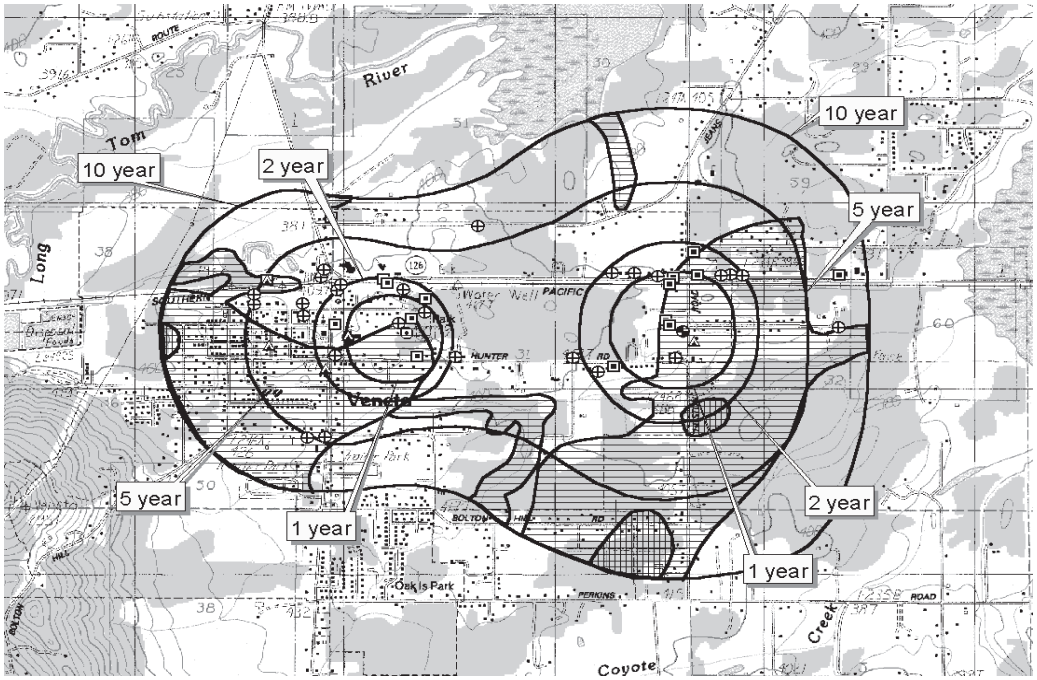

Figure 2. Example of groundwater drinking water protection area (solid boundaries) for two production wells, sensitive areas (patterned areas), and potential contaminant sources (symbols).

What is meant by a potential contaminant source?

EPA defines a potential contaminant source as a location where there is any activity having the potential to release one or more contaminants into water at a concentration of concern. After the DWPA has been identified a survey, using both databases and an onsite evaluation, is conducted within the DWPA *(www.deq.state.or.us/wq/dwp/SWAPSection5.pdf)*. The inventory serves as a basis for developing protection strategies because it

1) Gives the location of potential risks to the water supply,
2) Is a tool for educating the public about potential problems,
3) Is the basis for developing a reliable local management plan to reduce risks.

The inventory focuses on potential sources of microorganisms (viruses, bacteria, protozoa), inorganic chemicals (nitrate, metals), organic chemicals (solvents, fuels and pesticides) and turbidity/sediments.

We emphasize "potential" because during the site visit, individual facility inspections are not conducted. Facilities are identified as "potential" sources of contaminants based on their general activities and are ranked as high-, moderate- and low-risk based on the known occurrence of contamination with this general land use. When we identify a facility as a potential contaminant source, we assume a "worst case scenario" in terms of the chemicals and practices they use.

However, operating practices vary from one facility to another and the real risk may be lower than the "worst case" situation. Part of developing a protection strategy at the community level is to determine the real risk of the facilities identified. This can generally be accomplished by determining how the facility is complying with best management practices that pertain to their specific activities (see below).

How is the susceptibility of a drinking water supply to a contaminant source accomplished?

The susceptibility of a drinking water supply to contamination, or the likelihood that a drinking water supply will become contaminated, is based on two general factors: the presence of potential contaminant source and how it is operated, and the sensitivity of the drinking water source at that specific land use activity.

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Drinking water supply suseptability — continued

As described above, the inventory of potential sources of contamination identifies facilities that could become contaminant sources, but does not evaluate the operations of these facilities. This evaluation is the responsibility of the community, with assistance from the appropriate regulating agency.

Determining the sensitivity of a surface water intake or the aquifer is a more difficult task, consisting of consideration of the role of the natural environment, e.g., steep slopes, ease of soil erosion, soil permeability, depth to the aquifer, and any other factors that might influence the ability of a contaminant at the surface to move to a surface water body or the aquifer, e.g., proximity to the stream, faulty well construction, and excessive irrigation.

The natural environment generally lies beyond the control of the community or water system and the best method to minimize the potential impact of that environment is through the implementation of management of activities identified at the surface. The other factors, however, can be controlled by the community, e.g., repairing the well construction, to reduce the risk of contamination.

Maps were provided in the Source Water Assessment Report showing how the sensitivity varies spatially within the DWPA (see maps above). Overlaying the results of the inventory and sensitivity analysis gives an indication of how susceptible the water system is to an individual potential contaminant source and allows the water system and community to better plan its management strategies.

What has been learned from the Source Water Assessments?

Both public water systems and the respective agencies of DEQ and DHS have benefited from the information provided in the assessments. Water systems have a much better understanding of how their drinking water sources operate and how to protect them. The agencies are in a better position to respond to emergencies, to integrate drinking water issues in other programs, and better prepare for the implementation of future rules. Specific examples are given below:

- Water systems now know the surface area that contributes to their drinking water source.
- Water systems have been provided with information regarding where their drinking water source is most susceptible to contamination.
- Local officials have site specific information upon which to base land use decisions.
- The five highest potential risks in sensitive areas within watersheds are harvested forests, roads at stream crossings, irrigated crops, grazing animals where there are more than five large animals per acre, and above ground tanks (see Figure 3 for the top 10 PCSs).
- The five highest potential risks within sensitive areas of the DWPA for groundwater systems are high density housing where there is greater than one residence per half acre, heavy use highways, large capacity septic systems, above ground tanks, and sewer lines (See Figure 4 for the top 10 PCSs).
- Surface water watersheds often include multiple public water systems.
- Surface water watersheds contain many different stakeholders.
- Watershed headwaters for many water systems are in forested land.
- Sensitive areas cover a significant portion of the watershed.
- Approximately 24% of groundwater-based community water systems do not have a well report for at least one of their sources.
- Approximately 35% of groundwater-based community water systems are judged to have an inadequate well construction, primarily associated with the casing seal *(see next page)*.

- Approximately 376 groundwater-based community water systems have at least one source-related characteristic that results in the source being judged highly sensitive.
- Many systems use shallow unconfined aquifers as their source of drinking water.
- Approximately 22% of groundwater-based community water systems derive their drinking water from a depth of less than 50 feet.

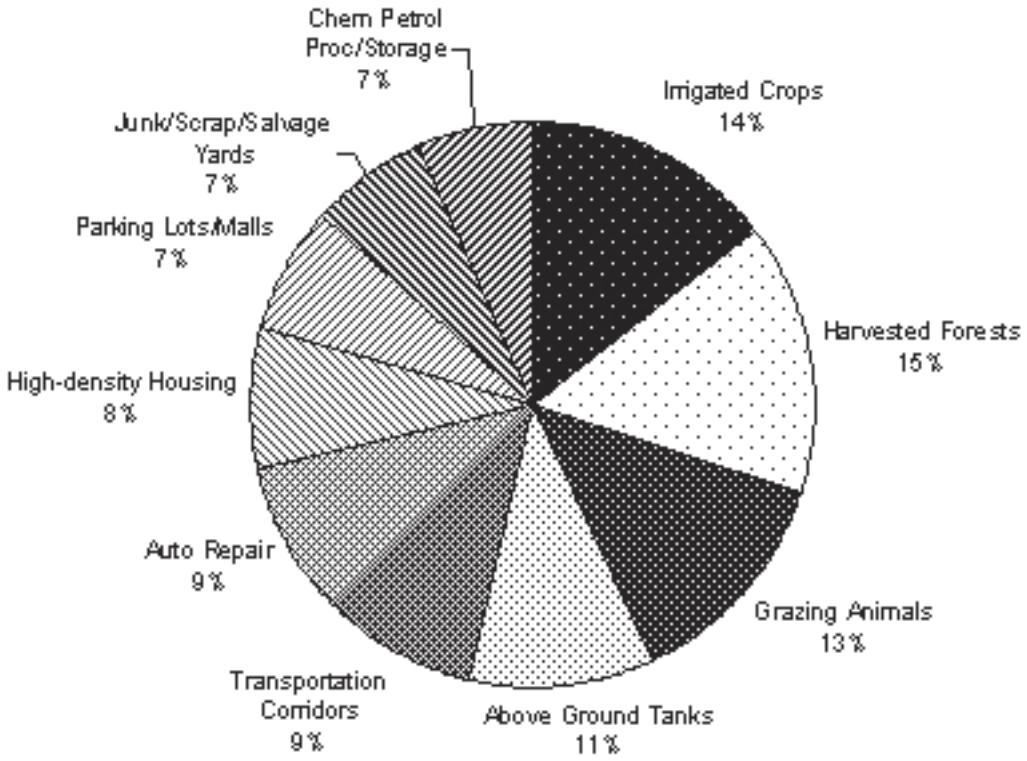

Figure 3. Relative abundances of the top 10 potential contaminant sources identified in the sensitive areas of subwatersheds supplying public water systems. PCSs were identified in 130 separate categories; and a total of 5574 PCSs were located. The top 10 PCSs above accounted for 1514 of those PCSs. Percentages represent relative abundances within this latter group.

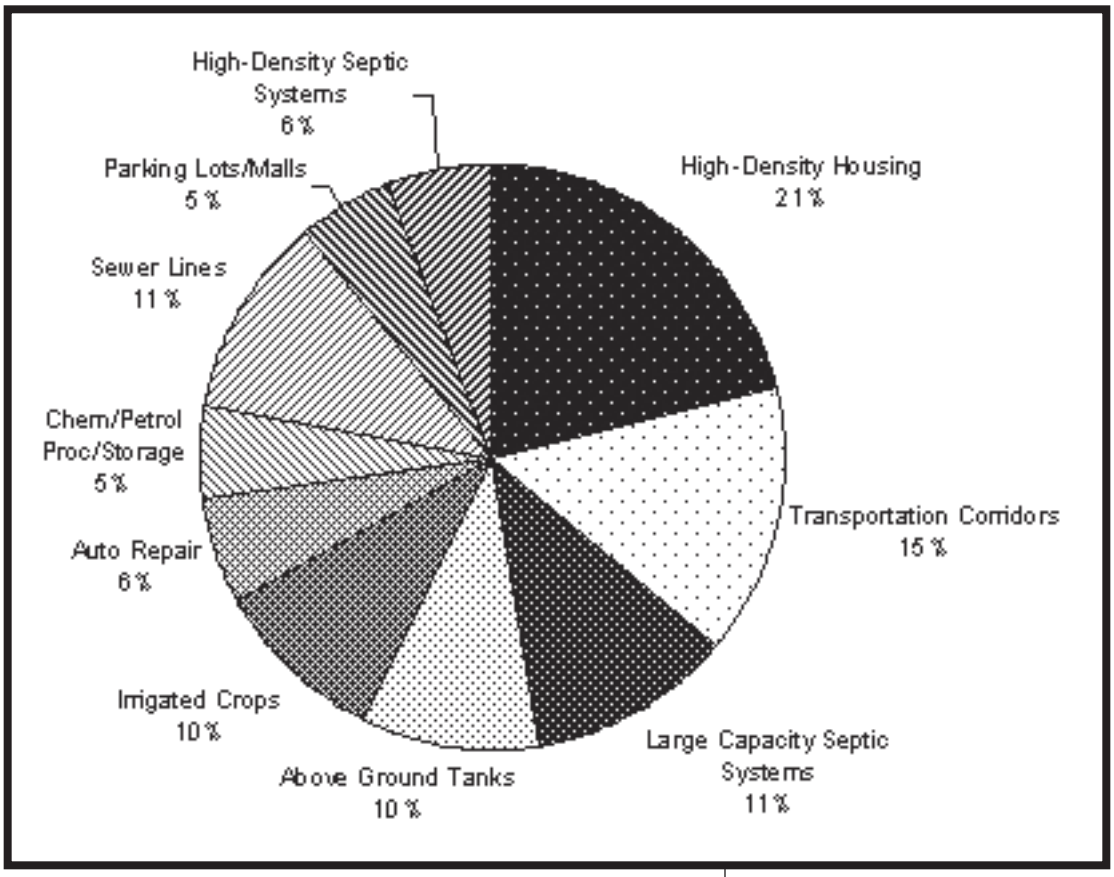

Figure 4. Relative abundances of the top 10 potential contaminant sources identified in the sensitive areas of recharge areas supplying groundwater-based public water systems. PCSs were identified in 133 separate categories; and a total of 6693 PCSs were located. The top 10 PCSs above accounted for 2583 of those PCSs. Percentages represent relative abundances within this latter group.

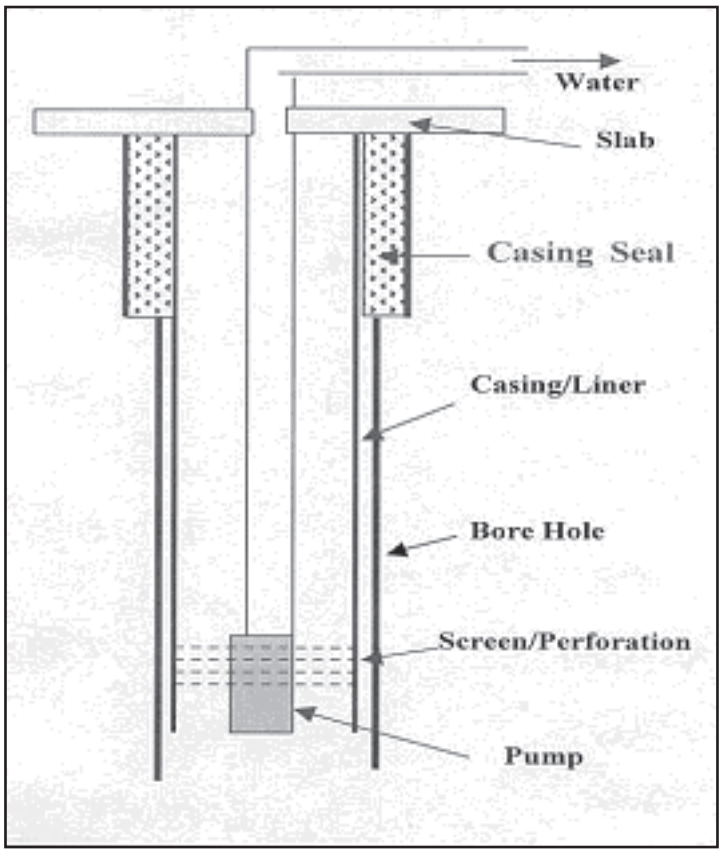

Figure 5. Diagram showing the relation of the casing seal to other well components. The casing seal fills the annular space between the casing and the hole with the depth controlled by local geologic conditions. Cement or bentonite are used as sealants and are designed to bond with the local formation to prevent shallow water, that is potentially contaminated, from migrating down the casing to the aquifer. Typical examples of inadequate casing seals include: too small of annular space, insufficient sealant to fill annular space, incorrect sealant material, e.g., drill cuttings, incorrect method of seal emplacement, and inadequate depth to isolate or protect the aquifer.

Drinking water protection: Is it required?

It's not the law, but it is a good idea. States were required to conduct Source Water Assessments and provide water systems or communities with the results of those studies. The results include a more detailed analysis of where the water is coming from and what are the risks to it. This information is designed to provide the basis of the development of a drinking water protection plan at the community or water system level.

The decision by a community or water system to develop a drinking water protection plan, however, remains voluntary in Oregon. This was a decision made by the Oregon State Legislature and there is no indication that this will change in the future. Some of the more obvious benefits for developing drinking water protection strategies include:

- Promotes long-term public health within the community.
- Facilitates better community planning.
- Protection is cost effective. It is very expensive to treat or replace sources of drinking water.
- Enhances economic health for the community. Property values have plummeted where contamination has occurred.
- Increases public understanding of, and the responsibility to protect drinking water sources.
- May lead to a monitoring waiver for the VOCs and SOCs (once every six years instead of once every three years)
- Additionally, it is likely that the USEPA will be looking for ways to "reward" those systems that have developed a plan to protect their resource in future regulations.

Drinking Water Protection: Why should we do it, we've never had a contaminant detection in all of our years of monitoring?

It's important to realize that monitoring, although an important indicator of water quality, only tells us what the condition of the water is now. Monitoring results have no ability to predict what will happen in the future. And, there are Oregon examples of public water systems having a history of nondetections suddenly finding themselves dealing with a contaminant. This is more common for coliform and nitrate, but has happened with respect to organic contaminants as well.

The only action that a water system can do that will have an effect in the future is prevention. Taking steps now to minimize the risk to a water system's source of drinking water will help provide a long-term safe drinking water source. More information regarding protection activities is provided below.

How do we develop drinking water protection strategies?

Each community or water system is unique, however there is a general process that all should try to follow. That process is shown schematically below and involves using the Source Water Assessment to identify risks to the drinking water source, convening a stakeholders group that represents the diverse interests within the Drinking Water Protection Area, and identifying the most useful best management practices that best fit the community's situation. At any point in this process, the water system or community can seek assistance from DEQ, DHS, OAWU, or other private organizations.

The Source Water Assessment Report is the basis from which drinking water protection strategies are developed. The report identifies the Drinking Water Protection Area, the sensitive zones, and the distribution of potential contaminant sources (PCSs) within that area. The report also discusses

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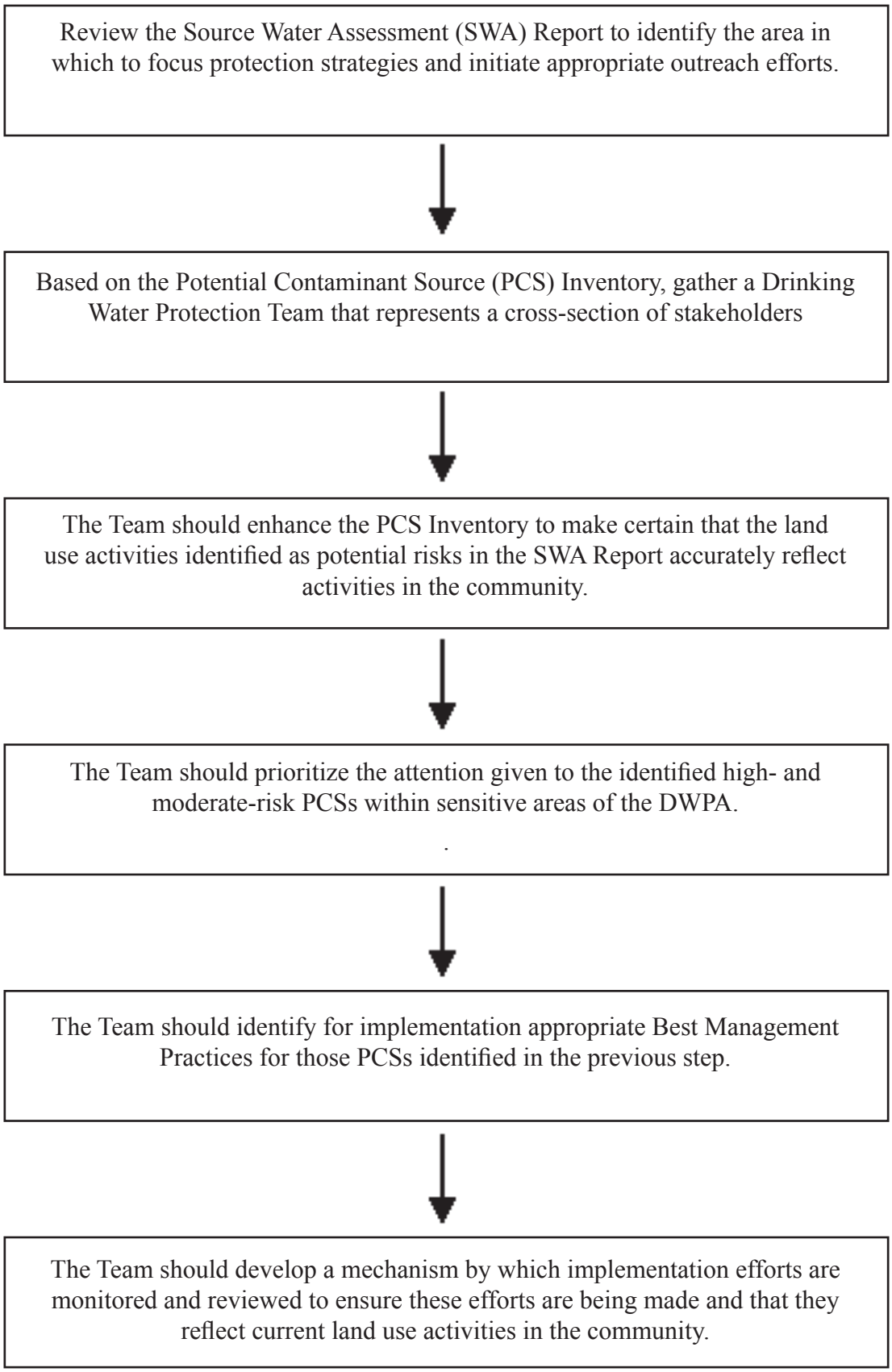
Drinking water protection strategies



Developing drinking water protection strategies — continued

the susceptibility, or the relative risk, that each PCS poses to the water system. As such, the report supplies the tools that allow water systems to identify and prioritize actions to minimize the threats to water quality.

The key to successful implementation of drinking water protection strategies is public involvement. This can best be done by assembling a Drinking Water Protection Team consisting of individuals that represent the various interests in the community, e.g., residents, industry, commercial and agriculture. The PCS inventory will identify the general categories of PCSs that are within the Drinking Water Protection Area from which to seek membership on the Team. Strategies that are developed in a vacuum, or without input from those that might be affected by the strategies, will likely fail. For more discussion on assembling a Team, see below.

The assembled Team should first of all address whether the PCS inventory, which was general in nature, accurately reflects land use activity within the Drinking Water Protection Area. The inventory may have missed some existing or historical landuses. Some of the identified PCSs may no longer be operating and perhaps some new ones have come on line. Some of the identified PCSs may already be taking steps to minimize the risk they pose to water quality. Activities that have been identified in the PCS inventory may have a permit to discharge waste. If so, these facilities are already operating in a minimal risk manner. The Team may choose to add new representatives to the Team at this time.

The Team should establish a priority with respect to what land use activities they will work with; hopefully, these activities will be represented on the Team. High and moderate risk PCSs within sensitive areas should received the highest priority. The Team may also want to use proximity to the well, spring or intake as a prioritization tool. Low risk PCSs and those facilities with current discharge permits have the lowest priority and the Team may choose not to work with those facilities at this time.

At this point, the Team should begin to identify potential Best Management Practices that might be employed to minimize risks. Considerable information is available (see discussion below) with respect to activity-specific BMPs. Remember that public education, personal responsibility and cooperation are the most effective tools, as is acknowledging the good works already being accomplished.

Finally, the best BMPs are those that are implemented. The Team should develop a process, perhaps an annual review, to ensure that the identified strategies have been put in place and have become part of the routine operational practices at the identified facility or land use.

How do we identify stakeholders and get the public involved?

Drinking Water Protection Plans developed without input from the public or from those facilities most likely to be affected have little hope of being widely accepted. The problem experienced by many communities, however, is getting the public and stakeholders to the table to help build the plan in the first place. Listed below are some suggested ways to stimulate the involvement that you need.

- Provide for an effective outreach program. Translate the issue into simple and concise language. Use the media if available, offer to present at local civic groups, send out flyers, etc., to get the message out that drinking water protection is important and the development of a drinking water protection plan will be done.
- Use the Potential Contaminant Source Inventory to identify categories of land use that will be addressed in the Plan. Identify potential stakeholders from that list. If there is a local business organization they may be helpful.
- Use local knowledge to help select potential committee members, e.g., extension

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Developing drinking water protection strategies — continued

agent, City Council members, Chamber of Commerce, Schools, etc. These individuals may be able to suggest potential committee members based on their interest in drinking water and/or the category of land use with which they are associated.

- Solicit applications from the general public through the media, flyers, posters, or other mechanism available to the Community. Emphasize that you are looking for individuals interested in the Community as well as drinking water.
- Be prepared to provide people with an understanding of the commitment of being on the Committee. For most communities, Committees have met over a period of six months with meetings every four to six weeks. Subcommittees may meet outside of the full Committee meetings.

We want to develop drinking water protection strategies but have no idea how to manage activities in the Drinking Water Protection Area.

This is a common concern expressed by communities and water systems. They want to develop a Drinking Water Protection Plan, but don't know where to start when it comes to designing management strategies. They want to know what they can do that will have a positive effect on lowering the risk to their drinking water supply. It is important to recall that communities will make these decisions through a local committee that represents stakeholders in the area. A good place to start is a review of "Oregon Wellhead Protection's Top Dozen List" of general management tools in the Oregon Wellhead Protection Program Guidance Manual *(www.deq.state.or.us/wq/dwp/dwphome.htm* and click on Wellhead (Groundwater) Protection Guidance Manual).

To effectively promote and accomplish drinking water protection, it is important that public water system operators and local community officials become more actively engaged in land management issues in their source areas. One of the values of the source water assessment is that it provides a water system with a discrete area in which to focus protection. The agencies will share this information with counties and communities so that they can take action to minimize risks in these areas.

The community or water system should begin by conducting public outreach to inform all those facilities that operate within the area and the people who live within the area, that they are directly over the aquifer or in a sensitive area of a watershed, they need to understand that what they do at the surface could impact their drinking water quality. The next step is to prioritize which facilities water systems may want to spend some extra time with in terms of helping them reduce the risk they may pose to drinking water.

This can be done by reviewing the discussion of susceptibility and the respective Tables relating potential contaminant sources to sensitive areas in the Source Water Assessment Report. The facilities whose risk is rated as moderate to high and whose locations are in moderate to highly sensitive areas should be addressed first. Areas with the Drinking Water Protection Area that are considered to have low susceptibility can be screened out at this time, as can low-risk facilities throughout the drinking water protection area.

Further, communities and water systems should not be as concerned with facilities operating under a permit issued by the Department of Environmental Quality. These facilities are already operating in a manner that is protective of the environment. Communities and water systems can determine which facilities are permitted within their Drinking Water Protection Areas by logging on to the DEQ's website (*www.deq.state.or.us*), clicking on the "Databases" link at the bottom of the page and then scrolling down to the link "Facility Profiler". When this link is pressed, the Facility Profiler page comes up and allows the viewer to enter a street address or latitude/longitude. The community or water system can then choose an appropriate radius and the profiler will list all permitted facilities within that area. Additional information is available for, or about, each facility by following the appropriate links.

Once the facilities that the community wants to address have been identified, the committee may begin to identify appropriate "Best Management Practices" (BMPs) associated with the individual facilities. The term BMPs is used to identify any practice that results in waste reduction or that is a prevention activity. Some BMPs are general in nature, applying to a wide range of facilities or activities, while others are specific to the activity. BMPs for the land use categories Commercial/ Industrial, Agricultural, Residential, Municipal and Miscellaneous are provided for water systems at *www.deq.state.or.us/wq/dwp/dwphome.htm* (select the link Potential "Management" Options by Land Use).

The Committee developing the Drinking Water Protection Plan for the community or water system should review these BMPs and select those that seem most applicable to their situation. The BMPs selected can be refined by direct discussions with the facilities involved. Often, education is the most important tool. Remember that each of the BMPs and general management strategies provided result in a *reduction of risk to the drinking water source* and therefore adds a measure of drinking water protection that was not there before.

How will the Source Water Assessments be used in land use planning?

Increasingly, communities are confronted with having to make difficult, often contentious, decisions regarding potentially competing land use practices – often with a minimum of available data. This has often been the case when trying to balance current and future drinking water needs with the needs associated with community growth. Typically, the relationship between land use activities and drinking water quality are poorly understood with the only readily available information regarding a water system being the location of the well or intake. Paradoxically, the long-term viability of the community is critically dependent on a quality drinking water source. Source Water Assessments provide information that can help communities make informed land use decisions.

With the knowledge of where the drinking water comes from, deciding upon specific site locations for land use activities from the perspective of drinking water quality will be much easier. For example, if a proposed activity has raised concern among the public regarding the potential impact on drinking water, a review of where the proposed site is located with respect to the DWPA may be helpful. If the proposed site is outside the DWPA then the potential for impact on the communities drinking water is low. On the other hand, if the site falls within the DWPA, the susceptibility analysis from the Source Water Assessment may help local planners decide on appropriate management practices at the facility to minimize the risk of water quality impact.

GIS-based maps of watersheds for public water systems using surface water are on the web at *http://www.deq.state.or.us/wq/dwp/SWACompleteSW.asp.* A similar data layer will soon be available for all recharge areas for the wells and springs that supply public water systems. The combined GIS data will be available for incorporation into land use planning, designation of special areas, etc., at the local or county level. Counties and Cities will be able to directly overlay the identified DWPA(s) on other planning information available to them. Feedback thus far indicates that staff and officials at the local level will be able to make more informed decisions regarding planning questions as a result.

Areas where the assessment information might be most useful include locating future facilities or developments, issues related to chemical usage, contaminant cleanup, the placement of dry wells, and locating a new drinking water source. Of greater and longer-term importance is the benefit of a better understanding where a community's drinking water comes from.

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Using the Source Water Assessments in land use planning — continued

Now that the Source Water Assessments have been completed what are the agencies plans for implementation?

Both the DEQ and DHS want to move the Source Water Assessment Reports from the shelf to being used to develop management strategies. Although there will be significant coordination between the two agencies, it is likely that, at least in the near future, the two agencies will continue with the existing split of responsibilities between surface water sources (DEQ) and groundwater sources (DHS). Assistance that will be available to communities will include:

- Direct process-oriented assistance to communities: early involvement of community leaders in strategy development, community workshops, assisting in increasing public participation, assembling local stakeholder teams, assist in the operation of meetings and provide examples and guidance associated with strategy development.
- Providing technical assistance for selecting and implementing protection activities.
- Coordination of drinking water protection with other agencies, e.g., DLCD, ODF, ODA, ODOT, and programs.
- Technical support for individual drinking water protection area maps using statewide GIS coverage.
- Updating drinking water protection guidance and fact sheets to better meet local community concerns.
- Encouraging community applications to the Drinking Water Protection Loan Fund to develop and implement protection strategies.
- Integrating the local assessment information into other water quality efforts, e.g., TMDLs, water quality management plans, salmon recovery, etc. and addressing potential future rule requirements, e.g. viral susceptibility through the Groundwater Rule.
- Conducting assessments for water systems that have come into being since the Source Water Assessment Program began in 1999.
- Modifying source water assessment results to include new drinking water sources, operational changes and resulting additions/ deletions to the local inventory.

If I am interested in developing drinking water protection strategy(ies) what should I do?

Drinking Water Protection is already at work in Oregon. At present, the following Oregon communities and districts are developing and implementing plans to protect their drinking water source areas: Eugene, Bandon, Portland, Gresham, Fairview, Salem, Springfield, Rainbow WD, Sutherlin, Cave Junction, Port Orford, Albany, Lebanon, Maupin, Halfway, Mollala, Oak Grove, Crystal Springs, Powell Valley Road WD, Sweet Home, Avion (Bend), Medford, Canby, Coburg, Bend, Scappoose, Junction City, Veneta, Wheeler, Hubbard, and the Clackamas River providers. Some of these communities were working on protection of their source waters many years before the Source Water Assessments were mandated.

Any water system or community interested in the potential of developing drinking water protection strategies should contact the respective coordinators for the agencies. Those systems using surface water sources should contact Sheree Stewart (DEQ) at 503-229-5413 or STEWART.Sheree@deq.state.or.us. Groundwater-based water systems should contact Dennis Nelson (DHS) at 541-726-2587 x21 or dennis.o.nelson@state.or.us.

**Oregon's Drinking Water Protection Team Department of Human Services — Dennis Nelson, Tom Pattee, Karen Kelley, Amy Parmenter, and Chris Hughes, Technical Services Manager*

Department of Environmental Quality — Sheree Stewart, Julie Harvey, Sue Gries, Steve Aalbers, and Mark Cullington, Groundwater/Drinking Water Protection Manager

Contract counties are responsible for all community water systems with groundwater sources serving less than 3,300 people as well as all nontransient noncommunity and transient noncomunnity water systems. Operators and managers of these systems should call their countyhealth department first for assistance with drinking water issues. State staff are responsible for all community water systems using surface water sources and those community systems serving 3,300 or more people. In those counties without a local health department contact please call the state program at (971)673-0405.

Contract counties

The Drinking Water Program contracts with the following counties to perform much of the program work at the local level.

Benton	Dan Moreno	(541)766-6677
	Email: daniel.moreno@co.benton.or.us	
Clackamas	Steve Dahl/Gregg Baird	(503)655-8386
	Email: steved@co.clackamas.or.us	
Clatsop	Hal Nauman	(503)338-3600
	Email: hnauman@co.clatsop.or.us	
Columbia	Mark Edington	(503)366-3828
	Email: medington@chdpublichealth.com	
Coos	Rick Hallmark/Lilo Kirn	(541)756-2020
	Email: rhallmark@co.coos.or.us	
Crook	Russell Hanson	(541)447-8155
	Email: russ.hanson@co.crook.or.us	
Curry	Mike Meszaros	(541)247-3254
	Email: meszarosm@co.curry.or.us	
Deschutes	Jeff Freund	(541)388-6563
	Email: jeff_freund@co.deschutes.or.us	
Douglas	Gerry Meyer/Dave Bussen	(541)464-3820
	Email: gvmeyer@co.douglas.or.us	
Hood River	Darryl Barton	(541)387-7130
	Email: darryl.barton@co.hood-river.or.us	
Jackson	John Manwaring/G. Stevens	(541)774-7825
	Email: manwarjs@jacksoncounty.org	
Jefferson	Susan Fuller/Diane Sayl	(541)475-4456
	Email: susan.fuller@co.jefferson.or.us	
Josephine	Sylvia Mireles	(541)474-5334
	Email: smireles@co.josephine.or.us	
Klamath	Delbert Bell/Susan Burch	(541)883-1122
	Email: sburch@co.klamath.or.us	
Lincoln	Amy Chapman/EricChristensen	(541)265-4127
	Email: achapman@co.lincoln.or.us	
Linn	John McEvoy/RickPartipilo	541)967-3821
	Email: jmcevoy@co.linn.or.us	
Malheur/Baker	Brian Wickert	(541)473-5186
	Email: bwickert@malheurco.org	
Marion	Rick Sherman	(503)588-5387
	Email: rsherman@co.marion.or.us	
Multnomah	Gerald Barnes	(503)988-3400
	Email: gerald.a.barnes@co.multnomah	
Polk	Jim Solvedt	(503)623-9237
	Email: solvedt.jim@co.polk.or.us	
Tillamook	Annette Pampush	(503)842-3902
	Email: apampush@co.tillamook.or.us	
Wasco/Sherman	John Zalaznik/Glenn Pierce	(541)506-2622
	Email: johnz@co.wasco.or.us	
Washington	Joseph Federico	(503)846-8722
	Email:joseph_federico@co.washington.or.us	
Yamhill	Gary VanDerVeen	(503)434-7439
	Email: derveeng@co.yamhill.or.us	
Dept. of Ag	Ellen Laymon	(503)986-4720
	Email: elaymon@oda.state.or.us	

Drinking Water Program Web site: *170.104.158.16* **or** *www.oregon.gov/DHS/ph/dwp*

Other numbers:

Well Logs *www.wrd.state.or.us/groundwater/gridweb*
PNWS/AWWA (503)655-4075 Judy Grycko, Exec. Dir.
OAWU (503)873-8353 Jason Green, Executive Director

State program

Technical staff members are frequently in the field assisting water systems. Each day one staff member serves as *phone duty person* in the Portland office and is available to answer questions at (971)673-0405. Please make use of this person unless you feel you must speak with a specific staff member.

General Inquiries	(971)673-0405
Portland office fax	(971)673-0457
Drinking Water Administration:	
Dave Leland, Program Manager	(971)673-0415
Diane Weis	(971)673-0427
Technical Services:	
Chris Hughes, Manager	(971)673-0411
Tom Charbonneau, Plan Review	(971)673-0406
Kari Salis, Lead Region 1	(971)673-0423
Evan Hofeld	(971)673-0410
Debra Lambeth	(971)673-0414
Dewey Darold	(971)673-0407
Pete Farrelly	(971)673-0462
John Odisio	(971)673-0418
Marsha Fox	(971)673-0408
John Potts, Lead Region 2 (Corvallis)	(541)757-4281
Scott Curry (Medford)	(541)776-6229 x284
Springfield office fax	(541)726-2596
Springfield office	(541)726-2587
Dennis Nelson, Ground Water	ext. 21
Vacant, Lead Region 3	ext. 25
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Karen Kelley	ext. 22
Kylee Godfrey	ext. 23
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Pendleton office	(541)276-8006
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Bill Goss	ext. 354
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John Fling	(971)673-0420
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Vacant	(971)673-0428
Vacant	(971)673-0463
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Vacant	(971)673-0461
Annette Hunt	(971)673-041
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Ron Hall, Manager	(971)673-0409
Kurt Putnam, Lead	(971)673-0421
Shane Phelps	(971)673-0419
Roberto Reyes-Colon	(971)673-0422
Tom Mitchell	(971)673-0417
Kate Mattimore	(971)673-1220
Deb Weatherford	(971)673-0426
Lee Keyes	(971)673-0413
Lab certification, Public Health Lab, Portland:	
Dr. Irene Ronning, Coordinator	(503)229-5505

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