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What is Oregon's water supply program?

In Oregon, the state, with or without assistance from county health departments, is responsible for ensuring, through a program of surveillance and regulation, that the public receives safe water in quantities adequate to the needs of consumers. All public water systems in the state are subject to this program. Bottled water, which supplies a small fraction of the state's drinking water, is regulated by the Oregon Department of Agriculture under Oregon's food laws. No standards have been set for in-state bottled water, but its bacteriological quality is tested frequently, and the four bottling plants in the state are inspected periodically for sanitary handling and bottling conditions. The water source is inspected only once.

Water systems that serve only mobile-home parks are supervised by the Oregon Department of Commerce, but the Health Division checks the water source. All other domestic water supply systems with four or more service connections (1,050 such systems existed in the state, as of August 1, 1976) are under surveillance of the Oregon Health Division, which sets standards for physical, chemical, and biological quality of the water supplied.

Fifteen of Oregon's 36 counties have health departments that assist the state Health Division by supervising water systems serving transient populations—in places people work or visit, or where foods are processed. In the remaining 21 counties, the state conducts the surveillance program.

Under current rules, if water does not meet state standards, the water supplier must take corrective action. If danger to public health is imminent, service must stop until the problem is corrected. If the violation of the water quality standards does not present an immediate danger, the supplier must remedy the situation within a specified time. If quality standards are met but the quantity is deemed inadequate, the supplier must restrict use of water to essential needs. New service connections and system extensions must stop until provisions are made to increase the amount of water available to consumers.

oped. These factors, coupled with difficulties in implementing and enforcing federal and state programs for safe drinking water, result in use of drinking water of questionable quality by a significant fraction of the state's population.

What is safe water?

Water that is safe for a paper mill, car wash, or laundry need not be as pure as water for drinking. To be considered safe, drinking water must produce no immediate ill effects and minimal long-term ill effects in the population served. Today, with growing population pressures and the resultant re-use of water sources, safe drinking water has become as much a manufactured product as soda pop or beer. Rarely, even in Oregon, can a raw water source be used for drinking without treatment of some kind.

Biological, chemical, and physical qualities are considered in certifying the safety of drinking water. The most common health hazards are biological, usually from contamination of water supplies by sewage. Microorganisms that survive readily in water can cause cholera, typhoid, gastroenteritis, hepatitis, and polio. Because testing for all known waterborne disease organisms is extremely difficult, a coliform bacterium found in the human intestinal tract is used as an **indicator** of fecal contamination of water.

Inorganic chemical contaminants including lead, mercury, arsenic, barium, cadmium, chromium, nitrates, selenium, silver, and fluoride may originate from a variety of sources and, in **sufficient concentrations**, may cause health disorders ranging from skin and tooth discoloration and dermatitis to liver damage, nervous disorders, circulatory collapse, and death. Some radioactive compounds, natural and manmade, are considered detrimental to health, as are certain organic chemicals, primarily pesticides.

Suspended particles (turbidity) do not necessarily mean unsafe water but may indicate improperly treated water. High turbidity may interfere with efficient disinfecting of water at the treatment site and with maintaining suitable concentrations of disinfectant in the distribution system. It also may interfere with accurate analysis of water samples.



WHAT? Problems with water in OREGON?

EVERY OREGONIAN knows that in 1975 the spring-fed water source for Crater Lake Lodge was contaminated by raw sewage. An estimated 80,000 persons visited the Lodge during the time the water was unsafe, and about 900 received compensation for damages suffered. But not everyone knows about less spectacular incidents that have occurred around the state. In one community of 790 persons, chlorination is the only treatment given to water coming from an open pond. Because of a flaw in the construction of the intake system, the primary screen that is designed to trap frogs, salamanders, and other pond life cannot be removed for cleaning. Residents report that bits of decayed wildlife periodically emerge from their household taps.

In another small community (61 persons), water is drawn from a 30-foot well. An inspection revealed a poorly constructed well cover and a dead rat in the well. Directions from an inspector to correct the problem resulted in construction of a wooden ramp in the well to enable drowning animals to climb out—but no improvement to the well cover.

Water is second only to air in its importance to human life, yet an estimated 20 percent of all Oregonians use drinking water of unknown or questionable quality. Because of the rapid increase in use of synthetic chemical compounds in recent years, little is known about the nature, health effects, and control of many of the contaminants found in water. Technologies for detecting and controlling viruses in water supplies have not been devel-

We all assume that the water we drink is safe—and usually it is. The Environmental Protection Agency (EPA) surveyed the Oregon Health Division records for 1970 through 1974 for water supply systems serving 15 or more connections (mobile-home parks were not included). This survey revealed some startling information.

In 1970, of 495 community water supplies, 280 (56%) met bacteriological standards for frequency of sampling, number of samples collected, and coliform count. By 1974, the number of water systems had increased to 727, but only 195 (27%) met the standards. Health Division records for the first five months of 1976 showed that only 267 of 836 systems (32%) fully conformed with bacteriological standards; 431 systems (52%) did not submit the required number of samples, and 138 submitted no samples at all. Sixty-eight systems (8%) submitted samples that contained coliform bacteria. In 1970, 1.36 million persons received bacteriologically safe water. This was 90 percent of the total number served. In 1973, 1.38 million received bacteriologically safe water, but this was only 84 percent of those served. These trends have continued and, as most Oregonians are served by water systems included in the surveys, this indicates treatment problems in an increasingly significant portion of water systems.

Clearly, significant problems occur in many domestic water supply systems in the state, and the problems have increased in recent years. A major difficulty in supplying safe drinking water appears to lie in the rapid increase of small water systems, those that serve 1,000 or fewer persons. The cost per person of supplying water that meets state standards is high in small districts. Residents of many such districts have been unable or unwilling to pay the taxes, water rates, and connection fees necessary to meet the cost of water that complies with state Health Division standards. In addition, the state has lacked sufficient resources for full inspection and enforcement of its standards.

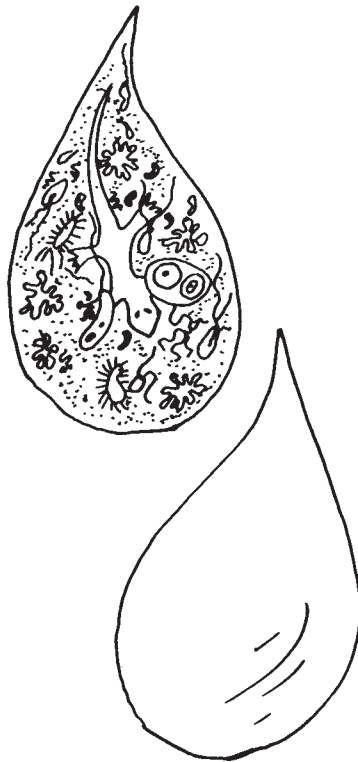
Most water systems in Oregon are small. More than half of the 727 systems studied in 1974 served populations of 500 or fewer. Some systems are large, however; Portland serves 382,000 people.

Oregonians are supplied from both surface and ground-water sources. In 1974, more than three-fourths of the 1.835-million study population were served by surface water delivered by 336 systems. Fifteen percent of the study population

received ground water from 356 sources. Systems that use ground water in Oregon tend to be small; however, the Klamath Falls system serves 35,000 people. Seven percent of the study population received water from 35 systems with both surface and ground-water sources.

What about the federal Safe Drinking Water Act?

The purpose of the federal Safe Drinking Water Act, passed in December 1974, is to ensure that public supplies of drinking water throughout the United States meet minimum national standards for the protection of health. Federal regulations before 1974 applied only to interstate carriers (buses, trains, and planes). The 1974 act covers public water systems, defined as those that pipe water to the public for human consumption, with at least 15 service connections or regularly serving at least 25 persons daily for 60 days in a year. Public systems are classified as community systems if they serve year-round residents and noncommunity systems if they serve transient or



intermittent users. Motels, hotels, service stations, campgrounds, restaurants, schools, churches, and factories with their own water supplies are noncommunity systems.

EPA is responsible for setting mini-

mum drinking water standards for public systems. The regulations will be both primary and secondary. Primary drinking water regulations are designed to protect public health as much as possible through technology, treatment techniques, and other generally available means—with cost taken into consideration. They will specify contaminants that may be harmful to health. They will also specify maximum concentrations of these contaminants, if this can be determined technologically and economically. If not, known treatment techniques to reduce contaminant concentration will be specified. Secondary regulations will protect the public welfare by setting standards for odor, taste, and appearance of drinking water. Enforcement of these secondary standards will be optional.

EPA, after holding hearings around the country and after consultation with federal agencies and advisory and technical groups, published the Interim Primary Drinking Water Regulations in December 1975. These regulations take effect on June 24, 1977. Meanwhile, the National Academy of Sciences is conducting a study of the effects of drinking water contaminants on health, determining maximum concentrations of contaminants allowable, and listing possibly harmful contaminants, such as organics, asbestos, and viruses, for which concentrations in drinking water cannot readily be determined. This study will form the basis for EPA's Revised Primary Water Regulations, scheduled to become effective in 1979. The revised regulations may be amended to provide greater health protection as new techniques become available, and they must be reviewed at least once every three years.

The present national Interim Primary regulations establish maximum concentrations for nine inorganic chemicals including arsenic, nitrate, lead, and mercury; for the organic pesticides and herbicides endrin, lindane, methoxychlor, toxaphene, 2,4-D, and 2,4,5-TP; for coliform bacteria; and for turbidity. Allowable concentrations of both natural and manmade radioactive materials have also been established. The regulations specify how often water samples must be collected and analyzed for various contaminants and the analytical methods to be used. Laboratories performing analyses for organic and inorganic chemicals, bacteria, and radioactivity must be approved by the agency enforcing the act. Because the allowable maximums were predicated on long-term use of a particular water supply, noncommunity systems are required to

meet only the standards for nitrate, bacteria, and turbidity.

Variations and exemptions may be granted to water systems unable to meet the primary regulations. A variance is granted when the available raw water source is so bad that it cannot meet the allowable contaminant concentration even with the best technology—or when the raw water is so good that specified treatments are not necessary to protect health. Variations may be continued indefinitely but are subject to review every three years. Exemptions for a specified period of short duration may be granted when a supply system in operation at the time the regulations took effect is unable to comply with them because of economic, time, or other compelling factors—if the exemption will not result in an unreasonable health hazard. A community water system must notify its customers in their water bills if it fails to meet a primary drinking water regulation, fails to perform monitoring, has been granted a variance or exemption, or fails to comply with the schedule prescribed in the variance or exemption. Newspapers and radio and television stations in the area must be notified when the water system exceeds a maximum contaminant concentration. Noncommunity systems must also ensure that all who use them are informed of any failure to conform with primary regulations, by posting a conspicuous notice to that effect.

Operators of public water systems are required to maintain accurate records, open to the public and EPA, of sample analyses, actions to correct violations, sanitary survey reports, and variations and exemptions.

How will the laws be enforced?

Congress intended that the states assume principal responsibility for implementation of the Primary Drinking Water Regulations. Before a state is given this primary enforcement responsibility, called "primacy", for the federal drinking water laws, however, EPA must determine that the state has:

- primary drinking water regulations no less stringent than the national regulations;
- adequate procedures for enforcement of state regulations; accurate record keeping and reporting of its activities in public water systems to EPA;
- provision for variations and exemptions, as required by the federal act; and
- adequate plans to provide safe drinking water in emergencies.

In November 1976, Oregon will submit to EPA notice of intent to assume primary enforcement responsibility, but final authority for the state's action will rest with the 1977 Oregon legislature.

The Health Division has listed changes in the Oregon laws on water supply systems that are necessary to meet federal requirements.

- Oregon must adopt drinking water standards at least as stringent as those of the Safe Drinking Water Act.



- Oregon must establish certification procedures for laboratories that analyze water samples for organic and inorganic chemicals and radioactivity. Bacteriological laboratories are now certified.
- Oregon must review plans for design and construction of new or substantially modified facilities at all categories of water systems including municipal, water district, mobile-home park, and those regulated by the Public Utility Commission (PUC). Under present law, the state does not have this authority for municipal, PUC-regulated, or mobile-home park water systems.
- Oregon must be able to compel compliance with drinking water standards for all systems over which the state has jurisdiction.
- All water suppliers must be required to keep records and submit reports. Present law limits state authority over municipal and PUC-regulated systems.
- Water suppliers must be required to give public notification when maximum contaminant concentrations are exceeded in water, when a failure to comply

with testing procedures occurs, or when the system is issued a variance or exemption.

- The penalty for violation must be raised from the present \$500 a day to \$5,000 a day—or less, if the amount is adequate to ensure compliance.
- Oregon must maintain records of tests performed to determine compliance with state regulations and submit updates of water system inventories and annual reports to EPA.
- Conditions for granting variations and exemptions must conform to federal law.
- Adequate plans for providing safe drinking water in emergencies must be made.

The Oregon Health Division has pointed out that the differences between present state requirements and the new federal law are not great. Most of the changes necessary would strengthen the state's surveillance and enforcement authority. According to the Health Division Fact Sheet of July 1976, state requirements are not enforced diligently enough. If all water systems conformed with present state requirements, few changes would be needed to bring them into compliance with the federal requirements.

Parts of present Oregon law are more stringent than the new federal regulations. In Oregon, water systems serving more than three single residences are subject to state regulation, but federal law applies to systems with at least 15 connections. Oregon requires two bacteriological samples a month from systems that serve 25-1,000 persons; federal standards require only one. Oregon also has standards for physical quality of drinking water, including color and odor. These secondary standards have not yet been promulgated for the federal act, and when they are, their enforcement will be optional.

The Oregon Health Division will recommend to the 1977 Legislature that Oregon assume the primary responsibility for enforcement of the federal Safe Drinking Water Act regulations and adopt rules that will bring Oregon drinking water laws in line with federal law. If Oregon does not assume primacy, water supply systems will still be required to meet any federal standards that are more stringent than present state law, and EPA will be the enforcing agency.

What will it cost?

As of January 1976, the Oregon State Health Division had records on 836 community water systems, as defined by the federal act. These

systems will require varying degrees of improvement to meet federal regulations, and thus costs to the systems' customers will vary. Table 1, adapted from one prepared by the Health Division, indicates the range of these costs.

If the state assumes primacy, the money and manpower required for a water system supervision program in Oregon would be as tabulated in Table 2.

If the state assumes primacy, the county health departments would take a more active role in the supervision of water systems. In those counties where adequate staff is available, the counties would be encouraged to undertake sanitary surveys of noncommunity water systems and of small community systems. Efforts would be made to provide the counties with funds for this purpose. The state would provide training the counties may require, establish policy and performance standards, and check periodically to ensure that the work is being done satisfactorily.

Many of the state's water systems have needed to increase user charges and to consider alternative methods of financing because operation and maintenance costs have increased and additional investment in expansion and improvements has been required. To lessen the direct financial burden upon water users and property owners, federal funding programs, as outlined below, have been enacted to assist local governments in improving the water systems.

- The Housing Community Development Act of 1974 initiated new programs of assistance to urban and rural communities. The act provides for formula grants to cities for broad-range, locally designed programs.
- Funding for economic development projects that are designed to revitalize the local economy of cities that suffer from high unemployment is found in the Public Works and Development Act.
- Economic development funds are spent by the Economic Development Administration (EDA) in the Department of

Table 1. Estimated Costs for Upgrading Community Water Systems

Particulars	Full treatment and monitoring required	Some treatment and monitoring required	No additional requirements
Number of systems	138	431	267
Percent of population served by community water systems	3%	15%	82%
Average number of connections per system	130	180	1,600
Average monthly cost per connection	\$4.79	\$4.31	None
Range of estimated increase in monthly costs per connection	\$3 to \$14	\$2 to \$12	None

Commerce. EDA operates an extensive program of grants for public facilities, as well as loans and loan-guarantee programs for businesses locating or expanding production in an EDA-project area. Public works grants and loans may go to states, local subdivisions, Indian tribes, and private and public nonprofit organizations representing a redevelopment area or a designated center for economic development.

- General revenue-sharing funds are administered by the Office of Revenue Sharing in the Department of the Treasury under the authority of the State and Local Fiscal Assistance Act. Funds are allocated based on population and need.
- Funds are available to rural communities with populations of less than 10,000 to construct facilities and to aid their economic development in various loan and

grant programs. These programs are administered by the Farmers Home Administration in the Department of Agriculture.

- Authorization of grants to state and local governments for construction, renovation, repair, or other improvement of local public works projects was contained in the Public Works Employment Act of 1976. The EDA will administer the program.

According to a 1976 study by CH2M-Hill, "Although the legislation for establishing these federal programs may exist, the availability of funds for a specific project is dependent upon a priority schedule for the distribution of appropriated funds."

At the state level the Oregon Health Division is drafting legislation to amend the Oregon Constitution to permit bonding for funds to improve water systems. If this is passed and approved by the electorate, then an additional source of financing will be available.

Table 2. Money and Manpower Required for a Water-System Supervision Program in Oregon

Source of Funds	1976		1977		1978		1979	
	\$*	FTE**	\$*	FTE**	\$*	FTE**	\$*	FTE**
State	0.466	20.7	0.520	21.5	0.660	17.4	0.780	31.8
Federal	0.024	0.8	0.340	10.8	0.440	26.0	0.520	20.0
TOTAL	0.490	21.5	0.860	32.3	1.120	43.4	1.300	51.8

* in millions

**full time employee or equivalent