



Pollutant Reduction Strategies for Common Land Uses/ Activities within Groundwater Sources of Drinking Water



PLEASE NOTE: The Internet URL Addresses listed in this document were included as a convenience for the users of this document. All URL Addresses were functional at the time this publication was last updated (July 2020). Active links for many of the resources are located at <https://www.oregon.gov/deq/FilterDocs/dwpgrwaterResources.pdf>. Additional resources can also be found at <https://www.oregon.gov/deq/wq/programs/Pages/DWP-Pubs.aspx> see “Summary of Technical Assistance Resources”. Contact Drinking Water Protection Staff (<https://www.oregon.gov/deq/wq/programs/Pages/dwp.aspx>) with questions or for assistance with any potential sources of contamination not identified in this document.

Potential Pollutant Type	Potential Impact	Pollutant Reduction and Outreach Ideas
Chemicals stored or used in close proximity to well or spring	Chemicals, fuels, and equipment maintenance materials may impact groundwater source	<ul style="list-style-type: none"> <input type="checkbox"/> Verify that no fuels, pesticides, fertilizers or other chemicals are used within 100 feet of the well or spring or stored near the wellhead or spring, and that all backup fuel supplies have secondary containment. <input type="checkbox"/> Consider increased setbacks based on aquifer sensitivity and degree of hazard. See info on Integrated Pest Management (http://npic.orst.edu/pest/ipm.html) for alternative methods. Alternate methods for vegetation management within the well or spring setback may include mechanical removal, mowing, or non-chemical pre-emergent or post-emergent herbicide. <input type="checkbox"/> Correct any outstanding well/spring box construction or casing seal deficiencies. <input type="checkbox"/> Create a spill response plan. <input type="checkbox"/> Acquire spill response equipment and any regulatory required training. <input type="checkbox"/> Ensure all fuels and chemicals have secondary containment. <p>Fact Sheets/Resources *Managing Small Quantity Chemical Use: http://www.oregon.gov/deq/FilterDocs/SQGHHandbook.pdf http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_ChemUseSmallQ.pdf *Integrated Pest Management: http://npic.orst.edu/pest/ipm.html</p>
Cropland -- Irrigated (includes orchards, vineyards, nurseries, greenhouses) Non-irrigated (includes Christmas trees, grains, grass seed, pasture)	Over-application or improper handling of pesticides/ fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to ground/surface water through runoff or infiltration. Drip-irrigated and non-irrigated crops are considered to be lower risk	<ul style="list-style-type: none"> <input type="checkbox"/> Work with the local SWCD, Oregon State University County Extension Agent, or Natural Resources Conservation Service to actively encourage management measures that protect water quality and develop farm plans when beneficial. Management measures may include: crop production practices, pesticide/fertilizer/petroleum product handling and storage, vehicle/equipment maintenance and repair, livestock waste storage and treatment, hazardous waste management, wastewater disposal/fill, and wells. <p>Agency Websites: Soil and Water Conservation Districts: http://oacd.org/conservation-districts/directory OSU Extension: http://extension.oregonstate.edu/find-us Natural Resources Conservation Service, Oregon: http://www.nrcs.usda.gov/wps/portal/nrcs/site/or/home/ Oregon Department of Agriculture: http://www.oregon.gov/ODA/Pages/default.aspx</p>

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		<ul style="list-style-type: none"> <input type="checkbox"/> If this land covers a large percentage of your Drinking Water Source Area, notify your local Soil and Water Conservation District (SWCD) of your source area location. <input type="checkbox"/> Identify and document any pesticides used to maintain site and areas applied. <input type="checkbox"/> Also send relevant fact sheets and information below. <p>Fact Sheets/Resources</p> <p>*Managing Agricultural Fertilizer Application (US EPA source): http://www.oregon.gov/decesBulletin_AgFertilizer.pdf</p> <p>*Managing Large-Scale Application of Pesticides: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_PesticidesLargeScale.pdf</p> <p>*Irrigation System Maintenance, GW Quality, and Improved Production: https://catalog.extension.oregonstate.edu/em8862</p> <p>*Guidance for Evaluating Residual Pesticides on Lands Formerly Used for Agricultural Production http://www.oregon.gov/deq/FilterDocs/GuidanceEvalResidualPesticides.pdf</p> <p><i>Additional recommendations:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Set up or participate in a local material exchange program. Contact local recycling contact: https://www.oregon.gov/deq/recycling/Pages/Local-Recycling-Contacts.aspx <input type="checkbox"/> Participate in Pesticide Stewardship or Integrated Pest Management Programs (or other efforts , such as pesticide collection events for unused and legacy pesticides) to reduce use of products that threaten water quality: http://www.oregon.gov/DEQ/wq/programs/Pages/Pesticide.aspx <input type="checkbox"/> See DEQ factsheet "Pesticide use in the vicinity of drinking water sources" for additional regulations and recommendations: https://www.oregon.gov/deq/FilterDocs/dwppesticideuseVicdws.pdf
<p>Agricultural activities other than cropland or animal management;</p> <p>includes farm machinery repair areas and equipment maintenance areas</p>	<p>Improper soil management or improper storage or management of cleaning solvents, fuels, petroleum products, pesticides, fertilizers, and irrigation water may impact drinking water</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Work with the local SWCD, Oregon State University County Extension Agent, or Natural Resources Conservation Service to actively encourage management measures that protect water quality and develop farm plans when beneficial. Management measures may include: crop production practices, pesticide/fertilizer/petroleum product handling and storage, vehicle/equipment maintenance and repair, livestock waste storage and treatment, hazardous waste management, wastewater disposal/fill, and wells. <p>Agency Websites:</p> <p>Soil and Water Conservation Districts: http://oacd.org/conservation-districts/directory</p> <p>OSU Extension: http://extension.oregonstate.edu/find-us</p> <p>Natural Resources Conservation Service, Oregon: http://www.nrcs.usda.gov/wps/portal/nrcs/site/or/home/</p> <p>Oregon Department of Agriculture: http://www.oregon.gov/ODA/Pages/default.aspx</p>

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		<p><i>Additional recommendations:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> If this land covers a large percentage of your drinking water source area, notify your local Soil and Water Conservation District (SWCD) of your source area location. <input type="checkbox"/> Identify and document any pesticides used to maintain site and areas applied. <input type="checkbox"/> Set up or participate in a local material exchange program. https://www.oregon.gov/deq/recycling/Pages/Local-Recycling-Contacts.aspx <input type="checkbox"/> Other than crops, see DEQ factsheets *“Pesticide use in the vicinity of drinking water sources” for additional regulations and recommendations: https://www.oregon.gov/deq/FilterDocs/dwppesticideuseVicdws.pdf *Automotive Repair and Maintenance Tips for Drinking Water Protection: http://www.oregon.gov/deq/FilterDocs/dwpautomaint.pdf *Managing Vehicle Washing to Prevent Contamination of Drinking Water: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_Vehic leWashing.pdf
<p>Grazing animals (as a guideline, only those areas with >5 large animals or equivalent per acre over an extended time)</p> <p>Includes small rural farms, boarding stables, auction lots, fairgrounds</p>	<p>Improper storage and management of animal wastes and wastewater in areas of concentrated animals may impact groundwater and drinking water</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Encourage farm operator to work with their local Soil and Water Conservation District (SWCD), Oregon State University County Extension Agent, or Natural Resources Conservation Service (NRCS) to actively encourage management measures that protect water quality. Measures can address livestock waste storage and treatment, wastewater disposal, etc. <p>Agency Websites: Oregon Department of Agriculture: http://www.oregon.gov/ODA/Pages/default.aspx Soil and Water Conservation Districts: http://oacd.org/conservation-districts/directory OSU Extension: http://extension.oregonstate.edu/find-us Natural Resources Conservation Service, Oregon: http://www.nrcs.usda.gov/wps/portal/nrcs/site/or/home/</p> <ul style="list-style-type: none"> <input type="checkbox"/> Share relevant fact sheets below. <input type="checkbox"/> If this land covers a large percentage of your drinking water source area, notify your local SWCD of your source area location. <input type="checkbox"/> Identify and document any pesticides used to maintain site and areas applied. <p>Fact Sheets/Resources Water Quality & Agriculture (ODA, see pages 6-8) https://www.oregon.gov/ODA/shared/Documents/Publications/NaturalResources/WaterQualityandAgriculture.pdf * Grazing management https://www.nrcs.usda.gov/wps/portal/nrcs/detail/or/snow/?cid=nrcs142p2_044356 * Manure Management in Small Farm Livestock Operations https://s3.wp.wsu.edu/uploads/sites/346/2014/11/em8649.pdf</p>
<p>Confined animal feeding operations (CAFOs)</p>	<p>Improper storage and management of animal wastes and wastewater in areas of concentrated</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Verify that the owner or manager has the contact information for the public water system in the Emergency Response section of their Animal Waste/Nutrient Management Plan to ensure timely notification of spills or releases that may impact drinking water supply.

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	animals may impact drinking water	<p>☐ Contact ODA's Livestock Water Quality specialist for your area to ensure that all CAFOs that are required to have a permit have one. Ensure the ODA specialist is aware of the public water system well location and that the permit and associated Animal Waste Management Plan are protective of the drinking water supply. Request that existing technical assistance resources and compliance inspections be prioritized for the drinking water source area.</p> <p>☐ Note that all permitted CAFOs are regularly inspected on a 10-month rotation and groundwater protection is part of the permit conditions.</p> <p>☐ Get notification from ODA on permit modifications or renewals; review/comment as appropriate.</p> <p>Fact Sheets/Resources *Oregon Department of Agriculture CAFO program: http://www.oregon.gov/oda/programs/NaturalResources/Pages/CAFO.aspx US EPA Animal Feeding Operations: https://www.epa.gov/npdes/animal-feeding-operations-afos</p>
Septic systems - residential, farm, commercial on-site systems	If not properly sited, designed, installed, and maintained, septic systems can impact drinking water; use of drain cleaners and dumping household hazardous wastes or pharmaceuticals can result in groundwater contamination; for higher-density septic, cumulative effects of multiple systems in an area may impact drinking water supply	<p>In addition to resources listed for the categories Residential Lands – private rural homes and Commercial/Industrial, share relevant information from list below:</p> <p>Fact Sheets/Resources *DEQ Septic Smart Program web-site: http://www.oregon.gov/DEQ/Residential/Pages/Septic-Smart.aspx **"Septic Smart for Homeowners - brochure": http://www.oregon.gov/deq/FilterDocs/septicowner.pdf *Managing Septic Systems to Prevent Contamination of Drinking Water: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_SepticSystems.pdf *Managing Household Pharmaceutical Waste: https://www.oregon.gov/deq/FilterDocs/HouseholdPharmaceuticalWasteDisposal.pdf</p> <p>Additional measures may include:</p> <p>☐ Make "Septic Smart for Homebuyers" available at local permitting counter or to local realtors: https://www.oregon.gov/deq/FilterDocs/septicbuyer.pdf</p> <p>☐ Develop ongoing education program on septic system operation, maintenance and upgrades</p> <p>☐ Consider grants to partially fund inspection/repair program</p> <p>☐ Implement required inspection program on property transfer</p> <p>☐ Refer local homeowners and small businesses to Oregon Onsite loan program that can help with septic system costs: http://www.oregon.gov/deq/Residential/Pages/Onsite-Loans.aspx</p>

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<p>Wells – private domestic, municipal, commercial, industrial, irrigation, or unused wells</p>	<p>Improperly installed or maintained wells and abandoned (unused) wells may provide a direct conduit for contamination to groundwater and drinking water source</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Notify well owners of closure requirements for unused wells and construction requirements for active wells. <input type="checkbox"/> Ensure local cross-connection program protects public water supply. <input type="checkbox"/> Offer educational programs to residential well owners on proper maintenance and drinking water protection. <input type="checkbox"/> Provide financial incentives for permanent well abandonment according to the Water Resources Department’s (WRD) “Water Well Owner’s Handbook” (Provided well construction is adequate, temporary abandonment will be protective of groundwater---contact WRD Staff for assistance, and provide a well log.) <input type="checkbox"/> Verify proper well abandonment. <input type="checkbox"/> Adopt local ordinance or internal procedures to ensure compliance with WRD well abandonment requirements prior to development. <input type="checkbox"/> Share applicable information from list below: <p>Fact Sheets/Resources</p> <p>*Domestic Well Safety Program –Oregon Health Authority http://public.health.oregon.gov/HealthyEnvironments/DrinkingWater/SourceWater/DomesticWellSafety/Pages/index.aspx</p> <p>*Groundwater Basics: https://www.oregon.gov/deq/FilterDocs/dwpGwBasics.pdf</p> <p>*Water Well Owner’s Handbook & other related guidance documents (WRD): https://www.oregon.gov/OWRD/programs/GWWLWCC/Pages/default.aspx</p> <p>*Groundwater Friendly Gardening Tips: http://wellwater.engr.oregonstate.edu/groundwater-friendly-gardening</p>
<p>Stormwater run-off</p> <p>focusing on high density housing (> 1 House/0.5 acre) but also includes commercial, industrial, and municipal areas.</p>	<p>Improper use, storage, and disposal of household chemicals may impact the drinking water supply; stormwater run-off or infiltration may carry contaminants to drinking water supply</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Identify underground injection wells and dry wells for stormwater disposal. Verify permit status. <input type="checkbox"/> Develop or participate in an existing education program on stormwater issues. <input type="checkbox"/> Develop ongoing public education program on pesticide and fertilizer use, household hazardous waste, pet waste, and household pharmaceutical waste disposal <input type="checkbox"/> Host or facilitate ongoing household hazardous waste collections <input type="checkbox"/> Work with your municipality to increase emphasis on pre-treatment for stormwater runoff and best management practices for stormwater. <input type="checkbox"/> Develop best management practices and maintenance plan for drywells and injection wells. <input type="checkbox"/> Review Portland’s Stormwater Management Manual and the Oregon’s Water Quality Model Code and Guidebook (or other stormwater management document), and develop program to address stormwater issues. <input type="checkbox"/> Consider municipal code to address stormwater - see DLCD Water Quality Model Code and Guidebook <input type="checkbox"/> Send applicable information from list below: <p>Fact Sheets/Resources</p> <p>*UIC Fact Sheets and Guidance http://www.oregon.gov/deq/wq/wqpermits/Pages/UIC-Guidance.aspx</p> <p>*Managing Stormwater to Prevent Contamination of Drinking Water: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_StormWater.pdf</p>

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		<p>*Managing Household Pharmaceutical Waste: https://www.oregon.gov/deq/FilterDocs/HouseholdPharmaceuticalWasteDisposal.pdf</p> <p>*Water Quality Model Code and Guidebook: https://www.oregon.gov/deq/FilterDocs/WQModCodeGuide.pdf</p> <p>*Portland's Stormwater Management Manual: https://www.portlandoregon.gov/bes/64040</p> <p>*Best Management Practices (BMPs) for washing vehicles: http://www.oregon.gov/deq/FilterDocs/EPASWPPacticesBulletin_VehicleWashing.pdf</p> <p>*Managing Pet and Wildlife Waste to Prevent Contamination of Drinking Water: http://www.oregon.gov/deq/FilterDocs/EPASWPPacticesBulletin_PetWaste.pdf</p> <p>*Disposal of Chlorinated Water from Swimming Pools and Hot Tubs: https://www.oregon.gov/deq/FilterDocs/bmpchlorwaterdisp.pdf</p> <p>*Household Hazardous Waste Program: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/hw/Pages/hhw.aspx</p> <p>*Underground Injection Control (UIC) Program (see Stormwater tab): http://www.oregon.gov/DEQ/wq/wqpermits/Pages/UIC.aspx</p> <p>*Healthy Lawn, Healthy Environment: https://www.epa.gov/sites/production/files/2014-04/documents/healthy_lawn_healthy_environment.pdf</p>
<p>Forest lands or forest management areas</p>	<p>Forest management activities including cutting and yarding of trees; improper management of pesticide and fertilizer applications; and road building/usage/maintenance activities may impact drinking water</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Notify forest landowner(s) or manager(s) of their location in your drinking water source area and send EPA fact sheets: *Managing Nonpoint Source Pollution from Forestry http://www.epa.gov/polluted-runoff-nonpoint-source-pollution/nonpoint-source-forestry and *Send relevant materials from EPA's National Management Measures to Control Nonpoint Source Pollution from Forestry: http://www.epa.gov/polluted-runoff-nonpoint-source-pollution/forestry-additional-resources *Managing Large-Scale Application of Pesticides: http://www.oregon.gov/deq/FilterDocs/EPASWPPacticesBulletin_PesticidesLargeScale.pdf <p><input type="checkbox"/> If there is private industrial forest land scheduled for harvest or chemical application within 2-year Time-of-Travel zone (or within short-term recharge area for a spring), work with landowner to set up direct communication, share maps, and provide notification on any chemical application.</p> <p><input type="checkbox"/> For details on pesticide use in Oregon forestry, please see: http://www.oregon.gov/ODF/AnalyticsReports/ForestryFacts_Herbicides_And_Forestry_01092017.pdf</p> <p><input type="checkbox"/> Work with Oregon Department of Forestry (ODF) Stewardship or District Forester to request voluntary protections such as no mixing, handling, or storage of bulk pesticides or fertilizers in the 2-year Time-of-Travel zone or Zone 1 for springs. ODF may be able to help facilitate communication with the land owners or managers to discuss site-specific concerns about protecting the groundwater or springs: http://www.oregon.gov/ODF/Working/Pages/FindAForester.aspx</p> <p><input type="checkbox"/> For assistance with drinking water source protection issues on federal forest lands, contact US Forest Service Region 6:</p>

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		<p>https://hrm.gdcii.com/directory/R6.htm</p> <p>Additional recommendations:</p> <ul style="list-style-type: none"> □ Set up an agreement or MOU with landowner(s) or manager(s) that addresses handling and application of pesticides and fertilizers and best management practices for equipment fueling and spills. □ See DEQ factsheet on “Pesticide use in the vicinity of drinking water sources” for additional regulations and recommendations: https://www.oregon.gov/deq/FilterDocs/dwppesticideuseVicdws.pdf
<p>Commercial or industrial sites</p> <p>includes businesses that 1) do not require permits or 2) regulated facilities like dry cleaners, cleanup sites, hazardous waste/materials sites, underground storage tanks, wastewater and solid waste disposal</p>	<p>Spills, leaks, or improper handling of solvents, petroleum products, wastewater, or other chemicals and materials associated with commercial or industrial activities may impact the drinking water supply</p>	<ul style="list-style-type: none"> □ Review "Drinking Water Protection Strategies for Commercial and Industrial Land Uses" and consider other general or business sector specific strategies for pollution risk reduction. http://www.oregon.gov/deq/FilterDocs/DWPStrategiesComInd.pdf □ Notify the owner or manager of their location within your drinking water source area and send the following general fact sheets: <ul style="list-style-type: none"> *Basic Tips for Keeping Drinking Water Clean and Safe https://www.oregon.gov/deq/FilterDocs/dwpBasicTips.pdf *Groundwater Basics https://www.oregon.gov/deq/FilterDocs/dwpGwBasics.pdf *Business and Industry tips for reducing water quality impacts (DEQ) https://www.oregon.gov/deq/FilterDocs/dwpbusindtips.pdf *Pollution Prevention for Industry and the Environment: https://www.oregon.gov/deq/Hazards-and-Cleanup/ToxicReduction/Pages/Pollution-Prevention.aspx □ Contact owner/operator to verify that any chemical or petroleum product storage (if present) cannot impact groundwater. For example, chemicals could be stored and used inside, or have secondary containment. Encourage business to receive technical assistance from DEQ's non-regulatory Toxics Use/Waste Reduction Technical Assistance Program: https://www.oregon.gov/DEQ/Hazards-and-Cleanup/hw/Pages/Technical-Assistance.aspx □ Implement relevant best management practices (BMPs) for stormwater and industrial wastewater: https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu https://www.epa.gov/npdes/industrial-wastewater □ Work with Drinking Water Protection staff and permitting program staff to ensure permitted facilities are in compliance.
<p>Golf courses, parks, lawn care (any highly-maintained areas)</p>	<p>Over-application or improper handling of pesticides/ fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants through runoff and infiltration</p>	<ul style="list-style-type: none"> □ Determine degree and type of chemicals used for lawns and landscaping maintenance. □ Work with landowners or operators to minimize or eliminate pesticide and fertilizer application. □ Provide training/workshops to park staff on water quality protection. □ Use products that are environmentally friendly. □ Minimize irrigation, or use water efficient irrigation. □ Ensure pesticides are handled and stored safely. □ Ensure that a spill response plan is in place, a spill kit is available and employees are trained annually in spill response. □ For golf courses, distribute Integrated Pest Management (IPM) information, and info on certifications for sustainable practices, such as

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		<p>https://auduboninternational.org/acsp-for-golf/ or https://www.groundwater.org/action/community/green-sites.html</p> <p>Fact Sheets/Resources</p> <p>*Healthy Lawn, Healthy Environment: https://www.epa.gov/sites/production/files/2014-04/documents/healthy_lawn_healthy_environment.pdf</p> <p>*EPA Source Water Protection Practice Bulletins: - Managing Small-Scale Application of Pesticides: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_PesticidesSmallScale.pdf - Managing Turfgrass and Garden Fertilizer Applications: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_TurfgrassGarden.pdf - Managing Small Quantity Chemical Use: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_ChemUseSmallQ.pdf</p> <p>*Groundwater Basics: https://www.oregon.gov/deq/FilterDocs/dwpGwBasics.pdf</p> <p>*Integrated Pest Management Info for Golf Courses: http://www.greengolfusa.com/tiki-index.php</p> <p>*Integrated Pest Management website (OSU): http://npic.orst.edu/pest/ipm.html</p>
<p>Underground storage tanks (USTs)</p>	<p>Existing or historic contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply; spills or improper handling during tank filling or product distribution may also impact the drinking water supply</p>	<p><input type="checkbox"/> Notify owner or manager of their location within your drinking water source area. Share technical information about protecting drinking water resources and basic groundwater principles: http://www.oregon.gov/deq/wq/programs/Pages/DWPAssessments.aspx https://www.oregon.gov/deq/FilterDocs/dwpGwBasics.pdf</p> <p>*DEQ's Underground Storage Tank Program: http://www.oregon.gov/DEQ/tanks/Pages/default.aspx</p> <p>*EPA info on managing Underground Storage Tanks: https://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_USTs.pdf</p> <p><input type="checkbox"/> For Active Registered Tanks: Verify permit status at http://www.oregon.gov/DEQ/tanks/Pages/Tank-Lists.aspx Contact DEQ Tanks program with questions. Ensure pre-treatment for stormwater runoff and best management practices for stormwater are in place.</p> <p><input type="checkbox"/> For Leaking USTs, verify status at https://www.oregon.gov/deq/tanks/Pages/Tank-Lists.aspx. Contact DEQ Tanks program at: Underground Storage Tanks Helpline, 1-800-742-7878, 503-229-6652, tanks.info@deq.state.or.us or Drinking Water Protection staff (Julie Harvey, DEQ, 503-229-5664) for assistance in verifying that cleanup is protective of drinking water.</p> <p><input type="checkbox"/> For non-regulated tanks (<1,100 gals or large heating oil tanks) also send: *Frequently Asked Questions About Heating Oil Tanks http://www.oregon.gov/deq/tanks/Pages/hot.aspx</p>

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Transportation corridors , right-of-ways, roads, railroads, transmission lines	Vehicle use increases risk for fuel and other chemical leaks, spills and emissions affecting drinking water. Over-application or improper handling of pesticides or fertilizers may impact drinking water supply. Construction and maintenance of roadways and corridors may contribute to increased erosion and turbidity in drinking water.	<ul style="list-style-type: none"> <input type="checkbox"/> Notify the owner (City, County, ODOT, railroad, transmission line, etc.) and local first responders of your Drinking Water Source Area location. Oregon Emergency Response Program Local Emergency Managers List: https://www.oregon.gov/OMD/OEM/docs/plan_train/locals_list.pdf Recognize stormwater discharge issues from transportation sources: https://www.epa.gov/npdes/stormwater-discharges-transportation-sources <input type="checkbox"/> In areas where pesticides are used for weed suppression, share technical information on groundwater and pesticides: *Groundwater Basics https://www.oregon.gov/deq/FilterDocs/dwpGwBasics.pdf Managing Small-Scale Application of Pesticides: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_PesticidesSmallScale.pdf <input type="checkbox"/> See DEQ factsheet “Pesticide use in the vicinity of drinking water sources” for additional regulations and recommendations: https://www.oregon.gov/deq/FilterDocs/dwppesticideuseVicdws.pdf <input type="checkbox"/> Request elimination or minimization of herbicide application on right-of-ways that may contaminate groundwater. <input type="checkbox"/> Identify if stormwater injection wells are present. If they are present, verify the permit status by contacting the Oregon DEQ’s Water Quality staff at (503) 229-5945. <p>Additional recommendations:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Encourage proper use or elimination of any dry wells or sumps in your wellhead protection area. <input type="checkbox"/> Ask transportation officials to examine spill/runoff detention capacity to avoid contaminants entering the groundwater after an accident. <p>Transportation and handling of fuels and chemicals in bulk Website: http://wellwater.oregonstate.edu/transport-and-transfer-spills</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ask for notification of water system in case of spills <input type="checkbox"/> Reroute transport of hazardous materials <input type="checkbox"/> Water system assumes responsibility of non-chemical weed control.
Residential lands – private urban or private rural homes	Spills, leaks, or improper handling of chemicals, fuels, wastewater, and other materials may impact drinking water; infiltration containing pesticides or fertilizers may impact drinking water	Provide information to residents within your drinking water source area. See Example letter - http://www.oregon.gov/deq/FilterDocs/dwpExampleLettertoResidents.docx . Outreach can be done through local media or via utility bills. Send (or refer to) relevant fact sheets and web resources from list below. <p>Fact Sheets/Resources</p> <ul style="list-style-type: none"> *DEQ DWP website for Residential/Rural Land Uses (under Management Strategies by Land Use): http://www.oregon.gov/DEQ/wq/programs/Pages/DWP-Source.aspx *Groundwater Basics: https://www.oregon.gov/deq/FilterDocs/dwpGwBasics.pdf *Healthy Lawn, Healthy Environment: https://www.epa.gov/sites/production/files/2014-04/documents/healthy_lawn_healthy_environment.pdf *What is Household Hazardous Waste?: http://www.oregon.gov/deq/FilterDocs/WhatisHHW.pdf

Potential Pollutant Type	Potential Impact	Pollutant Reduction and Outreach Ideas
		<p>*Household Hazardous Waste Program: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/hw/Pages/hhw.aspx</p> <p>*Household Pharmaceutical Waste Disposal: http://www.oregon.gov/deq/FilterDocs/HouseholdPharmaceuticalWasteDisposal.pdf</p> <p>*Groundwater Friendly Gardening Tips: http://wellwater.engr.oregonstate.edu/groundwater-friendly-gardening</p> <p>Stormwater runoff from residential lands: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_StormWater.pdf</p> <p>Additional measures may include:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Establish ongoing educational program on household hazardous waste and proper disposal of pharmaceuticals, lawn and landscaping, septic system maintenance.
<p>Sewer lines – within close proximity to well or spring</p>	<p>If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Contact jurisdiction for sewer/wastewater management and determine locations, status of sewer lines and sewer plan <input type="checkbox"/> Identify broken or cracked lines, areas with inflow and infiltration. <input type="checkbox"/> Work with jurisdiction to request maintenance, replacement, or double sleeve of sewer lines within 2-year TOT or within Zone 1 for springs; identify upgrade or replacement of lines as a high priority within City Sewer Master Plan.
<p>Random dump sites</p>	<p>Illegal trash and debris containing chemicals and hazardous materials may generate runoff and cause contamination to groundwater</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Notify the owner or operator of their location within your drinking water source area and send "Combating Illegal Dumping". <input type="checkbox"/> Implement appropriate community-based cleanup strategies including an education campaign – install sign, newspaper releases and ads, utility inserts, cleanup event, collection event, install lights, use vehicle barriers, or public-private partnerships. <input type="checkbox"/> If contamination is suspected, contact DEQ Drinking Water Protection or Site Assessment Program staff for assistance. <p>Fact Sheets/Resources Combating Illegal Dumping: http://www.oregon.gov/DEQ/mm/Pages/Illegal-Dumping-Clean-Up.aspx DEQ Site Assessment Program: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/env-cleanup/Pages/Site-Assessment.aspx</p>
<p>Irrigation canal, ponds</p>	<p>Runoff or infiltration containing sediment, pesticides or fertilizers may impact drinking water</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Determine from owner(s) or operator(s) whether fertilizer or pesticides may be present. If so, encourage practices to minimize groundwater infiltration. Send DEQ Factsheet: "Pesticide use in the vicinity of drinking water sources": https://www.oregon.gov/deq/FilterDocs/dwppesticideuseVicdws.pdf <input type="checkbox"/> Work with Drinking Water Protection staff or water quality permitting program staff to verify permit status (if any) and ensure pesticide application is protective of drinking water. <input type="checkbox"/> Work with land owner or manager to ensure that the pesticide/fertilizer/petroleum mixing and storage areas is located outside the 2 year Time-of-Travel zone or Zone 1 for springs. <input type="checkbox"/> If irrigation canals are in close proximity to shallow wells, share guidance on integrated pest management approaches to control

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		vegetation: http://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1010&context=centerforlakes_pub
Known contamination sites, spill sites, or downgradient plumes	Existing contamination from spills, leaks, or improper handling of used or stored materials may impact the drinking water supply	<ul style="list-style-type: none"> <input type="checkbox"/> Verify cleanup site status by checking Environmental Cleanup Site Information (ECSI) database at: http://www.oregon.gov/deg/Hazards-and-Cleanup/env-cleanup/Pages/ecsi.aspx <input type="checkbox"/> Contact DEQ Cleanup program or Drinking Water Protection staff (Julie Harvey, DEQ, 503-229-5664) for assistance in verifying that cleanup is protective of drinking water. <input type="checkbox"/> Ensure DEQ cleanup program staff are aware of the drinking water source area location, and are working towards “No Further Action” status. For more information, go to: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/env-cleanup/Pages/default.aspx
Mining activities	Spills, leaks, or improper handling of chemicals and wastes generated in mining operations or from heavy equipment may impact the drinking water supply	<ul style="list-style-type: none"> <input type="checkbox"/> Contact the site manager and verify that chemicals, petroleum products, and other materials are handled properly and share: *Business and Industry Tips for Drinking Water Protection https://www.oregon.gov/deg/FilterDocs/dwpbusindtips.pdf <input type="checkbox"/> Contact Oregon Dept. of Geology and Mineral Resources for more information on best management practices: http://www.oregongeology.org/mlrr/surfacemining-faq.htm <input type="checkbox"/> Contact DEQ Drinking Water Protection staff if you need assistance <input type="checkbox"/> Verify Permit status with regional DEQ office. Gravel mines may have a general WPCF permit 1000 for gravel mining activities and a General 1200-A permit for stormwater discharge. <input type="checkbox"/> Get notification from DEQ on permit modifications. <p>Additional recommendations:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Review Recommended Best Management Practices for Storm Water Discharges and implement best management practices (See Section 2.1) http://www.oregon.gov/deg/FilterPermitsDocs/BMPManual.pdf
Landfills, composting facility, historic waste dumps, waste transfer, waste recycling stations	Water percolating through or coming into contact with waste material may transport contaminants to groundwater supply	<ul style="list-style-type: none"> <input type="checkbox"/> Notify the landowner or manager of their location within your drinking water source area <input type="checkbox"/> Work with DEQ Drinking Water Protection staff or permitting program staff to review permits and ensure permitted facilities are in compliance. http://www.oregon.gov/DEQ/mm/swpermits/Pages/default.aspx <input type="checkbox"/> For historic landfills, check with the DEQ Site Assessment program to verify status of site: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/env-cleanup/Pages/Site-Assessment.aspx <input type="checkbox"/> Ensure DEQ cleanup program staff are aware of the drinking water source area location, and are working towards “No Further Action” status. For more information, go to: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/env-cleanup/Pages/default.aspx
Aboveground storage tanks	Spills, leaks, or improper handling of stored materials may impact the drinking water supply	<ul style="list-style-type: none"> <input type="checkbox"/> Conduct a survey of existing aboveground storage tanks to determine status. <input type="checkbox"/> Ensure aboveground storage tanks (ASTs) are 1) placed on a concrete pad or 2) have a drip pan or 3) have secondary containment. <input type="checkbox"/> Local government can potentially adopt ordinance, covenant, or rules to ensure ASTs have secondary containment.

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		<ul style="list-style-type: none"> <input type="checkbox"/> Notify the AST owner of their location within your drinking water source area and send: *Proper Care and Maintenance for Unregulated Tank Systems: http://www.oregon.gov/deq/FilterDocs/ProperCareMaintenance.pdf *Managing Aboveground Storage Tanks to Prevent Contamination of Drinking Water: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_ASTs.pdf Heating Oil Tank Program: http://www.oregon.gov/DEQ/tanks/Pages/hot.aspx Additional recommendations: <ul style="list-style-type: none"> <input type="checkbox"/> Develop a plan for ongoing (yearly) education to aboveground storage tank owners. <input type="checkbox"/> Implement the following best management practices: check regularly for leaks and loose fittings, and check the integrity of gaskets; test pipes for leaks; cleanup the area around the tank; know how to clean up spills and drips.
Underground injection control (UICs), dry wells, stormwater sumps	Shallow injection wells may transport untreated water directly into groundwater and impact drinking water	<ul style="list-style-type: none"> <input type="checkbox"/> Notify the landowner or manager of their location within your drinking water source area. <input type="checkbox"/> Work with Drinking Water Protection staff or permitting program staff to ensure permitted facilities are in compliance. <input type="checkbox"/> Share applicable information on UICs: *Oregon DEQ Underground Injection Control Program: http://www.oregon.gov/DEQ/wq/wqpermits/Pages/UIC.aspx
Schools, universities	Over-application or improper handling of cleaning products, lab chemicals, pesticides or fertilizers used on the school grounds may impact drinking water; parking lots, roadways, or vehicle maintenance may also contribute contaminants to runoff and infiltration	<ul style="list-style-type: none"> <input type="checkbox"/> Notify the school of their location within your drinking water source area and send the following fact sheets and/or links as appropriate: *DEQ's Household Hazardous Waste Program: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/hw/Pages/hhw.aspx *Healthy Lawn, Healthy Environment: https://www.epa.gov/sites/production/files/2014-04/documents/healthy_lawn_healthy_environment.pdf *Managing Septic Systems: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_SepticSystems.pdf *Septic Systems OSU Extension website: http://wellwater.oregonstate.edu/septic-systems-0 *Automotive Repair and Maintenance Tips for Drinking Water Protection: https://www.oregon.gov/deq/FilterDocs/dwpaumaint.pdf *Managing Vehicle Washing to Prevent Contamination of Drinking Water: http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_VehicleWashing.pdf <input type="checkbox"/> Contact the school and verify that there are no septic system, aboveground storage tanks, underground injection wells, or vehicle maintenance and washing. If there are, contact Drinking Water Protection staff for assistance https://www.oregon.gov/deq/wq/programs/Pages/DWP.aspx <input type="checkbox"/> Contact the school and verify they are complying with Oregon school Integrated Pest Management (IPM) law. Contact ODA with questions or assistance

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		http://www.ipmnet.org/tim/IPM_in_Schools/IPM_in_Schools-Main_Page.html Learn more about schools and drinking water: https://19january2017snapshot.epa.gov/schools-air-water-quality_.html
Utility stations, substations, maintenance, and transformer storage	Spills, leaks, or improper handling of chemicals and other materials including PCBs during transportation, use, storage and disposal may impact the drinking water supply	<ul style="list-style-type: none"> <input type="checkbox"/> Notify the landowner or property manager of their location within your drinking water source area <input type="checkbox"/> Work with DEQ Drinking Water Protection staff or permitting program staff to ensure permitted facilities are in compliance. <input type="checkbox"/> In areas where pesticides are used for weed suppression, share technical information on groundwater and pesticides: *Groundwater Basics http://www.oregon.gov/deq/FilterDocs/dwpGwBasics.pdf Managing Small-Scale Application of Pesticides: http://www.oregon.gov/deq/FilterDocs/EPASWPPacticesBulletin_PesticidesSmallScale.pdf <input type="checkbox"/> See DEQ factsheet “Pesticide use in the vicinity of drinking water sources” for additional regulations and recommendations: https://www.oregon.gov/deq/FilterDocs/dwppesticideuseVicdws.pdf
Large capacity onsite septic systems (serves > 20 people)	If not properly sited, designed, installed, and maintained, septic systems can impact groundwater and drinking water	<ul style="list-style-type: none"> <input type="checkbox"/> In addition to general Residential/Municipal Fact Sheets, send: *Managing Septic Systems to Prevent Contamination of Drinking Water http://www.oregon.gov/deq/FilterDocs/EPASWPPacticesBulletin_SepticSystems.pdf <input type="checkbox"/> Verify UIC registration and on-site permit with DEQ. <input type="checkbox"/> Get notification from DEQ on permit modifications <input type="checkbox"/> Upgrade septic systems and establish an ongoing septic system maintenance program. DEQ On-site permitting: http://www.oregon.gov/DEQ/Residential/Pages/Onsite.aspx <input type="checkbox"/> If applicable, ongoing education program for residents or businesses on household hazardous waste and proper disposal of pharmaceuticals. * Household Hazardous Waste Program: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/hw/Pages/hhw.aspx * Household Pharmaceutical Waste Disposal: http://www.oregon.gov/deq/FilterDocs/HouseholdPharmaceuticalWasteDisposal.pdf
Surface water - Rivers, streams, lakes, ponds, and wetlands in close proximity to wells	Infiltration of surface water into groundwater may carry contaminants such as bacteria, nitrates, metals, or synthetic chemicals to drinking water supply. Water bodies with known impairments/threats are listed on Oregon’s 303(d) list available	<ul style="list-style-type: none"> <input type="checkbox"/> Verify that wells and springs with surface water present within the 2-year Time-of-Travel Zone for wells or within Zone 1 for springs maintain low turbidity and remain e.coli free during and immediately following high rainfall events. <input type="checkbox"/> Consider strategies to improve/protect surface water quality especially within the 2-year Time-of-Travel / Zone 1 area based on aquifer sensitivity and degree of hazard. Strategies may include increased setbacks for chemical use/storage, riparian (river bank) protections to limit turbidity and overland flow, Integrated Pest Management (http://npic.orst.edu/pest/ipm.html), review of septic system operation and maintenance practices, review of recreational activity impacts (i.e. boating, campgrounds, etc.), and review of road maintenance practices.

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	<p>from DEQ. Localized contaminants to surface water / groundwater such as turbidity, bacteria, fuels, pesticides or other chemicals may not be identified by DEQ.</p>	<p>□ Contact DEQ’s basin coordinator (http://www.oregon.gov/deq/FilterDocs/basincoordinators.pdf) to inquire about water quality data and the quality of the surface water body. Drinking water protection staff can also help with relevant protection strategies. https://www.oregon.gov/deq/wq/programs/Pages/DWP.aspx</p> <p>Fact Sheets/Resources</p> <p>*Clean Boater Pledge and Guide (OSMB): https://www.oregon.gov/osmb/boater-info/Pages/Clean-Boater-Pledge.aspx</p> <p>*Clean Marina Program (OSMB): http://www.oregon.gov/OSMB/boater-info/Pages/Clean-Marinas.aspx</p> <p>* DEQ water quality assessment: https://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx</p> <p>*Riparian Protection (DEQ): https://www.epa.gov/nps/national-management-measures-protect-and-restore-wetlands-and-riparian-areas-abatement-nonpoint</p> <p>*Chemical Storage/Safety and Spill Prevention (EPA) http://www.oregon.gov/deq/FilterDocs/EPASWPPPracticesBulletin_ChemUseSmallQ.pdf</p> <p>If present, see also BMPs for “Septic systems”; “Stormwater Runoff”</p>
<p>Wastewater treatment, collection, and disposal sites. Includes lagoons, land application, wastewater treatment plants for residential, commercial, and agricultural wastewater.</p>	<p>If not properly designed, installed, and maintained, wastewater treatment areas can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells</p>	<p>□ Contact DEQ regional office water quality permitting staff to verify permit status and ensure permitted facilities are in compliance. https://www.oregon.gov/deq/Pages/Offices.aspx</p> <p>□ Notify the landowner or property manager of their location within your drinking water source area</p> <p>□ Get notification from DEQ on permit modifications: https://www.oregon.gov/deq/get-involved/pages/public-notices.aspx</p> <p>□ If applicable, ongoing education program for residents or businesses on household hazardous waste and proper disposal of pharmaceuticals.</p> <p>* Household Hazardous Waste Program: http://www.oregon.gov/DEQ/Hazards-and-Cleanup/hw/Pages/hhw.aspx</p> <p>* Household Pharmaceutical Waste Disposal: http://www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/Pharmaceuticals.aspx</p>
<p>Other – Contact DWP Program Staff for Assistance</p>		<p>□ Contact Drinking Water Protection staff for assistance in developing strategies to minimize the risk. https://www.oregon.gov/deq/wq/programs/Pages/dwp.aspx</p>