THE LOCAL DECISION-MAKERS' GUIDE TO GROUNDWATER AND WELLHEAD PROTECTION

Rural Community Assistance Program, Inc.

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Chapter I: Groundwater: You Can't Afford to Ignore It!

"Out of sight, out of mind . . ." According to EPA, half of all Americans, and 95% of rural residents, get their drinking water from underground sources. Since it's usually less expensive to drill a well than to build surface water treatment plants, most small systems rely on groundwater. But, once the well's drilled, most people don't think about groundwater again until there's a problem.

Many people still think groundwater is safe from contamination. They believe the soil, sand, gravel, and rocks filter and trap contaminants before they get to the water.

Not true. Since the 1970's, every state in the U.S. has had incidents of contaminated groundwater. These incidents range from bacteriological contamination, causing short-term stomach disorders, to pesticides that can cause cancer.

Out of sight? Yes. Out of mind? No! As a small system decision-maker, you can't afford to ignore your groundwater source. Protecting your community means protecting your water supply.

Once your groundwater is contaminated, deciding to protect it is like closing the barn door after the horse has run off. A contaminated water source can cost you and your neighbors dearly. If your water gets contaminated, you can expect additional costs for:

- new treatment equipment to remove contamination
- clean up and remediation
- consulting and legal fees
- water rate increases - 50-1000%
- real estate devaluation (who wants to live where the water's contaminated?)

One community in Massachusettes had its wells contaminated by a leaking gasoline storage tank. It's taken over 10 years of work and $3.3 million to remedy the situation.[1]

That's a high price to pay. Especially when there are things you can do to protect your groundwater supply. In this booklet we'll talk about groundwater and how you can protect it. Let's start with some basic facts about what groundwater is, and where it comes from.

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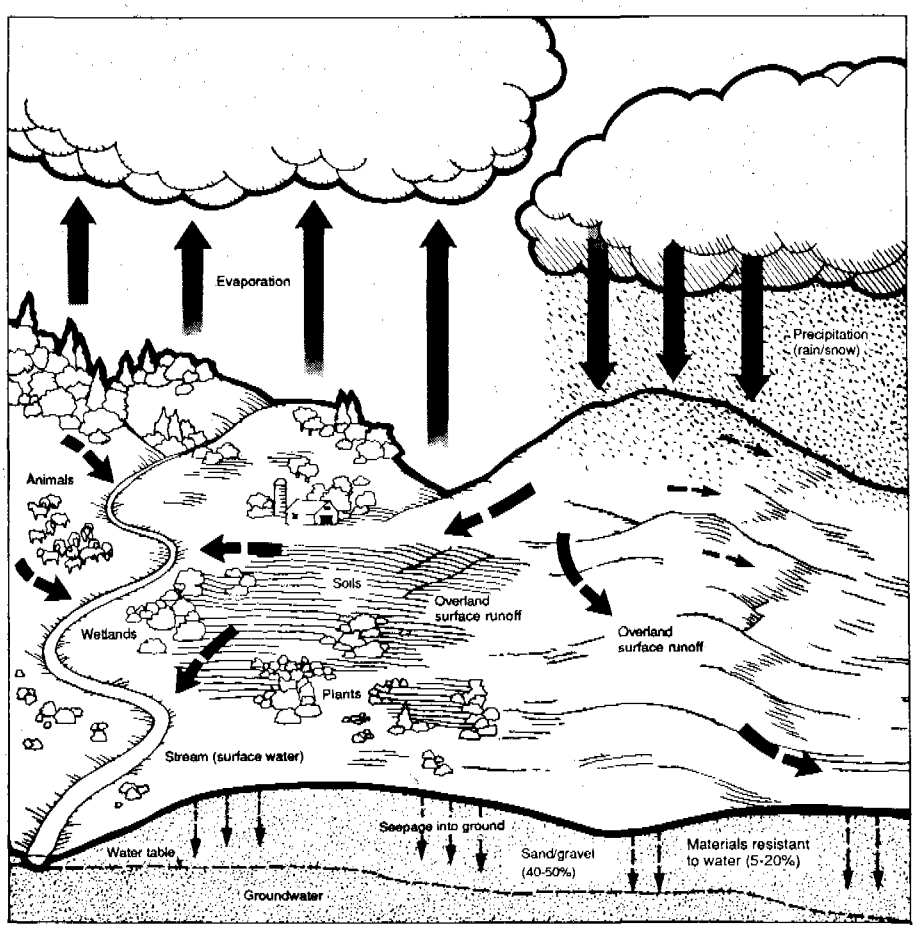
[1] USEPA. (1987). Wellhead protection: A decision-makers' guide. (USEPA publication No. 440/6-87-009. Washington, D.C. U.S. Government Printing Office.

Groundwater is the result of nature's own recycling program. Water constantly cycles from the atmosphere to the earth as *precipitation* and from the earth back to the atmosphere as *evaporation.*

Precipitation falls in the form of rain and snow. Some of it runs off into oceans, lakes and rivers; some evaporates and goes back into the atmosphere. The rest is absorbed into the ground. The arrows in the large chart show how rain and snow fall to the ground, run off into surface water reservoirs, and soak into the ground.



Where Groundwater Comes From

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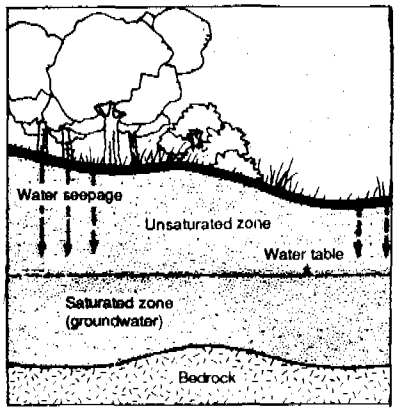
* The graphics in *The Local Decision-Makers Guide to Groundwater and Wellhead Protection* have been reprinted courtesy of the New York State Water Resources Institute, a unit of the Center for Environmental Research, Cornell University.

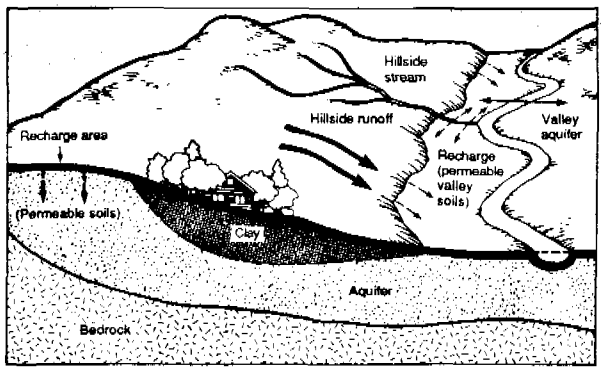
Water from rain and snow seeps into the ground and travels down to the ***saturated zone***, the area in which all the openings in the rock and soil are filled with water. The ***water table*** is the top of the saturated zone.

The area between the surface and the water table (the ***unsaturated zone***) contains enough moisture for plants, but not enough for use as a water supply. The water table moves up and down during the year according to the amount of rain and snowfall. Usually the water table is higher in the early spring and lower during the late fall, but heavy rains or drought can change the pattern.



The Saturated Zone

Saturated zones that contain enough water to supply wells are called ***aquifers***. The bottom of an aquifer is usually a layer of rock or other impermeable material. Some aquifers have a layer of impermeable material that separates the aquifer from the unsaturated zone above it. These are called ***confined aquifers***. Water seeps into the aquifer and forms ***recharge areas.*** Recharge areas can be very small or extend over hundreds of square miles.



Recharge

If your system relies on groundwater from an aquifer, it makes sense to know as much about the aquifer as possible. Here are some questions to get answers to:

1. How big is your aquifer? Who else gets water from your aquifer? Aquifers can be fairly small or they can cover many hundreds of square miles. Other communities, industry, and agriculture (for irrigation) can have an effect on both the quantity and quality of water you get from *your* well.

Find out who your neighbors are. Knowing who else is using the aquifer, and for what purposes, can give you an idea of what kinds of changes in water level or possible contamination you can expect. You'll also know who you'll need to work with to protect your shared source from depletion and contamination.

2. How is your aquifer recharged, and where is the recharge area? Contamination can enter any place water enters to recharge your aquifer. The main sources of water in aquifers are local precipitation and streams. Precipitation is generally free from contamination. Streams, however, can become polluted from municipal, industrial, and agricultural runoff as they travel along. The water that seeps into your aquifer from streams can bring contamination along with it. Knowing how and where your aquifer's recharged may make it possible for you to take precautions to protect streams from contamination before they reach your aquifer.

3. How much water is being pumped from your aquifer annually? Is the amount increasing or decreasing? Increased pumping of water by the users of a shared aquifer, can, over time, cause changes in both the amount of water you can pump, and the chemical quality of the water you pump. If pumping (*discharge*) rates exceed recharge rates, it may eventually lower the water table in the aquifer. This could mean having to deepen your well or lower your pump. Heavy pumping of an aquifer increases the movement of groundwater in the aquifer. As groundwater is drawn into wells, it's replaced by water from farther away. The quality of water — mineral content, hardness, and level of dissolved solids — you pump from your well can be adversely affected by the distance the water has to travel through the permeable rock of the aquifer. Long-term and careful monitoring of your aquifer can provide you with early warning that there are changes in water quality taking place. Knowing the trend of your water quality can allow your system to respond to adverse changes in an appropriate and timely way.

Start learning more about your aquifer, including the questions we've talked about. You can get these answers by talking to a representative in the Water Resources Division at the U.S. Geological Survey. There's an office in each state, and they have maps that show the aquifers in your area. You'll find them listed under U.S. Government, Department of the Interior, in your phone book blue pages.

Call them today. Invite them to come and talk at one of your monthly Board meetings. Take the first step in protecting your groundwater supply.

Chapter II: OOPS!

That's what the tanker driver said when he unloaded his supply of gasoline into the station's underground storage tank (UST) monitoring well. He mistakenly thought the "hole" led into the station's underground gas storage tank. But, as the town soon found out, it led right into their municipal water supply.

What about the camper who pulled his RV into the campground, located a hole, and dumped his sewage holding tank into it? You guessed it — it was an uncapped, abandoned well that led to the aquifer!

Accidents like these don't happen often, but they *do* happen, and they contaminate drinking water and cause serious and costly long-term problems. A great deal of groundwater contamination can be prevented if communities take some easy and inexpensive precautions. In the cases above, clearly marking the monitoring well and properly capping the abandoned water well would have prevented these accidents. Because we're careless, or just don't know how to protect it, we often "accidentally" jeopardize our groundwater.

Most drinking water contamination is caused by the way we manufacture, use, store, and dispose of things we use every day. By knowing where contamination can come from, you may be able to avoid accidental, but costly, mistakes. Communities who understand the potential hazards of the things around them can make the effort to use, store, and dispose of them wisely so they don't contaminate their precious groundwater.

Protecting your groundwater is a process that has several steps. The first step, which we talked about in *Chapter I,* is to identify where your groundwater comes from. The next step, is to figure out, in general, what kinds of *potential* contamination *might* threaten it.

In *Chapter I,* we talked about aquifers — the source of your groundwater supply. Ideally, you want to protect your entire aquifer from contamination. But, it may extend well past your system's boundaries and legal authority. We encourage you to start working with neighboring communities, who also use the aquifer, to develop cooperative groundwater protection programs. However, that's something that will take time to accomplish, so we suggest you ***start in your own backyard, right now.***

On the following pages, we'll talk about some of the potential sources of contamination you may find nearby. Use this checklist to help you start thinking about which activities might have an adverse affect on your water supply.

We've listed the activities according to the *relative* risk they *generally* pose to groundwater supplies. As the words "relative" and "generally" imply, the risk any of these pose to *your* community's groundwater depends on the extent to which they occur in your area.

Remember that these are *potential* sources of contamination. You'll notice that the list uses terms like "excessive use," "improper disposal," and "leaking." These are conditions that can be avoided if the users are knowledgeable and take care.

Think about what kinds of activities go on around you. Are they mostly agricultural, industrial, commercial business, or residential? Or is it a combination? Each of these activities has one or more potential hazards associated with it, such as bacteriological or chemical by-products that can potentially seep into your groundwater and contaminate your drinking water. Make a check mark next to the *potential* sources of contamination you know are in or near your community.

***Potential* Contamination from Waste Disposal:**

- ☐ municipal landfills (dumps) that may not be properly lined
- ☐ landfills that may not properly control dumping of hazardous waste
- ☐ unregulated dump sites like those at the end of the road or in the woods
- ☐ wastewater treatment lagoons that may be poorly constructed or maintained, overflow, seep, or have bad liners
- ☐ underground injection wells for hazardous waste that may leak
- ☐ septic tanks that may be poorly installed or maintained, or may be used to dispose of hazardous household chemicals
- ☐ sewer lines that may be worn out and leaking

***Potential* Sources from Industry:**

- ☐ diverse chemical compounds, metals, petroleum, and solvents used in manufacturing processes that may be spilled, leaked, or improperly disposed of

***Potential* Contamination from Retail Business and Light Industry:**

- ☐ beauty salons
- ☐ dry cleaners
- ☐ machine shops
- ☐ printers
- ☐ photo processors
- ☐ auto service stations that may improperly dispose of used motor oil, batteries, and solvents

***Potential* Contamination in Residential Areas:**

- □ use of septic tank cleaning products
- □ overloading septic tank systems with garbage disposal waste
- □ improper or excessive use of lawn and garden fertilizers and pesticides
- □ improper disposal of hazardous household chemicals like paint thinners, floor care products, cleaning compounds, poisons, motor oil — either down the household drain, out in the street, or in a pit in the backyard

***Potential* Sources of Contamination from Institutions:**

- □ trade schools that may not properly store or dispose of motor oil, paint, chemical solvents, and other products used in job-training classes
- □ research laboratories that may not properly dispose of hazardous waste
- □ hospitals and other medical facilities that may not dispose of hazardous waste properly
- □ prisons with printing or agricultural facilities that may not properly store and dispose of chemicals

***Potential* Contamination from Agricultural Operations:**

- □ pesticide runoff
- □ improper or excessive use of fertilizer
- □ improper disposal of wastewater used to rinse chemical containers and equipment
- □ leaking diesel and gasoline storage tanks
- □ improper animal waste disposal
- □ excessive crop dusting; improper disposal of wastewater used to wash equipment and planes
- □ inactive hazardous waste disposal sites
- □ improper application of municipal sludge and wastewater

Other *Potential* Sources of Groundwater Contamination:

- □ above ground and underground storage tanks for gasoline and chemicals that may leak
- □ spills of chemicals being transported or transferred
- □ pipelines for gas, oil, and sewage that may leak
- □ abandoned water wells that haven't been properly capped and allow contamination to go directly into the aquifer
- □ airports that may not properly store or dispose of chemical cleaners, solvents, or may have leaking fuel storage tanks
- □ golfcourses that do not properly store and use fertilizers and herbicides
- □ oil or gas production wells that may be poorly sealed or cased
- □ injection wells for disposing of liquid chemical and/or hazardous wastes that may leak

- ☐ military bases that may not properly store or dispose of hazardous waste, motor oil, fuel, and solvents
- ☐ old plumbing using lead pipes or solder
- ☐ old, inactive landfills that have been covered over and may be leaching contaminants into the groundwater
- ☐ runoff from highways of deicing salt and chemicals
- ☐ infiltration of contaminated surface water, such as streams, lakes, or ponds
- ☐ abandoned mining or quarry sites used for illegal dumping

***Potential* Contamination at the Well Site:**

- ☐ openings such as vents and water level access ports that aren't screened and capped
- ☐ sanitary seals that are cracked
- ☐ concrete pads that are cracked or don't slope away from the well
- ☐ casing or grouting that's cracked
- ☐ sample taps that are threaded to allow cross connection of hoses
- ☐ vents and valves that aren't pointed toward the ground
- ☐ unprotected chemical feeders that aren't tamperproof
- ☐ chemicals stored in or near the well house
- ☐ no perimeter security fence around the well
- ☐ use of unapproved well cleaning chemicals
- ☐ Well casing that doesn't extend to the top of the aquifer and above ground
- ☐ old oil-drip lubricated pumps
- ☐ corroded casing that has holes and allows contaminants into the well
- ☐ inoperative backflow preventer (check) valves
- ☐ abandoned wells that aren't properly capped

Each potential source of contamination is regulated by various state laws and agencies. However, each state has *different* laws and agencies that are responsible for enforcing them. For example: the use of pesticides and herbicides are regulated by the Department of Agriculture in Louisiana, but by the State Plant Board in Arkansas.

We suggest you call your state drinking water regulatory agency and ask what agency in your state is responsible for the ***Wellhead Protection Program***. *Then* ask a representative of the Wellhead Protection Program who you should contact for specific information about the potentially contaminating activities you've found in your area. They'll help you **assess the risk** these various activites might pose to your groundwater.

Chapter III: Mapping the Threats to Your Groundwater

If your community water system uses groundwater as its source, your water supply's long-term survival is one of your primary responsibilities. As a small system Board member, you've been elected or appointed to protect the public's health, safety, and welfare. That includes protecting your system's supply of groundwater.

You know about your responsibilities for the proper administration and management of a small water system. But what good are the best management practices, if you let your water source get contaminated? ***Groundwater protection is the ultimate preventive maintenance for your system's most precious component - it's water supply.***

Faced with the day-to-day problems of a small water system, it's easy for the Board to ignore its groundwater supply. It doesn't demand your immediate attention. It's been there all these years, faithfully serving the community, and it *seems* like it's already protected by nature. But, as you know from the previous chapters, groundwater *can* become contaminated, and it *will* be very expensive and time consuming to treat if it does. Start taking care of your groundwater. It's the best way to make sure you can continue providing safe, dependable, and affordable water to your community now and in the future.

In *Chapter I*, we talked about groundwater supplies (aquifers) and suggested you get a map from your state USGeological Survey. In *Chapter II*, we talked about some of the potential sources of contamination you might have in your area, and asked you to fill out a checklist of these potentially contaminating activities. In this issue, we'll talk about using your map and your checklist together to describe the area of your local **wellhead protection program.**

Let's first look at what a Wellhead Protection Program is. The 1986 Amendments to the Safe DrinkingWater Act made it mandatory that each state develop a "state program to protect wellhead areas within their jurisdiction from contaminants which may have any adverse affect on the health of persons."

As we mentioned at the end of the last issue, responsibility for Wellhead Protection (WHP) rests with different state agencies in different states, for example, the Department of Health in Arkansas and the Department of Environmental Quality in Louisiana. To find out who, in your state, is responsible for the Wellhead Protection Program (WHPP), call your state drinking water regulatory agency. They'll be able to direct you to the right place.

Most states have developed, or are in the process of developing, Wellhead Protection Programs to meet the SDWA regulations. A major part of the state

Wellhead Protection Program agency's effort is to "delineate," in other words, outline or define, the Wellhead Protection Area (WHPA) for each public water supply wellhead or well field in the state. To accomplish this, states have several options. The options range from very simple methods, such as drawing a circle of a particular radius around a well, to very complex methods, using computer generated models.

There are so many activities that can cause contamination of groundwater, federal efforts are directed to the *major problems* and the *major public water sources*. State agencies will have to prioritize their efforts as well — giving their attention *first* to the systems that are most vulnerable and that serve the largest numbers of people.

OK, what does all this mean to you as the member of a small system governing Board? It means that, in the beginning, there will be gaps in groundwater protection efforts.There may be a period of time before your community can expect to be contacted by the Wellhead Protection Program agency in your state. It means ***you need to start taking action, now, at the local level.*** It also means that if your community takes some steps of its own, that your state Wellhead Protection Program agency will probably commit its staff and assistance to your community's efforts right away because you've ***taken the initiative to start a local protection program.***

Let's look at the three steps you can take to develop a local Wellhead Protection Program:

(1) We suggest that your Board and other community leaders ***make a commitment to do their part to protect the community's water supply.*** Your water system has a vested interest in this commitment because it's your job to supply the community with safe water, and because contaminated water is usually very expensive to treat.

How do you get others to join you in this commitment? Make them aware of the importance of protecting the community's water supply. You all drink the same water. If your groundwater supply becomes contaminated, everyone suffers the possible adverse health effects and has to bear the cost.

(2) The next step is to form a working group or Task Force that will lead the local groundwater protection effort. This group should be drawn from a cross-section of local officials, business leaders, farmers and industry representatives, school teachers, environmentalists, and other concerned citizens. Make sure you have a group of energetic people who are committed to seeing the effort through. Your Task Force's immediate responsibility is to compile information and map the wellhead area.

(3) Before you start a groundwater protection program, you need to understand your community's water supply needs and capabilities, your waste disposal practices,

and potential sources of contamination — both now and in the future. Once you've gathered this information you'll place it on a series of maps that will represent a profile of your community.

How big an area should you map? As we mentioned, each state has, or will, develop its own criteria for delineating Wellhead Protection Areas. Therefore, the size of the area around a wellhead that's to be protected will vary.

In the meantime, experts agree that an **immediate** effort to protect *some* area, even if it's a very small area, is better than doing nothing at all. We suggest you begin your mapping in a ¼-mile radius around your water supply well or well field. ***This may not be large enough for your specific geologic conditions, but it will provide a measure of protection you don't have now.***

When you call your State Geological Commission or the U.S. Geological Survey in your state, ask for a "7½ Minute Topographic Map" that shows your community. They'll be able to tell you how you can obtain a copy.

Start with this base map (your USGS map) and identify the location of your current water supply well(s) and the area around the well for at least ¼-mile in all directions. Then, you can make a series of overlays to identify the different features of your community listed below. You can use clear plastic, transparency sheets, tissue paper, or tracing paper for your overlays.

Map A. Mark on Map A your present groundwater supply sources, service areas (including water lines), and areas that may yield large amounts of water for future use. You may have to ask your state geologist or other natural resources expert to help you locate any area of your community that may be used for supplying water in the future.

Map B. Mark on Map B your community's waste disposal sites and service areas (including sewer lines). Locate your community's land fill, industrial waste disposal pits, ponds, lagoons, junk yards, sewage treatment facilities, sites of chemical spills and leaks, and existing and proposed sewer lines, if any. This overlay will show you where potential contamination can reasonably be expected. Showing where municipal sewers are in place will show you where wastewater discharges are *not* likely to be entering your groundwater.

Map C. Locate on Map C any area that contains water that has *already* been contaminated by oil spills, land fill leachate, industrial waste disposal, or chemical leaks. This water should not be used unless it's being treated and constantly monitored.

Map D. Mark on Map D any existing potentially contaminating activities. Here's where you use your checklist from *Chapter II.* On this overlay, map all the

potentially contaminating activities on your checklist.

Map E. Mark on Map E any presently zoned areas and areas that have been "reserved" for federal, state, or local parks, conservation areas, or municipal and private open spaces. If your community has zones, such as residential, commercial, and industrial, locate them on this overlay. It doesn't matter what they're called, but rather the kind of activities that are allowed in each "zone." This overlay will show where the risk to your groundwater is most likely to occur during future development. The "reserved" areas are those in which future development isn't likely to occur.

Using Your Maps

If you overlay maps A and B on your base map, you'll have an idea where contamination of your water supply from waste disposal sites can be a problem. You'll also see where it's *unlikely* to occur — for example, in areas where municipal sewer lines exist.

Maps A and C overlaid on the base map will show you where existing contamination may be threatening your current and/or future water supply.

A, B, and D overlaid on the base map will show you if existing activities are a threat to your present or future groundwater supply.

A, B, and E overlaid on the base map will indicate what kinds of activities you can expect to occur in the future and how much of a risk they are to your water supply.

As you can see, you can learn a lot about the threats to your groundwater in a fairly short time. The maps you've made will make it easier to explain the present and future groundwater threats to the community when it comes time to develop your local groundwater protection program. Don't hesitate to call your state Wellhead Protection Program agency at any time during your mapping process — they're there to assist you and answer questions.

Chapter IV: Taking Action to Protect Your Groundwater

After mapping the potential threats to your community groundwater supply in the last Chapter, you have a good profile of your community's present and future activities. The next step, is for your Task Force to decide the best way(s) to protect your Wellhead Protection Area.

Selecting the "best" way will require sound judgement and an understanding of your community. You'll want to take into consideration questions like, "Are people in the community likely to work together to protect their water supply?" "Just how much regulation are people willing to accept?" "Are local newspapers and radio stations likely to help us put out information about groundwater protection in free public service announcements?"

Local Wellhead Protection Programs are voluntary. Therefore, you can establish protection methods based on the amount of time, money, expertise, and staff available for the effort. You may want to start by taking small steps and move onto some of the more complex methods after you've had a chance to educate your community about the potential health and economic risks of contaminated groundwater. By "phasing in" your Wellhead Protection Program, you'll probably meet less resistance than you will if you start out with some of the more restrictive measures.

There are a variety of strategies your community can use to protect its wellhead. Protection strategies are divided into two types: regulatory and non-regulatory. As the term "regulatory" implies, these strategies involve ordinances, or laws, that control land-use. Non-regulatory approaches are aimed at voluntary action and community education.

If your Task Force isn't sure the community's ready for regulatory strategies, or if they're not really needed, there are non-regulatory strategies you can use to protect your community water supply. These methods make use of educational efforts and voluntary actions on the part of the community.

As we mentioned earlier, everyone in the community has a stake in protecting their drinking water. If the community well gets contaminated, you'll all have to bear the inconvenience and expense of finding a new source of water or treating the contaminated water. You'll find that members of your community will try to do their part to protect their water ***if they're aware of the potential problems and how to avoid them.***

For example, we know of a small community whose drinking water was showing higher than normal levels of nitrates. Fertilizer, used by a neighboring farmer, was seeping into the ground and being carried in the groundwater to the community well.

Community leaders talked to him about the problem. The farmer voluntarily changed the type of fertilizer he was using. The county Cooperative Extension Service provided information to him about fertilizers that were just as effective, but that wouldn't harm the drinking water supply. Members of the community are usually willing to make this kind of voluntary effort when they understand how their activities are affecting their neighbors, and when there are reasonable alternatives.

Let's look at some of the things you can do to involve your community in wellhead protection:

- Start an educational campaign for local residents. You can do this by:

  1. holding a public meeting at which your Task Force explains the maps you've produced, where potential sources of contamination exist, and what community members can do to prevent contamination. Ask someone from your state Wellhead Protection agency to address the meeting.

  2. speaking to classes at local schools, and to Scout troops.

  3. asking the local newspaper to do articles about groundwater protection.

  4. sending out informational flyers in customers' water bills about the hazards of dumping used motor oil in the backyard and the improper use and disposal of toxic household chemicals, such as cleaning solvents and paint. Each of us disposes of about one pound of hazardous material each year — either by dumping it down the drain, putting it in the trash, or dumping it on the ground. That doesn't seem like much until you multiply it by the number of people in your community. You can get more information from your County Extension Service, your state Department of Health, and EPA.

  5. targeting information to specific groups, like farmers or gas station owners, and training them in how they can help protect the community water supply by using good management practices in their everyday operations. Again, this kind of information can be obtained from your County Extension Service, Department of Health, or your state Wellhead Protection agency. In many cases, they'll be happy to hold training sessions in your community.

- Put markers around the ¼-mile perimeter of your WHPA. Often a visual reminder that your community well is inside that boundary will encourage people to be more cautious.

- Establish a household hazardous waste collection day for the community. Make sure it's widely advertised, and that you have a licensed hazardous waste hauler to take it away. Try to get local businesses to contribute toward paying for the advertising and hauling.

- Encourage homeowners to take proper care of their septic systems. Septic systems should be inspected annually and pumped out regularly. People should be careful about what they put into septic systems. Chemicals like solvents, paints, oils, and pesticides can go from septic systems into the groundwater.

- Encourage people to use pesticides and fertilizers for home gardens in moderation and according to package instructions. Many of these products contain toxic chemicals that can seep through the soil and into local groundwater supplies. Your County Extension agent can give you lists of alternative products that aren't as hazardous to the environment.

This is just a partial list of suggestions about how your Task Force can approach the community with a Wellhead Protection Program. Use your imagination to develop others ways to bring your Wellhead Protection Program to the community.

If your Task Force believes, after studying its maps, that the wellhead protection area is in serious danger of being contaminated, and *if* your community already has a strong commitment to protecting it, you may want to pursue a combination of regulatory strategies. We suggest you contact your state Wellhead Protection Program agency and get their assistance. They'll be able to help you decide the best plan of action for your local wellhead protection needs.

Following, is a partial list, with a brief description, of some of the regulatory strategies communities across the country have put in place as part of their Wellhead Protection Programs.*

- ***Zoning ordinances*** divide the community into land-use districts — usually residential, commercial, and industrial. Zoning also specifies the type of activity that may be allowed in a district and regulations that can prevent potentially contaminating activities.

- ***Subdivision ordinances*** apply to land that is actually being divided into lots for sale and/or development. Subdivision ordinances are used to control growth, and usually specify that local services, such as water, sewer, and fire protection, are in place or must be part of the development. Subdivision ordinances can also regulate density, for example, the number of homes that can be built on one acre.

- ***Design standards*** place requirements on the design, construction, and operation of a proposed activity, such as double-walled underground storage tanks for chemical storage.

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* This list of regulatory approaches to wellhead protection was taken from *Citizen's Guide to Ground-Water Protection,* EPA publication #440/6/90-004, which is available from the Division of Groundwater Protection, Office of Drinking Water, USEPA, Washington, D.C.

- ***Operating standards*** are to ensure that the way a business or activity is conducted does not threaten the community water supply. These can be in the form of Best Management Practices (BMPs) that set standard operating procedures for potentially contaminating activities, such as setting limits on the type and amount of pesticide application.

- ***Source prohibitions*** are regulations that prohibit the use or storage of potentially contaminating materials within a defined area. If you have a regulation that chlorine can't be stored in your wellhouse, you've enacted a source prohibition.

Regulatory strategies for protecting your wellhead area can be very effective. There are, however, a number of drawbacks to regulatory strategies:

- Citizens may be opposed to having government (for example, the town council) regulate the way they can use their own land;

- As a Task Force, you don't have legal jurisdiction over the ¼-mile radius you've defined as your Wellhead Protection Area. Your responsibility would be to make recommendations and help educate the community about the need for regulations. Any ordinances or standards would be the responsibility of the local government body;

- Developing ordinances and other regulatory measures requires legal advice. The degree of authority local governments have to implement regulations varies from state to state. County governments in Texas, for example, don't have the legal authority to enact zoning ordinances.

  Most state Wellhead Protection Program agencies have model ordinances your community can follow, but be sure your city attorney works with you or your local government. Make sure that what you're proposing is within the legal authority of your local government.

- Regulations require people to enforce them. Often, small communities don't have the financial means to pay an employee to enforce the regulations they adopt.

We realize it's hard to get excited about something you can't even see. Taking an "out of sight, out of mind" approach, however, can mean serious trouble for your community water system. Your challenge is to explain to the community that it's in their best long-term interests to start making an effort to protect their water. By making an effort, *now*, you may be able to avoid the cost and inconvenience of trying to remedy a contaminated water supply source later.

Rural Community Assistance Program

Rural Community Assistance Program (RCAP) is a national network of nonprofit organizations working to insure that rural and small communities throughout the U.S. have access to safe drinking water and sanitary wastewater disposal. The six regional RCAPs provide a variety of programs to accomplish this goal, such as direct training and technical assistance projects, leveraging millions of dollars to assist communities develop and improve water and wastewater systems, and an extensive set of publications.

National Office:
Rural Community Assistance Program (RCAP)
602 South King Street, Suite 402
Leesburg, VA 22075
(703)771-8636

Southeastern Region:
Virginia Water Project (VWP)
P.O. Box 2868
Roanoke, VA 24001
(703)345-1184

Great Lakes Region:
WSOS Community Action Commission
P.O. Box 590
Fremont, OH 43420
(419)334-8911

Southern Region:
Community Resource Group (CRG)
2705 Chapman Street
Springdale, AR 72764
(501)756-2900

Northeastern Region:
Rural Housing Improvement (RHI)
P.O. Box 370
Winchendon, MA 01475
(508)297-1376

Midwestern Region:
Midwest Assistance Program (MAP)
P.O. Box 81
New Prague, MN 56071
(612)758-4334

Western Region:
Rural Community Assistance Corporation (RCAC)
2125 19th Street, Suite 203
Sacramento, CA 95818
(916)447-2854