



# Community Wellhead Protection Programs

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As communities become more aware of both the potential health risks and the economic effects of ground water contamination, they are beginning to look increasingly toward preventive efforts. The development of wellhead protection programs is a major preventive approach for the protection of community drinking water supplies.

Ground water is a vitally important natural resource. It is a source of drinking water for more than half of the U.S. population and more than 95 percent of the rural population. More than one-third of the water used in agriculture for irrigation and livestock watering is from ground water sources. Industries use ground water in their industrial processes. In addition, ground water is a support system for sensitive ecosystems, such as wetlands or wildlife habitats.

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If you live in a small community, chances are that ground water is one of your town's most important and valuable resources. Chances are, too, that your community's water suppliers are concerned about doing whatever is necessary to protect the quality of your community's ground water supplies.

## Rationale for Wellhead Protection Programs

The local government may or may not be directly responsible for a particular community's water supply. Nevertheless, once a water supply is contaminated, local officials do become involved in locating a clean supply, informing the public, and determining long-term solutions. Therefore, many communities



*This publication is number 13 in a series of 17 leaflets produced by the Ground Water Policy Education Project. This project is a joint effort of Cooperative Extension, the Freshwater Foundation and Soil and Water Conservation Society.*

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across the country have taken the initiative to protect their water supplies by developing wellhead protection programs, which protect limited geographic areas around wells and wellfields that provide public water supplies. Established by the Safe Drinking Water Act of 1986, the Wellhead Protection Program is specifically designed to help states and local communities protect their public water supplies in ways appropriate to their unique situations.

Even when no immediate water-related concern appears to exist, a community should be concerned about protecting its drinking water supply for three reasons:

- 1) to reduce potential risks to the health of the community,
- 2) to avoid the costs of cleaning up contamination and providing alternative water supplies, and

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- 3) to prevent the negative economic impacts on community development that ground water contamination can cause.

### **Protecting the Health of the Community**

Between 1971 and 1985, there were 245 ground water related outbreaks of disease, resulting in more than 52,000 individuals being affected by associated illnesses. While most of these diseases were short-term digestive disorders caused by bacteria and viruses, hazardous chemicals found in wells nationwide also pose risks to public health. While many such effects are unpredictable, some of these chemicals are known to cause cancer or permanent cell changes, while others are known to have toxic effects on the liver, central nervous system, and other organs.

### **Avoiding the Costs of Cleanup and Replacement of a Water Supply**

Cleaning up contaminated ground water can be technically difficult, extremely expensive, and sometimes it simply cannot be done. Once a water supply is contaminated, replacement is often the most reasonable alternative, and the costs of siting new wells, treating existing supplies, or providing bottled water are high.

In a Minnesota city, contamination of the public water supply by a solvent required construction of a new municipal water treatment and sewer system at a cost of nearly \$900,000. Municipal bonds were issued, and interest on an FHA loan cost \$48,000 per year for 30 years. Affected residents will pay for the overall costs of the remediation through substantially higher user fees for municipal water hook-ups.

### **Preventing Negative Economic Impacts**

The negative economic effects of contaminated ground water can extend far beyond the costs of remediation. Contaminated ground water often discourages new businesses or residents from locating in a community. Existing businesses may be forced to move to an area with access to an uncontaminated water supply. In the Minnesota city whose municipal water supply was contaminated by a solvent, the contamination affected 22 businesses. In addition, the city suffered an estimated \$1 million in lost potential sales for both residential and commercial real estate in the years during construction of the water treatment facility.

For all of these reasons—health, remediation costs, and lost economic opportunities—maintaining the quality of your community's ground water is essential.



## A Five-Step Approach to Developing a Community Wellhead Protection Program

### Step 1: Form a community planning team.

It is critical to involve the broad interests of the community in this process, so that all viewpoints are considered in developing a local wellhead protection plan. These interests may include water suppliers; elected officials; local government agency representatives, such as health, planning, and natural resources; businesses; developers; community service organizations; the farming community; environmental groups; and interested citizens. Regardless of the specific organization of the team, the basic goal is to provide for broad community participation in the planning process.

The selection of an effective team leader is also critical to the success of a wellhead protection plan. The team leader is responsible for keeping the process on track, making sure that all legitimate community interests have a voice in the process, and ensuring that the planning effort is brought to completion.

### Step 2: Define the area that needs protection.

By identifying the geographic area that contributes water to your well, you can limit the size of the area in need of the kind of special management and attention that will likely have an impact on daily operations of the community.

Determining this area exactly is not easy and requires some expertise in ground water hydrology. If such expertise is not readily available, a good starting point would be to identify the area within a radius of one-half mile around the public water supply well. This initially defined "wellhead protection area" could then be refined as more information becomes available.

Your community may be able to obtain the kind of hydrologic information and expertise you need from county, state, or federal agencies, such as county Extension or SCS offices, state health or environmental departments, or the U.S. Geological Survey. Another potential information source is local universities with departments in geology, water resources, agriculture, or civil or environmental engineering. Finally, you may know of citizens in the community who have professional expertise in these areas. The U.S. Environmental Protection Agency (EPA) can provide publications and a computer model for use in defining a wellhead protection area.

Once the team has defined the wellhead protection area, the next step is to locate it on a map, so that the planning team and the community clearly see the area to be placed under

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special management. Supporting information that may be helpful in this process can include U.S. Geological Survey topographic maps, town parcel maps, state natural features maps, and previous studies on the water resources in your area.

### Step 3: Identify the problems that may contaminate your well.

The process of identifying contamination problems should begin with a checklist of potential sources. Even though sources vary from community to community, a checklist is essential to assure that a threat is not unintentionally missed in the identification process.

Checklists are available from your state ground water office or the EPA. A partial listing of sources to consider includes:

gas stations	food processors
auto repair shops	pesticide usage
pesticide storers	feedlots
dry cleaners	junk yards
photo processors	heating oil storage
printers	coin-operated laundries
landfills	abandoned wells
airports	domestic septic tanks
golf courses	auto washes
nurseries	concrete suppliers
metal platers	boat refinishers

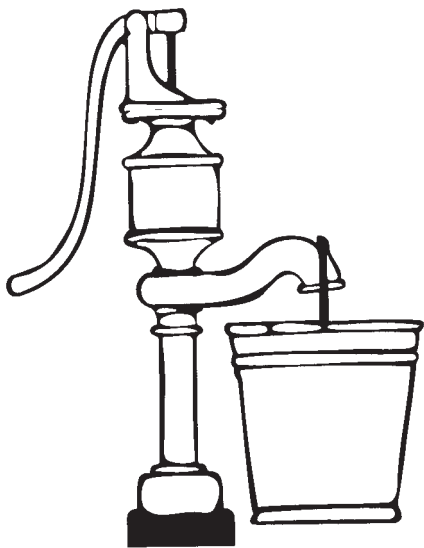


When the checklist is prepared, the team needs to survey the wellhead protection area to locate any sources. The team may conduct a mail, telephone, or door-to-door survey, or a combination of these approaches. Through the survey, the team will be able to identify the location of each source on a map, its proximity to the well, and the activities that may cause contamination of the ground water.

In El Paso, Texas, senior citizen volunteers surveyed potential sources of ground water contamination. The Texas Water Commission coordinated the survey to gain information to help protect El Paso's 140 public water supply wells. Identified by badges, the volunteers visited homes and businesses to obtain information. The effort was well-publicized by local news media, so that those living in the wellhead protection areas were prepared for the visits of the volunteers.

#### **Step 4: Begin special management of sources in the wellhead protection area.**

The next step is to begin managing the identified contamination sources—both existing sources and new sources that may want to locate in the area. If the initial team selection process focused on those in the community who have the authority to implement management of identified sources—including state and local officials who have the responsibility for education, planning, zoning, health, water supply, and other management activities—then these team members would have agreed to the wellhead protection concept early in the process and can now provide the authority to direct the key implementation steps.



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#### **Management by restriction**

One of the most common ways to protect ground water is to restrict certain activities within a certain distance from a well. For example:

- In Brookings, South Dakota, the town commission is acting to protect its aquifer from potential pollution sources. This protection effort includes regulating light industry, especially industry that involves the storage of large quantities of hazardous materials and warehouses that store fertilizers and pesticides for farming. In 1985, the commission established an Aquifer Critical Impact Zone. Within this zone, the manufacturing, storage, sale, or use of hazardous chemicals is prohibited.
- The town of Vestal, New York, requires a special permit for any new development or changes to existing structures that would result in: 1) any development of real property other than residential that exceeds \$50,000 in development cost; 2) any use of property that entails the storage of toxic or hazardous chemicals in excess of 55 gallons or 500 pounds (whichever is less) per month; and 3) any activity requiring a permit from the New York Department of Environmental Conservation.
- Soon after establishing a ground water monitoring program, Renton, Washington, discovered ground water contamination in several locations. Officials traced the contamination to a leaking fuel storage tank and several small businesses, including garages and dry cleaning facilities, that were disposing of hazardous waste improperly. In addition, they discovered leaks in several petroleum pipelines.

*Request assistance from state wellhead protection or drinking water officials and other appropriate sources to help develop your long-term strategy.*

*If your community expects significant growth in the future, begin planning now for those increased demands on water resources. If future demand might require development of a new wellfield, it may be helpful to begin now to restrict development near potential well sites.*

In response to these problems, Renton developed design and operating standards to protect the water quality of its community wellfield. The city developed stringent construction standards for new facilities that store hazardous material and established monitoring requirements for existing facilities.

#### **Other management options**

Besides restricting activities within a wellhead protection area, a community can pursue other ways to protect ground water. One option is to acquire high-risk areas for community-oriented land uses that have a low contamination potential, such as parks and recreation facilities. If this is not feasible, consider purchasing development rights to the land. Or, reward landowners who do not conduct risky activities by easing their taxes. Another option is to prohibit outright the most threatening activities within critical areas.

Be aware of management practices applicable to your identified ground water protection activities. For example, properly designing and siting septic tanks and periodically having them inspected and pumped are management practices that reduce the likelihood of contamination of nearby wells with bacteria and viruses. Being sure that road salt used to melt ice on winter roads is stored in a covered area is a management practice for preventing saltwater runoff that seeps down into the underlying ground water. Management practices are simply methods of minimizing the potential for harm to water quality.

Finally, educate the community about the importance of ground water and the potential sources of contamination that could threaten your community's ground water quality.

#### **Step 5: Plan for the future. Develop a contingency plan.**

Begin to develop a contingency plan in the event that your wells become contaminated despite your efforts. Even the most comprehensive and stringent wellhead protection program may fail to protect your wells.

A contingency plan should outline response procedures in the event of water supply disruption due to contamination or any other reason. State drinking water officials can identify both the individuals and organizations to notify immediately after an accidental release, as well as the types of equipment you would be likely to need in the event of a contamination incident. If your community does not have the recommended equipment, locate the nearest municipality that does.

**Be sure that your plan of action accomplishes the following:**

- allows for the fastest possible emergency response time,
- minimizes the amount of contaminant released,
- assures that other officials or emergency response personnel know who to contact,
- outlines an efficient and effective process for communicating with the public, and
- provides for alternative water supply sources.

Request assistance from state wellhead protection or drinking water officials and other appropriate sources to help develop your long-term strategy.

#### **Sustaining effort and evaluating regularly**

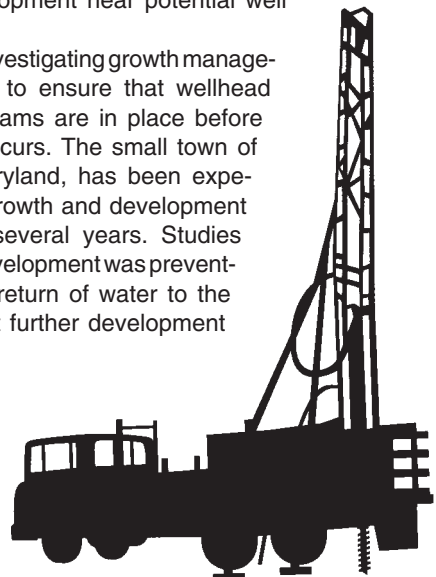
Even more important than designing a comprehensive wellhead protection program is sustaining your protection efforts in the future. One year of intensive ground water protection measures is not adequate to establish long-term ground water protection. Even modest ground water protection efforts will be more effective if they are sustained.

Plan an annual program evaluation to identify where improvements could be made and where new measures could be implemented. Begin thinking about the type of program you would like to have in place five or 10 years from now.

#### **Preparing now for future growth**

If your community expects significant growth in the future, begin planning now for those increased demands on water resources. If future demand might require development of a new wellfield, it may be helpful to begin now to restrict development near potential well sites.

Consider investigating growth management programs to ensure that wellhead protection programs are in place before development occurs. The small town of Mount Airy, Maryland, has been experiencing rapid growth and development over the past several years. Studies revealed that development was preventing the natural return of water to the ground and that further development



could result in water shortages. In response, the town council amended subdivision regulations to give the council authority to regulate the density of development based on anticipated demands and impacts on water supply and quality.

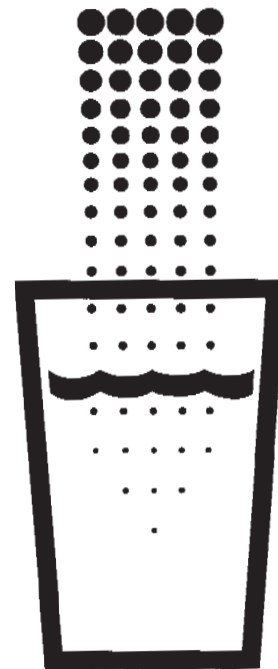
## Overcoming Obstacles to Wellhead Protection

Small communities often have very limited resources for implementing wellhead protection programs. Recognizing this fact, there are a number of ways to stretch the resources that are available.

- One of the largest obstacles for a small community is likely a lack of staff. While a community may not employ full-time local officials, a wealth of untapped resources often exists within various civic groups of a community. Identifying and encouraging such volunteer efforts will reduce the overall cost of your program, and get the community actively interested and involved in ground water protection.
- Another major obstacle is funding. Keep in mind that almost all kinds of taxes can be dedicated to wellhead protection initiatives. In addition, permit fees can be assessed against developers to recover those costs that their projects or activities impose upon public facilities and services. Access fees, the payments by users of a facility for the privilege of use (such as a connection fee or general facilities surcharge), can be directed toward wellhead protection. Unit charges that are paid by the direct user of a facility in proportion to use (metered water or sewer charges, for example) can also be directed toward wellhead protection activities. Even a small incremental increase can often provide sufficient revenues. Finally, fines and penalties can be levied against polluters who violate legal restrictions.
- Don't let insufficient funds—or even nonexistent funds—prevent you from taking action. Remember that your water supplier, whether municipal or private, has just as great an interest in maintaining water quality as you do. Suppliers interested in avoiding the costs of treating supplies or relocating wells may be willing to co-sponsor a preventive program with you. Local businesses, too, may be willing to work with you.
- A community may not have the expertise required for the type of program it would like to implement. To avoid this problem, begin by initiating activities that do not require sophisticated levels of expertise. In the meantime, be aware that your community may have more expertise available to it than you think. Talk with members of your community who are engineers or geologists or who have some other special background on which you could draw to help. Farmers may be able to give you a great deal of information about their land. County Extension and SCS offices, state officials, and local universities are also good sources of information and expertise.

*Many sources of expertise and funding are available to help you put together a wellhead protection program. Recognize the limits to your capabilities and plan your program accordingly.*

Many sources of expertise and funding are available to help you put together a wellhead protection program. Recognize the limits to your capabilities and plan your program accordingly. By setting reasonable and attainable goals for your community, you can help assure that your wellhead protection program will contribute substantially to the preservation of your community's valuable ground water resources.



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## The Oklahoma Cooperative Extension Service

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The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

Some characteristics of the Cooperative Extension system are:

- The federal, state, and local governments cooperatively share in its financial support and program direction.
- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and research-based information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Sam E. Curl, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 20 cents per copy. 0204