

# Oregon Wellhead Protection Program Guidance Manual

## Part 1

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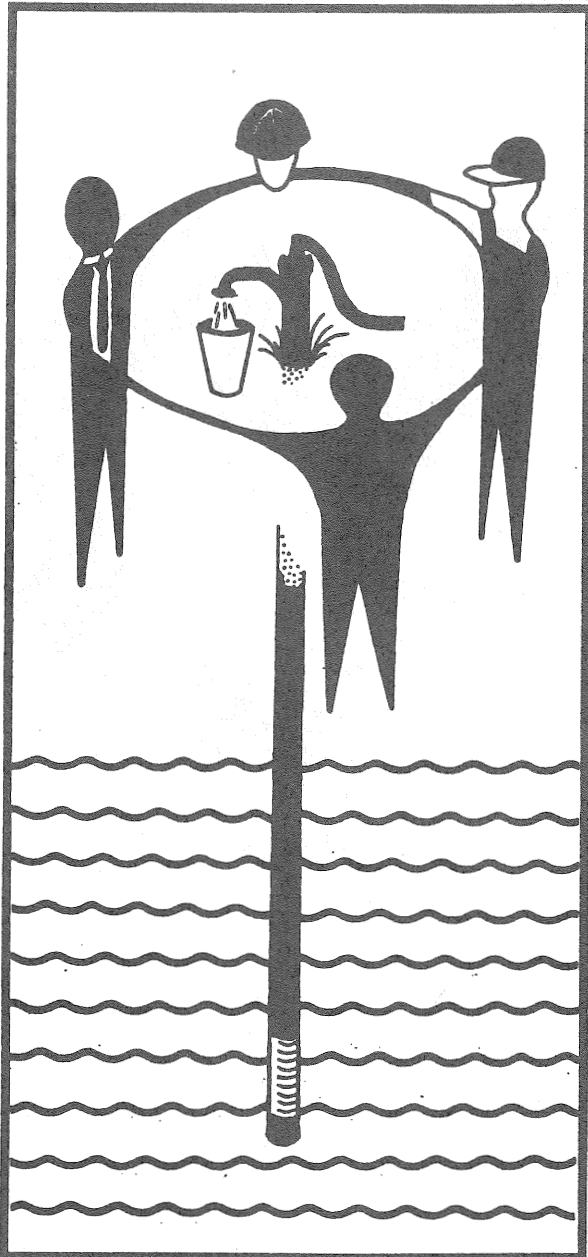
This document was originally developed in 1996 by OHS–Drinking Water Services (then a part of Oregon Health Division) and Oregon Department of Environmental Quality. It continues to serve as a valuable resource today.

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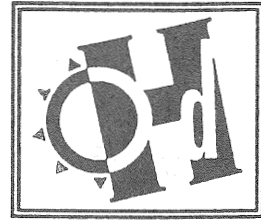


**Oregon  
Wellhead Protection  
Program  
Guidance Manual**

**May 1996**  
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**Department of Environmental Quality  
&  
Oregon Health Division**

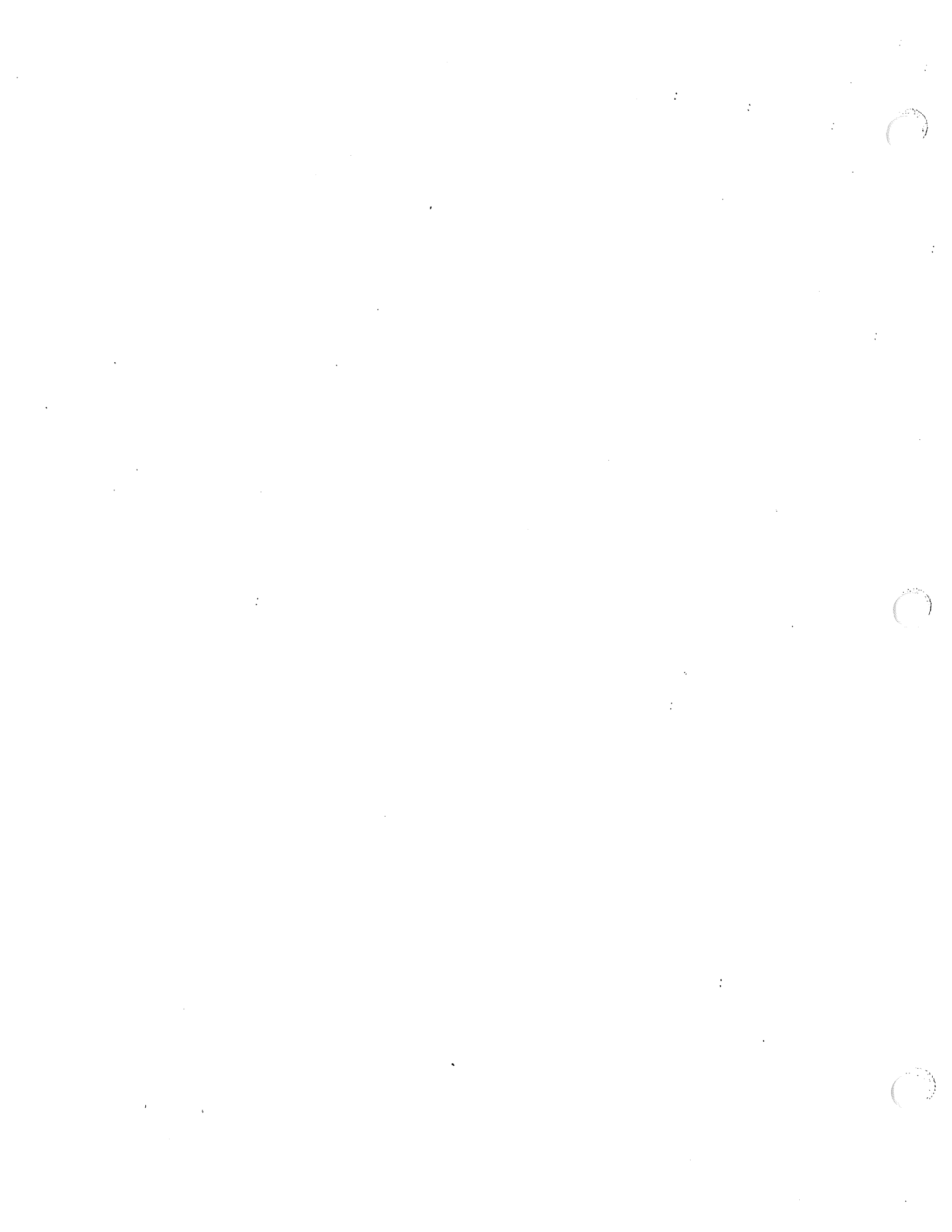




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# **Oregon Wellhead Protection Program Guidance Manual**

*Includes:*

**OAR 340-40-140 through -210  
OAR 333-61-020, -050, -057, & -065**

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## **"NOTICE"**

*This guidance applies to the voluntary development of wellhead protection plans in Oregon. It is intended solely as guidance for local jurisdictions and state officials implementing and certifying individual wellhead protection plans. Compliance with or use of these guidelines does not waive requirements from any other rules or statutes in Oregon.*

*Provided resources are available, the Oregon Department of Environmental Quality and Oregon Health Division will update this Guidance Manual in approximately two years (or earlier if necessary). We are always open to suggestions for changes or improvements to the document. Feel free to contact us at:*

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# ACRONYMS

<b>BMP</b>	<i>Best Management Practices</i>
<b>CERCLA</b>	<i>Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)</i>
<b>CFR</b>	<i>Calculated Fixed Radius</i>
<b>CWS</b>	<i>Community Water System</i>
<b>DEQ</b>	<i>Department of Environmental Quality</i>
<b>DFW</b>	<i>Department of Fish and Wildlife</i>
<b>DLCD</b>	<i>Department of Land Conservation &amp; Development</i>
<b>DOGAMI</b>	<i>Department of Geology and Mineral Industries</i>
<b>DP&amp;R</b>	<i>Department of Parks and Recreation</i>
<b>DSL</b>	<i>Division of State Lands</i>
<b>DWS</b>	<i>Drinking Water Section of OHD</i>
<b>EPA</b>	<i>U.S. Environmental Protection Agency</i>
<b>EQC</b>	<i>Environmental Quality Commission</i>
<b>FIFRA</b>	<i>Federal Insecticide, Fungicide and Rodenticide Act</i>
<b>MCL</b>	<i>Maximum Contaminant Level</i>
<b>MSDS</b>	<i>Material Safety Data Sheet</i>
<b>NAPL</b>	<i>Non-Aqueous Phase Liquid</i>
<b>NINCWS</b>	<i>Nontransient Noncommunity Water System</i>
<b>OAR</b>	<i>Oregon Administrative Rules</i>
<b>ODA</b>	<i>Oregon Department of Agriculture</i>
<b>ODF</b>	<i>Oregon Department of Forestry</i>
<b>ODOT</b>	<i>Oregon Department of Transportation</i>
<b>OEM</b>	<i>Oregon Emergency Management Division</i>
<b>OHD</b>	<i>Oregon Health Division</i>
<b>ORS</b>	<i>Oregon Revised Statutes</i>

# ACRONYMS

<i>OSU</i>	<i>Oregon State University</i>
<i>PPB</i>	<i>Parts Per Billion (=micrograms per liter [<math>\mu\text{g/L}</math>])</i>
<i>PPM</i>	<i>Parts Per Million (=milligrams per liter [<math>\text{mg/L}</math>])</i>
<i>POTW</i>	<i>Publicly Owned Treatment Works</i>
<i>PWS</i>	<i>Public Water Supply</i>
<i>RCRA</i>	<i>Resource Conservation and Recovery Act</i>
<i>SARA</i>	<i>Title III – Superfund Amendments and Reauthorization Act of 1986</i>
<i>SDWA</i>	<i>Safe Drinking Water Act</i>
<i>SFM</i>	<i>State Fire Marshal</i>
<i>SOC</i>	<i>Synthetic Organic Contaminant</i>
<i>SQG</i>	<i>Small Quantity Generator</i>
<i>SWCD</i>	<i>Soil and Water Conservation District</i>
<i>SWL</i>	<i>Static Water Level</i>
<i>TNCWS</i>	<i>Transient Noncommunity Water System</i>
<i>TOT</i>	<i>Time of Travel</i>
<i>TSCA</i>	<i>Toxic Substances Control Act</i>
<i>UST</i>	<i>Underground Storage Tank</i>
<i>USGS</i>	<i>United States Geological Survey</i>
<i>VOC</i>	<i>Volatile Organic Contaminant</i>
<i>WHP</i>	<i>Wellhead Protection</i>
<i>WHPA</i>	<i>Wellhead Protection Area</i>
<i>WRD</i>	<i>Water Resources Department</i>
<i>WRGC</i>	<i>Wellhead Rules and Guidance Committee</i>
<i>ZOC</i>	<i>Zone of Contribution</i>
<i>ZOI</i>	<i>Zone of Influence</i>

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# 1

## GENERAL INFORMATION

### 1.1 NEED FOR WELL-HEAD PROTECTION

**P**rotection of Oregon's groundwater resources is critical to accommodate a growing population and to support the continued economic health of Oregon. Groundwater is a critical natural resource that provides Oregonians with water for drinking, agriculture, and industry. Almost half of the state's population (48 percent or 1.4 million people) is dependent upon groundwater for their daily needs, while 77 percent (or 2.3 million) of the state's population is at least partially dependent upon groundwater used at home, work, or school. This figure includes the larger metropolitan areas which use groundwater as a backup water supply.

There are approximately 3,450 public water systems in Oregon. Public water systems are defined as those having four or more service connections or are used by 10 or more individuals per day at least 60 days per year.

Recent inventory shows that 88 percent of Oregon's public water systems rely at least in part on groundwater for their source of supply (permanent or emergency). There are also an estimated 300,000 domestic wells in use in Oregon. According to the Water Resources Division (WRD), the demand for groundwater has doubled over the last 20 years, from 3.3 billion gallons per day to 7.0 billion gallons per day in 1990.

In Oregon, DEQ estimates that public water suppliers and industry use about 7 percent each of the resource, agriculture uses 75 percent for irrigation, and 11 percent is used for livestock watering and rural domestic uses. The majority of wells are in shallow, unconfined aquifers (under 200 feet deep) which are common to most of Oregon's valleys. Most of Oregon's existing developed areas and those likely to grow in the next 20 years are located over unconfined aquifers which are generally the most sensitive to pollution. These very vulnerable areas of Oregon's valleys (and alluvial sediments) are extensive. Efforts to

protect groundwater at the local and state levels can be more efficiently directed if wellhead protection areas are known. This will allow us to focus our limited resources on priority areas first.

Domestic use is considered to be the use that requires the highest level of water quality and where potential groundwater pollution would have the greatest adverse impact on beneficial uses. Under current federal and state laws, assurances that public water systems meet drinking water standards are accomplished through monitoring and treatment. The Oregon Health Division (OHD) is responsible for administering both state and federal drinking water laws under ORS Chapter 448. This includes overseeing the sampling and analysis for over 100 different contaminants. The most current list of these contaminants, along with the maximum contaminant levels allowed by EPA, are provided in Table 1-1. **As of late 1995, OHD has reported detections of at least one of these contaminants in 383 (11%) of the**

**Table 1-1: Contaminants and Maximum Levels**

Name		mg/L	Name		mg/L
<b>Inorganic</b>	Antimony (Total) <sup>†</sup>	0.006	<b>volatile Organic</b> (Continued)	o-Dichlorobenzene	0.6
	Arsenic	0.05		p-Dichlorobenzene	0.075
	Asbestos	7 MFL <sup>‡</sup>		Styrene	0.1
	Barium	2		Tetrachloroethylene	0.005
	Beryllium (Total) <sup>†</sup>	0.004		Toluene	1.0
	Cadmium	0.005		Xylenes (Total)	10.0
	Chromium	0.1		Trans-1,2-Dichloroethylene	0.1
	Copper	1.3*		Trichloroethylene	0.005
	Cyanide <sup>†</sup>	0.2		Vinyl Chloride	0.002
	Fluoride	4.0		2,4-D	0.07
	Lead	0.015*		2,4,5-TP Silvex	0.05
	Mercury	0.002		3-Hydroxycarbofuran <sup>†</sup>	
	Nickel <sup>†</sup>	0.1		Adipates <sup>†</sup>	0.4
	Nitrate	10		Alachlor (Lasso)	0.002
	Nitrate-Nitrite	10		Aldicarb	
	Nitrite	1		Aldicarb Sulfoxide	
	Selenium	0.05		Aldicarb Sulfone	
	Sodium			Aldrin <sup>†</sup>	
	Sulfate			Atrazine	0.003
	Thallium Total <sup>†</sup>	0.002		Benzo(A) Pyrene <sup>†</sup>	0.0002
<b>volatile Organic</b>	1,1-Dichloroethane <sup>†</sup>		gamma-BHC (Lindane)	0.0002	
	1,1-Dichloroethylene	0.007	Butachlor <sup>†</sup>		
	1,1-Dichloropropene <sup>†</sup>		Carbofuran	0.04	
	1,1,1-Trichloroethane	0.2	Carbaryl <sup>†</sup>		
	1,1,1,2-Tetrachloroethane <sup>†</sup>		Chlordane	0.002	
	1,1,2-Trichloroethane <sup>†</sup>	0.005	Dalapon <sup>†</sup>	0.2	
	1,1,2,2-Tetrachloroethane <sup>†</sup>		Dibromochloropropane	0.0002	
	1,2-Dichloropropane	0.005	Dicamba <sup>†</sup>		
	1,2-Dichloroethane	0.005	Dieldrin <sup>†</sup>		
	1,2,3-Trichloropropane <sup>†</sup>		Dimaseb <sup>†</sup>	0.007	
	1,2,4-Trichlorobenzene <sup>†</sup>	0.07	Dioxin <sup>†</sup>	3 x 10 <sup>-4</sup>	
	1,3-Dichloropropane <sup>†</sup>		Diquat <sup>†</sup>	0.02	
	1,3-Dichloropropene <sup>†</sup>		Endothal <sup>†</sup>	0.1	
	2,2-Dichloropropane <sup>†</sup>		Endrin <sup>†</sup>	0.0002	
	Benzene	0.005	Ethylene Dibromide (EDB)	0.00005	
	Bromobenzene <sup>†</sup>		Glyphosate <sup>†</sup>	0.7	
	Bromodichloromethane <sup>†</sup>		Heptachlor Epoxide	0.0002	
	Bromoform <sup>†</sup>		Heptachlor	0.0004	
	Bromomethane <sup>†</sup>		Hexachlorobenzene (HCB) <sup>†</sup>	0.001	
	Carbon Tetrachloride	0.005	Hexachlorocyclopentadiene <sup>†</sup>	0.05	
	Chlorodibromomethane <sup>†</sup>		Methomyl <sup>†</sup>		
	Chloroethane <sup>†</sup>		Methoxychlor	0.04	
	Chloroform <sup>†</sup>		Metolachlor <sup>†</sup>		
	Chloromethane <sup>†</sup>		Metribuzin <sup>†</sup>		
	o-Chloromethane <sup>†</sup>		Pentachlorophenol	0.001	
	p-Chlorotoluene <sup>†</sup>		Phthalates <sup>†</sup>	0.006	
	Cis-1,2-Dichloroethylene	0.07	Picloram <sup>†</sup>	0.5	
	Dibromomethane <sup>†</sup>		Polychlorinated Biphenyls (PCB)	0.0005	
	m-Dichlorobenzene <sup>†</sup>		Propachlor <sup>†</sup>		
	Dichloromethane <sup>†</sup>	0.005	Simazine <sup>†</sup>	0.004	
Ethylbenzene	0.7	Toxaphene	0.003		
Monochlorobenzene	0.1	Vydate <sup>†</sup>	0.2		
		<b>Synthetic Organics</b>			

**LEGEND:**

- † Unregulated for systems with less than 150 connections until 1/1/96 (Phase 5).
- ‡ Unregulated organics.
- <sup>1</sup> Million Fibers per Liter.
- \* Action Level.

GW/WH5867AB



**active public water systems in Oregon.** In addition to this, there are approximately 50 individual public water systems which are currently threatened by groundwater contamination from active environmental cleanup sites in Oregon (DEQ, 1995).

Groundwater can become contaminated by many types of activities and land uses. Figure 1-1 illustrates some of the more common sources of groundwater contamination. Once any kind of contaminants enter the groundwater system, they can readily move with the normal flow of groundwater to reach a public water supply well.

When a public water system becomes contaminated, it is a very expensive and time-consuming process to address the problem. There are many direct costs associated with a loss of the public water system. Alternative drinking water supplies must be secured. Residents are often forced to buy and transport bottled water to their homes for daily water needs. The costs of replacing the contaminated water system or treating the existing one will generally result in substantial increases in the community's water rates. When a well becomes contaminated, this usually means the entire aquifer in that area is affected. There are costs associated with identifying and investigating the source of the contamination, as well as potential legal fees and consulting fees. Table 1-2 provides a summary of the costs associated with contamination response versus Wellhead Protection Plan development.

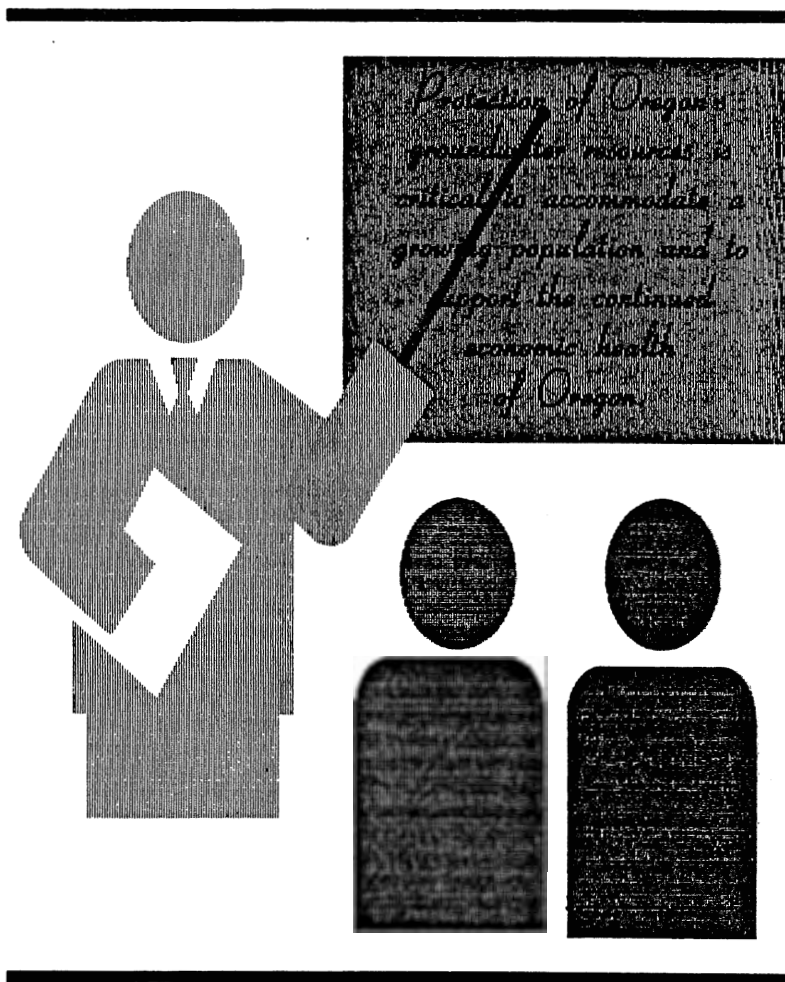
There are also many indirect costs associated with the loss of a public water system. The unknown costs and timeframes for cleanup and/or treatment of the contaminated drinking water can result in lower

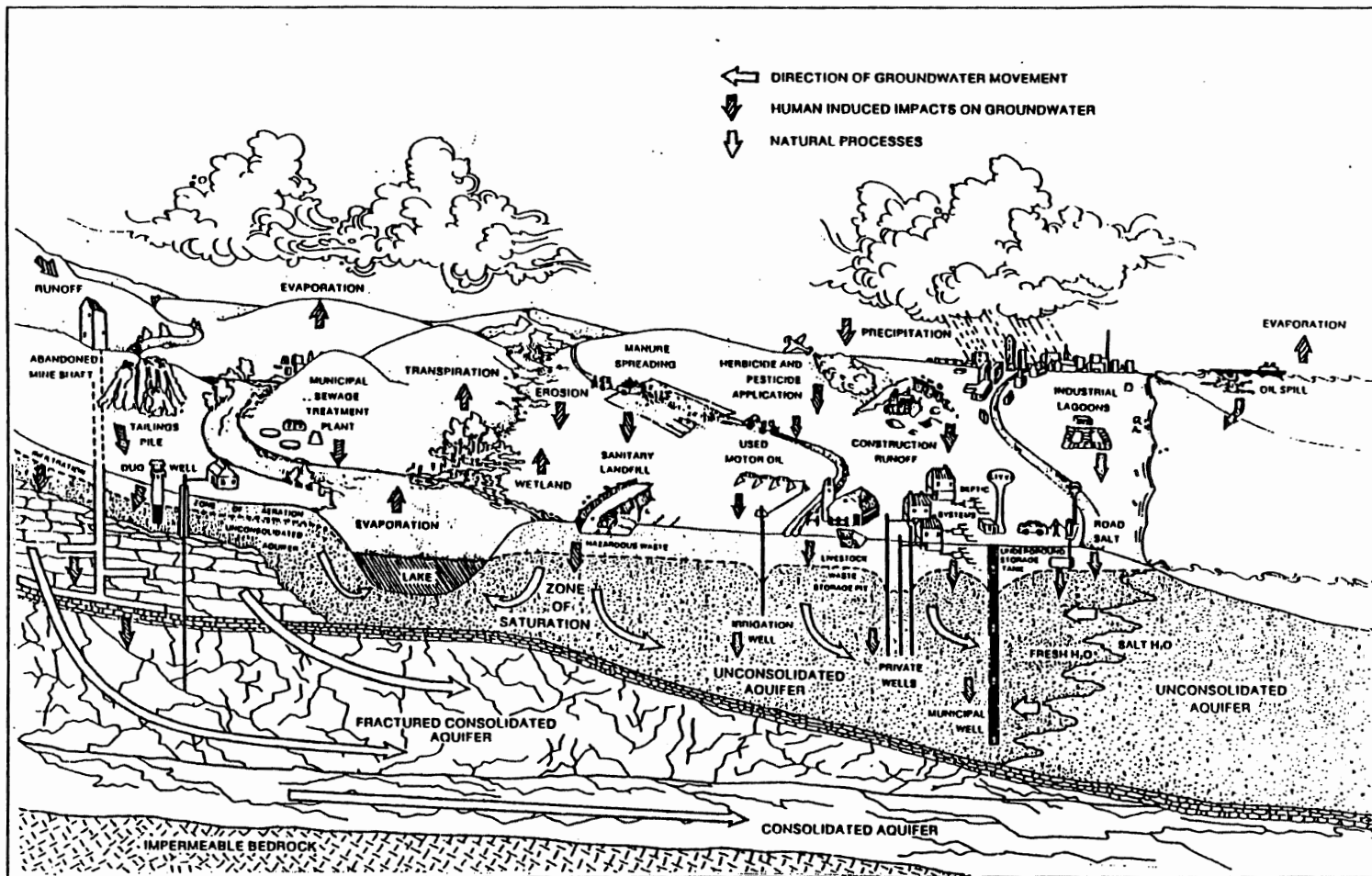
property values and an inability to sell homes in the community. Perhaps the greatest indirect cost associated with any contamination detection is the local community's high level of concern regarding the potential health impacts of drinking the contaminated water.

Although the requirements for monitoring the public water systems in Oregon provide some degree of assurance of safe drinking water, all systems are vulnerable to potential contamination, limited reliabilities of sampling, and equipment failure or human errors that can occur during treatment. One of the best ways to ensure safe

drinking water is to develop a program designed to protect against any potential contamination problems. This will provide another level of safety beyond the existing monitoring and treatment requirements.

Since groundwater supplies and conditions vary from one part of Oregon to another, the responsibility for protecting a community's groundwater rests substantially with the local jurisdictions. By working together, local jurisdictions and state agencies can implement custom-designed local wellhead protection plans to protect groundwater resources.





Source: Adopted from A Groundwater Protection Strategy for Virginia — May 1987

**Figure 1-1: Examples of Groundwater Contamination Sources**

**Table 1-2: Contamination Response vs. Wellhead Protection Plan Costs**

<b>SUMMARY</b>	
<b>1991-96 Actual Cost of Contamination Response to Detection of Trichloroethane in Drinking Water in a 300-Resident Oregon Community</b>	
Source Investigation/Sampling & Analysis	\$180,000
Water Treatment System Design & Installation	\$325,000
<b>TOTAL</b>	<b>\$505,000</b>
<b>Typical Costs for Wellhead Protection Plan Development in a Small Community</b>	
Delineation	\$ 500
Inventory of Sources	\$ 1,500
Management Plan	\$ 2,000
Contingency Preparation	\$ 500
Report Preparation	\$ 1,000
<b>TOTAL</b>	<b>\$ 5,500*</b>
<p><b>* NOTE:</b> DEQ and OHD estimate that Wellhead Protection costs for most large or small systems will average approximately \$5/year/person, generally taking 2-3 years to complete.</p>	

## 1.2 FEDERAL REQUIREMENTS

**T**he federal *Safe Drinking Water Act* (SDWA) was initially adopted in 1974. Its primary purpose was to ensure that drinking water supplies do not adversely affect the health of the general public. The SDWA required that the Environmental Protection Agency (EPA) set standards for maximum contaminant levels in public water supplies delivered to any use. EPA had developed standards for 34 contaminants by 1986. Increased public concern about other potential contaminants in drinking water supplies led to amendments to the SDWA in 1986. The amendments required EPA to set maximum contaminant levels for 83 compounds and an additional 25 compounds every 3 years thereafter.

Subsection 1428 of the SDWA Amendments of 1986 also required that each state develop a wellhead protection program to "protect wellhead areas within their jurisdiction from contaminants which may have any adverse effect on the health of persons." Wellhead protection areas are defined in Section 1428 as the "surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield." Each individual state was to determine how the wellhead protection areas are delineated.

The SDWA specified that each state had to submit individual wellhead protection programs to EPA for approval. The SDWA provided great flexibility for states in establishing programs that suit local needs in protecting public

water systems, but provided seven required elements. Section 1428 specified that each state program shall, at a minimum:

- Specify the duties of state agencies, local governmental entities, and public water supply systems with respect to the development and implementation of programs required by this section;
- For each wellhead, determine the wellhead protection areas based on all reasonable hydrogeologic information on groundwater flow, recharge and discharge and other information the state deems necessary to adequately determine the wellhead protection area;
- Identify within each wellhead protection area all potential anthropogenic (man-made) sources of contaminants which may have any adverse effect on the health of persons;
- Describe a program that contains, as appropriate, technical assistance, financial assistance, implementation of control measures, education, training, and demonstration projects to protect the water supply within protection areas from such contaminants;
- Include contingency plans for the location and provision of alternate drinking water supplies for each public water system in the event of well or wellfield contamination by such contaminants;
- Include a requirement that consideration be given to all potential sources of such contaminants within the expected wellhead area of a new water well which serves a public wa-

ter supply system;

- Encourage public participation to the maximum extent possible, including but not limited to the establishment of technical and citizen's advisory committees, and including notice and opportunity for public hearing on the state program before it is submitted to the Administrator.

The overall structure of each state's wellhead protection program can be tailored to state-specific implementation issues. The way in which it is administered can also vary from state to state. Each state must, however, include in their program a process by which local entities can gain state approval of their plans. This will ensure that all local plans meet the requirements of the SDWA. A state approval of a local plan will also confer official recognition to the plan.

In implementing the SDWA, EPA has encouraged states to develop mandatory wellhead protection programs which would **require** protection of public water supplies in each state. Many states have chosen to develop voluntary wellhead protection programs instead of mandatory due to fiscal, political, administrative, or other reasons. EPA has specified several additional components that should be included in voluntary programs to compensate for potential lack of implementation since participation is not mandatory. In addition to the elements listed above, EPA expects the following also be included in each voluntary program:

- An active and ongoing program to promote wellhead protection planning among local entities across the state, including a strong public educa-

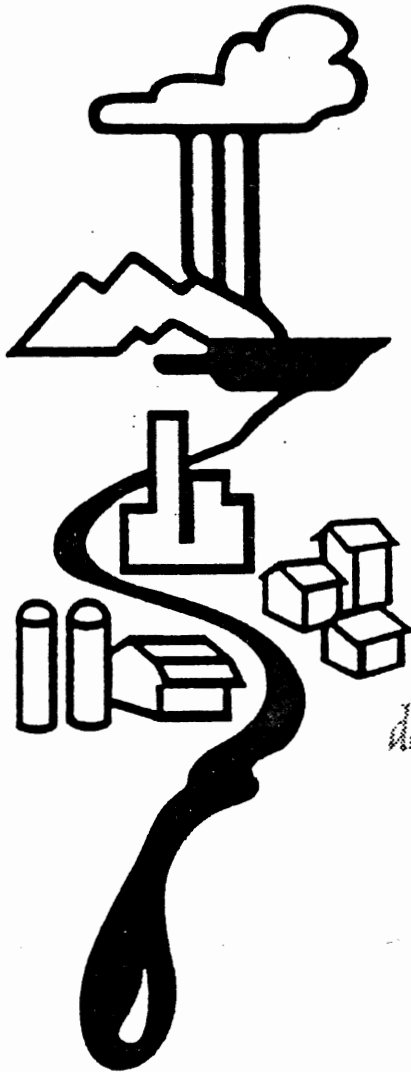
tion and outreach strategy,

- Specific incentives to serve as inducements for local participation,
- A plan for offering technical assistance and program guidance to local entities, and
- A description of how local

wellhead protection efforts and wellhead protection areas will be officially recognized by state programs and agencies with groundwater protection responsibilities, such as permitting and planning.

As of May 1995, 39 states have received EPA approval of their programs. Eighteen of those are vo-

luntary programs. One of the primary incentives for gaining EPA approval of a state wellhead protection program is the potential future availability of funds through the SDWA for wellhead protection. Only those states with approved programs will likely be eligible for any funding that may become available as a result of reauthorization of the SDWA.



*The federal Safe Drinking Water Act (SDWA) was initially adopted in 1974. Its primary purpose was to ensure that drinking water supplies do not adversely affect the health of the general public.*

## 1.3 PROGRAM DEVELOPMENT

**I**n August 1986, the Department of Environmental Quality (DEQ) was officially designated by the Governor as the lead agency for development and implementation of Oregon's *Wellhead Protection Program*. Oregon's natural resource agencies developed and gained approval of a comprehensive groundwater protection plan called the *Oregon Groundwater Act* in 1989. Wellhead protection was considered an integral part of that statute. When funding became available for wellhead protection in 1990, DEQ and other state agencies initiated the process of developing a wellhead protection program which would have been mandatory for public water systems in Oregon.

DEQ, the Oregon Health Division (OHD), the Water Resources Department (WRD) and other state agencies joined with public citizens to form an advisory committee to develop Oregon's *Wellhead Protection Program*. The Wellhead Advisory Committee (WAC - members listed in Acknowledgments Section) consisted of representatives from large and small communities, public water systems, county planning, consulting, industry, agriculture and environmental communities. Over a period of 2 years, the WAC developed conceptual plans for a mandatory wellhead protection program in Oregon. Acknowledging budget limitations statewide, the original proposal for the mandatory program included a 10-year phase-in of wellhead protection plan initiation by the public water systems in Oregon. The larger systems were to initiate the development of a wellhead protection plan first, followed by smaller systems later on. New statutory authorities and agency funding were

necessary for the development and implementation of a mandatory wellhead protection program. The DEQ and the WAC prepared a *Public Advisory Plan* (DEQ, 1992) to guide the implementation of the proposed mandatory program. However, the legislative proposal for the mandatory program failed to be approved in the 1993 session. The reasons for failure included the lack of state funding, concerns about increased land use controls, and local government's lack of resources to implement a mandatory program.

Wellhead protection plans were already being developed for Springfield, Boardman, Portland, Klamath Falls, and Medford. Many smaller public water systems and communities wanted to begin developing wellhead protection programs, but were concerned that there were no guarantees that any locally developed approach would address DEQ's future program requirements. DEQ recognized the need to establish a program and issue written guidance for wellhead protection, even if the most likely alternative for public acceptance was a voluntary program.

DEQ sought guidance in early 1994 from the Oregon Department of Justice (DOJ) in determining whether the existing statutory authorities for groundwater protection gave state agencies the ability to develop a voluntary wellhead protection program. The DOJ clarified that DEQ did have the statutory authority to institute a voluntary wellhead protection program, as long as local government participation is completely nonmandatory.

### 1.3.1 Statutory Authorities

- **Department of Environmental Quality (DEQ):**

Both the statutory provisions de-

scribing DEQ's general functions and those for groundwater protection provide a broad authority that would allow DEQ to institute a nonmandatory wellhead protection program. As part of its departmental functions, state statutes require that DEQ:

*"(a) Shall encourage voluntary cooperation by the people, municipalities, counties, industries, agriculture, and other pursuits, in restoring and preserving the quality of the air and the waters of the state in accordance with the rules and standards established by the commission.*

*"(b) May conduct and prepare, dependently or in cooperation with others,...programs pertaining to the quality and purity of the air or the waters of the state....*

*"(e) Shall conduct and supervise programs of air and water pollution control education, including the preparation and distribution of information regarding air and water pollution sources and control...*

*"(g) Shall develop and conduct demonstration programs in cooperation with units of local government...*

*"(L) Shall encourage the formulation and execution of plans in conjunction with ... associations of counties, cities, industries and other persons who severally or jointly are or may be the source of air or water pollution, for the prevention and abatement of pollution."*

ORS 468.035

DEQ thus has broad authority to institute programs and to work with units of local government to abate and prevent water pollution, especially when such programs can be considered educational or demonstrative. Moreover, the Legislative Assembly's policies mandate that:

*"Programs to prevent ground water quality degradation through the use of the best practicable management practices shall be established."*

ORS 468B.160(4)

DEQ also administers the state's water pollution control statutes which include provisions for protection of groundwater. The legislature has specified that a primary goal of the water pollution control statutes is to protect groundwater from contamination:

*"The Legislative Assembly declares that it is the goal of the people of the State of Oregon to prevent contamination of Oregon's ground water resource ..."* ORS 468.692

Under ORS 468.693 it is the state's policy to provide for:

- Public education on groundwater,
- State agency programs and rules consistent with the policy and goals established by the legislature,
- A statewide characterization of groundwater,
- The enactment of best practicable management practices,
- The establishment of groundwater contamination levels, and

- The protection of groundwater for existing and future uses.

DEQ's pollution control statutes allow the agency to set standards and regulations governing the discharge of contaminants to groundwater and also provide the agency authority to take action where contamination of a groundwater source has occurred. This authority is implemented through OAR 340-40-001, *et seq.* Under ORS 468(B).175, DEQ has authority to make a declaration of an area of groundwater concern where it finds contaminants exceed certain specified threshold levels due at least in part to nonpoint sources. This authority is overlapping with that of the Health Division. DEQ also has the authority under ORS 468(B).180 to make a declaration of a groundwater management area where it finds contamination above specified regulatory threshold levels.

None of the above mentioned statutes are structured to provide authority for DEQ to mandate or enforce local government participation in a wellhead protection program. None of those statutes provide authority for DEQ to have direct control of land usage within protection areas either. However, DEQ clearly has the authority to institute a nonmandatory wellhead protection program because such a program:

- "Encourages voluntary cooperation" between DEQ and cities;
- Pertains to the quality and purity of waters of the state;
- Will probably involve water pollution education;
- Could involve a demonstra-

tion of proper wellhead preservation; and

- Encourages the execution of a plan for the prevention and abatement of water pollution in cooperation with cities that may be the source of that pollution.

• **Oregon Health Division (OHD):**

OHD administers the *Oregon Drinking Water Quality Act* (ORS 448.119 through 448.285 and 454.235, 454.255 and 757.005). It is the primary authority applicable to public water systems in Oregon.

OHD adopts water quality standards, construction standards, operation standards, and other standards and requirements considered necessary by the Division to insure safe drinking water and to implement the federal *Safe Drinking Water Act* (ORS 448.131). OHD administers and oversees all sampling and analyses of drinking water in Oregon.

OHD regulations have applied to construction of new public water systems and to major additions or modifications to existing systems since around 1980. OAR 333-61-050 *et seq.* These regulations require detailed site plans for approval of wells to serve public water systems using groundwater (OAR 333-61-060). In effect, OHD's current regulations require a de facto wellhead protection area (ownership of the land by the water supplier is required) of 100 ft. radius (subject to variance or approval of OHD) for confined wells and similar or more restrictive criteria for unconfined public supply wells (OAR 333-61-050 (2)). The site plans must also identify sanitary hazards, reserved

areas to be kept free of contamination sources and evidence of control of the reserve areas.

OHD's regulations also require public water suppliers to provide comprehensive monitoring and testing of groundwater quality and may require that the system provide alternative supplies where contaminant levels are exceeded (OAR 333-61-045).

OHD also has the authority and responsibility to declare an **area of groundwater concern** if it confirms the presence in groundwater drinking water supplies of contaminants resulting at least in part from suspected nonpoint source activities above certain specified levels (ORS 448.268). This declaration can lead to comprehensive management strategies (it has the responsibility to notify the DEQ of a potential groundwater management area if it detects contaminants above certain specified threshold levels) but the authority is **remedial** in nature and not of a preventative type as required by a wellhead protection program.

While OHD has fairly comprehensive authority over public water supply systems, its authority does not extend beyond those systems in a manner which might be necessary to require the development and implementation of a comprehensive wellhead protection program by local governments. OHD's statutory authorities and responsibilities most directly applied to three specific elements of Oregon's wellhead protection program — the delineation, contingency, and new wells elements. OHD's role in implementing Oregon's Wellhead Protection Program will be discussed in more detail in Section 1.4 (Overview of Implementation).

After evaluating the statutory au-

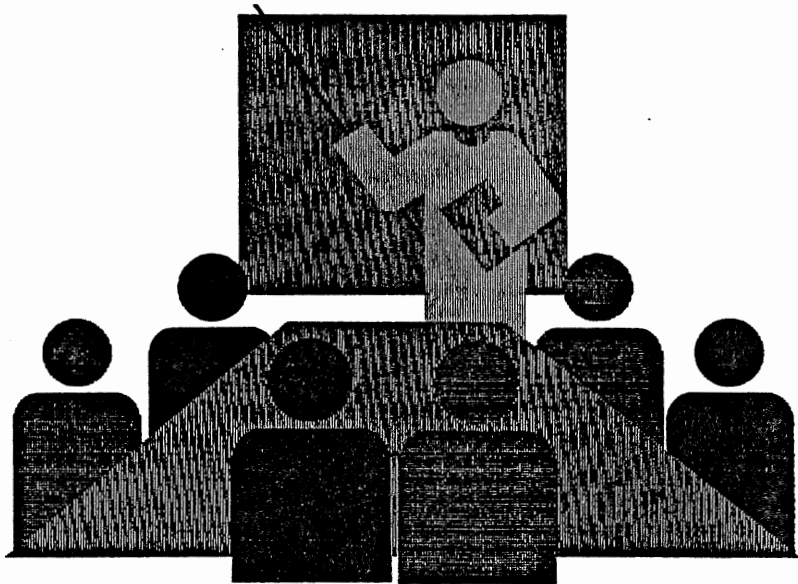
thorities and alternative approaches to develop a wellhead protection program, DEQ, OHD, and the citizens advisory committee members agreed to move forward with an effort to increase public education about wellhead protection and develop rules and a guidance manual to implement a voluntary wellhead protection program.

The first step in developing Oregon's voluntary *Wellhead Protec-*

*tion Program* was to form a new public advisory committee. The "Wellhead Rules and Guidance Committee" (WRGC) is made up of several members of past advisory committee, as well as new members from various interest groups and government agencies from throughout Oregon. WRGC met monthly for a year, providing valuable input and ideas as DEQ and OHD drafted this guidance manual and accompanying rules.

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*The first step in developing Oregon's  
voluntary Wellhead Protection  
Program was to form a new public  
advisory committee.*





## 1.4 OVERVIEW OF IMPLEMENTATION

**T**his section provides an overview of how Oregon's *Wellhead Protection Program* will be implemented at both the state and local levels. The Oregon DEQ will administer the program and be responsible for ensuring implementation and reporting to EPA. There will be significant involvement from other state agencies as well. The Oregon Health Division (OHD) will be responsible for providing technical assistance, review, and approval for the delineation, contingency, and new wells elements of wellhead protection. DEQ is responsible for all other elements in the process, including the final certification of the local community plans. The Oregon Department of Agriculture (ODA) will provide significant input for development of management approaches for agricultural lands within wellhead protection areas. The Water Resources Department (WRD) and the Department of Ecology and Mineral Industries (DOGAMI) will provide technical assistance and input as needed during the delineation, contingency, and new well element reviews. All agency reviews and "sign-offs" will be coordinated through DEQ. This will enable a more streamlined approach for the local communities.

### 1.4.1 How Do We Develop a Wellhead Protection Plan?

DEQ and OHD are hopeful that the demand for technical assistance and review of Wellhead Protection Plans will continue to be high. If the

demand exceeds existing staff resources, DEQ and OHD will prioritize individual requests based primarily upon the level of threats to groundwater quality within close proximity to the well. DEQ and OHD staff will determine this relative level of threat using the information presented by the community when the request is made. DEQ and OHD will meet regularly with other agencies and individuals to ensure smooth implementation of the program.

A wellhead protection effort can be initiated by any "Responsible Management Authority" (RMA) seeking to develop a **Wellhead Protection Plan** for their local area. The RMA could be any or all of the following:

- Public Water System (PWS)– (OHD: > 3 connections or > 10 people for 60 days/year) e.g., city, community, campgrounds, mobile home parks, schools, commercial/industrial);
- County;
- Special district;
- Indian tribe;
- State/federal government.

With the assistance of the Wellhead Rules and Guidance Committee, DEQ has developed a descriptive process for a local community to implement wellhead protection. The process is shown on Figure 1-2 as a sequence of "steps". The following steps will be described in detail in Section 3 of this Guidance Manual:

- **Step 1:** The RMA contacts DEQ or OHD and sets up workshop or meeting for an introduction to wellhead protection.

*[OPTIONAL — RMA can create a "Pre-Plan Assessment" of potential threats to drinking water*

*in nearby vicinity or well and use it to raise awareness for the need to protect the drinking water supply.]*

- **Step 2:** RMA identifies/cooperates with other RMAs and assembles a **Local WHP Advisory Team** (Team) to include representatives from the various interests and local communities potentially affected by the Wellhead Protection Plan.

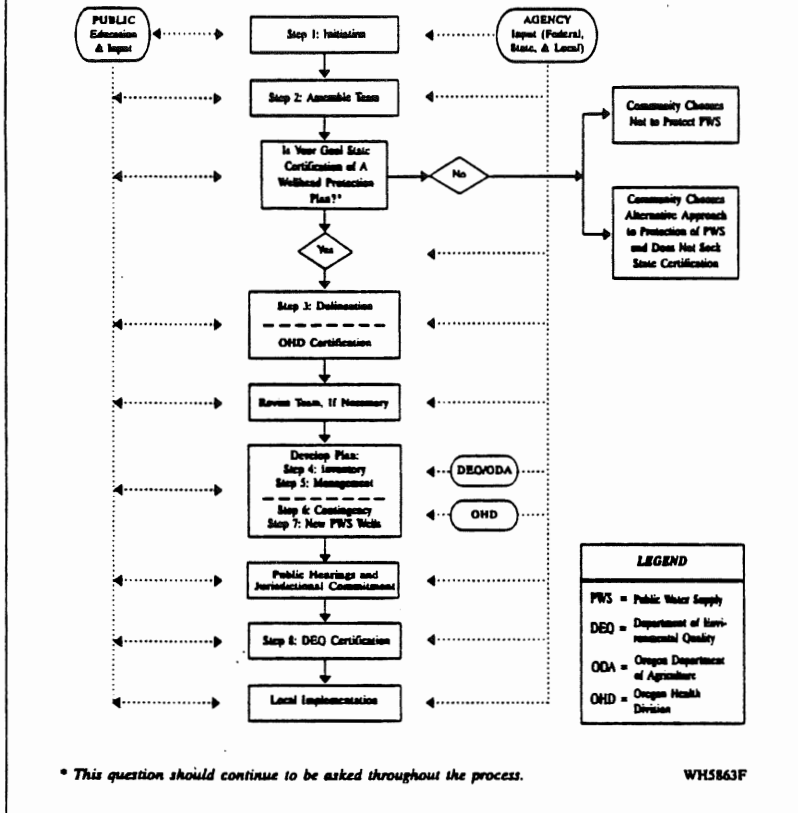
It is recommended at this point in the process that the local community, through the Team, determines if they want to ultimately gain state certification of their Plan. If the intent is to gain state certification, it is very important to contact and work with the Oregon Health Division (OHD) during the next step.

- **Step 3:** RMA(s) or consultant conducts **DELINEATION** of WHP area and gains sign-off from OHD (OHD consults with other agencies, as appropriate).
- **Step 4:** Team solicits volunteers as necessary and performs **INVENTORY** using technical assistance from DEQ.
- **Step 5:** Team develops the management approach using technical assistance from DEQ.

*[OPTIONAL — RMA(s)/consultant can conduct a "Use and Susceptibility Assessment" per OHD guidance.]*

- **Step 6:** RMA(s) develop a **CONTINGENCY PLAN** using technical assistance from OHD.
- **Step 7:** RMA(s) develop a plan describing procedures for any future **NEW WELLS** (due to growth or loss) using technical

## Oregon's WELLHEAD PROTECTION PROCESS



**Figure 1-2: Overview of Implementation**

assistance from OHD and WRD.

- **Step 8:** RMA(s) assemble and submit a written Plan of action and obtain certification from DEQ.

The written Plan or Report will document each element, public participation efforts, and implementation of management approach, updates, etc.

The primary purpose of this guidance manual is to explain how to move through these eight steps to accomplish wellhead protection in

your local area. Section 3 will describe each of these steps in detail and provide additional resources and references for assistance with the process. It is critical to involve the public in wellhead protection efforts at the initiation step of the process, as well as throughout the process.

### 1.4.2 What Are The Incentives for State Certification?

Local jurisdictions or RMAs that develop Wellhead Protection Plans can elect to submit the Plan for

state approval or "certification". Gaining certification of a Plan is not required, although there are some direct benefits for obtaining state certification. Four of the most significant incentives for state certification include:

- Because of the careful design of this program, which emphasizes procedures based on science and/or well-established practices that are result oriented, a community that gains plan certification can have confidence that the plan they implement will have a positive impact on the future quality of their drinking water resource. This plan will likely have high credibility throughout the community, will gain broad acceptance, and will be less subject to challenge.

- Communities with certified wellhead protection plans will have their monitoring requirements for organic chemicals (VOCs and SOCs) reduced by 50 percent — from once every 3 years to once every 6 years. Further reduction may be possible through a use and susceptibility analysis through the OHD.

- Communities with an implemented/certified plan may have greater success in securing funding for upgrading their water system if necessary because lenders will view a protected water system as less of a lending risk than an unprotected system.

- Gaining state certification of a community's wellhead protection plan will ensure that all requirements associated with the Oregon Department of Land Conservation and Development's land use regulations are addressed.

## 1.5 ROLES AND RESPONSIBILITIES

**O**regon's wellhead protection program will primarily be implemented by Oregon DEQ, but with significant input and involvement from other agencies. Local jurisdictions or Responsible Management Authorities (RMAs) obviously also play an extremely important role in accomplishing wellhead protection.

A more detailed list of specific responsibilities for each state agency or other entity follows:

### 1.5.1 Department of Environmental Quality (DEQ)

- Prepare public education/outreach information on wellhead protection and set up workshops with other agencies or groups.
- Administer EPA/DEQ wellhead protection grants and demonstration projects.
- Provide for program development, implementation, and operational coordination.
- Coordinate wellhead protection program data management.
- Update and maintain Oregon's Wellhead Protection Program Guidance Manual.
- Evaluate existing sources and the programs for preventing contaminant releases.
- Assist local jurisdictions to determine management needs for unregulated sources.
- Provide technical assistance to

Responsible Management Authorities, cities, and counties.

- Review existing permits for state regulated source facilities in a wellhead protection area for adequacy and compliance with the wellhead protection program.
- Provide OHD and WRD with information on contaminated groundwater areas as they might affect proposed, new, or up-graded public water system wells.
- Assist OHD as needed with new wells siting and contingency planning elements.
- Review management plan element and coordinate with WRD, OHD, ODA, DLCD, and DOGAMI.
- Contribute water quality and wellhead protection data to the state groundwater data repository.
- Prioritize environmental clean-up sites within an approved wellhead protection area.
- Provide model ordinances for management options with assistance from DLCD.
- Provide final review and certification of wellhead protection plans.

### 1.5.2 Oregon Health Division (OHD)

- Establish and conduct wellhead protection workshops with assistance from DEQ.
- Provide basic data on public water systems for delineation.

- Assist with demonstration projects and grants as appropriate.
- Provide technical assistance, review, and certify submittals for delineation of wellhead protection areas.
- Establish contingency planning workshops.
- Interagency coordination.
- Provide technical assistance to public water systems within staffing limits.
- Review and approve public water system contingency plans.
- Review and certify new wells element.
- Assist DEQ in evaluating existing management approaches and sources not currently controlled (microbial).
- Continue to assure compliance of drinking water standards by public water systems.
- Contribute water quality and wellhead protection data to the state groundwater data repository.
- Administer water quality sampling and analysis as required by the SDWA.
- Continue to assist in wellhead protection outreach and public education.

### 1.5.3 Water Resources Department (WRD)

- Review wellhead protection area delineations, integrating the data into basin plans, as needed.

- Provide assistance and data to OHD on delineation, new wells, and contingency planning elements.
- Interface the wellhead protection program with other water programs where applicable.
- Assist with wellhead protection public education, workshops, and outreach.
- Contribute data to the state groundwater data repository.
- Provide technical assistance as requested to public water systems, cities, and counties regarding the wellhead protection program.
- Participate in interagency coordination.

#### **1.5.4 Department of Land Conservation and Development (DLCD)**

- Facilitate city and county wellhead protection implementation, and coordination.
- Integrate voluntary wellhead protection into state land use planning process.
- Assist with public groundwater/wellhead protection education, outreach, and workshops.
- Contribute data related to wellhead protection program to the state groundwater data repository.
- Coordinate the agency review of comprehensive plan elements associated with the wellhead protection program.

#### **1.5.5 Department of Agriculture (ODA)**

- Assist DEQ in updating source categories and risk ranking.
- Assist in the updating of management guidelines for wellhead protection in agricultural lands.
- Regulate the use of pesticides.
- Assist in developing a rural wellhead protection technical assistance program.
- Assist with public education/outreach on wellhead protection.
- Assist with grants and demonstration projects as requested.
- Provide data as needed for the wellhead protection program and for the state groundwater repository.
- Provide data on federal/state grants/loans available to farmers, public water systems, and municipalities.
- Participate in interagency coordination.

#### **1.5.6 Department of Economic Development (DED)**

- Assist with the public and industrial groundwater/wellhead protection education, workshops, and outreach.
- Assist with grants and demonstration projects.
- Review and facilitate the wellhead protection implementation plan.

- Provide data as needed for wellhead protection and the state groundwater repository.
- Participate in interagency coordination.
- Facilitate the prevention of groundwater contamination.

#### **1.5.7 Department of Transportation (DOT)**

- Provide digital data as needed for wellhead protection area and source inventory.
- Oversee the placement of wellhead protection signs on state highway right-of-ways.
- Incorporate wellhead protection into transportation planning and design.
- Assist with public groundwater/wellhead protection education, workshops, and outreach.
- Employee education on wellhead protection.
- Participate in interagency coordination.

#### **1.5.8 Oregon State Fire Marshal (SFM)**

- Participate in interagency coordination in support of wellhead protection.
- Assist with public and employee education on groundwater/wellhead protection.
- Provide data as needed for wellhead protection and state groundwater repository.
- Integrate wellhead protection area boundary, potential con-

taminant source inventory data, and contingency plans into appropriate existing programs.

- Provide data to public water systems, cities, or counties for the delineated areas (inventoried chemicals and facilities). Existing regulations allow for data collection at a lower threshold for high-risk hazardous chemicals and facilities of concern upon request by local jurisdiction.
- If requested by public water systems, cities, and counties, include in OSFM annual survey packets to industry an additional, one page form for wellhead protection inventories.

#### **1.5.9. Responsible Management Authorities (RMA)**

- Facilitate the formation of a local advisory team to provide input as the wellhead protection plan is developed and implemented.
- Assist public water systems with potential contaminant source inventories for all wellhead protection areas identified inside jurisdictional boundaries.
- Protect groundwater resources identified by wellhead protection areas and planned locations of new wells.
- Incorporate wellhead protection areas into local comprehensive land use plans.
- Develop local management strategies for sources, specifically those not regulated by the state, in coordination with

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*Oregon's wellhead protection program will primarily be implemented by the Department of Environmental Quality (DEQ) and the Oregon Health Division (OHD).*

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the public water system. Additional regulation assistance can be requested for some potential contaminant sources (for example, underground storage tanks) beyond the state-wide minimums.

- Intra-jurisdictional coordination for wellhead protection areas located inside a city or county boundary but used by an adjoining city or county.
- Track potential contaminant sources by SIC codes for any spill violations and associated chemical releases located in a

wellhead protection area.

- Integrate wellhead protection areas into local emergency plans, if appropriate.
- Assist with and conduct public groundwater/wellhead protection education, workshops and outreach.
- Facilitate partnership with state agencies to protect critical groundwater resources.
- Oversee the placement of wellhead protection signs on city and county roads.

## 1.6 SIGNATORIES AND JURISDICTIONAL ISSUES

**M**any cross-jurisdictional issues may arise as wellhead protection areas are delineated. The wellhead protection area may not be entirely within your jurisdiction, city limits, or property boundaries. This section will discuss how to address issues concerning cooperation from your neighboring jurisdictions.

It is very important to involve as many as possible of the jurisdictions in your local area as you begin developing a Wellhead Protection Plan. If the neighboring jurisdiction also has a groundwater-supplied public water system, one of the primary incentives for them to become involved in your community's efforts is that it would be cost-effective to combine your resources and delineate more than one wellhead protection area at a time. This regional approach could be facilitated by the county, for example, or a committee representing all participating jurisdictions. Efforts to reduce the risk of contamination of the public water systems are generally easier by developing a coordinated regional approach and combining resources to implement your Plan(s). The Department of Environmental Quality and the Oregon Health Division are available to assist in local efforts to combine wellhead protection efforts. The results can be submitted as individual Plans or as a combined Plan. The agencies will evaluate the delineation and other elements of a combined Plan with the same criteria as for an individual Plan, using the resources and information contained in this manual as a guideline.

In the event that your neighboring

jurisdiction has no groundwater-supplied public water system, you should still ask for their involvement, **especially if part of your wellhead protection area is located within their jurisdiction.** Ideally the neighboring jurisdiction(s) will be willing to participate in protecting your public water supply since this will benefit the surrounding area as well (see Section 1.1 for a discussion of the benefits). Although the staff resources may not be available for them to participate in the actual development of your Plan, the most important contribution from them will be to become a "signatory" to your Plan. Becoming a signatory to your Wellhead Protection Plan means that neighboring jurisdiction(s) will help facilitate the implementation of your Plan within their city limit or jurisdictional boundaries (this could include the county). The level of involvement on their part will depend upon the number and types of potential contamination sources within the wellhead protection area in their jurisdiction and the particular types of management approaches selected by your community (preferably with their input) for those potential sources. Example activities might involve helping to coordinate events such as household hazardous waste collections, spill response planning, and facilitating local educational workshops or installation of signs to raise public awareness of the location of the wellhead protection area boundary.

In some cases, a neighboring jurisdiction(s) will not be cooperative and will refuse to participate in the development, or refuse to become a signatory to, your Wellhead Protection Plan. One of the most effective ways to resolve the issue will be to ask your county officials for assistance. This should be your first priority in seeking a

resolution for any cross-jurisdictional conflicts, as these solutions are generally more easily and effectively accomplished at the local level. This could be done by developing a "Memo of Understanding" between the affected jurisdictions. The DEQ Wellhead Protection Program staff can also be consulted for assistance in resolving the issue informally. DEQ will use any available state or federal (tribal commissions, etc.) resources to help facilitate a resolution to this issue. Since this is a voluntary program, there is no mechanism for DEQ to require another jurisdiction to participate or become a signatory to your Wellhead Protection Plan.

The only state agency in Oregon with current authority to require any kind of participation in a wellhead protection effort is the Department of Land, Conservation, and Development (DLCD). DLCD administers the Oregon Statewide Planning Goals. Under the existing rules, when the "location, quality, and quantity" of a groundwater resource is identified, the area becomes a "Goal 5 Resource". Under the existing rules, this includes any wellhead protection area that is delineated. DLCD has proposed (as of 4/96) to modify these rules and exempt most of the wellhead protection areas in Oregon from any Goal 5 requirements. Only the wellhead protection areas of public water systems serving more than 10,000 people or have more than 3,000 service connections will now be affected by Goal 5 requirements. There are currently 26 communities in Oregon that meet these criteria.

Under the new proposed (as of 4/96) rules, if your jurisdiction has a public water system that serves greater than 10,000 people or has more than 3,000 service connec-

tions and the local government chooses to delineate the wellhead protection area, the Goal 5 Resource element in Oregon's State-wide Planning Program could be used to ensure your public water supply is also protected by neighboring jurisdictions. A wellhead protection area in these larger communities in Oregon becomes a Goal 5 resource when the voluntary delineation is certified by the Oregon Health Division. Once a Goal 5 resource is identified under Oregon's planning program, local jurisdictions must take steps to protect it.

A DEQ-certified Wellhead Protection Plan will automatically serve to address any Goal 5 requirements for protecting these groundwater resources. Once a wellhead protection area delineation is certified

by the Oregon Health Division in one of the larger communities in Oregon, the neighboring jurisdictions will be required to participate in the development of or become a signatory to your Wellhead Protection Plan. More information about Goal 5 planning requirements and wellhead protection can be obtained by calling DLCD at 503-373-0083 (see also Section 3.5.1).

Documentation of your efforts to secure the participation of neighboring jurisdictions should be a part of your Wellhead Protection Plan report. If good faith efforts (on all levels) are made and are unsuccessful, DEQ will still evaluate and potentially certify your Plan if at least 70 percent of the delineated wellhead protection area is within the jurisdiction of the

signatories to your Plan. DEQ will evaluate these "70 to 99 percent Coverage" Plans based on the same criteria used for the others. Keep in mind that the single most important factor in the certification of a Wellhead Protection Plan will be whether there is a significant **reduction in the risk of contamination** to your public water system. Depending on the management approaches selected by the local community, one can very easily choose protective tools for that 70 percent of the wellhead protection area that are more effective than others managing the entire wellhead protection area. DEQ will consider these issues, as well as the non-cooperative jurisdiction's potential sources and proximity to the supply well in evaluating whether to certify the Plan.





# 2

## WELLHEAD PROTECTION RULES

### 2.1 DEQ's AND OHD's PROPOSED RULES

**O**regon's *Wellhead Protection Program* will be accomplished through rules administered by both DEQ and OHD. The purpose of rules to accomplish a voluntary program are two-fold (Table 2-1):

- The rules provide the "framework" or specifications for how the local plans can be developed in a consistent manner, and
- The rules describe how the local plans can be "certified" or approved by OHD and DEQ.

Under their statutory authorities, OHD's rules provide for the delineation, contingency, and new wells elements of wellhead protection. DEQ's rules provide for all other elements, overall administration of the program, as well as the final certification of the local plans.

### 2.1.1 DEQ – OAR 340-40-140 through 340-40-210

*Statutory Authorities:*  
ORS 468.035; ORS 468B.015(2);  
ORS 468B.150-180

#### STATEMENT OF PURPOSE

##### 340-40-140

- (1) **Meet Federal Requirements:** The intent of these rules is to fulfill the Federal requirements under the *Safe Drinking Water Act* for the establishment of a state Wellhead Protection Program.
- (2) **Protect Public Water Systems:** The purpose of a Wellhead Protection Plan is to protect the groundwater relied upon by a public water system from contamination. This is accomplished by reducing the risk of contamination to the groundwater from potential sources.

- (3) **Establish Voluntary Wellhead Protection Program:** Local jurisdictions and/or public water systems may voluntarily develop a Wellhead Protection Plan, but are not required, by these rules, to do so.

- (4) **Procedures for State Approval:** These rules establish a process to enable the Department to certify a local Wellhead Protection Plan if it is submitted for certification, and to establish the process for a Responsible Management Authority, if they choose, to seek certification from the Department for a locally developed Wellhead Protection Plan.

#### DEFINITIONS

##### 340-40-150

- (1) "Contingency Plan" means a document setting out an organized, planned and coordinated course of action to be fol-

lowed in the event of a loss of capacity to supply water to the distribution system or in case of a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.

- (2) "Department" means the Department of Environmental Quality.
- (3) "Delineation" means the determination of the extent, orientation, and boundaries of a wellhead protection area using factors such as geology, aquifer characteristics, well pumping rates, and time of travel.
- (4) "Element" means one of seven components considered by the U.S. Environmental Protection Agency as the minimum required components in any state wellhead protection program: specification of duties, delineation of the wellhead protection area, inventory of potential contaminant sources, specification of management approaches, development of contingency plans, addressing new (future) wells and springs, and ensuring public participation.
- (5) "Governmental Entity" means any local, state, Indian tribe, or federal organization or agency which may own or manage lands or activities within a Wellhead Protection Area.
- (6) "Plan" means Wellhead Protection Plan.
- (7) "Potential Contaminant Source" means any activity which has the potential to release contaminants to the groundwater.

- (8) "Public Water System" means a system supplying water for human consumption that has four or more service connections or supplies water to a public or commercial establishment which operates a total of at least 60 days per year, and which is used by 10 or more individuals per day.
- (9) "Responsible Management Authority" means a Public Water System whose water supply is being protected and any governmental entity with management, rule or ordinance making authority to implement wellhead protection management strategies within a Wellhead Protection Area. Responsible Management Authorities are responsible for implementation of the Wellhead Protection Plan; includes cities, counties, special districts, Indian tribes, state/federal government entities as well as Public Water Systems.
- (10) "Signatory" means any Responsible Management Authority in the Wellhead Protection Area who signs the Wellhead Protection Plan. Signing the plan indicates the Responsible Management Authority will implement the actions outlined for their jurisdiction in the plan.
- (11) "Stakeholder(s)" means person(s) and/or governmental entity(ies) who could or will be affected by activities or requirements that may be required within a local wellhead protection area.
- (12) "Team" means the local Wellhead Protection Team; which includes representatives from the Responsible Management

Authorities and various interests and stakeholders potentially affected by the Wellhead Protection Plan.

- (13) "Wellhead Protection Area" means the surface and subsurface area surrounding a water well, spring or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach that water well, spring or wellfield.
- (14) "Wellhead Protection Plan" refers to a Department certified plan which identifies the actions to be taken at the local level to protect a specific defined Wellhead Protection Area. The Plan is developed by the local Responsible Management Authority(ies) and/or team and includes a written description of each element, public participation efforts, and an implementation schedule.

## **GENERAL POLICIES**

### **340-40-160**

- (1) It is the policy of the state to promote the protection of the quality of the groundwater resource from contamination by encouraging public water systems and/or governmental entities to voluntarily develop local Wellhead Protection Plans to protect the groundwater resources which a Public Water System relies upon for its drinking water.
- (2) A certified Wellhead Protection Plan will be recognized as meeting the Wellhead Protection requirements under the Federal Safe Drinking Water Act of 1986, Section 1428

(42 USC 300F to 300J - 26).

- (3) The Department will coordinate and work cooperatively with the Health Division, Department of Agriculture, Water Resources Department, Department of Land Conservation and Development and other governmental entities to promote the voluntary development of Wellhead Protection Plans.
- (4) Other state rules may apply and may or may not pertain to the delineated Wellhead Protection Area, including but not limited to the rules of those agencies listed in Section (3) of this rule.
- (5) The Department will, within available resources, provide information and technical assistance to local Wellhead Protection Teams and other interested parties in the development of their Wellhead Protection Plans.
- (6) All Responsible Management Authorities who have jurisdiction within a Wellhead Protection Area are encouraged to work together to develop a Plan to manage those activities that may have the potential to contaminate groundwater within that Wellhead Protection Area.
- (7) Implementation of a Wellhead Protection Plan shall rely upon existing enforcement capabilities of the Responsible Management Authorities within the delineated Wellhead Protection Area. Nothing in these rules will modify or change existing authorities or requirements put in place through other statutes or rules.

- (8) The Department shall maintain a guidance manual to assist Responsible Management Authorities and Wellhead Protection Teams in the development of a state certifiable Wellhead Protection Plan. This manual is intended solely to provide information and assistance in identifying strategies for developing a Wellhead Protection Plan. The guidance manual provides examples of how a protection plan could be developed to meet the requirements of these rules to gain Department certification as a Wellhead Protection Plan. It does not contain mandatory standards or other legal requirements nor does it include binding statements or interpretations of law or agency policy.

**REQUIRED ELEMENTS OF A WELLHEAD PROTECTION PLAN**

**340-40-170**

- (1) A Wellhead Protection Plan shall contain and address the following seven elements:
  - (a) Specification of duties:
    - (A) The Plan shall identify all the Responsible Management Authorities within a Wellhead Protection Area. The jurisdictional boundaries of each Responsible Management Authority shall be shown on a map;
    - (B) For each Responsible Management Authority identified, the expectations, their respective responsibilities, and the duties they will perform with regards to implementing the

Plan must be identified;

- (C) The Plan shall either:
  - (i) Have all Responsible Management Authorities in the Wellhead Protection Area sign the Wellhead Protection Plan indicating that they will implement the actions outlined for their jurisdiction in the plan; or
  - (ii) Describe the procedure used to notify and attempt to involve those Responsible Management Authorities not willing to sign the plan.
- (b) Delineation of Wellhead Protection Areas: Delineation of Wellhead Protection Areas shall occur as described under Health Division's rules under OAR 333-61-057(1);
- (c) Inventory of Potential Contaminant Sources: After delineation of the Wellhead Protection Area, an inventory identifying the potential sources of contamination within the Wellhead Protection Area shall be completed. The inventory shall be designed to identify:
  - (A) Past practices which may have resulted in a potential threat to the groundwater;
  - (B) Those potential sources of contamination presently existing; and
  - (C) Those potential sources which may exist in the future.
  - (d) Management of Potential Sources of Contamination:
    - (A) For those potential sources of contamination identified under the inventory element of

paragraphs (1)(c)(A),(B), and (C) of this rule, the Plan shall identify the management action to be employed to reduce the risk of contamination to the groundwater from those source(s) and justification for the proposed management actions and level of protection provided;

- (B) The Plan must identify the process used to address unanticipated potential sources of contamination that may locate within the Wellhead Protection Area, how the source will be evaluated for acceptability within the area, and how the management actions identified in the Plan for reducing the risk of contamination will be implemented.
- (C) Any management plans that directly regulate farming practices for the purpose of protecting water quality on agricultural lands within a Wellhead Protection Area shall be developed and implemented by the Oregon Department of Agriculture in accordance with Oregon Department of Agriculture authorities.
- (e) Contingency Plan: Development of contingency plans for Wellhead Protection Areas shall be in accordance with Health Division rules under OAR 333-61-057(4);
- (f) Siting of New Public Water System Wells or Springs: Siting of new public water system wells or springs shall be in accordance with Health Division rules under OAR 333-61-057(3);
- (g) Public Participation: A description of the public participation efforts shall be in-

cluded in the Plan, including:

- (A) Documentation that property owners and residents within the Wellhead Protection Area were notified of the development of a Wellhead Protection Plan. Notification at a minimum shall include publication of the intent to develop a Wellhead Protection Plan in a local newspaper and a description of the process for developing and participating in the development of the Wellhead Protection Plan;
- (B) Formation of a Team to develop the Plan. The Team can either be a new group formed for the specific purpose of developing a plan or it can be an existing group that is assigned the additional duty of developing a Plan;
- (C) Description of steps taken to provide opportunity for various interests within the affected area to participate;
- (D) Documentation that all local public hearing procedures were followed in developing and adopting the Plan.

#### **CERTIFICATION PROCEDURE**

##### **340-40-180**

- (1) For a Wellhead Protection Plan to be certified by the Department, the plan must meet requirements specified in OAR 340-40-170.
- (2) The Department shall act as the contact point for development and approval of Wellhead Protection Plans. The Department shall coordinate with other governmental entities so that the Plan is consis-

tent with the requirements of those governmental entities before Department certification of the Plan is granted.

- (3) The Health Division shall be responsible for certifying the delineation, and reviewing contingency plans and the new wells elements of the plan as provided for under OAR 333-61-020 through 333-61-065. The Department shall accept the Health Division's recommendations and certification.
- (4) After consultation with the Department of Agriculture on agricultural issues, the Department of Land Conservation and Development on land use issues, the Health Division and other governmental entities as appropriate, the Department shall be responsible for reviewing the remaining elements and giving the overall certification for each local Wellhead Protection Plan if each element is found to be adequately addressed.
- (5) Within 60 days of the receipt of a request for certification of a Wellhead Protection Plan, the Department will send a written acknowledgment of receipt of the request and an estimated date for Department review and certification of the plan.
- (6) After certification of the plan, the Department will provide a written certification of completion to all signatories to the plan.

#### **UPDATE PROCEDURE**

##### **340-40-190**

- (1) A Wellhead Protection Plan

must be recertified every five years from the date of prior Department certification.

- (2) Recertification of the present Plan can take place if all the following conditions apply:
  - (a) No conditions that could potentially modify the boundaries of the Wellhead Protection Area have occurred;
  - (b) An updated inventory is completed and submitted which shows that no new potential sources of contamination have moved into the Wellhead Protection Area which are not addressed in the existing Plan;
  - (c) The management practices outlined in the existing Plan are still appropriate and being implemented;
  - (d) The existing contingency element in the Plan is still relevant; and
  - (e) All signatories to the existing Plan agree to recertify the Plan by signing the recertification request letter.
- (3) If a certified Plan cannot meet the conditions under section (2) of this rule, then a revised Wellhead Protection Plan must be resubmitted for certification. A revised plan shall require:
  - (a) Form a Team to develop the Plan. The Team can either be a new group formed for the specific purpose of developing a Plan or it can be an existing group that is assigned the additional duty of developing a Plan;
  - (b) Identify the elements under

OAR 340-40-170 where the Plan is no longer adequate or relevant;

- (c) Modify the Plan in those areas identified in subsection (b) of this section to meet conditions outlined in OAR 340-40-170 and 180;
- (d) Perform and submit a new potential source inventory; and
- (e) Submit to the Department for review and certification per OAR 340-40-180.

#### **DECERTIFICATION PROCEDURE**

##### **340-40-200**

- (1) If the signatories to a Wellhead Protection Plan do not recertify or submit for recertification their previously certified Wellhead Protection Plan, then the Plan is automatically decertified until such time as the signatories of the Plan recertify the Plan through the update procedure per OAR 340-40-190.
- (2) Any Responsible Management Authority that is a signatory to a certified Plan shall have the ability to withdraw from participation in a Wellhead Protection Plan and the certification process. The Department shall review the plan to determine if the plan is still certifiable without the participation of the withdrawing Responsible Management Authority.
- (3) A plan can also be decertified by the Department if it comes to the Department's attention that a signatory to a Plan is not or has not adhered to and

implemented the certified Plan.

- (4) To decertify a Wellhead Protection Plan, the Department will send a certified letter to all signatories to the Plan detailing the reason(s) why the Department believes the certified Plan is or was not being followed or is no longer valid and the Department's intent to decertify the Plan.
  - (a) The signatories to the Plan will have 30 days to respond as to why their Plan should not be decertified;
  - (b) The Department will review the signatories response and make a determination as to whether the Plan is still certifiable;
  - (c) The Department will then send a copy of its decision to all signatories of the Plan;
  - (5) The Department will afford the remaining signatories the opportunity to maintain the certification, provided withdrawal by a Responsible Management Authority does not render the Plan uncertifiable, by notifying the Department and all other Responsible Management Authorities within the Wellhead Protection Area that they will continue to implement the plan as certified in their respective jurisdictions.

#### **APPEAL PROCEDURE**

##### **340-40-210**

Final Department decisions regarding certification, recertification, or decertification are not subject to contested case hearing rights but are reviewable under ORS 183.484.

**2.1.2 OHD — OAR 333-61-020, -050, -057, and -065**

Statutory Authority:  
ORS 448.123(1)(a);  
ORS 448.131(2)(a), (c);  
ORS 448.160; ORS 672.525

**DEFINITIONS**

**333-61-020**

- (1) **Aquifer.** A water saturated and permeable geological formation, group of formations, or part of a formation that is capable of transmitting water in sufficient quantity to supply wells or springs.
- (2) **Aquifer Parameter.** A characteristic of an aquifer, such as thickness, porosity and hydraulic conductivity.
- (3) **Aquifer Test.** Pumping a well in a manner that will provide information regarding the hydraulic characteristics of the aquifer.
- (4) **Average Groundwater Velocity.** The average velocity at which groundwater moves through the aquifer as a function of hydraulic gradient, hydraulic conductivity and porosity.
- (5) **Calculated Fixed Radius.** A technique to delineate a wellhead protection area, based on the determination of the volume of the aquifer needed to supply groundwater to a well over a given length of time.
- (6) **Conceptual Model.** A three-dimensional representation of the groundwater system, including the location and extent of the hydrogeologic units, areas of recharge and discharge, hydrogeologic boundaries and hydraulic gradient.
- (7) **Contingency Plan.** A document setting out an organized, planned and coordinated course of action to be followed in the event of a loss of capacity to supply water to the distribution system or in case of a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment.
- (8) **Delineation.** The determination of the extent, orientation and boundaries of a wellhead protection area using factors such as geology, aquifer characteristics, well pumping rates and time of travel.
- (9) **Discharge.** The volume rate of loss of groundwater from the aquifer through wells, springs or to surface water.
- (10) **Drawdown.** The difference, measured vertically, between the static water level in the well and the water level during pumping.
- (11) **Effective Porosity.** The ratio of the volume of interconnected voids (openings) in a geological formation to the overall volume of the material.
- (12) **Element.** One of seven objectives considered by the U.S. Environmental Protection Agency as the minimum required components in any state wellhead protection program: specification of duties, delineation of the wellhead protection area, inventory of potential contaminant sources, specification of management approaches, development of contingency plans, addressing new (future) wells, and ensuring public participation.
- (13) **Future Groundwater Sources.** Wells and/or springs that may be required by the public water system in the future to meet the needs of the system.
- (14) **Hydraulic Head.** The energy possessed by the water mass at a given point, related to the height above a datum plane that water resides in a well drilled to that point. In a groundwater system, the hydraulic head is composed of elevation head and pressure head.
- (15) **Hydrogeologic Boundary.** Physical features that bound and control direction of groundwater flow in a groundwater system. Boundaries may be in the form of a constant head, e.g., streams, or represent barriers to flow, e.g., groundwater divides and impermeable geologic barriers.
- (16) **Hydrogeologic Mapping.** Characterizing hydrogeologic features (e.g., hydrogeologic units, hydrogeologic boundaries, etc.) within an area and determining their location, areal extent and relationship to one another.
- (17) **Hydrogeologic Unit.** A geologic formation, group of formations, or part of a formation that has consistent and definable hydraulic properties.
- (18) **Interfering Wells.** Wells, that because of their proximity and pumping characteristics,

and as a result of the aquifer's hydraulic properties, produce drawdown cones that overlap during simultaneous pumping. The result is a lowering of the pumping level in each well below what it would be if that well were pumping by itself.

- (19) **New Groundwater Sources.** Additional or modified wells and/or springs owned by the Public Water System.
- (20) **Open Interval.** In a cased well, the open interval is the sum of the length(s) of the screened or perforated zone(s). In an uncased (open-hole) well, the open interval is considered as the sum of the thickness(es) of the water-bearing zones, or if undeterminable, 10 percent of the length of the open hole.
- (21) **Porous Media Assumption.** The assumption that groundwater moves in the aquifer as if the aquifer were granular in character, i.e., moves directly downgradient, and the velocity of the groundwater can be described by Darcy's Law.
- (22) **Potential Contaminant Source Inventory.** Determination of the location within the wellhead protection area of activities known to use or produce materials that can contaminate groundwater.
- (23) **Potentiometric Surface.** A surface that denotes the variation of hydraulic head in a given aquifer across an area.
- (24) **Provisional Delineation.** Approximating the wellhead protection area for a well by using the wellhead protection area from another well in the

same hydrogeologic setting or by using generalized values for the aquifer characteristics to generate an approximate wellhead protection area for the well. Used only for the purpose of evaluating potential siting of new or future groundwater sources. Not an acceptable way to formally delineate a wellhead protection area.

- (25) **Recharge.** The process by which water is added to a zone of saturation, usually by downward infiltration from the surface.
- (26) **Recharge Area.** A land area in which water percolates to the zone of saturation through infiltration from the surface.
- (27) **Recovery.** The rise in water level in a well from the pumping level towards the original static water level after pumping has been discontinued.
- (28) **Responsible Management Authority.** The Public Water System whose water supply is being protected and any governmental entity having management, rule or ordinance making authority to implement wellhead protection management strategies within a Wellhead Protection Area. Responsible Management Authorities are responsible for implementation of the Wellhead Protection Plan; includes cities, counties, special districts, Indian tribes, state/federal government entities and Public Water Systems.
- (29) **Team.** The local Wellhead Protection team, which includes representatives from

the Responsible Management Authorities and various interests and stakeholders potentially affected by the Wellhead Protection Plan.

- (30) **Time-of-Travel (TOT).** The amount of time it takes groundwater to flow to a given well. The criterion that effectively determines the radius in the calculated fixed radius method and the upgradient distance to be used for the analytical and numerical models during delineation of the wellhead protection area.
- (31) **Water-Bearing Zone.** That part or parts of the aquifer encountered during drilling that yield(s) water to the well.
- (32) **Water Table.** The upper surface of an unconfined aquifer, the surface of which is at atmospheric pressure and fluctuates seasonally. The water table is defined by the levels at which water stands in wells that penetrate the aquifer.
- (33) **Wellhead Protection.** Implementing strategies within a wellhead protection area to minimize the potential impact of contaminant sources on the quality of groundwater used as a drinking water source by a public water system.
- (34) **Wellhead Protection Area (WHPA).** The surface and subsurface area surrounding a spring, well or wellfield, supplying a public water system through which contaminants are reasonably likely to move toward and reach that spring, well or wellfield.
- (35) **Wellhead Protection Plan.** A plan, certified by the Depart-

ment of Environmental Quality (DEQ), which identifies the actions to be taken at the local level to protect a specifically defined wellhead protection area. The Plan is developed by the local Responsible Management Authority and/or team and includes a written description of each element, public participation efforts, and an implementation schedule.

## CONSTRUCTION STANDARDS

### 333-61-050

(1) General:

- (a) A public water system or other Responsible Management Authority using groundwater, or groundwater under the direct influence of surface water, derived from springs, confined or unconfined wells that wishes to have a state certified wellhead protection program shall comply with the requirements as specified in OAR 333-61-057, 333-61-060, and 333-61-065, as well as OAR 340-40-140 through 340-40-200 and other applicable rules. Additional technical information is available in the Oregon Wellhead Protection Guidance Manual.

## VOLUNTARY WELLHEAD PROTECTION PROGRAM

### 333-61-057

- (1) In accordance with OAR 340-40-140 through 340-40-200, a public water system or other Responsible Management Authority that wishes to have a state certified wellhead protection program shall comply with the requirements prescribed in this rule.

- (2) Delineation of the wellhead protection area (WHPA).

- (a) Delineation requirements for all groundwater sources are as follows:

- (A) Delineations will be accomplished using a minimum TOT criterion of 10 years unless a hydrogeologic boundary is encountered at a shorter time of travel or as specified in paragraph (2)(c)(B) of this rule;

- (B) Delineations will be accomplished by a registered geologist, engineering geologist or other licensed professional with demonstrated experience and competence in hydrogeology in accordance with ORS 672.505 through 672.705.

- (C) Except as noted in paragraph (2)(c)(B) of this rule, a conceptual groundwater model shall be developed for all public water systems participating in the voluntary wellhead protection program. The conceptual model shall be based on available information, including but not limited to: well reports, published reports and available unpublished reports and theses, etc. Sources of this information include the Water Resources Department, U. S. Geological Survey, Department of Geology and Mineral Industries, Department of Environmental Quality, University Libraries and the Division. The conceptual model shall include, but not be limited to, the identification and characterization of hydrogeologic units, determination of hydrogeologic boundaries, if any, areas of discharge and recharge and

distribution of hydraulic head for the aquifer(s) of concern. The conceptual model shall also evaluate whether or not the porous media assumption is valid.

- (D) The delineated WHPA and supporting documentation shall be submitted to the Division for review and certification.

- (E) Within 60 days of the receipt of the delineated wellhead protection area and supporting documentation, the Division will send a written acknowledgment of that receipt and an estimated date for Division review and certification of the delineation.

- (F) The delineation techniques stipulated in this rule represent the minimum acceptable effort required for a state certified program. The use of a more sophisticated technique is acceptable.

- (b) Springs. For water systems served by springs, hydrogeologic mapping shall be used to delineate the recharge area to the spring(s);

- (c) Wells:

- (A) All delineations for groundwater derived from wells shall use a adjusted pump rate ( $Q_a$ ) that allows for potential growth using one of the methods below, whichever yields the smallest value for  $Q_a$ :

- (i) 125 percent of average pump rate as determined from the month representing the highest usage;

- (ii) 125 percent of average pump rate as determined using a



- comparable community;
- (iii) The design capacity of the pump; or
  - (iv) 90 percent of the safe yield of the well.
- (B) For water systems serving  $\leq 500$  population, the minimum acceptable delineation method is a calculated fixed radius. Parameters considered in this technique include  $Q_a$ , effective porosity, open (screened or perforated) interval or thickness of the water-bearing zone(s), whichever is less, and a TOT of 15 years;
  - (C) For water systems serving 501 to 3,300, the WHPA(s) shall be delineated using a combination of an analytical technique and hydrogeologic mapping;
  - (D) For water systems serving  $> 3,300$ , the conceptual model shall be refined using site-specific collected data. Data collected shall include, but not be limited to, measured static water levels for the purpose of generating a map of the appropriate potentiometric or water table surface, and at a minimum a 24-hour constant-rate aquifer test. The well to be tested should remain idle for a period of 24 hours prior to the test. Water levels in the well should be monitored at appropriate intervals during the pre-pumping-, pumping- and recovery phases. Additional technical information is given in the Oregon Wellhead Protection Guidance Manual;
  - (E) For water systems using wells and serving a population of 3,301 to 50,000, the WHPA(s) shall be delineated as provided in paragraph (C) of this subsection, with the exception of using the site specific data collected in accordance with paragraph (D) of this subsection;
- (F) For water systems serving a population  $> 50,000$ , the WHPA(s) shall be delineated using numerical models or comparable analytical methods. The model must be calibrated using field observations and measurements of appropriate hydrogeologic parameters.
- (d) Susceptibility Analysis. To guide the development of management strategies, the aquifer's susceptibility within the WHPA may be determined using the methods described in the Use and Susceptibility Waiver Guidance Document or another pre-approved process. Additional technical information is available in the Oregon Wellhead Protection Guidance Manual;
  - (e) Delineation Update. The public water supply's WHPA delineation shall be re-examined every five years for potential revisions (OAR 340-40-190). Factors that may require revision of a WHPA boundary include, but are not limited to the following:
    - (A) A significant change in the pumping rate;
    - (B) A significant change in recharge to the aquifer;
    - (C) Wells outside the control of the water system placed in a manner that could significantly modify the shape and/or orientation of the original WHPA.
- (3) New and Future Groundwater Sources.
    - (a) New Sources. With regard to the voluntary wellhead protection program, a new source is defined as an additional or modified well(s) and/or spring(s) that will be used by the water system:
      - (A) For new wells or springs outside an existing WHPA or deriving water from a different aquifer than that supplying other already delineated WHPAs, the following shall be completed:
        - (i) If more than one potential site is available, the water system or other responsible management authority shall conduct a provisional delineation and a preliminary potential contaminant source inventory for each site being considered in order to evaluate the long-term viability of each of the sites available.
        - (ii) Delineate the chosen site following procedures in section (2) of this rule. Further technical information is provided in the Oregon Wellhead Protection Guidance Manual.
      - (B) For new wells or springs inside an existing WHPA or potentially influencing an existing WHPA, the following shall be completed:
        - (i) Evaluate sites and delineate WHPA(s) as described in subparagraphs (3)(a)(A)(i) and (ii) of this rule;
        - (ii) Modify the existing wellhead protection plan to encompass modifications resulting from the new delineation.

(C) New wells or springs as defined in subsection (3)(a) of this rule shall comply with all appropriate construction standards as described in OAR 333-61-050 and shall comply with plan submission requirements in OAR 333-61-060.

(b) Future Sources. A public water system or other responsible management authority that has recognized the need for future groundwater supplies beyond their current capacity may choose to identify the area where this future supply will be obtained in accordance with subparagraph (3)(a)(A)(i) of this rule.

(4) Contingency Planning.

(a) Public water systems shall develop or revise contingency plans for response to potential loss or reduction of their drinking water source(s). Key elements of the plan shall in

clude, but not be limited to, the following:

- (A) Inventory/prioritize all threats to the drinking water supply;
- (B) Prioritize water usage;
- (C) Anticipate responses to potential incidents;
- (D) Identify key personnel and development of notification roster;
- (E) Identify short-term and long-term replacement potable water supplies;
- (F) Identify short-term and long-term conservation measures;
- (G) Provide for plan testing, review and update;
- (H) Provide for new and on-going training of appropriate individuals;
- (I) Provide for education of the

public; and

- (J) Identify logistical and financial resources.
- (b) Public water systems shall coordinate their contingency plan with the emergency response plans of the appropriate county and/or city and with the contingency plans developed by industries using hazardous materials within the well head protection area.

#### **OPERATION AND MAINTENANCE**

#### **333-61-065**

- ...(d) Implementing actions to assure safe drinking water during emergencies. Water systems wishing to have a state certified wellhead protection program shall comply with the contingency planning requirements as described in OAR 333-61-057(4).

**Table 2-1: Index of Information on Rule Requirements**

<b>OAR Number</b>	<b>Subject</b>	<b>Corresponding Information in Guidance Manual</b>	<b>Section / Page Number</b>
340-40-170(1)(2)	Specification of duties for local plans	Roles of Responsible Management Authorities (RMAs).	Section 1.5 / p. 1-13
		Signoff by RMAs.	Section 1.6 / p. 1-16
333-61-057(1)	Delineation of wellhead protection areas	OHD technical guidance for delineation.	Section 3.3 / p. 3-4
		Example delineation methods.	Appendix A / p. A-1
340-40-170(1)(c)	Inventory of potential contaminant sources	DEQ guidance for inventory.	Section 3.4 / p. 3-32 & Appendix B / p. B-1
		Examples of inventory maps.	Appendix C / p. C-1
340-40-170(1)(d)	Developing management plan to address potential sources	DEQ technical assistance for management approach.	Section 3.5 / p. 3-47
		Example ordinance.	Appendix E / p. E-1
		Pollution prevention information.	Appendix F / p. F-1
		Example homeowner letter.	Appendix G / p. G-1
		Household hazardous waste information.	Appendix H / p. H-1
333-61-057(2)	New and future groundwater sources	OHD technical guidance for new and future sources.	Section 3.7 / p. 3-85
333-61-057(3)	Contingency planning	OHD guidance for developing a contingency plan.	Section 3.6 / p. 3-84
		Example contingency plan.	Appendix I / p. I-1
340-40-170(1)(g)	Public participation	Soliciting public involvement.	Section 3.1 / p. 3-1
		Example notification letter.	Appendix G / p. G-1
		Formation of a local Team.	Section 3.2 / p. 3-3
340-40-180	Certification procedure	Requirements and method for obtaining certification from OHD and DEQ.	Section 3.8 / p. 3-88
340-40-190 & 200	Procedure for recertification and decertification	DEQ guidance for recertification, revisions, updates & decertification.	Section 3.8 / p. 3-89
340-40-210	Appeals to DEQ decisions	Procedure for local jurisdictional appeal of DEQ's decisions regarding certification issues.	Section 3.8 / p. 3-89

