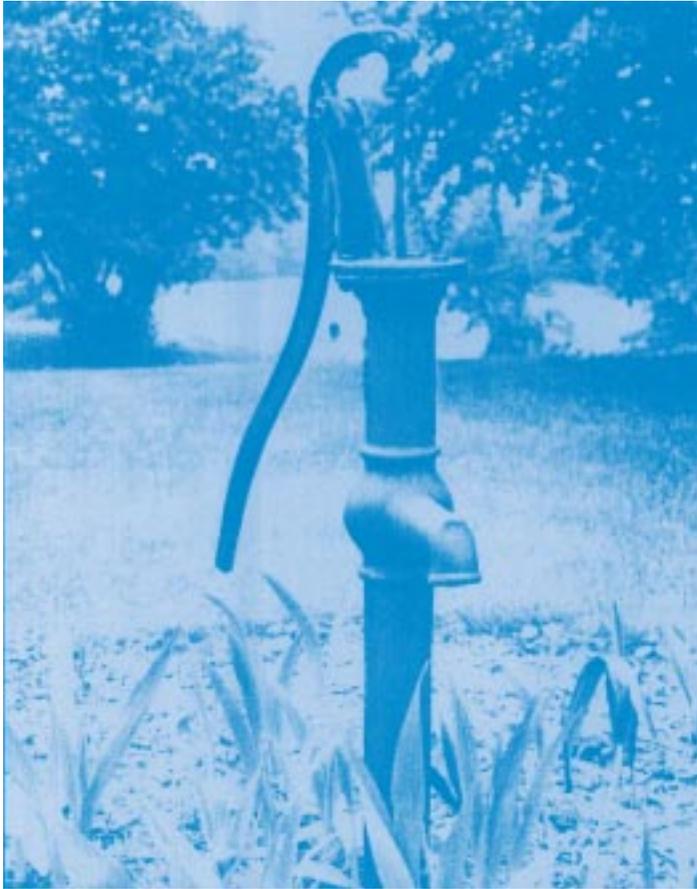


An **OUNCE** *of* **PREVENTION**



*A Groundwater Protection
Handbook for Local Officials*

Vermont Department of Environmental Conservation

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PREVENTION



*A Groundwater Protection
Handbook for Local Officials*

Vermont Department of Environmental Conservation
September 2005

Credits

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Introduction



Why should a town or water system invest the energy and resources to protect its groundwater? Primarily, because it is good planning for the future, for the possibility that water demand pressures may be greater, or that a water resource may be depleted, or that it has been compromised with contamination or potential contaminant sources. Taking positive actions now can yield tremendous savings later.

The vitality of your community depends on continued access to safe and plentiful groundwater. With protection, your source waters can be reliable. However, studies in the United States and world-wide demonstrate that activities on the land surface affect the quality and quantity of our drinking water. **Reasonable control of land use in source protection areas by local government is the best means of assuring protection.** Municipal officials, water supply owners and operators, and water consumers should openly discuss and implement a protection program for their groundwater and surface water resources. In the case of publicly-owned systems, concerned citizens should contact and work through their elected and appointed officials.

As communities in Vermont grow, many will need additional sources of water. It is important to be proactive instead of waiting until your existing water supply cannot meet the needs of the community. As part of local planning efforts, parcels of land that are suitable for future well sites should be identified and protected. Land around potential surface water sources should also be protected from incompatible development, providing additional insurance against any possible contamination of a community's existing drinking water source. The goal is to provide clean water for future generations in Vermont communities.

Vermont prides itself on its clean environment and generally pristine waters. In order to ensure this high-quality drinking water, Vermont requires each Community and Non-Transient, Non-Community (NTNC) water supplier to develop a source protection plan (SPP) for its water supply as a condition of its permit to operate.

The SPP is really common sense; it identifies where the water comes from, identifies any potential threats to the water, outlines what will be done to minimize those threats, and outlines a contingency plan in case there is any unforeseen contamination. This handbook provides material to help local officials further understand how to protect their drinking water source.

The vitality of your community depends on continued access to safe and plentiful groundwater.

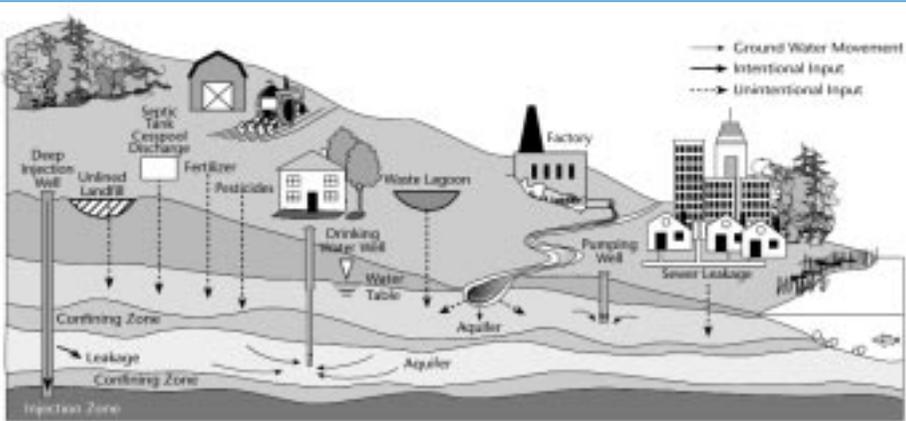
This booklet describes our groundwater and surface water resources and what local community leaders can do to help protect them.

Like most states, Vermont is experiencing increased development pressures and sprawl. Land is being developed in Vermont at 2.5 times the rate of population growth. In the decade from 1982 to 1992, population increased by 9.8% while the amount of developed land increased 25% (source of data: Vermont Forum on Sprawl). This development may threaten ground and surface water supplies. Furthermore, drinking water sources are becoming more difficult to site.

This booklet describes our groundwater and surface water resources and what local community leaders can do to help protect them. To help assist them, examples and resources are also provided. The term “source water” is used frequently. This refers to groundwater and surface waters that are used as the source of a drinking water supply. The approaches to protecting these source waters are similar. However, in Vermont, the large majority of small water supplies utilize groundwater resources. As a result, this booklet emphasizes this particular aspect of groundwater science.

All waters move within a watershed, whether in rivers and lakes, over land, or underground. All activities within a watershed have an influence on how water moves, as well as its quality. We need to consider the watershed in order to understand the many influences on the water that we are trying to protect. Vermont has begun to manage resources in the state on a watershed basis in order to address the interconnections and more effectively protect its water resources.

<http://www.anr.state.vt.us/dec/waterq/planning.htm>

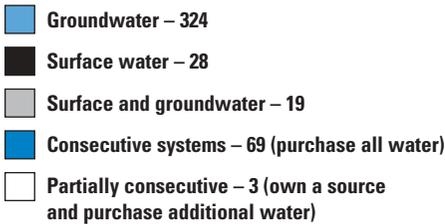
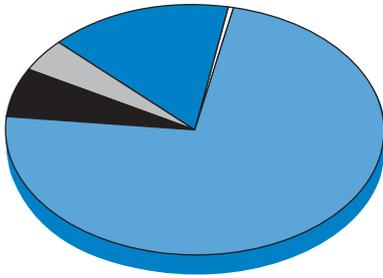


Source: National Water Quality Inventory: 1998 Report To Congress – Ground Water and Drinking Water Chapters, U.S. EPA.

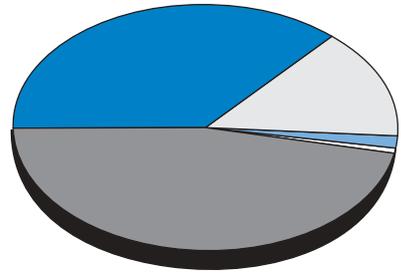
Groundwater Use Facts

COMMUNITY WATER SYSTEMS*

Source of Supply



Ownership



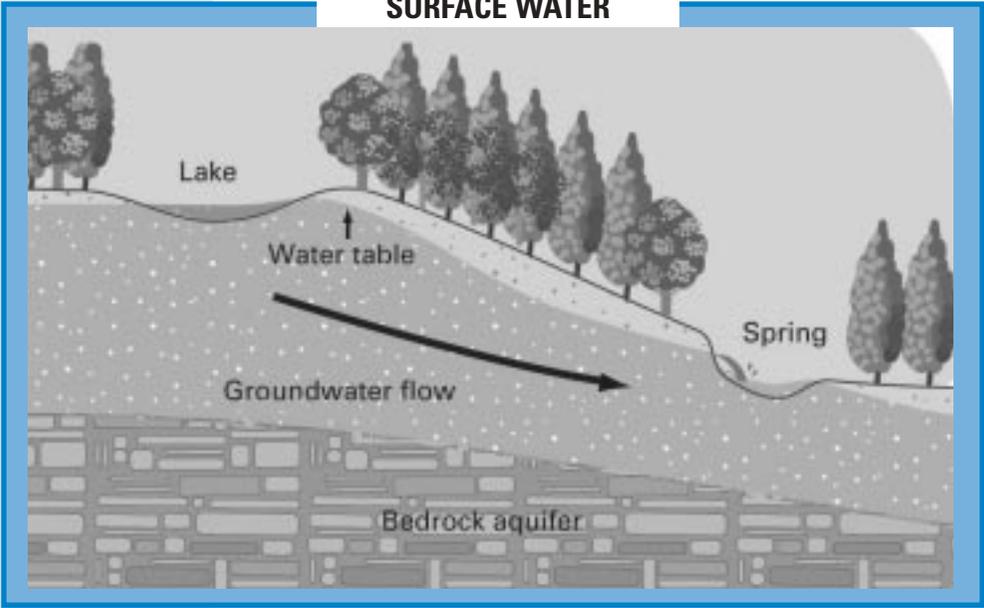
*Source: Water Supply Division 2005

Protecting groundwater is imperative because groundwater is currently used for drinking water by approximately 70% of all Vermonters. About 46% of the state's population is self-supplied (private wells), while about 24% is served by public water systems that use groundwater. The rest (30%) rely on surface water as their source of drinking water.

The majority of Vermont's groundwater is classified as Class III. Class III groundwater is defined as suitable as a source of water for individual water supply, irrigation, agricultural use, and general and commercial use. There are only about a dozen localized groundwater-contamination sites that are designated as Class IV, unsuitable for potable water use. Currently there are no Class I or II groundwaters in the state that would receive higher levels of protection for use as public community water supplies. However, Source Protection Areas for community water supplies are analogous to Class II areas.

Groundwater is currently used for drinking water by approximately 70% of all Vermonters.

SURFACE WATER



EACH DAY IN VERMONT:

50 MILLION GALLONS of groundwater

are withdrawn. Withdrawals from public and private

groundwater sources account for **33 MILLION GALLONS**

per day. Agricultural use accounts for **2 MILLION GALLONS** of

groundwater withdrawn daily, another **12 MILLION GALLONS** are used

for commercial and industrial purposes, and the remaining, **3 MILLION**

GALLONS withdrawn, are used for mining and the generation of

thermoelectric power.





The village well on the green, the spring house up on the hill, the well in the front lawn — Vermonters use water every day. Most of us take its high quality and constant flow for granted. What if your drinking water was declared “unsafe”? Ask the townspeople of Bellows Falls. A promising new town well site was chosen to meet the increasing demand. But when the well was chemically tested, synthetic organic toxins were found! The Village of Bellows Falls was forced to construct a filtration plant to treat surface water instead.

Other Vermont stories show the need for local source water protection:

- ◆ Volatile organic compound (VOC) contamination of Lyndonville's village wells led to the construction of a new water treatment system at a cost of approximately \$800,000.
- ◆ VOC contamination of the Williamstown Town Well led to replacement of the Town water supply at a cost of approximately \$900,000.
- ◆ East Fairfield needed to develop a new well after a history of nitrate pollution, possibly due to failing septic systems and excessive fertilizer applications.
- ◆ On average, each month, there are 30 public community water systems on “boil-water notices” for unhealthy water or poor distribution. In 2003, 115 groundwater-supplied public water systems received boil-water notices mostly due to bacterial contamination.

In addition, there are almost 2,500 underground storage tanks (USTs) in Vermont that have the potential to threaten groundwater quality if they leak. There are also approximately 1,400 hazardous waste sites in Vermont that have degraded, or have the potential to degrade, groundwater to the point where it is non-potable.

Fortunately, most source water in Vermont is potable with little or no treatment. The above examples, however, demonstrate the need for local and state action to assure that water supplies are protected. The state is doing its part by regulating most potential contaminants within source water protection areas and by encouraging local authorities to protect their wells, springs, streams, and other surface water sources. Now your community

Most of us take its high quality and constant flow for granted. What if your drinking water was declared “unsafe”?

Your water supply's reliability depends on preventing risks to both its quality and quantity.

can help prevent unexpected crises by developing the necessary controls for your source water's protection. A community is better suited to protect its source water than the state through such means as local groundwater protection ordinances. This handbook will provide you with examples of some of the tools for protecting your drinking water source.

Everyone drinks and uses water. Every day, the average household uses up to 75 gallons of water per person. Ingesting contaminated water can cause public health problems. Detection usually occurs after someone gets sick or the water smells or tastes funny. Often, contamination occurs long before health effects become apparent. Insufficient quantity of available water can also cause health problems by hampering a community's ability to manage sanitary needs. The lack of water can also impact development. Without careful planning, too many wells in one area could deplete the groundwater supply unexpectedly. The reliability of your water supply depends on preventing risks to both water quality and quantity.

What would it cost if your groundwater source became contaminated and unfit to drink? Canaan Village's municipal well was polluted by a leaking gasoline tank located 400 feet away. The cost of the new well was \$60,000. Luckily, a new site was available. Your community may not be so fortunate without long-range planning.

More examples of communities in Vermont which have had their drinking water supplies contaminated include the following:

East Clarendon: In this community, the public water supply at a mobile home park, as well as private wells at five residences, were contaminated by a leaking underground storage tank. The cost of providing a water treatment system at the mobile home park was \$125,000; the five residential treatment systems cost \$4,000 per residence. In addition to the capital costs, there were operation and maintenance costs associated with these treatment systems. For example, maintenance at each residence costs more than \$1,500 per year. The residents were also provided with bottled water. The total cost spent to address this groundwater contamination problem was \$1.3 million.

Killington: At this slopeside community, more than 30 residential wells and wells supplying several restaurants were contaminated by a leaking above ground storage tank (AST) that had been buried in the ground. Although the tank only had a capacity of 275 gallons of gasoline, the impact of the

leak over time was great. The cost to clean up the site and provide water treatment was over \$1.4 million (\$115,000 for bottled water and water treatment and \$1,285,000 for site clean up and monitoring).

Hartland: In this small village, 39 private wells and a recreation center's well were contaminated with MTBE from what is believed to have been a 4,000-gallon fuel tanker truck spill that occurred more than three years before any contamination was detected. Although it is unknown how much gasoline was released during the accident, other Vermont communities can learn from this unfortunate incident.

In these circumstances, the **LESSONS LEARNED** are:

- ◆ Even a small spill can cause major contamination of groundwater. Of particular concern is methyl-*tert*-butyl-ether (MTBE), which has become increasingly common in Vermont's gasoline supplies. MTBE travels quickly through the subsurface and is difficult to contain or remediate.
- ◆ It is important to address any spill regardless of the size, in order to prevent the spill from contaminating your community's groundwater supply.
- ◆ Towns need to have their first responders (in most cases, the Fire Department) report all spill incidents and coordinate with the appropriate state officials to ensure that the best effort has been made to address potential contamination.



What about treatment? In Vermont, treatment of surface water typically includes filtration. The cost of a new filtration plant for one Vermont community with 500-600 connections was more than \$2 million. Obviously, the high cost of surface-water filtration could make source replacement with groundwater a more reasonable alternative.

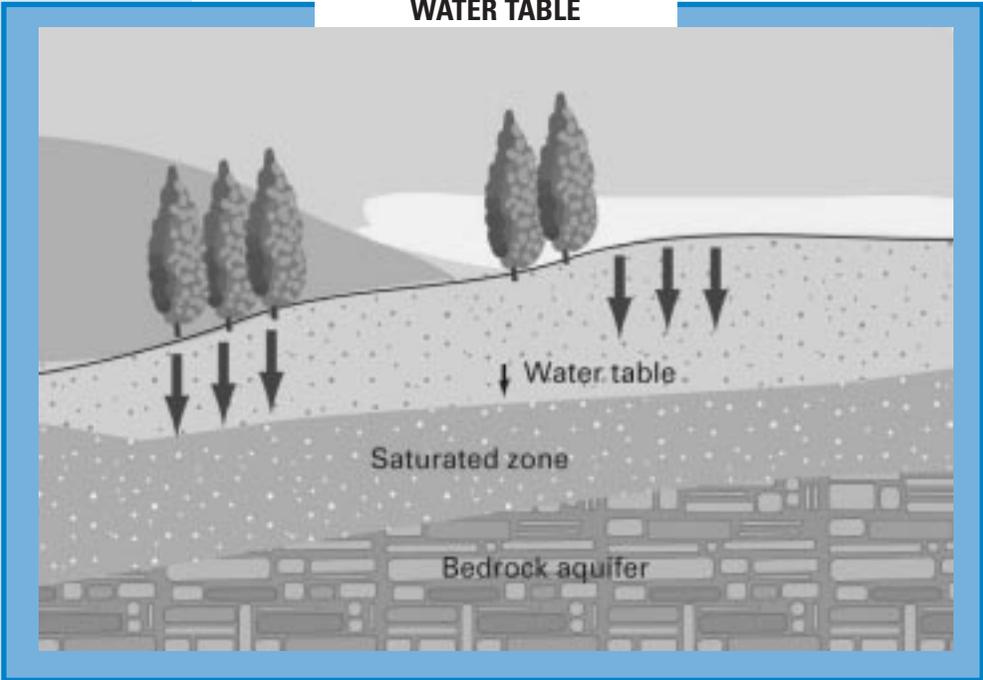
The costs of protection. A protection plan can be made up of several components that will vary in cost and effectiveness. The decision to pursue a source water protection program should include a realistic budget and timetable for implementation. Some Vermonters pay minimal water rates that are insufficient to provide for adequate operation, maintenance, and protection. A reasonable increase in rates, however, could create a special fund for water supply improvements and protection.

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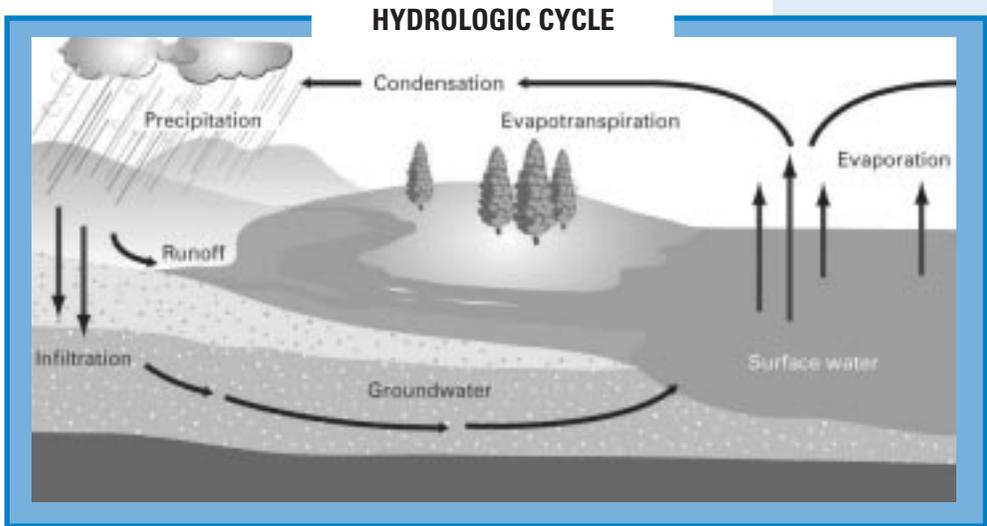


More than two thirds of the population of Vermont relies on groundwater as their source of drinking water. Many individual households have their own drilled wells and most public water systems pump groundwater to serve their customers. These wells may be low-yielding bedrock wells or high-yielding sand and gravel wells. Another type of well is a dug well which draws from shallow water tables and is generally more vulnerable to surface water contamination than a drilled well. However, a properly constructed dug well in a good location can produce high-quality water.

WATER TABLE



Groundwater, the unseen link in the hydrologic cycle, is constantly recharged by precipitation percolating through the soil to the water table. After reaching the water table, groundwater is always moving towards points of discharge, such as surface waters and springs. Compared to surface water, it is more difficult to understand where groundwater comes from and how it moves because it is not visible at the surface. However, having a better under-



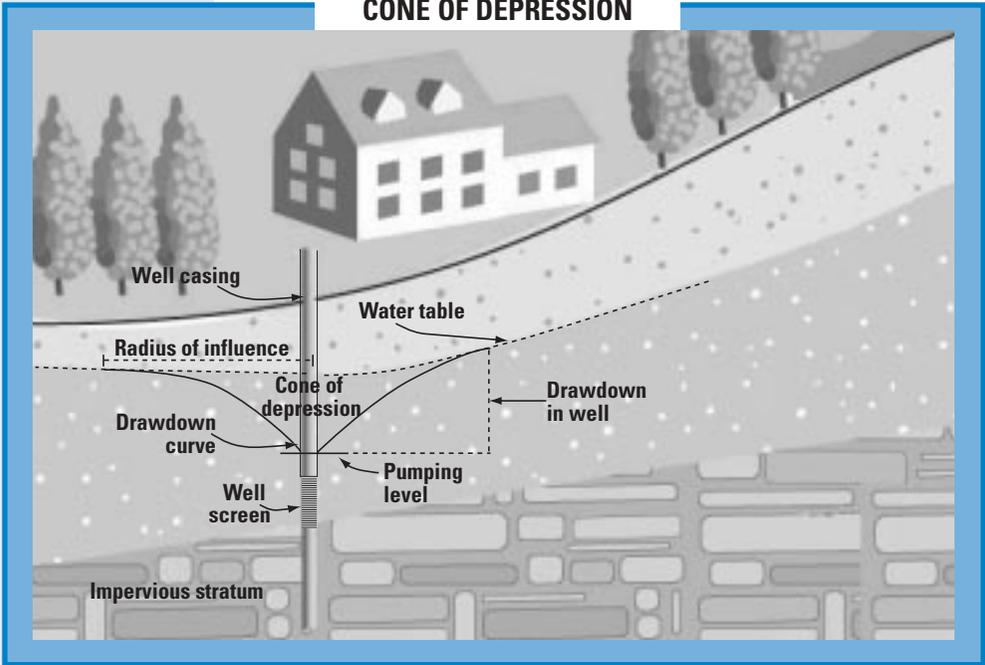
standing of groundwater resources will help a community design a more effective source protection program.

Vermont's gravel wells, bedrock wells and springs tap groundwater. Wells intercept this slow-moving resource before it reaches natural points of discharge. By pumping groundwater from wells, natural groundwater flow is changed. Water is pulled from all directions toward the well, creating a cone of depression. On the land surface, the specific area from which water travels toward the well is called a zone of contribution or direct recharge area.

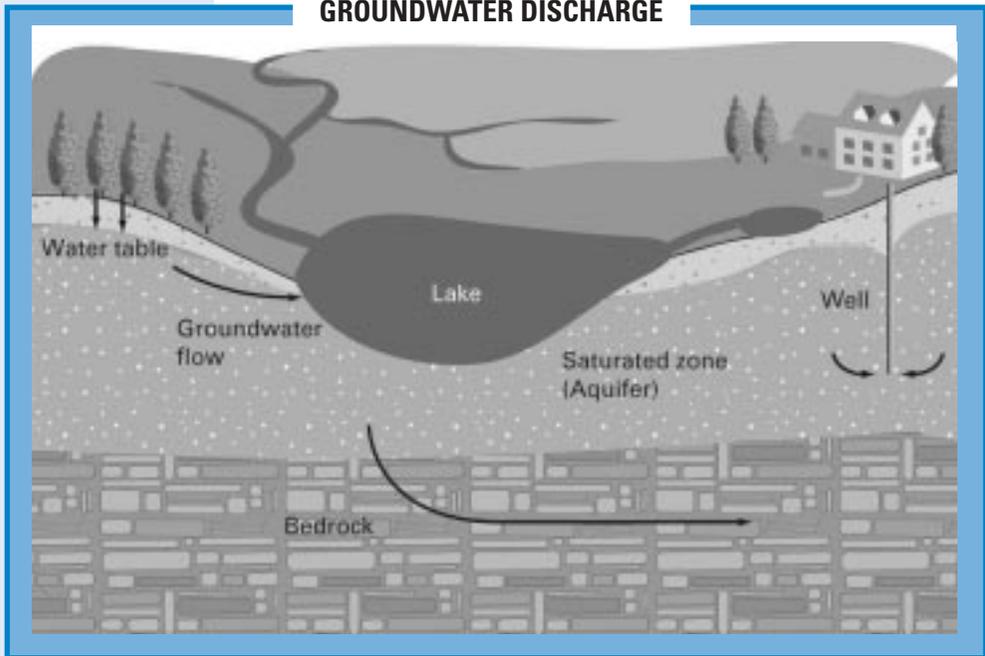
In Vermont, it is part of the source protection area. Springs are recharged from areas upslope. The size and shape of a recharge area is dependent on many factors including well depth, water demand of the well, flow volumes of a spring, and the type of aquifer (e.g., bedrock, sand and gravel). That is why a standard isolation distance (recharge area) does not effectively protect the drinking water. Every activity on the land surface within a recharge area may directly affect the quantity and quality of drinking water. Any contamination on the land surface may percolate into the ground and ultimately reach the groundwater being pumped out of a well.

Landfill leachate, leaking oil or gasoline from vehicles and storage tanks, road salt, sewage, industrial wastes, and other materials can find their way into and contaminate groundwater. The adverse health effects of contaminated drinking water resulting from incompatible land use activities cannot always be predicted

CONE OF DEPRESSION



GROUNDWATER DISCHARGE



by using technical calculations. Generally speaking, waste disposal and chemical applications to the land surface can be properly sited and adjusted to reduce the risk of health problems. Uncontrolled chemical discharges, however, should be prohibited because dilution rates cannot be determined without specific knowledge of the nature of the chemicals and the often complex geologic and groundwater flow conditions.

HOW RECHARGE AREAS ARE IDENTIFIED

Vermont's groundwater aquifers reflect the state's diverse geology. While forming Vermont's mountains, tectonic forces distorted the resistant bedrock, creating fractures where groundwater now flows. Glaciers also shaped Vermont's river valleys and uplands, leaving behind coarse-grained sand and gravel deposits as storage areas for groundwater. The state's wells and springs generally receive groundwater from precipitation on up-slope areas, through saturated gravel deposits or water-filled bedrock fractures.

An investigation of a well or spring, including an analysis of available flow, water quality data, and surrounding geology can determine the land surface area from which your drinking water is drawn. This area is considered the **recharge area** or **Source Protection Area (SPA)**. The SPA may cover a few acres to a thousand acres. A SPA map, when used as a practical planning tool, can help you locate the potential threats to your water supply and create feasible protection measures.

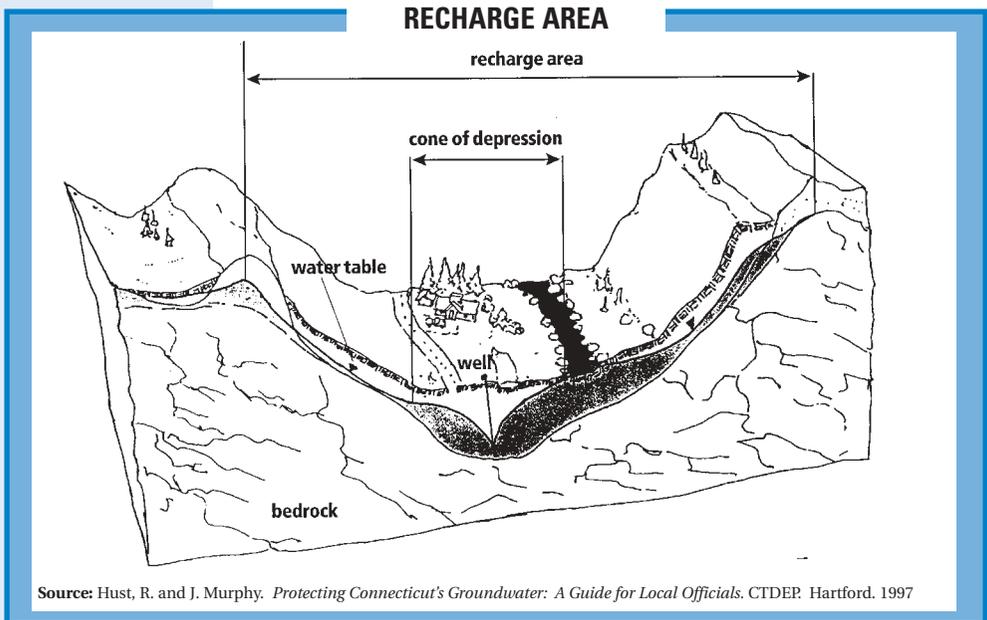
Maps of recharge areas, or SPAs, provide a scientific basis for your groundwater protection program. SPA maps of community water systems are available from the Department of Environmental Conservation's (DEC's) Water Supply Division. SPAs are mapped by analyzing hydrogeologic information to infer recharge areas. Technically speaking, a SPA represents the land-surface area that encompasses the recharge, collection, transmission, and groundwater storage zones for a particular community well or spring. Each SPA has a hydrogeological rationale to justify the designation of its boundaries. Where there has been no mapping, the state utilizes a variable radius circular SPA with a 3,000 foot maximum radius.

Vermont communities can use available SPA maps for their source water protection programs. Because of Vermont's diverse geology, recharge area mapping may sometimes require test drilling, pump tests, and complicated analyses for further refine-

A SPA map, when used as a practical planning tool, can help you locate the potential threats to your water supply and create feasible protection measures.

ment. However, many groundwater sources do not require this detailed information. A private hydrogeological firm may charge several thousand dollars to determine recharge areas for sources within areas of relatively uncomplicated geology. However, the costs to delineate some sources can be much greater. Local officials should contact the Vermont Geological Survey (www.anr.state.vt.us/dec/geo/vgs.htm) or the Water Supply Division to discuss the mapping of their source water aquifer, as well as potential source aquifers to supply future needs.

Identification of SPAs and aquifers is one of the first steps in being able to protect a community water supply. The Vermont Water Supply Rule contains methods for delineating source protection areas for groundwater sources (<http://www.vermontdrinkingwater.org/wsrules.htm>). This delineation on the land surface provides a focus for state and local source water protection programs. Delineation of a SPA is required for Public Community Water Systems and for NTNC water systems (e.g., schools, daycares, and businesses) under the Water Supply Rule. SPA delineation is highly recommended for transient non-community water systems (such as gas stations, motels, and restaurants). Delineation is based on an analysis of such information as existing data, the water system's maximum day demand, and local geology.



Source: Hust, R. and J. Murphy. *Protecting Connecticut's Groundwater: A Guide for Local Officials*. CTDEP. Hartford. 1997



An evaluation of your source water protection area's potential threats, its present and planned development, and the community's available resources will guide your selection of the most practical source water protection plan. After delineating the source water protection area, the next step is to conduct an inventory of all the potential sources of contamination in the recharge area and to assess their risk (each of these steps is also required of Public Community Water Systems as part of the Water Supply Rule). This is important information on which to base any local protection program.

To coordinate this effort, local officials may wish to appoint a committee. After doing the inventory and assessment, this committee should recommend a realistic course of action, including how much money and time should be devoted to a local source water protection program.

Depending on the water system's ownership and local support, a **SOURCE WATER PROTECTION COMMITTEE'S MEMBERSHIP** might include:

- ◆ Interested water consumers and SPA landowners (citizens)
- ◆ Your water system operator
- ◆ Board of Health members or Town Health Officer
- ◆ Conservation Commission members
- ◆ Town and Regional Planning commission members
- ◆ Town officials and school officials (Select Chair, Road Commissioner, Principal)
- ◆ Members of your public works department
- ◆ Persons representing other local interests
- ◆ Your water system governing committee members



Local officials should consider all sorts of creative means to protect their water supply. If the source protection area extends into another town, local officials should consider ways to engage the neighboring municipality in helping to protect drinking water

resources. If the source protection area includes desirable developable land, town members might want to consider working with a land trust to purchase the land or its development rights. (See the Resources section for more information on land trusts.)

If there is considerable residential and commercial development, your town might want to focus on a strong education and outreach campaign, or they may want to pass local regulations. There are many ways to create a source water protection program. The right one for a particular community will depend on the inventory and assessment of potential contaminant sources, as well as the character of the town.

SOURCE WATER ASSESSMENTS AND SOURCE PROTECTION PLANS

Source Water Assessments

The Source Water Assessment Program (SWAP) is a requirement under the federal Safe Drinking Water Act Amendments of 1996. The program requires the identification of Potential Sources of Contamination and the identification of their risks to the three types of public water systems: 1) Community Water Systems, 2) Non-Transient, Non-Community Water Systems (i.e., a school, daycare, or business), and 3) Transient, Non-Community Water Systems (i.e., motels, gas stations, and restaurants with their own source of water).

The federal requirements of the **SOURCE WATER ASSESSMENT PROGRAM** include:

- ◆ **Delineation** of a source water assessment or protection area
- ◆ **Inventory** of the potential contaminants of concern in the delineated area
- ◆ **Assessment** of the susceptibility of the drinking water source to contamination
- ◆ **Public outreach and reporting**



These requirements must be met for all public water systems, including municipalities, mobile home parks, schools, office buildings, restaurants, motels, gas stations, etc. The Vermont Source Protection Program incorporates these elements into the state's existing regulatory requirements and includes additional

requirements (source protection plans) to protect Vermont's drinking water.

Source Protection Plans

Source Protection Plans utilize the information obtained during the SWAP phase and are developed as an important part of actively managing and protecting public water supply sources. A Source Protection Plan identifies the potential sources of contamination in a specific area, assesses the risks of these potential sources of contamination, describes how to manage the risk from the potential sources of contamination, and discusses how to handle emergencies.

In order to provide for better protection of public health, every Public Community Water System, like municipalities and mobile home parks, is required to have an approved Source Protection Plan. If a Public Water System already has an approved Source Protection Plan, the requirements of the Source Water Assessment Program are met. NTNC Public Water Systems, like schools and businesses with their own source of water, are also required to have a Source Protection Plan.

We encourage you to contact your water system directly to review the plan. You can also call the state Water Supply Division to request a copy of the plan or set up an appointment to review the Source Protection Plan. Please note the Water Supply Division charges a small fee to cover actual copying costs. The Source Protection Plan must be updated every three years in order to adequately identify and manage any changes.

In **VERMONT, A SOURCE PROTECTION PLAN** includes:

- ◆ **Maps (Delineation)**
- ◆ **Inventory and Assessment of Potential Sources of Contamination**
- ◆ **Management Plan**
- ◆ **Contingency Plan**



Source Protection Plan Requirements

Vermont's Source Water Assessment and Protection Program includes specific requirements for the three different types of public water systems, as described below.

For public community and NTNC water systems that are required to develop a source protection plan, information and guidance on preparing a plan can be found at <http://www.vermontdrinkingwater.org/swapp.htm>

Requirements for the Three Types of Public Water Systems

1. Public Community Water Systems

A Public Community Water System could be a municipality, mobile home park, or retirement community which serves at least 25 residents year round or has at least 15 service connections. These systems are required to have Source Protection Plans — Delineation, Inventory, Assessment, Management Plan, and Contingency Plan.

The system is responsible for developing the Source Protection Plan. The Water Supply Division is available to provide technical assistance in preparing the Plan.

2. Non-Transient, Non-Community Public Water Systems

A Non-Transient, Non-Community (NTNC) Public Water System could be a school, factory, or office building with its own source of water and serving at least 25 of the same people more than six months per year.

Each system is responsible for developing its Source Protection Plan. The Water Supply Division is available to provide technical assistance in preparing the Plan.

3. Transient, Non-Community Public Water Systems

A Transient, Non-Community (TNC) Public Water System could be a restaurant, motel, or campground serving 25 or more people a day more than 60 days a year.

Historically, these systems have not been required to develop Source Protection Plans. Under the new program, the Water Supply Division has visited each TNC system and completed a Source Water Assessment for the system in lieu of a complete Source Protection Plan. A Management Plan and Contingency Plan will not be prepared as part of the Source Water Assessment. The system will not be responsible for developing the Assessment or a Source Protection Plan.

Preparing a Source Protection Plan Update

Guidance on preparing an update of the plan can be found at <http://www.vermontdrinkingwater.org/swapp.htm>

The **UPDATE** should entail the following:

- ◆ **Inspect the Source Protection Area**
- ◆ **Update Your Potential Source of Contamination Maps and Inventory**
- ◆ **Update Your Landowner List**
- ◆ **Update Your Management Plan**
- ◆ **Update Your Contingency Plan**
- ◆ **Communicate with Relevant Landowners and Town and State Officials**



The **WATER SUPPLY DIVISION ASSISTS** the water system with implementing their Source Protection Plans by providing the following:

- ◆ Maintains Geographic Information Systems (GIS) files on the sources and delineations of Source Protection Areas
- ◆ Provides assistance and training to Public Water Systems in developing and implementing source protection, including talking to local organizations, committees, and officials about source protection
- ◆ Issues permits for all public water supply sources
- ◆ Develops a financial assistance program for source water assessment and protection
- ◆ Reviews and approves Source Protection Plans
- ◆ Educates water systems and state officials on integrating source protection and watershed protection
- ◆ Works with other state agencies to develop and integrate source water protection into their programs and regulations
- ◆ Creates informational and educational materials on source water protection for both the general public and water systems
- ◆ Provides information on Source Protection Plans to the public





CHAPTER 4 *Evaluation Procedures*

First, an **overall evaluation** of the present condition of the source protection area's and the feasibility of water quality protection should be made. After locating the recharge area on aerial photos or a large-scale map, the committee can inventory and assess its present development and the possibilities for a comprehensive protection plan for the entire area. The physical condition and projected lifetime of the water system should be considered in this initial assessment. This procedure should also address the town's future development goals.

It is important to know how much development might occur within the source protection area. It is also important to determine if the town will need more water in the future. If so, a proactive stance to protecting a future water supply would be well advised.

EVALUATION COMPONENTS to consider:

- ◆ Adequacy of existing water supply (quantity and quality) and realistic possibilities for improvements and expansion
- ◆ Future water demand and distribution
- ◆ Competing water uses affecting groundwater quantity (i.e., stream alteration for hydropower and other pumping wells)
- ◆ Existing and future development within the SPA
- ◆ Value of future development to community (i.e., financial, aesthetic, environmental, and increased demand on public services)
- ◆ Value of groundwater protection (costs of replacement versus costs of protection versus costs of future supply)
- ◆ Availability of future protected groundwater sources (i.e., property, quantity, quality, realistic distribution)
- ◆ Contingency plan for emergency source of supply



Second, a **detailed inventory** of all existing and projected land uses within the recharge area should be conducted to determine specific threats to the water supply. Collecting of water quality samples, including those from private wells, in the SPA helps in

determining if any chemical changes are occurring. A detailed land-use map helps with visualizing your inventory.

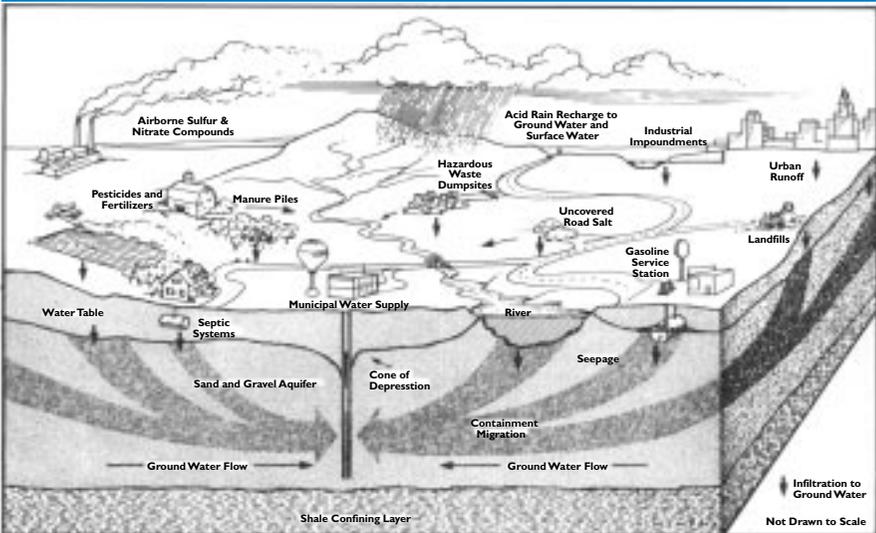
POTENTIAL SOURCES of CONTAMINATION:

Do these exist in your source protection area?



- ◆ Stormwater runoff
- ◆ Underground storage tanks
- ◆ Aboveground storage tanks
- ◆ Gas stations
- ◆ Septic systems/leachfields
- ◆ Auto body and repair facilities
- ◆ Businesses, such as dry cleaning, photo finishers, printers, furniture strippers, health clinics, beauty salons, and dental offices
- ◆ Agricultural activities including areas of pesticide and fertilizer application and storage
- ◆ Road salt storage and use
- ◆ Industrial facilities
- ◆ Waste disposal sites (e.g., active or closed landfills, treatment lagoons)
- ◆ Salvage yards
- ◆ Hazardous storage or disposal sites
- ◆ Private wells
- ◆ High traffic areas
- ◆ Forestry operations
- ◆ Mining operations or drainage
- ◆ Radioactive waste storage facilities or disposal sites

POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION

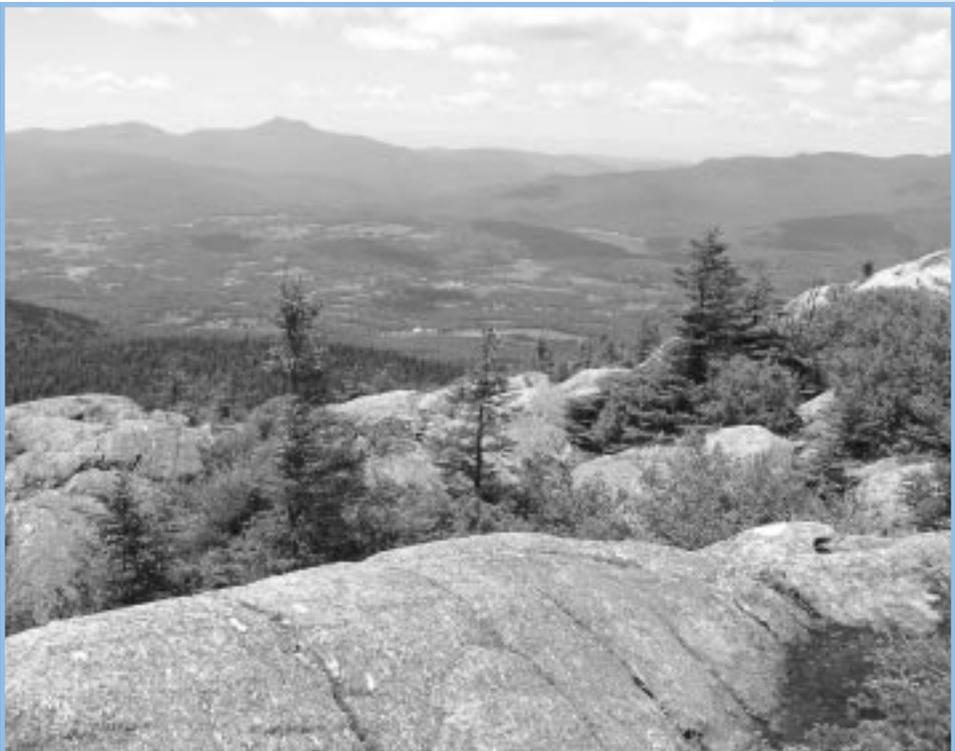


Source: National Water Quality Inventory: 1998 Report To Congress – Ground Water and Drinking Water Chapters, U.S. EPA.

Many of these potential sources of contamination are regulated by the state to ensure that they operate appropriately and properly. This does not mean that they no longer pose a threat. The state permitting program provides information on any permitted operations in the source protection area. The DEC can provide assistance in evaluating the potential threats to a community's water supply.

The Water Supply Division has an active GIS system that includes the location of Public Water System sources, Source Protection Areas, underground storage tanks (permitted ones), hazardous sites, roads, streams, and other similar coverages. Historical data on junkyards, landfills, dumps, and other sites may also be available.

Once an overall determination of the recharge area's contamination potential is completed, a town must decide whether to recommend that the existing source be protected or that a new source be identified, or both. If it decides to protect the existing source, then the most appropriate method of protection must be selected.





Regardless of the procedure, your groundwater protection program must maintain suitable quality and adequate quantity of the drinking water.

The most important components of a source protection plan are the actual measures taken to protect the drinking water source, either groundwater or surface water. Protection efforts can be creative and can be integrated into town planning and resource conservation.

This section describes groundwater protection techniques that are most suitable for your recharge area. Since every town's situation is unique, this handbook provides an outline that can be adjusted according to specific details and objectives. Generally speaking, public education, maintenance programs, and monitoring should be started in all SPAs. Acquisition, an option open to any protection area, should always be considered for currently undeveloped SPAs. Amending existing regulations may be easier than adopting new ordinances. While pursuing acquisition agreements or adoption of regulations, a community can implement interim techniques that will achieve short-term protection. Regardless of the procedure, your groundwater protection program must maintain suitable quality and adequate quantity of the drinking water.

Private water systems can control development as effectively as publicly owned systems through private agreements with SPA landowners. However, since regulatory schemes will require adoption through the political process, private systems should encourage the town's participation in protecting all community drinking water supplies.

Remember, before planning any effective protection program, the source protection area must be delineated and outlined on a map. Then an inventory of any potential sources of contamination must be done. It is then important to determine any state controls on the activities in the source protection area. Your community should use appropriate state regulations to provide as much protection as possible. This includes active participation in Act 250 reviews and ensuring that source water protection is fully considered in permits issued.

Because the state cannot address all local drinking water protection concerns, your community should design a protection program that addresses the particular threats identified. Choose your protection techniques according to your SPA evaluation. Armed

with the information provided in your source water assessment and protection plan, your community can make informed decisions about how to best protect your water source now and in the future.

There are a number of fairly simple steps that a local community should take to protect its drinking water sources in the near future, including educating the local citizens about the valuable resources in their community, increasing awareness of land use changes that may affect the water supply, and ensuring that all existing development in a source protection area is managed well to minimize threats to water quality. Examples of these and other techniques will be discussed in this chapter. Utilizing all available information effectively to target local protection efforts is important. (Examples of information and resources available are provided in Chapter 7.)

PUBLIC EDUCATION

Public education is a critical component of source water protection and is a technique that is always appropriate. It raises community awareness and encourages local action. Townspeople can be your most important resource for protecting your water supply. Informing residents about the location of the community's source protection area and explaining how different activities within the area can affect the water supply's quality and quantity can encourage residents to be careful and observant. Communities should discuss the importance of protecting source water and how they can use their resources most efficiently. Protection techniques can be as simple as cutting back on lawn fertilizers and pesticides in high-density residential areas and taking used motor oil to recycling centers. Several organizations and government agencies can provide additional information. (See Chapter 7: Resources for ideas.)

Easy Public Education Techniques:

1. Post SPA signs along major roads and railways that cross your town's SPA boundary. This has educational value and allows for a more efficient response when spills occur. Warning signs can be purchased from the Vermont Rural Water Association (<http://www.vtruralwater.org>). However, some water suppliers may decide not to draw attention to remote sources as a more effective way to protect them.

Utilizing all available information effectively to target local protection efforts is important.

Water system personnel should visually inspect the SPA in order to detect threats to the water supply and recharge area and respond appropriately before serious consequences can occur.



2. The U.S. EPA now requires public community water suppliers to provide information about drinking water quality to all consumers annually in a Consumer Confidence Report (CCR) (<http://www.epa.gov/safewater/ccr1.html>). It also requires the CCR to reference the source water assessment that has been completed for the water system. The report could be expanded within a community to include information on the source protection areas, such as where they are located, what threats may be posed to drinking water quality, and what individuals can do to protect them.
3. Distribute a map of your source protection area to members of the town planning board and conservation commission so they will be better able to include drinking water protection in the land-use decision-making process.

OBSERVATION TECHNIQUES

Water system personnel should visually inspect the SPA in order to detect threats to the water supply and recharge area and respond appropriately before serious consequences can occur. This information is also useful when updating the source protection plan. An inventory of land-use activities must be conducted during the initial evaluation phase, but should be frequently updated. This inspection can be done by town employees, conservation commissions, or local volunteers.

MAINTENANCE PROGRAMS

Maintenance programs for activities within SPAs can help reduce the possibility of contamination from potential pollution sources. In some cases, this maintenance is required by a state permit that allows a facility to operate. However, there are other activities that are not as thoroughly regulated by the state and that your community may want to ensure are operating properly. The following section highlights some of the more common potential sources of contamination and suggests actions that can be taken to decrease the likelihood of any contamination occurring.

POTENTIAL POLLUTION SOURCES:



- ◆ **Animals and Agricultural Activities**
- ◆ **Automobile Repair Shops and Junkyards**
- ◆ **Gas Stations**
- ◆ **Hazardous Waste Sites**
- ◆ **Household Hazardous Waste Storage**
- ◆ **Low-quality Surface Waters**
- ◆ **Major Waste Disposal Site**
- ◆ **On-site Sewage Disposal Systems (Septic Systems)**
- ◆ **Pesticide/Fertilizer Storage and Use**
- ◆ **Road Salt Storage and Use**
- ◆ **Sewer Line Leaks**
- ◆ **Stormwater**
- ◆ **Underground Storage Tanks (gasoline, heating oil)**

Potential Pollution Sources

- ◆ **Major Waste Disposal Sites** (landfills and dumps, industrial and manure lagoons, sewage treatment facilities, sludge and septage disposal sites)

Suggested Action:

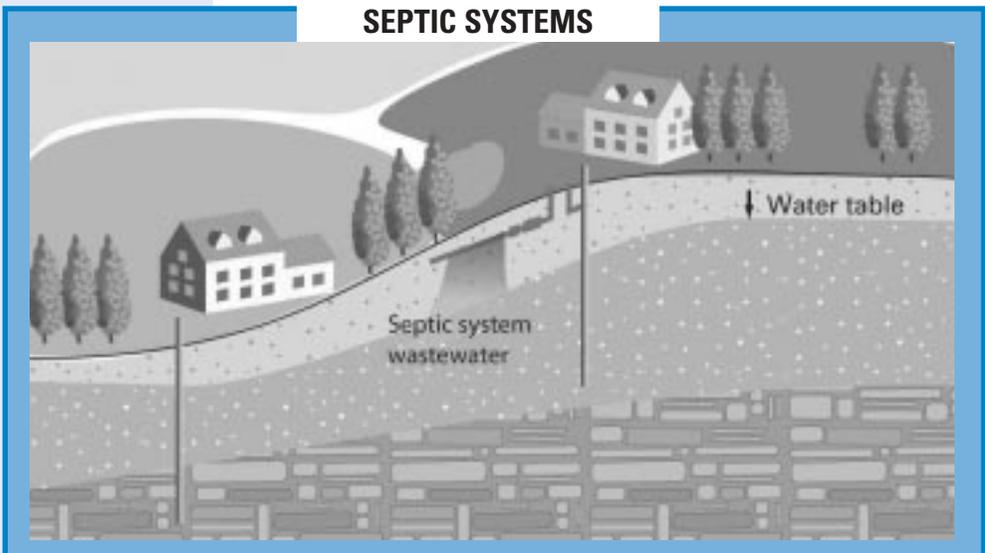
- Ask the facility or the DEC for their reports regarding regular inspections to ensure compliance with state regulations and permits
- Encourage the facility to regularly share with the water system the results of their on-site groundwater monitoring
- Become familiar with state compliance and sampling requirements for the regulated activities in the SPA.

- ◆ **On-site Sewage Disposal Systems** (septic systems)

Suggested Action:

- For municipal owned in-ground facilities, encourage regular and appropriate sampling and analysis of groundwater if located within your SPA to provide early detection of potential contamination.
- For individual owners, require pumping of septic tanks every three years (include in your health ordinance).

SEPTIC SYSTEMS



- Closely review the activities for septage and sludge disposal within SPAs to be sure their permit conditions are followed (this activity is restricted by state regulation).
- Prohibit use of septic tank cleaners containing organic solvents (they are health risks and should be prohibited).
- Contact the DEC Wastewater Division regarding required permits. www.anr.state.vt.us/dec/www/wwwmd.cfm

◆ **Underground Storage Tanks** (gasoline, heating oil)

Suggested Action:

- Educate and encourage owners to replace tanks older than 20 years, since Vermont's weather is hard on underground tanks (freeze/thaw causing expansion/contraction). The Petroleum Cleanup Fund (PCF) awards grants to eligible applicants to remove, replace, or upgrade underground storage tanks (USTs) used to heat residences located in Vermont. The PCF also awards grants to eligible applicants to remove, replace, or upgrade aboveground storage tanks (ASTs) used to heat residences located in Vermont.
<http://www.anr.state.vt.us/dec/wastediv/ust/ustgrantapplication.htm>
- Require through local regulations, or by education, that homeowners place new home heating oil tanks in basements so tanks are protected from the elements and are therefore less likely to leak, and any leaks are more quickly detected. This should only apply to concrete basements, not dirt basements.
- Identify where all USTs are in your SPA. Commercial underground gasoline and diesel tanks must be permitted by the Waste Management Division, and owners/operators must operate their tank systems in accordance with regulations which include leak detection, and spill prevention measures. Large heating oil tanks (>1,100 gallons) and home and farm gasoline and diesel tanks must be registered with the state, but do not have the same operational requirements as commercial systems. Work with the owners to ensure that leaks are reported to you as well as to the DEC.
- Get assistance from the DEC's Waste Management Division with reviewing spill and compliance reports.
<http://www.anr.state.vt.us/dec/wmd.htm>

*Any spill of
petroleum
greater than
two gallons
must be
reported.
Call 1-800-641-
5005 any time.*

- Provide education that any spill of petroleum greater than two gallons must be reported. Call 1-800-641-5005 any time.
- Encourage tank owners and operators to use the UST tank operations and maintenance manual.
<http://www.anr.state.vt.us/dec/wastediv/ust/OandM.htm>

◆ Stormwater

Regulated stormwater runoff refers to precipitation, snowmelt, and the material dissolved or suspended in precipitation and snowmelt that runs off impervious surfaces and discharges into surface waters or into groundwater via infiltration. Runoff is increased by impervious surfaces (paved and unpaved roads, parking areas, roofs, driveways, walkways) and can cause local flooding, channel erosion, and loss of infiltration to groundwater. Stormwater affects water quality because the runoff often picks up pollutants (e.g., sediment, oil, metal particles, fertilizer, pesticides, waste).

Suggested Action:

Larger communities in Vermont are required to undertake the following measures and smaller communities could consider adopting the following practices as well:

- Public Education and Outreach
- Public Participation/Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post-Construction Runoff Control
- Pollution Prevention/Good Housekeeping

More information is available from DEC's Stormwater Management Section of the Water Quality Division (<http://www.anr.state.vt.us/dec/waterq/stormwater.htm>). The staff can provide both technical assistance and regulatory oversight to ensure proper design and construction of treatment and control practices necessary to minimize the potentially adverse impacts of stormwater runoff on receiving waters throughout Vermont.

◆ Household Hazardous Waste Storage

Suggested Action:

- Educate and encourage residents to store household hazardous materials in original labeled containers with

*Encourage
best
management
practices.*

lids and caps tightly sealed and away from areas where they could contaminate groundwater.

- Educate and encourage residents to participate in household hazardous waste collection events or sponsor a collection day. Information concerning collection events can be obtained from DEC's Solid Waste Management Division or by calling the Recycling Hotline (1-800-932-7100).
- Provide citizens with information on alternatives to toxic household products.

💧 **Pesticide/Fertilizer Storage and Use**

Suggested Action:

- Educate and encourage the use of best management practices. Help is available from the Department of Agriculture, Food and Markets, Pesticide and Groundwater Monitoring Program (<http://www.vermontagriculture.com>), as well as the Natural Resources Conservation Service (<http://www.vt.nrcs.usda.gov/>). (See Chapter 7: Resources for more information.)
- Use private agreements to control nitrate pollution from excessive fertilizer use.
- Participate in review of applications for herbicide spraying along power-line corridors, state highways, and railways within SPAs. Contact the Department of Agriculture, Food and Markets, Pesticide and Groundwater Monitoring Program for assistance.

💧 **Road Salt Storage and Use**

Suggested Action:

- Locate municipal salt storage piles outside of SPAs or, if that is not possible, as far away from the well or surface water body as possible.
- Consider the costs of storage area location versus water supply replacement.
- Locate salt and sand piles on impervious pads inside buildings. Contact the Water Supply Division for copies of the salt storage guidelines.
- Load salt and sand over an impervious pad, and clean up spills promptly and regularly.
- Contain waste from vehicle washing inside building.

- Contact the Agency of Transportation to assist town highway crews regarding responsible storage and application methods.
- Encourage responsible application of de-icers within SPAs. Reduction may be warranted with adequate safety precautions.
- Try using sand without salt. Towns that have switched to using sand without adding salt say that sand-only works just as well; other towns are trying de-icers to reduce salt application.
- Reduce salt applications next to wells and intakes where possible.
- Consider other options and practices that will prohibit off-site migration of salt.

Other Potential Pollution Sources

- Monitor municipal wastewater facilities for leakage from sewer lines.
- Educate people involved with animals and agricultural activities how these activities may affect the groundwater or surface water.
- Educate or enact regulations that are designed to improve low-quality surface waters, as they may supply contaminated water to groundwater sources located next to a river bank or shoreline.
- Enact regulations that prohibit or require extensive monitoring and inspections of automobile repair shops and junkyards in SPAs.
- Monitor the activities related to gas stations and facilities where wastes are temporarily stored or where floor drains are used. All hazardous materials and wastes shall not empty into a floor drain. All wastes shall be properly disposed of in accordance with state regulations.
- Obtain information related to State listed hazardous waste sites where there are known releases of a hazardous substance into groundwater or surface water.

Refer to *Protecting Public Water Sources in Vermont* document for an extensive list of potential sources of contamination. This document is available from the Water Supply Division.

MONITORING TECHNIQUES

Monitoring groundwater quality within SPAs can reveal chemical changes that may be corrected before irreversible contamination occurs. Some water quality sampling is required by statute.

However, additional sampling of pollution sources within the SPA can help prevent unexpected pollution and expedite any remediation to minimize future health problems.

Sampling Required By State or Federal Statute

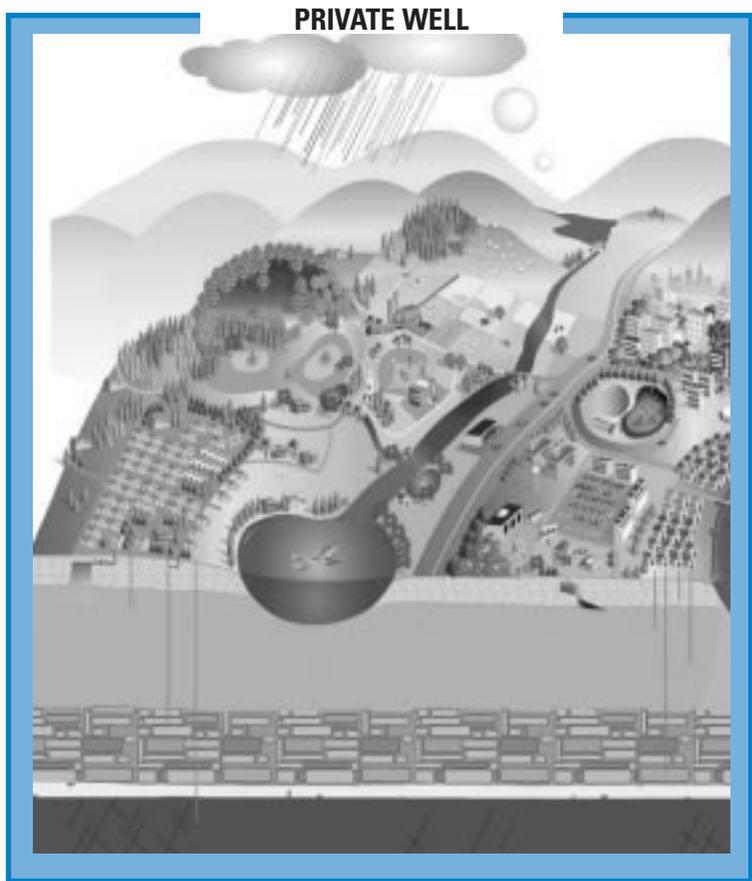
If the facilities listed below are municipally owned, then the town or city already received this information through the facility contact. If these are privately owned facilities, you may be able to work with them in order to have them share their information with you. This will assist you in having advanced warning to initiate remedial efforts and for protecting the groundwater supply from pumping contaminated water should sampling indicate a problem.

- **Public Water Systems** (Water Supply Division, DEC)
 - Bacteria samples are taken at a specified frequency, depending on the size of system;
 - Specified inorganic chemical analyses; and as required
 - Organic chemicals including synthetic organic chemicals (SOCs) or volatile organic chemicals (VOCs); and
 - Radionuclide analysis.
- **Solid Waste Disposal Facilities** (Solid Waste Section, Waste Management Division, DEC)

Annual or semi-annual sampling is required at landfills throughout the state (closed and operating) in order to monitor groundwater quality. Results are reported to the DEC.
- **Hazardous Waste Sites** (Waste Management Division, DEC)

All identified hazardous sites are required to install monitoring wells and take samples. Results are reported to the DEC.
- **Community Subsurface Sewage Systems** (Wastewater Management Division, DEC)

Monitoring wells are installed at some sites and samples are taken by the operators. Results are reported to the DEC.



Additional Options for Sampling of Pollution Sources in the SPA

- Obtain all groundwater sample analyses that are taken within the SPA, including private wells (if possible).
- The Department of Health, or the DEC Water Supply Division, may be able to assist in interpreting the results.
- Use educational efforts to help enforce maintenance programs. Your town health officer can help.
- Require a chemical sample of each new well within the SPA through local regulations.
- Consider sampling at the water system more frequently than is normally required if background levels begin to increase.
- Costs are high! Therefore, use the existing sampling to its fullest and combine it with your maintenance programs.

LONG-TERM PROTECTION

A long-term protection strategy is the most effective way to ensure the quality of your drinking water supply. Protection techniques require control or restriction of property uses, and, therefore, require direct contact with property owners within your SPA. Cooperation with, and understanding of, landowner objectives affects the success of your negotiations. Source water protection does not always require absolute control or prohibition of development. With reasonable care and using best management practices, certain activities, such as residential development, agriculture, and forestry, can be compatible with source water protection. (See Chapter 7: Resources for more information.)

The suitability of individual on-site sewage disposal systems needs to be determined. The DEC's Wastewater Management Division can assist with such determinations (<http://www.anr.state.vt.us/dec/www/wwwmd.cfm>).

There are many long-term protection techniques, and the best techniques for a particular community will depend on factors such as the political will of the citizens to adopt a protection ordinance, the financial ability of the town to purchase land, and staff capabilities in the town to implement a local bylaw or oversee any tax incentive or land purchase program. The following section provides an overview of many of the options that a community can adopt. Any of these can be modified to meet the specific desires of a community. Contact the Water Supply Division or refer to the other resources listed in the back of this handbook to learn more.

Purchase land within the SPA: Controlling development within your SPA is guaranteed with ownership. Landowners may be willing to sell their property within the SPA to the water system owner. Also, the power of eminent domain allows municipalities to “condemn” property, where necessary to protect a public use. Full compensation is required. In many cases, the costs of land at fair market value may leave acquisition as a last resort. However, a land swap, donation, or bargain sale may be feasible. If a municipality owns property not needed for its purposes, it might negotiate a swap with a landowner within the SPA. Land swaps need no funding appropriation so long as both parcels are equally assessed.

Incentives: Federal income tax deductions are available for donations and bargain sales to municipalities and charitable

LAND ACQUISITION is a great way to achieve source protection. Recently, St. Albans City purchased 100 acres around their northern reservoir. This brings the total number of acres owned by the city to approximately 850 acres in their northern reservoir, 400 acres in their southern reservoir, and all the land around their emergency source, Silver Lake. St. Albans City recognized that, as a surface water source, the best way to ensure clean reliable drinking for the future was to control the activity around their source. This can be accomplished through planned, thoughtful use of funds allocated to the water system by the town or other sources.

organizations with 501(c)(3) tax exempt status. For donations of fee title, a landowner can deduct the fair market value of the donated property. For bargain sales, a landowner may deduct the difference between the property's fair market value and its sale price. Also, to regain some return from the acquisition the new owner could lease back the property for certain compatible activities.

Acquisition of Less-Than-Fee Interests in a SPA: By restricting deeds within a SPA, a landowner may continue compatible uses while a community acquires long term security in water supply protection. Less-than-fee interests in property, such as conservation restrictions, easements, and development rights, can permanently limit property to its current use or prohibit specific types of future development. These interests can be purchased or donated by a landowner. Although the interests are acquired, the landowner retains title to, and use of, the property subject to the restriction on the deed. These voluntary arrangements do not grant public access to the property unless specifically enabled. The costs of purchased development rights or conservation restrictions varies with landowners, development pressure, and property characteristics.

Federal income tax deductions are available for the appraised value of any donated rights to municipalities or charitable organizations with 501(c)(3) tax exempt status. In Vermont, donations of less-than-fee interests in land to a municipality also reduces the landowner's local property tax assessment (10 VSA Section 6306(b)).

Funding sources for land protection:

- The Drinking Water State Revolving Fund (SRF) provides low interest loans to purchase land or conservation easements within a source protection area. This Source Protection Fund is managed by the Water Supply Division and is intended to protect public water sources and ensure compliance with drinking water regulations. Priority list applications for land purchase or conservation easement projects may be submitted at any time for projects that are ready to proceed. The Municipal Source Water Protection Loan Application is available from the Water Supply Division.
<http://www.anr.state.vt.us/dec/watersup/capacity.htm>
- There are many other not-for-profit organizations, including The Vermont Land Trust, The Nature Conservancy, Trust for Public Land, and numerous land trusts that work to protect significant land parcels from development. (See Chapter 7: Resources.) If you believe that lands within your source protection area might have special resource value, contact your local land trust.

For more specific funding sources, see Chapter 6: Funding.

Interim techniques provide an intermediate level of protection and may be easier to implement than long-term protection or regulatory programs

GROUNDWATER GUARDIAN PROGRAM

Consider participating in the national Groundwater Foundation's Groundwater Guardian Program (<http://www.groundwater.org/gg/gg.html>). The Groundwater Guardian program encourages communities to begin to enhance groundwater awareness and protection activities. Groundwater Guardian supports communities in their efforts and recognizes their achievements. Communities begin the process by forming a Groundwater Guardian team consisting of citizens, business and/or agricultural representatives, educators, and local government officials. These teams then develop Result-Oriented Activities (ROAs) to address the community's groundwater protection concerns. ROAs fall into many categories including education and awareness, pollution prevention, public policy, conservation, and best management practices.

REGULATORY TOOLS

Regulatory schemes can protect water supplies by allowing local officials to assess a proposed development's compatibility with water supply needs within a SPA. This can be accomplished in a variety of ways. Existing local regulations can be amended to specifically address source water protection. Town plans express objectives and policies to guide future growth and to protect the environment, including water supply. They provide the guidelines for zoning bylaws, subdivision regulations, and official maps. Act 250 reviews provide a forum for all towns and adjoining property owners to address projects that may affect a groundwater source. Act 250 approval requires that a project comply with town and regional plans. Source Protection Plans are required as part of the permitting process for new public water supplies. Consult the DEC Water Supply Division for details of this requirement.

Local Health Ordinance. Towns wanting to adopt a local health rule, regulation, or ordinance should follow Title 24 Chapter 59 and consult with the town's attorney. Towns should also refer to 24 VSA § 1972 (c), which limits the adoption of an ordinance/rule when it is covered by the town charter, special law, or statute. It is important that towns do not attempt to adopt an ordinance that conflicts with a state law/rule. Your local board of health may adopt a public health ordinance that protects against contamination of drinking water and ensures that facilities are designed, constructed, operated, and maintained in a manner that will promote sanitary and healthful conditions throughout the town.

The ordinance can include specific site evaluation and construction requirements for new development including, but not limited to, individual on-site sewage disposal systems. Long-term maintenance to prevent future health risks can also be included. New projects within a SPA could be required to meet stricter standards to demonstrate their compatibility with your water supply. These requirements can be referenced in other regulatory schemes, such as zoning bylaws and subdivision regulations, to avoid inconsistency and duplication.

Zoning Bylaws. Municipalities may adopt zoning to “permit, prohibit, restrict, regulate, and determine land development” (24 VSA, Chapter 117, Section 4410, 4411). A wellhead protection district or source water protection district can permit compatible development, such as agriculture or forestry, using best manage-

ment principles, open space conservation and environmentally sound residential and commercial development. Generally, the SPA is protected by an overlay zone — a zoning tool used to promote site-related public benefits. Overlay zones are typically used where there is special concern in a geographical area that does not coincide with standard zoning district boundaries. Usually, the overlay zone adds a new layer of regulations to those already existing in the underlying zone.

GOOD EXAMPLES OF TOWNS APPLYING OVERLAY DISTRICTS OR ENACTING ZONING REGULATIONS.

The towns of Chester and Bellows Falls have written in their town plan what are permitted uses and what are permitted as “conditional” uses. However, the towns vary on what they consider permitted and permitted conditional use. Chester, for example, only allows single-family occupation, forestry, and agricultural crop production. Conditional uses are only those that will be connected to the municipal sewage disposal system. Conditional uses require review and approval from the planning commission. The planning commission determines whether or not a use will have a negative impact the drinking water source. An excerpt from their town plan detailing their ordinance language is available at the Water Supply Division or by contacting the towns directly.

If your community decides to adopt zoning bylaws to protect groundwater, a clear statement of the district’s purpose should be developed, such as:

- **To preserve and maintain existing and future community ground and surface water sources and their SPAs from adverse development for the public health and safety; or**
- **To conserve the natural resources of the district.**

After the source water protection district is located, certain activities can be prohibited, while others are permitted or allowed with conditions. (See MODEL GROUNDWATER PROTECTION ORDINANCE – Appendix A.).

Permitted and conditional uses must allow some reasonable use of a property. However, some properties may not be suited for certain development and may be zoned accordingly.

Performance standards (24 VSA, Chapter 117, Section 4414(5)) can specifically describe the acceptable level of operation, such as waste generation and disposal, for particular uses. For exam-

ple, the Town of Norwich (<http://www.norwich.vt.us/>) requires that proposed developments may not result in the pollution or unreasonable reduction in the quality of groundwater. However, before adopting similar standards, towns should understand how to enforce them consistently.

The source water protection district may also assign an allowable density for development using on-site disposal systems. The appropriate density is difficult to determine. This depends on the type of aquifer and other subsurface conditions. Guidance on an evaluation method, using geologic susceptibility, residence times, and dilution rates is available from DEC's regional offices. (See Resources section.)

Subdivision Regulations. These regulations, adopted under 24 VSA, Chapter 117, Section 4418, explain the requirements for design and layout of developments involving the division of land. Standards are usually required for the design of sewage systems and water supplies. These standards enable the planning commission to consider protection of groundwater supplies in reviewing development proposals. Subdividing land requires a permit from the Wastewater Management Division.

Act 250 Review. Permit approval requires evidence that the subdivision or development “will not result in undue water...pollution, and will not cause an unreasonable burden on an existing water supply” (10 VSA, Chapter 151, Section 6086). Towns participating in these hearings may use their town plans and assistance from DEC to address the development's impact on the groundwater supply. With or without a town plan, municipalities are parties to any Act 250 proceedings. Local participation in this process can help assure that groundwater protection is addressed. The SPA focuses the attention of Act 250 review on the appropriate protection of the water supply.

INTERIM TECHNIQUES

Interim techniques provide an intermediate level of protection and may be easier to implement than long-term protection or regulatory programs. The following techniques are appropriate when procedures for adopting ordinances or funding for acquisition can delay the protection program's implementation.

Official Map. Under 24 VSA, Chapter 117, Section 4401(3), a town may map locations of existing and proposed streets, parks,

schools, and other public facilities, including water supply and SPAs. If the SPA is delineated on the Official Map, the town has the right to withhold a permit for land development on the SPA. Following that action, the town has 120 days to institute proceedings to purchase the land in question. (Note: Alternatives to purchasing the land include passing an ordinance to protect the SPA, see Appendix A). If a town fails to act within 120 days, the permit shall be deemed granted.

Property Tax Programs. Land owners within SPAs can be rewarded for keeping their property in compatible uses. Municipalities may stabilize local property taxes on productive agricultural and forest land through contracts with landowners. Authorized under 24 VSA, Chapter 75, Section 2741 and 16 VSA, Chapter 123, Section 3458a, these contracts expire after 10 years unless renewed. To reduce an increased tax burden on other property owners, a town's state aid to education will reflect the value of the property without stabilization. If land is conserved it should be listed at fair market value reflecting conservation easements or zoning designation.

The Current Use Tax Assessment Program, authorized under 32 VSA, Chapter 124, provides landowners of 25 or more contiguous acres of productive agricultural or forest land with use value assessment. An advantage of this program is that the state reimburses reduced taxes to the town.

Agreement Prior to Purchase. When SPA property is currently in compatible use but future ownership is questionable, agreements with SPA landowners, such as a "right of first refusal" or an "option to purchase," may be desirable. If undesirable development becomes inevitable, purchase of the property or easements may be necessary. These agreements can hold the acquisition option open for a limited time.

A right of first refusal is a contract between a landowner and an interested party that allows the interested party to meet a prospective buyer's existing offer within a stated period of time (usually 30 days). The decision to exercise that right often depends on the prospective buyer's stated development plans.

An option to purchase is a contract between a landowner and an interested party that enables the party to purchase the property for a specific price during a stated period of time. The option gives an interested party additional time to work out financing.

*Commitment to
the continued
vitality of your
groundwater
resource can
protect your
community's
health.*

ACTION

Local responsibility and initiative will determine the success of your drinking water protection program. Without local support, the quality and quantity of your drinking water source are far from guaranteed. Support can come from your town government, your water supply owner, landowners within your SPA, or a group of water consumers. Commitment to the continued vitality of your groundwater resource can protect your community's health. Local action, before a crisis develops, allows you to take charge of your future.

Vermont's future will benefit from local groundwater protection programs. Creative programs can preserve Vermont's quality of life, its rural heritage, and its agricultural and forest lands. In the past, Vermont has chosen to be a forerunner in environmental protection. Groundwater protection is becoming increasingly important. Protection will not be easy, but through cooperation with state agencies, water supply owners, and groundwater consumers, communities can reinforce their concern for safe drinking water and of groundwater resource protection.

Environmental Finance Center

www.efc.umd.edu/

This organization, located in Falmouth, Maine, works with communities to develop innovative funding and financing strategies for environmental and community development projects. The Center is supported through a partnership with the U.S. Environmental Protection Agency. *The Center's Guidebook of Financial Tools* provides a wide-ranging list of funding and financing methods, assembled to assist those faced with the challenge of paying for sustainable environmental systems (www.epa.gov/efinpage/guidbkpdf.htm).

Environmental Systems Research Institute (ESRI) www.esri.com

ESRI's grant program, Community Development/Public Works Grants for Livable Communities, designed to foster and support the integration of GIS technology within community development agencies throughout the United States. The awards provide software solutions, data, and training to local governments and communities for projects for a host of applications that include environmental protection and utilities.

EPA Catalog of Federal Funding Sources for Watershed Protection

<http://cfpub.epa.gov/fedfund/>

A searchable database of financial assistance sources (e.g., grants, loans, cost-sharing) available to fund a variety of watershed protection projects.

Directory of Watershed Resources, Environmental Finance Center, Boise State University

<http://sspa.boisestate.edu/efc/>

A searchable database of funding sources to assist communities and watershed groups in finding creative funding solutions to support their own plans for environmental protection.

Vermont Drinking Water State Revolving Fund (DWSRF)

<http://www.anr.state.vt.us/dec/watersup/grants.htm>

The Safe Drinking Water Act, as amended in 1996, established the Drinking Water State Revolving Fund (DWSRF) to make funds available to drinking water systems to finance land purchase in SPAs and for infrastructure improvements. The program also emphasizes providing funds to small and disadvantaged communities and to programs that encourage pollution prevention as a tool for ensuring safe drinking water.

Vermont Clean Water State Revolving Fund (CWSRF or nonpoint source grant funding)

<http://www.vermontdrinkingwater.org/>

Clean Water State Revolving Fund (CWSRF) programs provided an average of \$3.8 billion over the past five years in low interest loans to fund water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management.

**Rural Utility Service (RUS) –
Water and Environmental Programs**

<http://www.usda.gov/rus/water/index.htm>

Water and Environmental Program (WEP) provides loans, grants and loan guarantees for drinking water, sanitary sewer, solid waste and storm drainage facilities in rural areas and cities and towns of 10,000 or less. WEP also makes grants to nonprofit organizations to provide technical assistance and training to assist rural communities with their water, wastewater, and solid waste problems.

**Rural Community Assistance
Program (RCAP)**

<http://www.rcap.org/programs/sdwap.html>

Provides technical assistance grants to rural communities with population of 10,000 or less. Relevant projects include watershed surveys, delineation of well-head protection areas, inventories of existing land uses and potential risks to water supplies and designation of land use controls to minimize the risks of resource degradation from future development.

**Natural Resources Conservation
Service (NRCS)**

<http://www.nrcs.usda.gov/programs/>

Consists of three relevant programs: Watershed Protection and Flood Prevention Program; Resource Conservation and Development Program; and Community Planning Initiatives.

USDA Farm Service Agency (FSA)

<http://www.fsa.usda.gov/vt/>

The Conservation Reserve Program (CRP) can provide farmers with payments to take their agricultural land out of production (including for use as well-head protection areas).

This section is a guide to publications, websites, and agencies where assistance and information are available. A groundwater protection program involves many aspects of community life which may be complicated without further assistance. These resources can also be used for public education programs.

Unless area code is indicated, all phone numbers use the 802 Vermont area code.

PUBLICATIONS

Protecting Drinking Water Sources in Your Community: Tools for Municipal Officials – <http://www.neiwpsc.org>

Vermont Groundwater Protection Rule and Strategy – www.vermontdrinkingwater.org

2005 Groundwater Report to the Secretary of the Agency of Natural Resources – www.vermontdrinkingwater.org

The Trust for Public Land: Protecting the Source – <http://www.tpl.org/>

Source Water Stewardship: A Guide to Protecting and Restoring Your Drinking Water – <http://www.cwn.org/cwn/>

Getting In Step: A Guide for Conducting Watershed Outreach Campaigns EPA 841-B-03-002 – <http://www.epa.gov/owow/watershed/outreach/documents/>

Getting In Step: Engaging and Involving Stakeholders in Your Watershed – <http://www.epa.gov/owow/watershed/outreach/documents/>

The Rhode Island Source Water Assessment Program: A Model for Public Education and Participation, The Land Use Inventory – http://www.uri.edu/ce/wq/program/html/SWAP_LUInv.htm

Community Rules: A New England Guide to Smart Growth Strategies – <http://www.clf.org/general/index.asp?id=347>

Ordinances for the State of Vermont <http://www.epa.gov/safewater/protect/gwpos/ordvt.htm>

Land Use Planning in Vermont: 15 Years After Act 250 (available from the Vermont Department of Housing and Community Affairs)

Model Ordinances to Protect Local Resources – a U.S. EPA Web site that provides ordinances, BMPs, and links with the Local Government Environmental Assistance Network. <http://www.epa.gov/owow/nps/ordinance/>

Non-Regulatory Tools for Watershed Management – the Horsley Witten Group: Sustainable Environmental Solutions Web site. What types of approaches are available? Which are the most effective? First click on publications, then look at the non-regulatory tools pdf. There is a chart that lists education/outreach tools and their effectiveness. <http://www.horsleywitten.com/>

AGENCY AND ORGANIZATIONAL RESOURCES

Water Supply Division Agency of Natural Resources Department of Environmental Conservation

The Old Pantry Building
103 South Main Street
Waterbury, VT 05671-0403
Phone: 241-3400

www.vermontdrinkingwater.org

- Groundwater data collection
- Drilled well reports
- State groundwater levels
- Well Head Protection Areas and Source Protection Areas
- Regulation of public water supplies
 - Engineering, design and source approval, permits
 - Protection requirements
 - Municipal water supply funding
 - Monitoring and compliance
- Evaluation of threats to groundwater quality and quantity
- Source Water Protection Loan funding
- Well construction advice
- Water quality sample reports
- Water supply construction funding

Vermont Geological Survey

103 South Main Street, Logue Cottage
Waterbury, VT 05671-3273
Phone: 241-3608

www.anr.state.vt.us/dec/geo/vgs.htm

- Conducts surveys and research relating to the geology, mineral resources, and topography of the state.

Public Service Board and Public Service Department

112 State Street
Montpelier, VT 05620-0191
Phone: 828-2358

www.state.vt.us/psb

- Certificate of public good and rates for private water suppliers

Department of Housing and Community Affairs

National Life Building
Montpelier, VT 05620-0501
Phone: 828-3211

www.dhca.state.vt.us

- Community block grants programs

TOWN HEALTH OFFICERS AND BOARDS OF HEALTH

Vermont Health Department Division of Environmental Health

108 Cherry Street
PO Box 70
Burlington, VT 05402-0070
Phone: 863-7200

800/464-4343

www.healthyvermonters.info

- Assistance for local health officers and individuals with local health problems
- Disease outbreaks and public health risk assessment

Vermont Health Department Laboratory Division

195 Colchester Avenue
PO Box 1125
Burlington, VT 05402-1125
Phone: 863-7335

800-660-9997 (within Vermont)

www.healthyvermonters.info

- Water testing information

LOCAL PLANNING AND PROTECTION

Town Planning Commission

Regional Planning Commission (see full listing on page 50)

- Assistance and experience drafting town plans and ordinances

Agency of Natural Resources Dept. of Environmental Conservation

Water Supply Division
The Old Pantry Building
103 South Main Street
Waterbury, VT 05671-0403
Phone: 241-3400

www.vermontdrinkingwater.org

- Explanation of SPA Projects
- Potential future groundwater sources
- Compatible activities within SPA

Vermont Rural Water Association

(formerly Northeast Rural Water Association)

187 St. Paul Street
Burlington VT 05401-4689
Phone: 660-4998

800/556-3792

www.vtruralwater.org

- Source protection planning assistance at no cost to town or system
- Small water system technical assistance at no cost to town or system

Department of Housing and Community Affairs (DHCA)

National Life Building
Montpelier, VT 05620-0501
Phone: 828-3211

<http://www.dhca.state.vt.us/>

- Assistance with interpreting the Vermont Municipal and Regional Planning and Development Act

Natural Resources Board

(formerly Environmental Board)
National Life-Records Center Building
Montpelier, VT 05620
Phone: 828-3309

www.nrb.state.vt.us

District Environmental Commissions

(see full listing on page 49)

- Responsible for Act 250

Department of Forests, Parks, and Recreation

103 South Main Street
Waterbury, VT 05671-0601
Phone: 241-3678 (Forests)

<http://www.vtfpr.org/>

- Acceptable Management Practices. Ask for the District Forester phone number.

International City/County Management Association (ICMA) Source Water Awareness Media Tool Kit

http://www.lgean.org/html/_tooldetail.cfm?id=43

- ICMA provides a tool kit to help raise community awareness about drinking water protection issues that includes guidelines and sample promotional materials for launching a successful media campaign.

Natural Resources Conservation Council

www.vermontagriculture.com/nrcc.htm

- Provides leadership to conservation districts

Vermont Association of Conservation Districts

487 Rowell Hill Road
Berlin, VT 05602
Phone: 229 9250

www.vacd.org

Vermont Forum on Sprawl

110 Main Street
Burlington, VT 05401
Phone: 864-6310
<http://www.vtsprawl.org/>

- Organization's mission is to encourage economic vitality in community centers and preserve Vermont's unique working landscape and quality of life.

Vermont League of Cities and Towns

89 Main Street, Suite 4
Montpelier, VT 05602
Phone: 229-9111
www.vlct.org

- The league provides educational, legislative, and insurance trust services to all political subdivisions of the State of Vermont.

LAND TRUSTS

Vermont Land Trust

8 Bailey Avenue
Montpelier, VT 056
Phone: 223-5234
www.vlt.org

- Experienced in creative protection techniques for Vermont farm and forest Vermont farm and forest land

The Nature Conservancy

27 State Street
Montpelier, VT 05602
Phone: 229-4425
www.nature.org (For Vermont specific, click on "where we work")

- National land trust for the protection of unique natural areas

Trust for Public Land

3 Shipman Place
Montpelier, VT 05602
223-1373
www.tpl.org

- A national, nonprofit, land conservation organization that conserves land for people to enjoy as parks, community gardens, historic sites, rural lands, and other natural places, ensuring livable communities for generations to come.

ON-SITE SEWAGE DISPOSAL (Septic Tanks and Leachfields)

Wastewater Management Division

103 South Main Street, Sewing Building
Waterbury, VT 05671-0405
Phone: 241-3822
www.anr.state.vt.us/dec/www/wwwmd.cfm

- Issues permits required by the state.

Town Health Officer

Local Health Services Program

Vermont Health Department

108 Cherry Street
Burlington, VT 05402
Phone: 863-7220
www.healthyvermonters.info

- Assistance with health ordinances and problems.

Natural Resources Conservation Service

(see full listing on page 51)

- Soil surveys to determine site capability for sewage disposal

PESTICIDES AND FERTILIZERS

Pesticide and Groundwater Monitoring Program **Vermont Department of Agriculture, Food and Markets**

116 State Street, Drawer 20
Montpelier, VT 05620-2901
Phone: 828-2916

www.vermontagriculture.com/pid.htm

- Assistance/information on storage facilities, best management practices and herbicide spraying of powerline corridors

Natural Resources Conservation Service (see full listing on page 51)

- Assistance and information on fertilizer storage and use

UVM Extension Service (contact your county extension agent)

- Assistance and information on best management practices, storage and use

PROPERTY TAX PROGRAMS

Town Listers

Property Valuation and Review Division **Vermont Department of Taxes**

P.O. Box 1577
Montpelier, VT 05601-1577
Phone: 828-5860

www.state.vt.us/tax/pvr.shtml

- Information about local tax stabilization and the Current Use Assessment Program

ROAD SALT

Town Road Commissioner

Maintenance Division **Agency of Transportation**

1 National Life Drive – Drawer 33
Montpelier, VT 05633-5001
Phone: 828-2587

<http://www.aot.state.vt.us/maint/Operations.htm>

- Information regarding salt use on state highways and storage within SPAs
- Technical assistance and information on road deicing and storage/design techniques for town highway crews

UNDERGROUND STORAGE TANKS (Gasoline, Heating Oil)

Local Fire Chief

Underground Storage Tank Program **Waste Management Division, DEC**

103 S. Main Street
Waterbury, VT 05671-0404
Phone: 241-3888

<http://www.anr.state.vt.us/dec/wastediv/ust/home.htm>

- Assistance and information on installation, removal and inventory techniques for USTs

HAZARDOUS WASTE SITES

Sites Management Section

Waste Management Division, DEC

Agency of Natural Resources

103 S. Main Street

Waterbury, VT 05671-0404

Phone: 241-3888

http://www.anr.state.vt.us/dec/wastediv/SMS/sites_management_section.htm

- Provides state oversight for the investigation and cleanup of properties where a release of a hazardous material has contaminated the environment including soils, groundwater, and surface water.

SOLID WASTE

Waste Management Division, DEC

Agency of Natural Resources

103 S. Main Street

Waterbury, VT 05671-0404

Phone: 241-3888

<http://www.anr.state.vt.us/dec/wastediv/solid/home.htm>

- Landfill approval
- Illegal dump sites
- Monitoring
- Post closure care of closed landfills (includes groundwater monitoring)
- Solid waste district map – districts with approved plans

Residuals Management Program

Wastewater Management Division, DEC

The Sewing Building

103 S. Main Street

Waterbury, VT 05671-0405

- Provides state oversight of the management of residuals, such as septage and wastewater sludge (a.k.a. biosolids)

UVM Extension Service (contact your county extension agent)

- Sludge and septage disposal techniques

Vermont Agency of Transportation Maintenance Division

1 National Life Drive – Drawer 33

Montpelier, VT 05633-5001

Phone: 828-2587

<http://www.aot.state.vt.us/maint/Operations.htm>

- Automobile junkyard approval (town's approval required)

Environmental Assistance Division, DEC

103 S. Main Street

Waterbury, VT 05671-0407

Phone: 241-3589 or 800-974-95599

<http://www.anr.state.vt.us/dec/ead/index.htm>

- Provides guidance to permit applicants, offers environmental compliance assistance to Vermont businesses and municipalities, and provides assistance to municipal household hazardous waste programs

HAZARDOUS MATERIALS

Local Fire Chief

Local Civil Defense Officer

Waste Management Division, DEC

103 S. Main Street

Waterbury, VT 05671-0404

Phone: 241-3888

www.anr.state.vt.us/dec/wastediv/rcra/rcrahome.htm

- Responsible for hazardous materials disposal
- Monitoring

SPILLS!!!

Immediately call 1-800-641-5005 or your local Fire Chief

REGIONAL OFFICES – AGENCY OF NATURAL RESOURCES

Barre Regional Office

5 Perry Street – Suite 80
Barre, VT 05641
Phone: 476-0190

Essex Regional Office

111 West Street
Essex Junction, VT 05452-4695
Phone: 879-5656

Pittsford Regional Office

(now located in Rutland)
271 North Main Street, Suite 215
Rutland, VT 05701
Phone: 786-3851

Rutland Regional Office

450 Asa Bloomer State Office Building
Rutland, VT 05701-5903
Phone: 786-5900

Springfield Regional Office

100 Mineral Street
Springfield, VT 05156-3168
Phone: 885-8855

St. Johnsbury Regional Office

1229 Portland Street, Suite 201
St. Johnsbury, VT 05819-2099
Phone: 751-0130

DISTRICT ENVIRONMENTAL COMMISSIONS (Responsible for Act 250)

District #1 (Rutland County) &

District #8 (Bennington County)

440 Asa Bloomer State Office Building
Rutland, VT 05701-5903
Phone: 786-5920

District #2 (Windham County and southern half of Windsor County except Washington, Williamstown and Orange) & District #3 (northern half of Windsor County)

100 Mineral Street – Suite 305
Springfield, VT 05156-3168
Phone: 885-8855

District #4 (Chittenden County) & District #6 (Franklin and Grand Isle Counties) & District #9 (Addison County)

111 West Street
Essex Junction, VT 05452-4695
Phone: 879-5614

District #5 (Washington County and Lamoille County)

5 Perry Street, Suite 60
Barre, VT 05641-4267
Phone: 476-0185

District #7 (Caledonia, Orleans and Essex Counties)

1129 Portland Street, Suite 201
St. Johnsbury, VT 05819-2099
Phone: 751-0120

See website for map of District Environmental Commissions
www.anr.state.vt.us/dec/permit_hb/anrregmap.htm

REGIONAL PLANNING COMMISSIONS

Vermont Association of Planning and Development Agencies

www.access-vermont.com/vapda

Addison County Regional Planning and Development Commission

79 Court Street
Middlebury, VT 05753
Phone: 388-3141
www.acrpc.org

Bennington County Regional Commission

P.O. Box 10
9 Church Street, Apt. B
Arlington, VT 05250
Phone: 375-2576 or 375-9964
www.rpc.bennington.vt.us

Central Vermont Regional Planning Commission

29 Main Street, Suite 4
Montpelier, VT 05602
Phone: 229-0389
www.central-vt.com/cvrpc

Chittenden County Regional Planning Commission

30 Kimball Avenue, Suite 206,
South Burlington, VT 05403
Essex Junction, VT 05453
Phone: 846-4490
www.ccrpcvt.org

Lamoille County Regional Planning Commission

Tegu Building, 43 Portland Street
P.O. Box 1009
Morrisville, VT 05661-1009
Phone: 888-4548
www.lcpvt.org

Northwest Regional Planning Commission

155 Lake Street
St. Albans, VT 05478
Phone: 524-5958
www.nrpcvt.com

Rutland Regional Planning Commission

67 Merchants Row - Opera House
P.O. Box 965
Rutland, VT 05702
Phone: 775-0871
www.rutlandrpc.org

Southern Windsor County Regional Planning Commission

The Ascutney Professional Building
P.O. Box 320
Ascutney, VT 05030
Phone: 674-9201
www.swcrpc.org

Two Rivers-Ottauquechee Regional Commission

3117 Rose Hill
The King Farm
Woodstock, VT 05091
Phone: 457-3188
www.trorc.org

Upper Valley Lake Sunapee Regional Planning Commission

30 Bank Street
Lebanon, NH 03766-1756
Phone: 603-448-1680
www.uvlsrc.org

Windham Regional Planning and Development Commission

139 Main Street, Suite 505
Brattleboro, VT 05301
Phone: 257-4547
www.rpc.windham.vt.us

US DEPARTMENT OF AGRICULTURE – NATURAL RESOURCES CONSERVATION SERVICE

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

Bennington Field Office

310 Main Street
P.O. Box 505
Bennington, VT 05201
Phone: 442-2275

Berlin Field Office

617 Comstock Road, Suite 1
Berlin, VT 05602
Phone: 828-4493

Brattleboro Field Office

28 Vernon Street, Suite 330
Brattleboro, VT 05302
Phone: 254-9766

Middlebury Field Office

68 Catamount Park, Suite B
Middlebury, VT 05753
Phone: 388-6748

Morrisville Field Office

109 Professional Drive, Suite 2
Morrisville, VT 05661
Phone: 888-4935

Newport Field Office

59 Waterfront Plaza, Suite 12
Newport, VT 05855
Phone: 334-6090

Rutland Field Office

170 So. Main Street, Suite 6
Rutland, VT 05701
Phone: 775-8034

St. Albans Field Office

27 Fisher Pond Road, Suite 1
St. Albans, VT 05478
Phone: 527-1296

St. Johnsbury Field Office

1153 Main Street, Suite 2
St. Johnsbury, VT 05819
Phone: 748-2641

White River Junction Field Office

28 Farmvu Drive
White River Junction, VT 05001
Phone: 295-7942

Williston Field Office

1193 South Brownell Road, Suite 35
Williston, VT 05495
Phone: 865-7895

OTHER ORGANIZATIONS

American Groundwater Trust

www.agwt.org

American Water Works Association

www.awwa.org

The Groundwater Foundation

www.groundwater.org

Groundwater Protection Council

www.gwpc.org

National Ground Water Association

www.ngwa.org

**New England Interstate Water
Pollution Control Commission**

<http://www.neiwpcc.org/>

New England Water Works Association

www.newwa.org

**Northeastern Vermont Development
Association**

<http://www.nvda.net>

RCAP Solutions

<http://www.rhircap.org/>

**U.S. EPA, New England
Drinking Water Program**

<http://www.epa.gov/region1/eco/drinkwater/index.html>

U.S. Geological Survey

<http://vt.water.usgs.gov/>

Vermont Rural Water Association

www.vtruralwater.org

Water Systems Council

www.watersystemscouncil.org



The following model ordinance is designed to be incorporated, as an overlay zone, into an existing zoning bylaw. An overlay zone functions within a zoning ordinance as a separate district that is placed over an existing district. The standards of the overlay zone do not exempt an applicant from meeting the standards of the underlying zone.

As the characteristics of all Source Protection Areas and all towns vary, it is recommended that municipalities consult with the Water Supply Division in tailoring this model ordinance to fit their specific needs.

A version of this model ordinance can be downloaded from <http://www.vermontdrinkingwater.org/swapp.htm>

GROUNDWATER PROTECTION OVERLAY DISTRICT

A. TITLE

This bylaw shall be known as the Groundwater Protection Overlay District Bylaw of the Town of _____ (“GPOD Bylaw”). This bylaw is in addition to other districts already established through the Town of _____ Zoning Ordinance.

B. PURPOSE AND INTENT

The Town of _____ recognizes that many residents rely on groundwater for their safe drinking water supply, and that certain land uses can contaminate groundwater, particularly in shallow/surficial aquifers, or where contaminants can get into a bedrock aquifer. To ensure the protection of these drinking water supplies, this bylaw establishes a zoning overlay district to be known as the Groundwater Protection Overlay District (GPOD).

The purpose of the GPOD is to protect public health and safety by minimizing contamination of vulnerable aquifers and preserving and protecting existing and potential sources of drinking water supplies. It is the intent of the Town of _____ to accomplish this through the adoption of this GPOD. The GPOD allows for appropriate land use regulations, in addition to those currently imposed by existing zoning districts or other state and federal regulations. It is intended that public education and cooperation will complement this effort.

The GPOD is superimposed on all (or specific) current zoning districts and shall apply to all new construction, reconstruction, or expansion of existing buildings and new or

expanded uses. Applicable activities/uses allowed in a portion of one of the underlying zoning districts that fall within the GPOD must additionally comply with the requirements of this district. Uses prohibited in the underlying zoning districts shall not be permitted in the GPOD.

C. AUTHORITY

1. This bylaw has been prepared and adopted pursuant to the provisions of 24 V.S.A. Chapter 117 (§ 4414(2)), known as the Vermont Municipal and Regional Planning and Development Act.
2. Pursuant to 24 V.S.A. Chapter 117, the [Zoning Board of Adjustment/Development Review Board] of the Town of _____ is authorized to review, approve, conditionally approve, and deny applications for land development, including sketch, preliminary and final plans, and installation. Pursuant to 24 V.S.A. § 4440(d) the [Board] is authorized to hire qualified persons to conduct an independent technical review of applications and to require the applicant to pay for all reasonable costs thereof.

D. DEFINITIONS

For the purposes of this section, the following terms are defined below:

1. **Aquifer.** A geological formation, group of formations or part of a formation either composed of unconsolidated rock, sand, gravel, or other unconsolidated soils, or composed of bedrock with an interconnected series of crevasses, fractures, joints, faults, cleavages, bedding planes, porosity, or other geologic features which allow groundwater to move in the subsurface environment and are capable of storing and yielding groundwater to wells and springs.
2. **Contamination.** An impairment of water quality by chemicals, biologic organisms, or other extraneous matter whether or not it affects the potential or intended beneficial use of water.
3. **Land Development.** The division of a parcel into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or other structure, or of any mining, excavation or landfill, and any change in the use of any building or other structure, or land, or extension of use of land.
4. **Facility.** Something that is built, installed, or established for a particular purpose.
5. **Gray Water.** All domestic wastewater except toilet discharge water.
6. **Groundwater.** Water below the land surface in a zone of saturation.
7. **Groundwater Protection Overlay District.** A zoning district that is superimposed on all underlying zoning districts in the Town of _____. It includes all lands that are included in the definitions of Zones A and B of the GPOD, and is included

in the Official Map of the Town of _____. This district may include specifically designated recharge areas that collect precipitation or surface water and carry it to aquifers.

8. **Hazardous Material** means all petroleum and toxic, corrosive or other chemicals and related sludge included in any of the following:
 - (A) any substance defined in section 101(14) of the federal Comprehensive Environmental Response, Compensation and Liability Act of 1980;
 - (B) petroleum, including crude oil or any fraction thereof; or
 - (C) hazardous wastes, as determined under subdivision (9) of this section;
 - (1) “Hazardous material” does not include herbicides and pesticides when applied consistent with good practice conducted in conformity with federal, state and local laws and regulations and according to manufacturer’s instructions.
 - (2) “Hazardous material” does not include livestock wastes.
9. **Hazardous Waste.** Any waste or combination of wastes of a solid, liquid, contained gaseous, or semi-solid form, including, but not limited to those which are toxic, corrosive, ignitable, reactive, strong sensitizers, or which generate pressure through decomposition, heat or other means, which in the judgment of the Secretary of the Vermont Agency of Natural Resources may cause, or contribute to, an increase in the mortality or an increase in serious irreversible or incapacitating reversible illness, taking into account the toxicity of such waste, its persistence and degradability in nature, and its potential for assimilation, or concentration in tissue, and other factors that may otherwise cause or contribute to adverse acute or chronic effects on the health of persons or other living organisms, or any matter which may have an unusually destructive effect on water quality if discharged to ground or surface waters of the state. All special nuclear, source, or by-product material, as defined by the Atomic Energy Act of 1954 and amendments thereto, codified in 42 U.S.C. § 2014, is specifically excluded from this definition. The storage and handling of livestock wastes and by-products are specifically excluded from this definition.
10. **Primary Containment Facility.** A tank, pit, container, pipe or vessel of first containment of a liquid or chemical, excluding the storage and handling of livestock wastes and by-products.
11. **Public Water Supply.** Any system or combination of systems owned or controlled by a person, that provides drinking water through pipes or other constructed conveyances to the public and that has at least 15 service connections or serves an average of at least 25 individuals daily for at least 60 days out of the year. Such term includes all collection, treatment, storage and distribution facilities under the control of the water supplier and used primarily in connection with such system, and any collection or pretreatment storage facilities not under such control that are used primarily in connection with such system. This also includes any water supply system with ten or more residential connections.
12. **Release.** Any unplanned or improper discharge, leak, or spill of a potential contaminant including a hazardous material and/or hazardous waste, excluding the storage and handling of livestock wastes and by-products.

13. **Secondary Containment Facility.** A second tank, catchment pit, pipe, or vessel that limits and contains a hazardous material or hazardous waste leaking or leaching from a primary containment area; monitoring and recovery are required excluding the storage and handling of livestock wastes and by-products.
14. **Spill Response Plans.** Detailed plans for control, re-containment, recovery and clean up of hazardous material and/or hazardous waste releases, such as during fires or equipment failures.
15. **Stormwater Treatment Practice (STP).** A stormwater treatment practice that is a specific device or technique designed to provide stormwater qualify treatment and or quality control.
16. **Stormwater Runoff.** Precipitation that does not infiltrate the soil, including material dissolved or suspended in it, but does not include discharges from undisturbed natural terrain or wastes from combined sewer overflows.
17. **Time-Of-Travel Distance.** The distance that groundwater will travel in a specified time. This distance is generally a function of the permeability and slope of the aquifer.

E. ZONES WITHIN THE GROUNDWATER PROTECTION OVERLAY DISTRICT

1. Zone A: Drinking Water Critical Impact Zone.

Zone A is defined as the area within the two-year time-of-travel distance mapped around a public water supply well(s) or around the location designated for a future water supply. *(Note: Zone A is generally equivalent to a public water supply's combined Zone 1 and 2 as identified in their water system's Source Protection Plan. Although this zone may typically include the area within 500 to 1000 feet of a public water supply well, it should not be reduced to less than 200 feet from the supply well.)*

- a. **Permitted Uses:** The following uses are allowed within Zone A provided they meet the appropriate performance standards outlined in Section 2 below and are designed so as to prevent any groundwater contamination.
 - Parks, greenways, or publicly-owned recreational areas such as foot, bicycle and/or horse paths, playgrounds, ball fields and tennis courts.
 - Necessary public drinking water supply related facilities, including the construction, maintenance, repair, and enlargement of source, treatment, storage, pumping, or distribution facilities.
 - Conservation efforts for soil, water, plants, and wildlife.
- b. **Conditional Uses:** The following uses are allowed only under the terms of a conditional use permit and must conform to the provisions of the underlying zoning district and meet the performance standards outlined in Section 2 below. Non-conforming uses may only be expanded to the extent permitted by the

underlying zoning district, and their expansion must conform with the performance standards outlined in Section 2 below.

- Automobile body/repair shop;
 - Gas station;
 - Fleet/trucking/bus terminal;
 - Dry cleaner;
 - Electrical/electronic manufacturing facility;
 - Machine shop;
 - Metal plating/finishing/fabricating facility;
 - Chemical processing/storage facility;
 - Wood preserving/treating facility;
 - Junk/scrap/salvage yard;
 - Mines/gravel pit;
 - Irrigated nursery/greenhouse stock;
 - Proposed land developments which utilize an “enhanced prescriptive” or “performance based” approach for wastewater systems according to the State of Vermont, Environmental Protection Rules effective 1/1/05;
 - Expansion of existing non-conforming uses to the extent allowed by the underlying district. The applicant should consult the local zoning plan to confirm nonconforming uses. The Town of _____ reserves the right to review all applications and shall not grant conditional use approval unless it finds such expansion does not pose greater potential contamination of groundwater than the existing use;
 - Equipment maintenance/fueling areas;
 - Injection wells/dry wells/sumps, except for single-family residences directing gutter downspouts to a drywell;
 - Underground storage tanks, (except septic tanks and those with spill, overflow, and corrosion protection requirements in place);
 - All other facilities involving the collection, handling, manufacture, use, storage, transfer or disposal of any hazardous material or hazardous waste having potentially harmful impact on groundwater quality;
 - All uses not listed as allowed or conditional shall be prohibited.
- c. **Two Year Time of Travel:** Approval of septic disposal systems within the two-year time of travel boundary is prohibited unless it can be demonstrated that the discharge from the septic disposal site is not hydraulically connected to the drinking water aquifer, or that additional information is presented to document that a two-year time of travel is met or exceeded to the existing or potential water supply source.

2. Zone B: Drinking Water Potential Impact Zone.

Zone B is established as the remainder of the GPOD not included in Zone A, but deemed necessary to ensure adequate protection of public drinking water supplies. *(Note: Zone B is generally equivalent to a public water supply's Zone 3 as identified in their water system's Source Protection Plan.)*

- a. **Permitted Uses:** All uses allowed in the underlying zoning districts provided that they can meet the Performance Standards as outlined for the GPOD.
- b. **Conditional uses:** All conditional uses permitted in underlying districts may be approved by the Town of _____ Zoning Board of Adjustment or Development Review Board provided they can meet performance standards outlined for the GPOD.
- c. **Performance Standards:** The following permitting standards shall apply to uses in Zones A and B of the GPOD:
 - Any conditionally permitted facility involving the collection, handling, manufacture, use, storage, transfer or disposal of hazardous material or hazardous wastes must have a secondary containment system that is easily inspected and whose purpose is to intercept any leak or release from the primary containment vessel or structure. Underground tanks or buried pipes carrying such materials must have double walls and inspectable sumps.
 - Open liquid waste ponds containing hazardous material or hazardous wastes will not be permitted without a secondary containment system.
 - Storage of petroleum products in quantities exceeding (___) gallons at one locality in one tank or series of tanks must be in elevated tanks; such tanks must have a secondary containment system as noted above.
 - All permitted facilities must adhere to appropriate federal and state standards for storage, handling and disposal of any hazardous material or hazardous waste.
 - All conditionally permitted facilities must prepare an acceptable contingency plan for preventing hazardous materials and/or hazardous wastes from contaminating the shallow/surficial aquifer should floods, fire, or other natural catastrophes, equipment failure, or releases occur:
 - (a) All conditionally permitted underground facilities shall include, but not be limited to a monitoring system and secondary standpipe above the 100-year flood control level, for monitoring and recovery. For above-ground conditionally permitted facilities, an impervious dike, above the 100-year flood level and capable of containing 110 percent of the largest volume of storage, will be provided with an overflow recovery catchment area (sump).
 - (b) All conditionally permitted facilities shall include fire fighting plans and procedures, a fire retarding system, and provide for dealing safely with any other health and technical hazards that may be encountered by disaster control personnel in combating fire. Hazards to be considered are pipes, hazardous materials, hazardous wastes, or open flames in the immediate vicinity.
 - (c) For equipment failures, plans for conditionally permitted facilities that use, maintain, store, process or produce hazardous materials and/or hazardous wastes shall include, but not be limited to, below-ground level, removal and replacement of leaking parts, a leak detection system with monitoring,

and an overfill protection system; and above-ground level, liquid and leaching monitoring of primary containment systems, the replacement or repair and cleanup and/or repair of the impervious surface.

- (d) For any other release occurring, the owner and/or operator shall report all incidents involving liquid or chemical material to the Town of _____.

Since it is known that improperly abandoned wells can become a direct conduit for contamination of groundwater by surface water, all abandoned wells shall be properly plugged according to local and state regulations.

3. Liability.

Nothing in this ordinance shall be construed to imply that the Town of _____ has accepted any of an owner/developer's liability if a permitted facility or use contaminates groundwater in any aquifer.

F. DISTRICT BOUNDARY DISPUTES

If the location of the GPOD boundary in relation to a particular parcel is in doubt and the application already requires conditional use approval because of the requirements of the underlying zone, the Town Zoning Administrative Officer, interpreting the municipal zoning bylaw literally, shall inform the applicant whether he/she believes the project is located within the GPOD. If the project would not need conditional use approval based on the requirements of the underlying district, the Zoning Administrative Officer may still determine, based on the official map, that such project is located within the GPOD. Such decision may be appealed to the [Zoning Board of Adjustment/Development Review Board].

The burden of proof shall be upon the owner(s) of the land to demonstrate where the boundaries of the district should be located with respect to their individual parcel(s) of land. If the owner(s) request that the Town of _____ determine more accurately the boundaries of the district with respect to individual parcels of land, the Town may engage a professional engineer, hydrologist, geologist, or soil scientist and charge the owner(s) for the cost of the investigation.

G. ENFORCEMENT AND PENALTIES

1. A violation of this ordinance shall be a civil matter enforced in accordance with the provisions of 24 V.S.A. §§ 4451, 4452 and 4454 or 24 V.S.A. §§ 1974a and 1977, et seq., in the discretion of the zoning administrator. A civil penalty of not more than \$_____ per violation (*Note: may be up to \$100 per violation*) may be imposed for violation of this ordinance. The Zoning Administrative Officer shall issue a notice of alleged violation, which shall include the opportunity to cure the violation within seven days. If it is not cured after seven days, a municipal ticket may be issued

immediately. The Zoning Administrative Officer may institute, in the name of the municipality, any appropriate action seeking an injunction, or other appropriate relief to prevent, restrain, correct, or abate that construction or use. Such action may be initiated in either the Vermont Environmental Court, or in the Vermont Judicial Bureau, as appropriate. Each day that the violation continues shall constitute a separate violation of this ordinance.

H. ENFORCEMENT OFFICIALS

1. The town (village/city) [zoning administrator, constable, police officer, health officer, state police trooper, or county sheriff, other] shall be the designated enforcement officer(s). Said designee(s) shall issue tickets and may be the appearing officer at any hearing.

I. SEVERABILITY.

If any portion of this ordinance is held unconstitutional or invalid by a court of competent jurisdiction, the remainder of this ordinance shall not be affected.

J. EFFECTIVE DATE.

This zoning bylaw shall become effective 21 days after its adoption by the legislative body. (Unless the town has determined to adopt, amend, and repeal zoning bylaws by Australian ballot, in which case, the bylaw shall become effective upon adoption by the voters of the Town of _____.)

This zoning bylaw shall become effective 21 days after it has been adopted by a majority of the Selectboard of the Town of _____ (urban towns only).

Signatures

Date

ADOPTION HISTORY:

1. Agenda item at Planning Commission public hearing held on _____.
2. Agenda item at Selectboard public hearing held on _____.
3. Read and approved at regular Selectboard meeting on _____ and entered in the minutes of that meeting which were approved on _____.
4. Approved by legislative body on _____ OR, if town is a rural town AND it has determined to use Australian ballot to adopt, amend, or repeal zoning bylaws, such vote occurred on _____.
5. Other actions [petitions, etc.]



APPENDIX B Definitions

Activity: Any source or potential source of a contaminant which is detected in or has a reasonable probability of entering groundwater or surface water.

Aquifer: Underground body of saturated earth materials sufficiently permeable to yield useful amounts of groundwater to springs or wells.

Class I Groundwater: Class I groundwater is groundwater that has been classified by the Secretary and approved by the General Assembly and that is suitable for public water supply use; has uniformly excellent character; has no exposure to activities which pose a risk to its current or potential use as a public water supply source; and is in use as a public water supply source, or is determined by the Secretary to have a high probability for such use.

Class II Groundwater: Class II groundwater is groundwater that has been classified by the Secretary and that is suitable for public water supply use; has uniformly excellent character; is exposed to activities which may pose a risk to its current or potential use as a public water supply source; and is in use as a public water supply source, or is determined by the Secretary to have a high probability for such use.

Class III Groundwater: Class III groundwater is suitable as a source of water for individual domestic water supply, irrigation, agricultural use, and general industrial and commercial use.

Class IV Groundwater: Class IV groundwater is defined as not suitable for as a source of potable water but suitable for some agricultural and commercial use.

Community Water System: A Community Public Water System could be a municipality, mobile home park, condominium complex, retirement community, or any water system which serves at least 25 residents year round or has at least 15 service connections.

Groundwater: Water below the land surface.

Groundwater Protection Rule and Strategy: The statute directs the Secretary to protect groundwater through existing regulatory programs and by the adoption of a strategy to assist in coordinating groundwater management statewide.

Hazardous Material: Any material, or combination of materials, determined to have a harmful effect on water quality, human life or other living organisms.

Methyl-*tert*-Butyl-Ether (MtBE): A gasoline additive which, at low levels, may make drinking water supplies undrinkable.

Land Trust: A land trust is a private, non-profit organization created to protect and preserve significant areas by acquiring property and conservation restrictions. Its purposes include long-term monitoring of the properties and agreements. Most land trusts get 501(c)(3) tax-exempt status in order to offer tax incentives to their donors.

Non-potable Water: Water which is not of sufficient quality to be consumed.

Non-Transient, Non-Community (NTNC): An NTNC Public Water System could be a school, factory, or office building with its own source of drinking water which

serves at least 25 of the same people more than six months per year.

Potable Water: Water of sufficient quality to be consumed.

Potential Source of Contamination: A facility or activity that stores, uses or produces chemicals or elements and that has the potential to release contaminants within a source protection area and in an amount that could threaten a water supply.

Public Water Supply: Any water supply system with fifteen or more connections or that serves at least 25 individuals daily at least 60 days per year.

Recharge Area: The land area in which precipitation recharges a given spring or well. The recharge area is generally the same as the Well Head Protection Area (WHPA).

Solid Waste: Any discarded garbage, refuse, septage, liquid or semi-solid material resulting from industrial, commercial or residential activity that has been collected, transported, stored, treated, disposed, recovered or reused.

Source Water Assessment Program (SWAP): A component of the Safe Drinking Water Act of 1996 that requires sources of drinking water be identified and recharge areas mapped, potential sources of contamination within the recharge area identified, susceptibility to contamination determined and the risks ranked, and the information supplied to the public. Vermont implements this program through the Vermont Source Protection Program.

Source Protection Area (SPA) or Source Water Protection Area (SWPA): An area delineated around a ground or surface water supply in which contaminants are reasonably likely to move. These areas were previously referred to as Well Head Protection Areas (WHPAs).

Source Protection Program: The process used by water suppliers in Vermont to identify risks to their water systems and identify ways to manage them. This includes delineation of the source protection area, inventory of potential sources of contamination, assessment of the risk posed by these potential sources of contamination, a management plan and a contingency plan in the event of a short or long term water loss.

Transient, Non-community (TNC) Water System: A TNC Public Water System supplies a restaurant, motel, gas station, or campground and serves 25 or more people a day more than 60 days a year.

Vermont Water Supply Rule: This rule applies to all water supplies in the state, including public water systems, bottled water systems, non-public systems, and privately owned water sources. The rule's primary purpose is to regulate water systems in the state so that they provide clean and safe drinking water to Vermont citizens.

Water Table: The upper surface of the groundwater below which the ground is saturated.

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For any information related to protecting groundwater in Vermont contact:

Water Supply Division

Vermont Department of Environmental Conservation

Agency of Natural Resources

103 South Main Street, Old Pantry Building

Waterbury, VT 05671-0403

Phone: (802) 241-3400

Toll-free in Vermont: (800) 823-6500

www.vermontdrinkingwater.org