OREGON
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## Inside...



# OREGON'S PUBLIC DRINKING WATER SOURCES

**DRINKING WATER SOURCE MONITORING**

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## OVERVIEW

The Oregon Department of Human Services (DHS) and Oregon Department of Environmental Quality (DEQ) drinking water protection team recently developed and implemented a first-phase "2008-09 Drinking Water Source Monitoring" project. The project was funded through the federal Drinking Water Revolving Fund set-asides for local assistance-drinking water protection. The project collected screening level data from drinking water sources within areas supporting multiple land uses. This data was collected to determine whether there are potential human health concerns from contaminants not currently regulated under the federal Safe Drinking Water Act. Project leaders also sought to determine pollution prevention and technical assistance priorities for drinking water sources.

[Editor's Note: In addition to numerous "contaminants of emerging concern" gaining notoriety nationally (see below), many commercial chemical compounds are unique to Oregon, the result of manufacturing practices that result in many such compounds being routinely left off national monitoring lists — practices which also occur in other states.]

Staff from DEQ's Laboratory and Environmental Assessment Division collected groundwater and surface water samples from 13 drinking water sources identified as particularly susceptible to contamination through assessments conducted earlier by DHS and DEQ (see Stewart, ***Insider*** #373). In 2008 and 2009, laboratory staff collected samples above the surface water intakes serving the cities of Detroit, Gold Hill, Jefferson, Riddle, Seaside, and Hillsboro. They also collected samples at the supply wells for Independence, Oakridge, Keizer, Spray, Avion (Bend), Vale, and Whispering Pines Mobile Lodge in Corvallis.

SAMPLES WERE ANALYZED FOR A BROAD ARRAY OF SEVERAL HUNDRED COMPOUNDS, INCLUDING:

- Oregon-specific herbicides
- Insecticides
- Pharmaceuticals
- **V**olatile **o**rganic **c**ompounds ("VOCs"— including cleaners)
- Fire retardants
- **P**olycyclic **a**romatic **h**ydrocarbons (PAHs)
- Plasticizers

DHS reviewed and interpreted analytical results from the DEQ laboratory and gave the information to the individual public water systems. Data from the project shows that

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very low measurable levels of some contaminants are present in these water sources, and that these levels are far below applicable standards or guidelines where those exist. The project team will start a new phase of monitoring this spring, focusing on systems with one primary type of risk/land use in the source area and those where community officials have requested state testing due to potential high risks of future contamination.

## PUBLIC WATER SYSTEMS & OVERSIGHT

***"Primacy"***

DHS is responsible for oversight of drinking water quality at public water systems statewide. DHS is also responsible for administering and enforcing national drinking water regulations established by the US Environmental Protection Agency (EPA) under the federal Safe Drinking Water Act (SDWA), through an arrangement with EPA called "Primacy." Under Primacy, DHS adopts state regulations that are no less stringent than federal regulations, and DHS enforces those regulations directly with public water suppliers. EPA oversees the DHS Primacy program.

***"MCLs"***

SDWA regulations require public water systems to meet **m**aximum **c**ontaminant **l**evels (MCLs), or in some cases, treatment technique requirements, for specific regulated contaminants in water delivered to users for drinking. EPA has established MCLs or treatment techniques for 91 contaminants, taking into account both protection of public health and the level of environmental protection that water systems can achieve using the best available water treatment technology.

***Oregon Systems***

About 2,700 public water systems in Oregon are subject to regulation under the federal Safe Drinking Water Act. Public water systems are defined as those serving 25 or more people at least 60 days per year. Community water systems have 15 or more service connections used by year-round residents. Currently, 882 community water systems serve an estimated 3.2 million Oregonians. Another 346 are non-transient, non-community water systems including schools or workplaces with independent water supply systems that serve the same people day after day. The remaining 1,471 are transient non-community water systems serving transient populations such as campgrounds, parks or restaurants with their own independent water supply systems. An additional 921 very small water systems, those serving 10 to 24 people each and representing approximately 16,000 Oregonians, are subject only to state regulations under the Oregon Drinking Water Quality Act. Not covered by either state or federal drinking water standards are an estimated 600,000 Oregonians who get their drinking water from individual home wells.

## ASSESSING & PROTECTING DRINKING WATER SOURCES

### THE 2005 ASSESSMENTS

***SDWA Amendments***

Amendments made to the federal Safe Drinking Water Act in 1996 directed and empowered state drinking water programs to begin or expand efforts to protect sources of drinking water. In Oregon, DHS partnered with DEQ to jointly carry out a statewide drinking water source protection effort. DHS secured available set-aside funds from Oregon's allocation of the Drinking Water Revolving Fund, and the agencies began joint efforts to 1) conduct assessments of public drinking water sources, and 2) work with local communities to assist them in implementing local protection efforts.

***Locating Risks***

In 2005, DHS and DEQ completed source water assessments for all Oregon public water systems. The agencies used geologic data and **g**eographic **i**nformation **s**ystem (GIS) technology to produce maps delineating the source areas for all groundwater wells and surface water intakes. The agencies also identified locations of potential risks from 98 separate land uses and activities. They found that more than 15,500 of these potential contaminant risks were in source areas upstream and upgradient of public water systems. All of this data is compiled in a database and used frequently for research and strategic planning; the information can be accessed at: www.deq.state.or.us/wq/dwp/dwp.htm

***Top Surface Water Risks***

THE TOP FIVE POTENTIAL CONTAMINANT RISKS IDENTIFIED FOR SURFACE DRINKING WATER SOURCES WERE:

- Managed/clear-cut forests
- Irrigated crops
- Grazing animals (>5/acre)
- Above-ground fuel/chemical tanks
- Auto repair shops

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***Top Groundwater Risks***

THE TOP FIVE POTENTIAL CONTAMINANT RISKS IDENTIFIED WITHIN GROUNDWATER SOURCE AREAS WERE:

- High-density housing (including onsite septic systems)
- Transportation corridors
- Above-ground fuel/chemical tanks
- Irrigated crops
- Underground fuel storage tanks

***Tiered Risk Ranking***

Using the data from the source water assessments, DHS and DEQ were able to identify the Oregon public water systems that have high susceptibility to risks of contamination. Database queries and GIS were used to rank the systems into four tiered groups — i.e., Tiers 1 through 4. Tier 1 systems are considered at highest risk due to the number and proximity of the individual contamination risk sites, and the sensitivity of the source area where those contaminant risks are located. The groundwater recharge or source areas considered "sensitive" included those within a two-year time-of-travel zone from each well and having shallow depths, alluvial sediments or fractured bedrock in the recharge zone, plus a high infiltration potential. Characteristics of sensitive areas within surface water watersheds include: high-erosion soils; high slopes; and high-infiltration soils (especially those near the streambanks) and those areas within 1000 feet of midstream.

The project team analyzed and ranked 211 surface water intakes. For surface water, 47 systems fell within the Tier 1 ranking of high risk, 40 were within Tier 2, and 31 were in Tier 3. Out of 1,827 groundwater sources analyzed, 569 were in Tier 1, 324 were in Tier 2, and 289 were in Tier 3.

***Susceptibility Analysis***

Susceptibility analysis for Oregon public water systems has two important uses. The data allows DEQ and other natural resource agencies to prioritize technical assistance and grants and develop work plans for monitoring and potential research. This analysis also provides public water suppliers with information on where their greatest risk occurs and where to focus their available resources for protection. The identification of the high-risk systems has already served as an important tool for determining priorities for drinking water protection work.

***Cost & Risk Avoidance***

Oregon communities need safe and reliable sources of drinking water for homes and businesses. Safe drinking water supplies are dependent upon well-maintained and operated treatment systems and distribution networks. However, drinking water supplies are also dependent on the quality of the source waters used. Protecting the drinking water source areas in Oregon is vitally important for reducing the future costs of treatment, as well as reducing any health risks associated with the contaminants that are not addressed through current drinking water regulatory requirements.

## CONTAMINANTS OF EMERGING CONCERN

***New Compounds***

The issue of contaminants of emerging concern gained significant attention recently, after the US Geological Survey (USGS) released national monitoring data results. Several USGS monitoring sites included Oregon waters. New chemical compounds were identified in local surface water and groundwater resources, similar to those found across the country and including pesticides, pharmaceuticals, and personal care products. Agencies and water suppliers in Oregon recognized the potential for these pollutants to be in Oregon's drinking water sources after reviewing the USGS data.

## SOURCE WATER MONITORING PROJECT PLANNING

***Unrequired Monitoring***

The SDWA does not require that source waters supplying public drinking water systems be monitored – only the finished or treated water must be monitored by public water suppliers prior to delivery to customers. In order to learn more about the quality of the source waters serving public water systems, DHS and DEQ developed a plan to monitor the source waters upstream of surface water intakes and at groundwater wells serving about a dozen selected public water systems. Data previously collected as part of the Source Water Assessment project, as well as a Susceptibility Analysis project helped to determine the priorities for the first phase of the sampling plan. The chemical compounds selected for the sampling plan include many not currently addressed in SDWA requirements.

***Determining Priorities***

The goal of this Drinking Water Source Monitoring project is to determine future program priorities based on actual data.

THIS FIRST PHASE (2008-09) OF THE STUDY HAD THREE PRIMARY OBJECTIVES:

1) Collecting and analyzing samples from surface water and groundwater for a list of contaminants of interest

 

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2) Using the results as screening-level data on whether there are potential human health concerns beyond those contaminants currently regulated under SDWA regulations in the drinking water systems that were determined to be at higher risk (Tier 1) from the upstream potential sources of contamination
3) Using the study results to improve strategic planning and determine priorities for technical assistance and pollution prevention

### *Selecting Sampling Sites*

To select sampling locations, the project team first performed database queries for existing water quality data. As most upstream and upgradient source areas do not have established ambient monitoring stations for drinking water parameters, this step did not prove to be immediately useful. The susceptibility analysis results were then used to select priorities. Public water systems were selected from the Tier 1 group and those with a variety of land uses and activities in their source areas were ranked the highest. In the initial 2008-09 round of sampling, the DHS/DEQ team determined that it would be most useful to choose locations that represented a cross-section of land uses or activities. For surface water systems, sampling sites included Mackey Creek (City of Detroit), Rogue River (City of Gold Hill), Santiam River (City of Jefferson), Cow Creek (City of Riddle), Necanicum River (City of Seaside) and the Tualatin River (City of Hillsboro/Joint Water Commission). For groundwater systems, the wells were from the Independence Water System, City of Oakridge, City of Keizer, City of Spray, Avion Water Company (Bend), City of Vale, and Whispering Pines Mobile Lodge (near Corvallis).

### *Priority Contaminants*

In developing a priority "contaminants of interest" list of pollutants, the DHS/DEQ team employed a number of resources, including: recent national USGS emerging contaminant data in drinking water source areas; an analysis of current unmonitored pollutants used in Oregon; other state source monitoring programs; and consultations with environmental toxicologists at Oregon State University and DHS that have public health/drinking water expertise.

### *Data Sources*

DATA SOURCES FOR PRIORITIZING WITHIN EACH GROUP OF POLLUTANT INCLUDED:

- USGS national detection data on pharmaceuticals (Dana Kolpin, primary author, see USGS website: http://toxics.usgs.gov/pubs/OFR-02-94/index.html see also: http://toxics.usgs.gov/regional/emc/)
- Cleaners
- **V**olatile **o**rganic **c**ompounds (VOCs)
- Fire retardants from a 2007 analysis of Oregon's highest risks from household chemicals (see DEQ Household Hazardous Waste website: www.deq.state.or.us/lq/sw/hhw/index.htm)
- Pesticides used in Oregon forestry from Oregon Department of Forestry records
- Pesticides used in Oregon agriculture from a 2002 DEQ Willamette Valley study
- Pesticide Stewardship Partnership data (see Masterson, ***Insiders*** #400; #416/417 & #442) and past DEQ monitoring in other agricultural areas around the state

In addition, other high-risk chemicals were added for review by DHS toxicologists based on recent public water system monitoring results and national data analysis from EPA's drinking water records.

### *Oregon "Contaminants of Interest"*

After developing lists within each pollutant group, agency toxicologists selected final priorities based on determinations of potential risks to public health. Most of chemical compounds that were analyzed are not currently regulated under the SDWA. The project team identified more than 50 compounds as "contaminants of interest" for drinking water in Oregon.

OREGON CONTAMINANTS OF INTEREST INCLUDE:

- Herbicides (total of 12 from agriculture/forestry/urban land uses or sources)
- Insecticides (12 from agriculture/urban sources)
- Fungicides (three from agriculture/forestry sources)
- Metals (copper, arsenic, mercury)
- Bacteria/pathogens (coliform from human and animal wastes)
- Drugs (five from human waste discharge from onsite or wastewater treatment plants)
- Cleaners/VOCs (seven from wastewater/industry sources)
- Fire retardants (three from wastewater/urban sources)
- PAHs (five from combustion-air deposition/runoff from industrial or urban sources)
- Plasticizers (one from industry/urban sources)

### *Methodology Expands List*

When DEQ Laboratory staff analyzed for these 50 compounds, the list significantly expanded in number as analysis methods were selected. For example, the method analysis for semi-VOCs by gas chromatograph/mass spectrum includes approximately 126 compounds. Included in the expanded analysis were also: 67 VOCs; 32 pesticides; and 16 metals. Additional analytes were reported and summarized as part of the chemical analysis results and, overall, the final laboratory reports included 272 compounds.

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***Sampling Methods***

DEQ Laboratory staff took samples in May/June of 2008, October 2008 (for all sites), and then in June 2009 (for re-testing three wells). The sampling locations included source water upstream of six individual public water system intakes and the wells serving seven individual public water systems. For the surface water sites, samples were collected from a point near the intake, then approximately 200 feet and 400 feet upstream of the intake. At one system, samples were collected at both of the intakes, located on two separate reaches of stream segments (six public water systems; seven sites sampled). Actual field locations where samples were collected depended on access to the river or stream. At the groundwater wells, staff collected samples from a pre-selected well at the first access point after the water was pumped above ground. In two wells, there was no access prior to chlorination so many of the organic compounds could not be analyzed with an adequate degree of confidence. Due to the access issues, only five of the groundwater wells had all analytes reported in the results.

## TESTING: KEY FINDINGS

***Low Level Results***

The data from the 2008-09 testing revealed that there are very low levels of contaminants present in the source waters sampled. DHS toxicologists analyzed DEQ's laboratory results to provide interpretative information to the public water supplier and local community officials at each source water site. DHS compared the sample results to: current SDWA drinking water standards; secondary standards; or health guidance levels in scientific publications and toxicological research information. Most contaminant levels were orders of magnitude lower than any established standards or regulatory limits.

***Sampling Summary***

2008-09 SOURCE WATER SAMPLING RESULTS MAY BE BROADLY SUMMARIZED AS FOLLOWS:

- 28 percent of samples analyzed from surface water sources had at least one contaminant
- 22 percent of samples from wells had at least one contaminant
- Two groundwater samples (at one well) were found to have arsenic and manganese at levels above the secondary drinking water standards
- Eight surface water samples (at five intakes) were found to have aluminum at levels above the secondary drinking water standards
- The highest number of contaminant detections in surface water included microbes, steroids/hormones, metals, phthalates, and pesticides
- The highest number of contaminant detections in groundwater included steroids/hormones (cholesterol), metals, and pesticides (Atrazine)
- One surface water source contained three pharmaceuticals at low levels: Sulfamethoxazole (an antibiotic), Carbamazepine (a mood stabilizer), and Diphenhydramine (an antihistamine)

***Specific Compounds***

In the surface water sources sampled, the insecticide DEET was found at 85 percent of the sites, the herbicides Atrazine and Diuron were found at 43 percent of the sites and Fluometuron was detected at 28 percent of the sites. Overall, pesticides were present in 29 percent of surface water source samples, but the highest concentrations were at levels below the state's water quality criteria for aquatic life, health-based levels, or drinking water standards (where available). Diethylphthalate and Bis(2-ethylhexyl)phthalate were found at 57 percent of the sites. Metal compounds were identified in almost half of the sites sampled. The highest number of detections included aluminum (at 100 percent), barium and manganese (at 57 percent). Since most metals in Oregon waters are from natural sources and attach to suspended clays in streams, it is not unusual to find high concentrations in source waters. Where the secondary maximum contaminant levels were exceeded for aluminum and manganese, the levels are likely significantly reduced by the drinking water treatment facility. Conventional treatment processes reduce turbidity and suspended solids from the source water with filtration. Finished drinking water samples at these public water systems met the established federal drinking water standards.

In the groundwater sources, the herbicide Atrazine was detected in 40 percent of the samples, but the levels never exceeded the drinking water standard. In the limited number of samples that were analyzed for steroids and hormones, all of them had coprostanol (considered a marker for human wastes). This can come from both onsite septic systems, as well as from wastewater treatment discharges upstream. Arsenic and manganese were also found in high concentrations at separate sample sites (arsenic is a very common natural contaminant in Oregon's groundwater). The high levels of both arsenic and manganese are indicative of geologic formations supplying the well water. In many areas of Oregon, these metals are quite common and treatment is necessary to reduce those levels where the drinking water standards are routinely exceeded. Metals were found at about half of the well sites sampled, but most were well within acceptable drinking water standards.

 

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***Site-by-Site Evaluation***

As part of the project's susceptibility analysis, DEQ also evaluated land uses/activities for source areas of each of the intakes and wells. Project staff conducted further evaluation of potential sources of contaminants on a site-by-site basis for each contaminant detected. These sources likely arise from multiple land uses and activities in the watershed or recharge area for the wells. Since the levels were very low in this initial sampling project, DHS and DEQ will use the data analysis to determine potential associations with sources and to provide technical assistance to public water systems to reduce concentrations of source water contaminants.

***Contaminants & Sources***

## DATA ANALYSIS: POTENTIAL SOURCES

### Key Findings: Surface Water Supplies

PRESENT CONTAMINANTS AND THEIR POTENTIAL SOURCES INCLUDE:

- MICROBES (E. COLI), STEROIDS & HORMONES are human waste byproducts and are likely from upstream wastewater discharge, high-density onsite septic systems discharging to groundwater, or heavy recreational uses.
- METALS can be from industrial or wastewater discharge, but most likely come from natural suspended clays in streams. In surface waters where metals were found, the concentrations were higher in the spring, which may be indicative of potential agricultural fertilizer sources.
- PHTHALATES are contaminants from plastics, perfumes, car care products, cosmetics and flooring. Phthalates in surface water can come from the breakdown of PVCs, plastics or flooring materials. Other very likely sources are wastewater discharges and high-density housing with onsite septic systems, since the compounds are found in so many household products.
- PESTICIDES can enter surface waters from agricultural fields, forests, urban lawns, and roadside spraying. Results from this drinking water source monitoring suggest the primary sources are orchards, irrigated crops, harvested forests, and high-density housing. The insect repellant DEET enters surface waters from swimmers or wastewater from baths/showers after application to skin. DEET is very persistent once it enters a water body.
- PHARMACEUTICALS were detected in source waters that have both multiple wastewater treatment discharges upstream, as well as high-density housing using onsite wastewater disposal. It is well documented that drugs are primarily found in human urine and can also come from improper disposal of unused drugs in toilets.

### Key Findings: Groundwater Supplies

PRESENT CONTAMINANTS AND THEIR POTENTIAL SOURCES INCLUDE:

- STEROIDS & HORMONES are very likely linked to human waste byproducts released through onsite septic systems into groundwater. The most common marker of these byproducts is coprostanol, found in human feces.
- METALS are very common in Oregon's groundwater resources from natural geologic formations but are also found in stormwater runoff/infiltration from urban areas and agricultural fertilizer applications.
- PESTICIDES are found at low levels in wells surrounded by agricultural activities and high-density housing. Household lawn applications of pesticides can contribute as many pesticides to local groundwater resources as large-scale crop irrigation and spraying.

## OTHER RELEVANT STUDIES

### SIMILAR RESULTS

Other recent studies have also identified contaminant levels of concern in Oregon drinking water sources and are discussed below.

***Clackamas River Study***

**Clackamas River Monitoring & Testing**

DEQ has conducted pesticide monitoring in the Clackamas River since 2005. This river serves as the source of drinking water for more than 380,000 citizens. DEQ sampling results showed two insecticides at levels that exceed state water quality criteria. DEQ is collaborating with USGS on this project, along with the local Soil and Water Conservation District, Clackamas River Basin Council, Oregon State University Extension Service, and Oregon Department of Agriculture. DEQ and the other state agencies are working to develop benchmarks for pesticides of concern because the state does not have water quality standards for many of them. This will result in a statewide Pesticide Management Plan that will prioritize pesticides of concern and list a set of desired actions to deal with these pesticides. With this data, DEQ and the Oregon Departments of Agriculture and Forestry can work with pesticide producers and applicators in the basin to reduce pollutant loads to levels that do not pose public health risks.

***Pesticide Management***

The USGS also conducted extensive monitoring for other contaminants in the Clackamas River starting in 2002. Sample results found 63 pesticides in source water and 15 pesticides in treated water.

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***Clackamas Toxics of Concern***

Twelve of the pesticides in finished drinking water do not have maximum contaminant levels set by state or federal agencies. For the three pesticide contaminants that do have standards, the treated Clackamas River water meets federal standards for drinking water. USGS has developed health-based screening levels for most pesticides without drinking water standards. The pesticides and other detected concentrations in the raw drinking water sources were very low and did not exceed any of the screening levels established thus far by USGS. Other toxics of concern found in this drinking water supply included various plasticizers, disinfection byproducts and volatile organic compounds, including benzene and toluene ("*Concentration Data for Anthropogenic Organic Compounds in Ground Water, Surface Water, and Finished Water of Selected Community Water Systems in the United States, 2002-05*" USGS: 2007). This new data is particularly useful in identifying specific sources and land uses that are contributing toward pollutants. This will assist DEQ and other natural resource agencies in making better decisions about how to prevent contamination in source waters.

**National Studies**

***Lower Oregon Percentages***

When Oregon's results are compared with national data from USGS and other researchers, DHS and DEQ find that *most of the Oregon percentages are lower for contaminant detections*. In a national reconnaissance study, USGS found that human waste byproducts, several nonprescription drugs, the insect repellent DEET and detergent metabolites were all found at detection frequencies above 75 percent. During 2008 and 2009, Underwriters Laboratories Inc. (UL) conducted analyses of more than 200 finished drinking water samples from across the United States. This data included samples from 145 public water systems in 29 states. UL routinely conducts regulatory testing for SDWA compounds, but in this project also tested for a broad range of pharmaceuticals. Cotinine, a nicotine metabolite, was found in 57 percent of the samples. A synthetic fragrance, Galaxolide, was found in 53 percent of the samples. The most common prescription drug found was Carbamazapine, an anti-depressant, at 46 percent. DEET insect repellent was found in 41 percent of the samples. UL is quick to point out that this data is limited — of the top 120 drugs now prescribed in the United States, only a couple of those have laboratory standards currently available. The vast majority of prescription drugs cannot be measured in drinking water or source water.

***Standards Lacking***

***New Measurement Capabilities***

***Widespread Findings***

There are many other research projects underway to test for emerging contaminants in drinking water sources and treated water. The majority of analytical results in drinking water tests reveal very low concentrations. Until recently, chemists did not even have the technology to measure the compounds at parts-per-billion or parts-per-trillion levels. It is clear now, however, that these personal care products and pesticides and drugs are found virtually in every stream tested in the country where humans reside or recreate. State agencies also recognize that drinking water treatment plants cannot completely eliminate toxic contaminants from source waters.

## POLLUTION REDUCTION PROGRAMS

### RESULTS SUPPORT EXPANDING PARTNERSHIP EFFORTS

***Reduction Efforts***

DHS and DEQ will use data from this Drinking Water Source Monitoring project to prioritize drinking water source areas for other partnership programs. These projects can be implemented with the help of DEQ and DHS drinking water protection staff within source areas for drinking water intakes or wells.

***Pesticides***

In its existing Pesticide Stewardship Partnership projects, DEQ and its partners work to identify streams with elevated levels of pesticides and to find ways to reduce contaminant drift and runoff in those streams, using a collaborative, voluntary approach. The goals include developing better monitoring of pesticides and improved pesticide management and reduction strategies. These projects have been successful in reducing both the levels of pesticides in streams, as well as the potential risks from stored pesticides picked up through collection events documented in five basins. SDWA monitoring across Oregon shows 53 public water systems with consistent detections of pesticides. These are areas where the drinking water protection staff can focus small-scale Pesticide Stewardship Partnership projects using the existing successful strategy.

***Turbidity***

To address existing turbidity problems, DEQ is currently working with 15 public water systems to research and document water quality issues associated with nonpoint sources. Many of these systems have chronic problems with high turbidity — some so severely that system intakes must be shut down periodically due to extremely high turbid water. High turbidity levels can also carry additional contaminants into and through the treatment facilities. This DEQ research study included collection of raw water data, interviews with operators, GIS research on land uses, and field inspections. The final report, which is expected in early 2010, will provide an analysis of the turbidity impacts for public water systems. This data will also be used to develop climate change projections and identify strategies for protecting the most vulnerable systems from losses due to landslide-causing storms and land-use changes.

***Report Expected***

 

***Drinking Water Sources***

***SB 737 Tie-In***

***Treatment Plant Monitoring***

As part of DEQ's drinking water protection strategies, the agency has mapped on GIS the intakes of all public water systems and outfalls of all facilities permitted under the federal Clean Water Act's National Pollutant Discharge Elimination System program ("NPDES program"— administered in Oregon by DEQ). An estimated 208 publicly-owned wastewater collection/treatment systems serve the majority of Oregon's urban centers. There are 52 that process more than 10 million gallons per day. These 52 large wastewater treatment plants are part of a statewide project designed to reduce toxics discharged into Oregon waterways. (see Grabham, ***Insider*** #448 and SB 737 article, ***Insider*** #453) DEQ's Priority Persistent Pollutant List process identified 118 toxic pollutants that persist in the environment and/or accumulate in animals. DEQ will require monitoring for these pollutants at these 52 treatment plants. These facilities must also develop toxics pollutant reduction plans those pollutants that exceed trigger levels set by DEQ. Sixteen of these facilities are upstream of public water system intakes. Pollutant reductions in treatment plant discharges will ultimately reduce the pollutants in the drinking water sources. Drinking water protection staff will be available to assist communities upstream of intakes as they seek to reduce the toxic compounds in discharges from wastewater treatment plants.

## NEXT STEPS

***Determining "Safe"***

EPA and state public health and environmental agencies across the country are seeking to address emerging contaminant issues in drinking water. Determining what is "safe" water for public health and aquatic health is difficult. There are many toxic contaminants for which there are no national or international drinking water standards. The synergistic and cumulative effects of the various compounds that have been detected in water are not known. DHS and DEQ will continue to track the new data and toxicological research and adjust work plans and priorities as necessary. The drinking water protection efforts are also closely linked to other current DEQ and DHS toxics monitoring and pollution prevention initiatives, especially the DEQ Toxics Reduction project (see Masterson, ***Insider*** #452) and the Oregon Toxics Monitoring Program (see: www.deq.state.or.us/lab/wqm/toxics.htm).

***Continuing Efforts***

**Drinking Water Source Monitoring Phase II**

In 2010, DHS and DEQ will move into Phase II of the Drinking Water Source Monitoring project. This will likely include sampling locations with more specific sources of potential contaminants. The DHS/DEQ team is currently evaluating several options for the next set of sampling locations.

CURRENT THINKING IS THAT PHASE II WILL COMBINE TWO CRITERIA, including:

1) Source areas for public water systems that have requested monitoring and have verified susceptibility to contaminants, and where those risks encompass large portions of the watershed or recharge area. About 25 percent of the Phase II monitoring can be dedicated to those systems that request monitoring based on known risks and concerns. This would address important strategic objectives; since 2003, the agencies' strategic plan has included an objective to address specific concerns from public water systems, environmental health officials or local/county governments.
2) Those public water system source areas with discreet risks of contamination in close proximity to intakes or wells. These would include systems that have large-scale, single land-use risks or activities that are high-priority Tier 1 and 2 systems. For example, intakes or wells would be sampled where source areas include all agriculture, all urban, an NPDES-permitted facility discharge just upstream, or all forests. This will allow DHS and DEQ to determine more about those individual sources and corresponding risks.

## CONCLUSION

***No Immediate Health Concern***

Based on current scientific literature and research, data generated from the first phase (2008-09) of the Drinking Water Source Monitoring project does not suggest there is reason for immediate public health concern. Through the drinking water protection efforts, DHS and DEQ will continue to work to reduce levels of contaminants in source waters to provide the highest quality waters to public water system treatment plants. Reducing levels of contaminants in source waters serving public water systems will translate into safer drinking water after treatment.

***On-Going Strategies***

DEQ and DHS drinking water team will continue to prioritize statewide program efforts and local technical assistance using all available data sources. The near-term strategy for addressing new "emerging" micro contaminants includes: collecting more specific data to assess drinking water risks; continuing to evaluate potential exposure risks based on scientific research; and actively minimizing the input of toxics from known sources (primarily by waste collection events and public education).

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