Drinking Water Source Protection

Strategies and Success Stories

Adapted from OHA-DWS's Drinking Water Protection Bulletins, 2006-2008

Updated 2024

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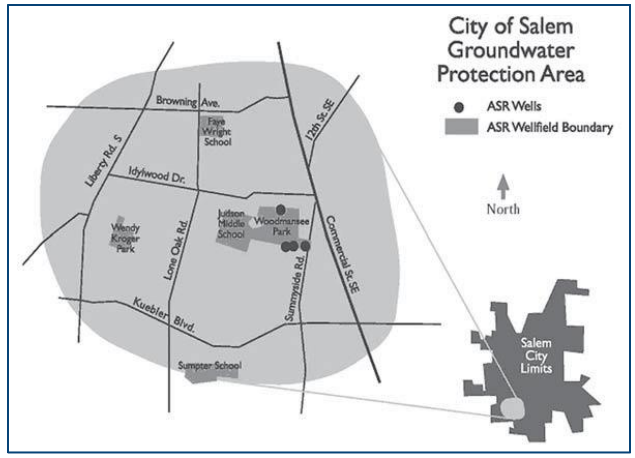
https://www.oregon.gov/deq/wq/dwp/Pages/default.aspx

Salem educates underground storage tank owners

(Adapted from the article in OHA-DWS’s Drinking Water Protection Bulletin, Fall 2006)

The City of Salem’s Public Works Department collaborated with DEQ’s Western Region Tanks Program to reduce risks to their drinking water in the south Salem Drinking Water Source Area of their aquifer storage and recovery (ASR) program.



Compliance inspections were conducted jointly at each regulated underground storage tank (UST) facility located within the drinking water source area. The city recognized that USTs were already regulated by DEQ. However, the joint inspection program increased awareness of the importance to protect the city’s drinking water aquifer by delivering brochures and packets supplied by the city to each facility owner, and it ensured that possible leaks from regulated USTs would be detected, remedied and, to the greatest extent possible, prevented.

This project, along with other protection activities, raised awareness about the steps that the public and businesses can take to protect drinking water. Other activities included installing signs at the boundaries of the ASR and producing a magnet with a drinking water information phone number, a video, and a brochure.

Protection strategies for auto-related shops

(Adapted from the article in OHA-DWS's Drinking Water Protection Bulletin, Fall 2006)

Auto-related shops are considered high-risk potential* contaminant sources to drinking water in Oregon. But there are many things you and your community can do to protect your drinking water from these risks.

What: Automotive/fleet/trucking/equipment repair, maintenance, and servicing shops

Rank: Ninth most threatening potential contaminant source* identified statewide in drinking water source areas (based on number in sensitive areas).

Why are auto-related shops a risk? Spills, leaks, and improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact your drinking water supply.

Are these potential contaminant sources in my drinking water source area? Check your Source Water Assessment or contact DWS.

What can you do? See Drinking Water Protection Strategies for Commercial & Industrial Land Uses[1] for comprehensive information. Specific strategies include the following:

- Contact owners and operators through individual emails, letters, or one-on-one contact and encourage use of best management practices. Distribute the Vehicle Maintenance and Washing[2] fact sheet.
- Provide technical assistance to individual businesses to evaluate wastewater handling, stormwater discharges, and hazardous materials handling and storage. See DEQ's Toxic Reduction and Safer Alternatives web page[3] for useful information. EcoBiz[4] can provide free technical assistance, facilitate employee training, and provide recognition for businesses that reduce environmental impacts.

**It is important to remember that the land uses discussed are only potential sources of contamination to the drinking water. Water quality impacts are not* *likely to occur when contaminants are properly used and managed and contaminant releases are minimized.*

[1] https://www.oregon.gov/deq/FilterDocs/DWPStrategiesComInd.pdf

[2] https://www.epa.gov/system/files/documents/2023-01/bmp-vehicle-maintenance-and-washing.pdf

[3] https://www.oregon.gov/deq/hazards-and-cleanup/toxicreduction/pages/default.aspx

[4] https://ecobiz.org/

The City of Cave Junction takes steps to protect its drinking water

(Adapted from the article in OHA-DWS's Drinking Water Protection Bulletin, Summer 2007)

Cave Junction is a community of approximately 1,600 residents (in 2007) in the Illinois Valley of south central Josephine County. The city uses both groundwater (Daisy Hill Well) and surface water (an intake on the East Fork of the Illinois River) as sources of drinking water. The city expressed an interest in protecting these water supplies early in the Source Water Assessment process during the early 2000s.

There are no state or federal regulations requiring communities to protect its drinking water, so Cave Junction decided to take steps of its own to address the issue. The city decided to develop a local regulatory framework to protect its drinking water, one of the many tools available to Oregon communities. In July 2004 Cave Junction, with the assistance of the Oregon Association of Water Utilities (OAWU), used the Source Water Assessment Report provided by OHA-DWS and DEQ to develop a drinking water protection plan[1] that comprised both groundwater and surface water components.

Cave Junction's groundwater protection plan was developed to "protect the public water supply in the City of Cave Junction and to those it serves from land uses which pose a threat to the quality (and/or quantity) of the ground water being extracted from the wells." The city used the delineation of the drinking water source area to identify Drinking Water Critical Impact Zones 1 and 2. These zones, associated with the Daisy Hill Well, correspond to the 1- and 2-year time-of-travel zones identified during the source water assessment (see Figure 1 below).

Within Zones 1 and 2, the city encourages certain types of land uses, such as parks and greenways, and prohibits others, for example, auto repair shops, gas stations, dry cleaners, irrigated nurseries, high-density (less than one unit/acre) housing, septic systems, dry wells, and others. The plan also recognizes Zones 3 and 4, which correspond to the 2- and 5-year and 5- and 10-year time-of-travel, respectively (refer to Figure 1). All uses are permitted within these zones provided they meet performance standards specified within the plan, such as secondary containment associated with chemical storage and use, double-walled underground tanks and pipes, and properly abandoned unused wells, etc.

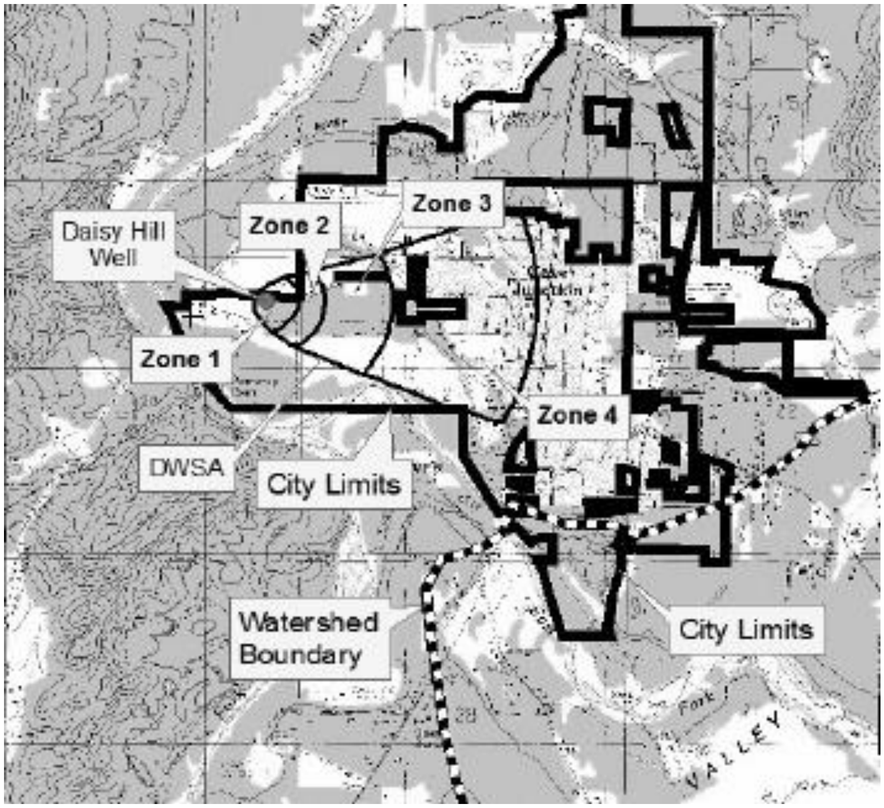


Figure 1. The Drinking Water Protection Area for the city of Cave Junction's Daisy Hill Well. Boundaries are marked for the 1-, 2-, 5- and 10-year time-of-travel for groundwater to move through the aquifer to the well. Also shown are the city limits and the watershed boundary near the city's intake.

The city also has adopted surface water protection regulations to protect the sub-watershed area supplying the city's intake on the East Fork of the Illinois River. These regulations apply only to that part of the watershed that lies within the city limits of Cave Junction and, therefore, fall under the city's jurisdiction. The stated purpose of these regulations is to protect "existing or potential public water supplies from the effects of point and non-point pollution or sedimentation."

As with the groundwater protection area, the city has established use regulations, and has also developed specific review criteria for development within the designated drinking water protection area (see Figure 1).

Within the drinking water protection area, certain land uses are prohibited, including storage, production, treatment or disposal of hazardous materials, dry cleaners, automobile service stations, disposal of septage or septic sludge, and others. The city also requires an impact study to be performed or reviewed by a registered professional engineer for any new application for a building permit, zoning amendment, or subdivision of land. This study must be submitted to the city for review. The city will review the application to ensure that steps have or will be taken to reduce the risk to water quality. Importantly, spill reporting and recovery plans are required.

The city also has established a 200-foot buffer zone along any public water-supply rivers and tributary streams that must be protected. Within the buffer zone, the natural state, with respect to vegetative cover and topography, must be maintained. Land uses such as septic tanks and drainfields, feed lots, fuel storage over 50 gallons, sanitary landfills, and others are prohibited within the buffer strip and within 50 feet of the buffer strip.

The city also has developed a subdivision ordinance that is directed at waste disposal and stormwater runoff. Specifically, no septic systems or dry wells are permitted.

Through these locally developed regulations, the city has taken extraordinary steps to protect its valuable drinking water resources. These steps significantly reduce the risk of contamination of the city's drinking water supply and help preserve this resource for the future.

If your community is interested in developing a drinking water protection plan, see DEQ's Protecting Your Source web page[2] for comprehensive information. Assistance in interpreting your city's Source Water Assessment Report, developing your protection strategies, and designing a plan that meets your city's specific needs can be found by contacting OHA-DWS or DEQ (see contacts on cover page).

[1] https://www.cavejunctionoregon.us/water-treatment/page/drinking-water-protection-plan

[2] https://www.oregon.gov/deq/wq/dwp/Pages/DWP-Source.aspx

Protection strategies for abandoned wells

(Adapted from the article in OHA-DWS's Drinking Water Protection Bulletin, Summer 2007)

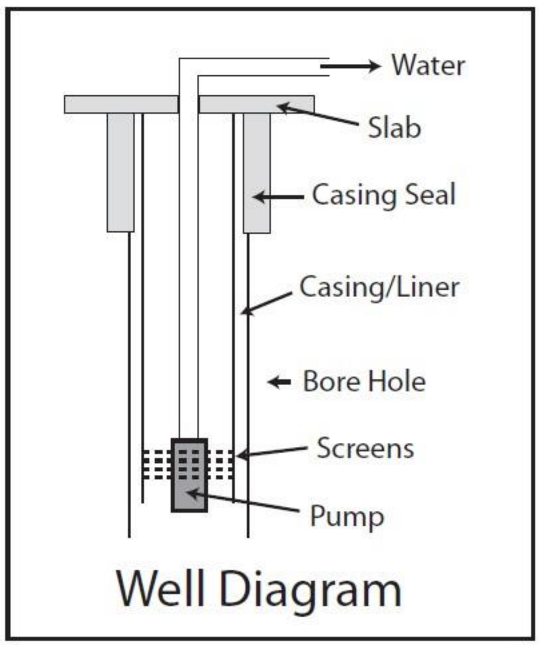
Abandoned wells are relatively common potential* contaminant sources to drinking water in Oregon. But there are many things you and your community can do to protect your drinking water from these risks.

What: Wells that are no longer in use or are poorly constructed and have not been properly abandoned.

Why are abandoned wells a risk? If the well was poorly constructed, the casing seal (see well diagram below) may allow shallow potentially contaminated groundwater to move down the outside walls of the casing and gain access to the water system's aquifer. For information about well construction and water well abandonment, see:

- What to Do About Old, Unused Water Wells[1]
- Oregon Water Resources Department[2]
- OHA Oregon's Domestic Well Safety Program[3]

Are these potential contaminant sources in my drinking water source area? Check your Source Water Assessment Report and contact OHA-DWS, or search for your well log on the Oregon Water Resources Department's web page[4].



What can we do? The Oregon Water Resources Department has rules requiring temporary or permanent abandonment of water supply wells that are not in use. Temporary abandonment involves capping the well, and permanent abandonment involves filling the well with cement or other approved sealant. You can encourage well owners to follow these procedures in several ways:

- Contact the owners of older homes or known wells and inform them that their wells could serve as a conduit for contaminants to move into the community's drinking water source. Distribute fact sheets and discuss storage or application of chemicals near the well. If the home is served by the water system, mention that the well must be isolated from the house's drinking water supply to prevent a potential backflow event.

- Subsidize well abandonment (approximately $2,000 or more). Elsewhere, communities use the following sources of funding:
    - Increase in the water-use fee to offset abandonment costs
    - Drinking Water State Revolving Fund[5]: Oregon offers both low-interest loans and grants.
    - Oregon Water Resources Department's Water Well Abandonment, Repair, and Replacement Fund[6]
    - Community Development Block Grants
    - General obligation bonds
    - Tax incentives.

**It is important to remember that the land uses discussed are only potential sources of contamination to the drinking water. Water quality impacts are not likely to occur when contaminants are properly used and managed and erosion and contaminant releases are minimized.*

[1] https://wellowner.org/resources/water-well-maintenance/old-unused-wells/

[2] https://www.oregon.gov/owrd/pages/index.aspx

[3] https://www.oregon.gov/oha/PH/HealthyEnvironments/DrinkingWater /SourceWater/DomesticWellSafety/Pages/index.aspx

[4] https://apps.wrd.state.or.us/apps/gw/well_log/Default.aspx

[5] www.healthoregon.org/srf

[6] https://www.oregon.gov/owrd/programs/GWWL/WARRF/Pages/default.aspx

Legacy pesticide pickup: A direct reduction in risk

(Adapted from the article in OHA-DWS's Drinking Water Protection Bulletin, Summer 2007, by Amy Chinitz of the Springfield Utility Board.)

Hundreds of thousands of people depend on groundwater and surface water in the southern Willamette Valley for their drinking water. Protecting this precious resource requires us to identify risks and manage and reduce them accordingly. The hugely successful Agricultural Chemical Removal Project is an excellent example of this approach.

> *Through a unique partnership between farmers and city, county and state officials, a significant threat of pesticide contamination was eliminated.*

The process began with an OSU Extension Service survey of over 700 growers in the Upper Willamette Basin that found that thousands of gallons of obsolete agricultural chemicals remained on farms. Explanations for the continued presence of these chemicals included high disposal costs, lack of knowledge regarding how to handle the illegal chemicals, and the fact that commercial growers are not permitted to participate in household hazardous waste collection events. Recognizing the potential threat these farm chemicals posed, several agencies (Lane County Waste Management, Eugene Water and Electric Board, Springfield Utility Board, OSU Extension Service and the Oregon Department of Environmental Quality) teamed up to create a free, no-risk opportunity for growers to safely dispose of unwanted and obsolete farm chemicals. The Agricultural Chemical Removal Project was launched in the fall of 2006, with grant funding awarded to EWEB by the Oregon Governor's Fund for the Environment. A second collection event occurred during the spring of 2007.

Implementing this project involved a series of steps, from mailing questionnaires to hundreds of growers to conducting the actual collection events in Glenwood (located between Eugene and Springfield). Because many of the chemicals had been sitting in barns or sheds for decades, sometimes even pre-dating the current property owners, several growers needed assistance identifying and/or repackaging old chemicals. With help from McKenzie Fire and Rescue and the Eugene Fire Region 2 HazMat Team, the team visited farms to provide assistance and to ensure that the chemicals would be transported without spilling or leaking along the way. This often meant “overpacking” deteriorated drums or torn bags into larger and more stable containers.

Some of the assorted pesticides removed from farm storage during the legacy pesticide pickup. Note that the chemicals are packed in a drum for shipping.

Once the chemicals were safely packaged and inventoried, the growers delivered their chemicals to the Lane County Waste Management facility in Glenwood. A total of 126 growers disposed of 88,890 pounds of materials. The collected material included pesticides, fertilizers, waste oil and fuels, and other agricultural chemicals. Pesticides made up the largest portion (49,000 lbs) and included chemicals such as DDT, Aldrin, Chlordane, Dinoseb, Diazinon, Malathion, and others.

The success of the Agricultural Chemical Collection Project demonstrates that protecting an important resource takes teamwork. This project never could have happened without the effective collaboration among agencies and the willing participation by growers. Thanks to everyone involved, including other project partners such as OHA-Drinking Water Servies, the Southern Willamette Valley Groundwater Management Area, and the East Lane Soil and Water Conservation District.

Other legacy collection events in Oregon have yielded similar results. A collection event in the northern part of the Willamette Valley in January 2007 at Donald and in February 2006 at Mt. Angel invited farmers from Marion, Yamhill and Clackamas counties. They collected 34,000 pounds of waste pesticides (mostly legacy) from more than 80 growers.

Lane County Waste Management staff pack farm chemicals for safe transport.

Smart growth as part of your drinking water protection plan

(Adapted from the article in OHA-DWS's Drinking Water Protection Bulletin, Summer 2007)

Oregon's population is increasing and businesses want to relocate to the state. The state encourages new businesses and industry to move in. This means, potentially, development in areas that have been forested or undeveloped in the past and redevelopment in urban areas using existing infrastructure. Often, developments are proposed in areas that include public drinking water wells or surface water intakes. If developments are proposed in sensitive portions of your drinking water source area, there are tools you can use to encourage water quality protection.

By developing at higher densities within the watershed, ample open space or otherwise undeveloped land remains to perform critical watershed functions.

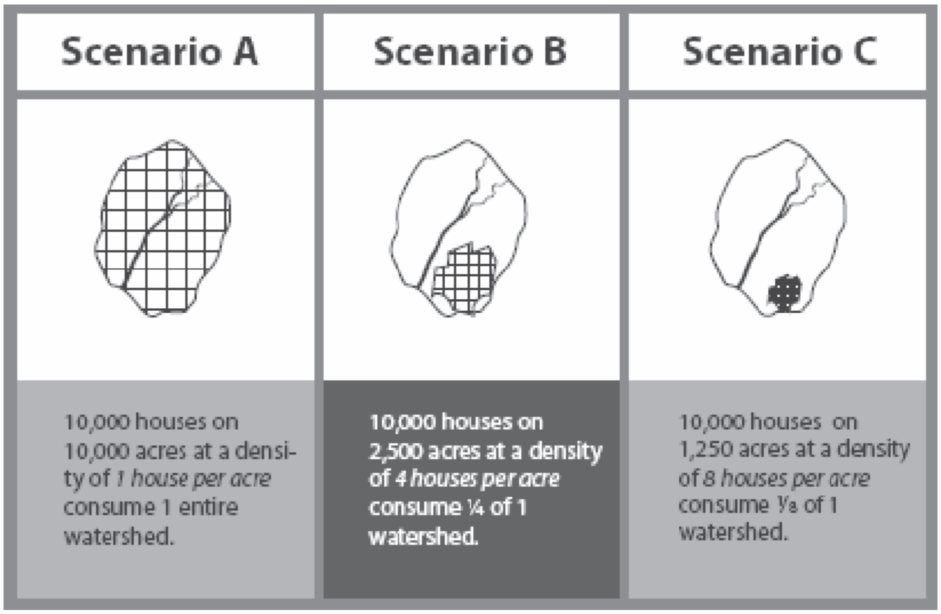
Reference: Protecting Water Resources with Higher Density Development, EPA 231-R-06-001 January 2006

Smart growth has emerged as a way to approach community, economic and environmental goals in an integrated fashion. It is a sound alternative to continuing the traditional approach of piecemeal, discrete development across the landscape, where the change of an individual site — seen alone — might not have a significant environmental cost but, cumulatively and over the long term, it leads to the issues and problems associated with sprawl. Smart growth efforts have taken different forms around the country, but the guiding principles address a variety of goals. The actual tools used for water quality protection can vary according to local conditions and needs, often bundled together into what is referred to as *low-impact development* (see definition here[1]). One tool is for communities to encourage development in areas with existing infrastructure, which protects open space while revitalizing urban areas through infill and brownfield redevelopment.

Smart Growth Resources

- www.smartgrowthamerica.org
- www.epa.gov/smartgrowth
- www.smartgrowth.org
- www.naco.org
- www.nemo.uconn.edu
- www.cwp.org

When new developments are proposed, local communities should communicate their concerns about drinking water source protection to regional or county planning agencies. Planning officials may not know about the source area that supplies your specific drinking water, even though they are generally supportive and recognize the importance of incorporating water quality protection measures into new construction. Use the maps in your Source Water Assessment report to illustrate the sensitive areas needing protection.



Here’s an example of what an official from one small Oregon community requested of the county:

> “We are seeking new ways to allow growth in our community, and some of the growth is within our drinking water watershed. As a community, we are committed to promoting environmentally sound growth.
>
> “We are asking our regional land-use planning and permitting partners to assist us in protecting the watershed that supplies our community with its drinking water. We are concerned about the potential for large-scale changes in the watershed hydrology. In terms of the hydrologic cycle, developing land will generally mean that less water is infiltrated and more runs off at the surface. This could have significant impacts on our drinking water supply. Increased vehicle use, roads, construction site sediment runoff and residential trash and waste are all potential sources of concern for our drinking water during development and post-development. Greater

paved surface area per capita results in increases of nonpoint source pollution from vehicles, pets and lawn care activities.

"As we incorporate measures to protect water quality in the source area for our drinking water, we also protect public health by providing safe, clean water for our community. If we can maintain the quality of the source water, we do not have to spend public funds for additional treatment facilities. We believe clean drinking water is beneficial for the entire region."

Research has shown that significant changes in the distribution and amount of water in a watershed can occur after development: Greater volumes of precipitation run off the land more quickly, resulting in a sharp spike in stream levels, which can cause or worsen flooding and erosion. The effects of urban and suburban runoff are most dramatic when natural land is first developed. Soils that have been compacted by heavy machinery during construction, landscaping or farming often function like paved surfaces. Land that was once able to soak up rain without a rise in stream levels behaves quite differently after roofs, roads and other impervious surfaces are created.

In traditional development patterns, the number of stream channels can be reduced because stormwater conveyances are used to channel water away from the structures. Normal streamflow can be significantly reduced because rainfall and snowmelt do not infiltrate and recharge the smaller stream tributaries in the watershed. Low-density residential suburbs and office parks are generally surrounded by roads, shopping centers, recreational centers, schools, utilities and their associated parking lots, which together add up to increased impervious surfaces. In addition to decreased water quality for drinking water, increased impervious surfaces may lead to the destruction of habitat for fish and wildlife, increased nutrient pollution in water ways, sudden and large variations in stream temperatures, and polluted runoff from human and household sources.

In areas in the watershed where residents depend on wells, underground aquifers can be depleted due to increasing demand from development and an associated decrease in infiltration as impervious surfaces replace natural land cover. When aquifers are not recharged, groundwater flow is reduced and the streams are not supplied with the base flow that groundwater normally provides.

In contrast, smart growth or low-impact development design techniques involve the incorporation of natural drainage systems. Using smart growth can help preserve natural water conditions by promoting infiltration and limiting impervious (paved) surfaces. This strategy can be highly successful in reducing urban street runoff and promoting infiltration, which reduces both downstream peak flows and runoff pollutants.

Smart growth can address multiple planning goals. Natural drainage systems serve to retain the physical structure of the pre-existing wetlands and streams, as well as the diversity and abundance of aquatic life. Smart growth helps to meet multiple planning goals — community amenities, wildlife habitat, water resource management and aesthetic values. Smart growth concepts include a set of tools to better manage stormwater from areas appropriately designated for growth. Soil amendments, vegetated swales, green roofs, bioretention areas and rain gardens are just some of the techniques that can be used to improve water management in the watershed.

Smart growth can help protect drinking water quality through:

- conservation of open space and clustered development patterns,
- taking a regional approach to planning to avoid or reduce cumulative impacts to water quality, and
- recognizing that economic vitality is dependent upon a reliable, high-quality water supply serving the local region.

Because there are no regulations *requiring* the protection of public drinking water source areas, it is imperative that you (as public officials) express your desire to ensure that any new development be implemented with adequate protection for your drinking water resource.

[1] https://sor.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&glossaryName=Green%20Infrastructure%20Glossary

Septic system operation basics: Educating homeowners

(Adapted from the article in OHA-DWS's Drinking Water Protection Bulletin, Summer 2008.)

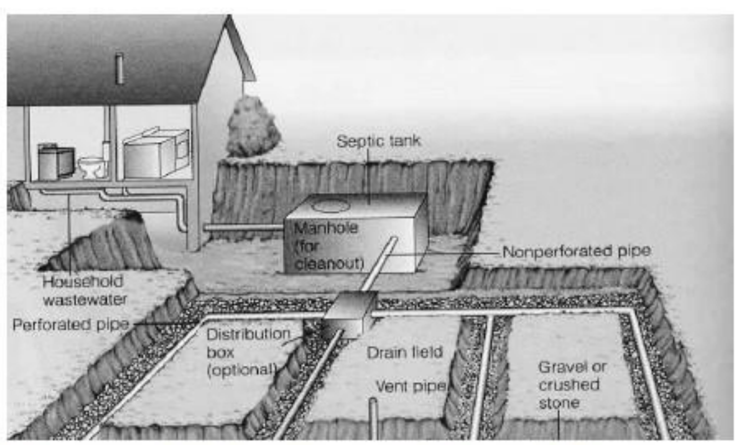
Conventional septic systems are designed to remove disease-producing (pathogenic) organisms, not nitrate, household chemicals or prescription drugs.

Septic (onsite) systems are designed to treat and dispose of sanitary waste in rural areas or in some small communities or developments. As in all wastewater treatment systems, including those in larger communities, the primary targets of the treatment are pathogenic (disease-producing) organisms, not potential contaminants such as nitrate, household chemicals, pesticides, drugs and personal care products.

Even properly functioning septic systems are designed to discharge to groundwater.

In contrast to larger communities where wastewater treatment plants discharge "treated effluent" to surface waters, the primary function of a properly operating septic system drain field is to discharge effluent to groundwater. Therefore, the improper use of an onsite system, in particular the disposal of improper substances or the lack of maintenance, can lead to groundwater pollution.

Household septic systems generally have three main components: a septic tank, a distribution box (optional), and a drain field (see diagram). Wastewater flows into the septic tank, where solids settle to the bottom of the tank and grease, oil and fats float to the top forming a "scum layer." The partially clarified wastewater that resides between the solids at the bottom and scum layer is discharged to the drain field.



From: www.co.thurston.wa.us/health/ehoss/inspect_septic.html#step1

As illustrated, the drain field usually consists of a network of perforated pipes in gravel-filled trenches. As the effluent from the septic tank travels through these pipes, it drains into the gravel layer and from there into the surrounding soil.

The bulk of the microbial treatment of the effluent occurs within the soil as it percolates down under the force of gravity. Soil particles bind and hold pathogenic organisms until they either die or are destroyed by other microorganisms. This treatment functions best if the soils tend to be aerated and well drained.

Septic systems serve a much-needed service, and are generally effective for what they are designed to do, i.e., remove pathogenic organisms. If not used correctly, however, problems can occur. One effective method of preventing groundwater contamination is education and outreach directed toward septic tank owners. Informing local residents of the potential problem of disposal of household chemicals, prescription and over-the-counter drugs, personal care products and other chemicals through the septic system can significantly reduce the risk to local groundwater. In addition, homeowners need to know best practices for maintenance and operation of their system.

Outreach materials and other resources:

- https://wellwater.oregonstate.edu/well-water/septic-systems
- https://www.epa.gov/septic/brochures-and-fact-sheets-about-septic-systems-homeowners
- https://www.epa.gov/wqc/contaminants-emerging-concern-including-pharmaceuticals-and-personal-care-products
- https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/SOURCEWATER/DOMESTICWELLSAFETY/Documents/SepticWells%20brochure_JSWCD.pdf
- https://www.oregon.gov/deq/residential/pages/onsite-about.aspx
- www.nsf.org

Implementing drinking water protection strategies: septic systems

(Adapted from the article in OHA-DWS's Drinking Water Protection Bulletin, Summer 2008)

Public water systems that have had septic systems identified in their Source Water Assessment as a potential contaminant source can significantly reduce the risk of potential impact by implementing simple outreach measures.

Many residents using onsite (septic) systems do not understand the connection between surface activities and water quality. Decisions regarding the use, storage and disposal of household chemicals often are made without considering how these practices might affect water quality, either surface water or groundwater. However, at least some of those people will modify their practices once they learn how susceptible drinking water is to activities at or near the surface.

The list of resources below provides ways for communities and water system operators to help customers become better informed about the proper use of home-related chemicals. Simply making outreach materials available to residents can go a long way toward protecting the resource.

DEQ and OHA-DWS would like to acknowledge the protection efforts made by public water systems. Many communities and water systems may benefit by being able to tell residents that the agencies have formally recognized the community and water system for taking steps to protect their drinking water. OHA-DWS and DEQ offer a Drinking Water Source Protection Award. For more information, see the OHA-DWS source protection web page (https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/DRINKINGWATER/SOURCEWATER/Pages/index.aspx).

Resources

DEQ Protecting Your Source (see, in particular, the information under Residential/Rural Land Uses. An example letter to residents is included.)	https://www.oregon.gov/deq/wq/dwp/pages/dwp-source.aspx
Groundwater Basics for Drinking Water Protection (DEQ)	https://www.oregon.gov/deq/FilterDocs/dwpGwBasics.pdf
Domestic Well Safety Program (OHA) Resources/ contacts for domestic/private wells	http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/SourceWater/DomesticWellSafety/Pages/index.aspx
Well Water Program (OSU) technical assistance for domestic/private wells & septic systems	http://wellwater.oregonstate.edu/
Oregon's Domestic Well Testing Program for Real Estate Transactions	http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/SourceWater/DomesticWellSafety/Pages/Testing-Regulations.aspx
Household Hazardous Waste Program website (DEQ)	https://www.oregon.gov/DEQ/Hazards-and-Cleanup/hw/Pages/hhw.aspx
Household Hazardous Waste - locally-sponsored and county collection programs	https://www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/HHW-Events.aspx https://www.oregon.gov/DEQ/Hazards-and-Cleanup/hw/Pages/HHW-by-County.aspx

Household Pharmaceutical Waste Disposal (OHA)	https://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/SourceWater/Pages/takeback.aspx
Household Hazardous Wastes (EPA	https://www.epa.gov/hw/household-hazardous-waste-hhw
Recycle Used Motor Oil Resources (EPA)	https://www.epa.gov/recycle/managing-reusing-and-recycling-used-oil
Frequently Asked Questions About Heating Oil Tanks (DEQ)	https://www.oregon.gov/DEQ/tanks/Pages/hot.aspx
Proper Care/Maintenance of Heating Oil and Other Unregulated Tank Systems	https://www.oregon.gov/deq/FilterDocs/ProperCareMaintenance.pdf
Oregon resources for on-site septic systems (DEQ)	https://www.oregon.gov/deq/residential/pages/septic-smart.aspx
Oregon's Onsite Wastewater Management Program (Septic Systems) (DEQ)	https://www.oregon.gov/DEQ/Residential/Pages/Onsite.aspx
Local Outreach Toolkit for Septic Systems (EPA)	https://www.epa.gov/septic/septic-systems-outreach-toolkit
A Homeowners Guide to Septic Systems (EPA)	https://www3.epa.gov/npdes/pubs/homeowner_guide_long.pdf (long version) https://www3.epa.gov/npdes/pubs/homeowner_guide_short.pdf (short version)
Septic Tank Maintenance (DEQ)	https://www.oregon.gov/deq/FilterDocs/septictankmaintFS.pdf
Septic Systems OSU Extension website (OSU)	https://wellwater.oregonstate.edu/septic-systems-0

Water Well Owner's Handbook & other related guidance documents (WRD)	https://www.oregon.gov/OWRD/WRDPublications1/Well_Water_Handbook.pdf
Disposal of Chlorinated Water from Swimming Pools and Hot Tubs (DEQ)	https://www.oregon.gov/deq/FilterDocs/bmpchlorwaterdisp.pdf
Source Water Protection Publications (EPA) for managing various including: • Septic Systems • Turfgrass and Garden Fertilizer Application • Small-Scale Application of Pesticides Small Quantity Chemical Use • Pet and Wildlife Waste • Storm Water Runoff	https://www.oregon.gov/deq/wq/dwp/pages/dwp-pubs.aspx (see EPA Source Water Protection Practices Bulletins)
Oregon Integrated Pest Management Center (OSU)	https://agsci.oregonstate.edu/oipmc
National Pesticide Information Center	http://npic.orst.edu/
Integrated Pest Management and Pesticide Safety for Schools (OSU)	http://blogs.oregonstate.edu/schoolipm/sample-page/
Golf Course Integrated Pest Management (IPM) tool and BMP Generator, and certifications	http://www.greengolfusa.com/tiki-index.php https://auduboninternational.org/acsp-for-golf/
EcoBiz Certified Landscapers and Auto Repair Shops	http://ecobiz.org/find-an-ecobiz/