PART IV: GROUNDWATER ASSESSMENT

Groundwater Importance

Groundwater is vital to the livelihood of Vermont's residents. Although Lake Champlain supplies potable water to approximately 19% of the population, the majority of drinking water is supplied from groundwater sources. Furthermore, groundwater is used to support a variety of commercial, industrial, and agricultural activities, including ski resorts and family farms.

How Good is It?

The quality and quantity of groundwater varies due to both natural and human influences. No comprehensive studies have been completed on the quality of the resource. A limited number of public water supplies have detected contamination from anthropogenic sources. The annual report on drinking water quality violations is available on the Water Supply Division's website at http://www.vermontdrinkingwater.org. Although Vermont's historically rural landscape has precluded large-scale contamination of groundwater, nearly 2,500 contaminated sites have been identified which threaten Vermont's groundwater (refer to the figure on the following page). As Vermont's population and industrial development increase, the quality and quantity of the resource will be threatened further unless it is properly protected.

Recently, there has been an increase in concern and awareness of risks to drinking water safety associated with naturally occurring geologic sources of radionuclides (includes uranium, radium, radon, thorium) found in certain bedrock formations. Exposure to radionuclides at levels which exceed health standards poses a health risk to water consumers, particularly when that exposure occurs over a long period of time. The Agency of Natural Resources has started a three year effort that will delineate areas prone to radioactive groundwater. Identification of these areas will help achieve three goals: (1) provide warning to people that may currently be consuming groundwater that exceeds health standards; (2) inform public officials of potential consequences from development in these areas; and (3) to identify radioactive-free areas that may be used as alternative groundwater sources.

Closely related to the identification of radionuclide-bearing groundwater areas is the concern over the disposal of drinking water treatment process wastes. Use of softening/ion exchange systems in homes or by water suppliers effectively removes problematic dissolved constituents in water, concentrates those materials and sends them to individual wastewater disposal systems (septic tank solids and leach field effluent). In order to determine the fate, transport and concentration potential of radionuclides discharged to septic systems and leaching fields, the Department will be conducting an evaluation at several residential and very small water treatment units.

Costs of Contamination

Each year, an estimated $5 - 10 million is spent for cleanup of contaminated groundwater at publically and privately funded cleanup sites. Over 75% of the sites are associated with above ground and underground storage tanks (UST). At one site, a leaking UST contaminated 27

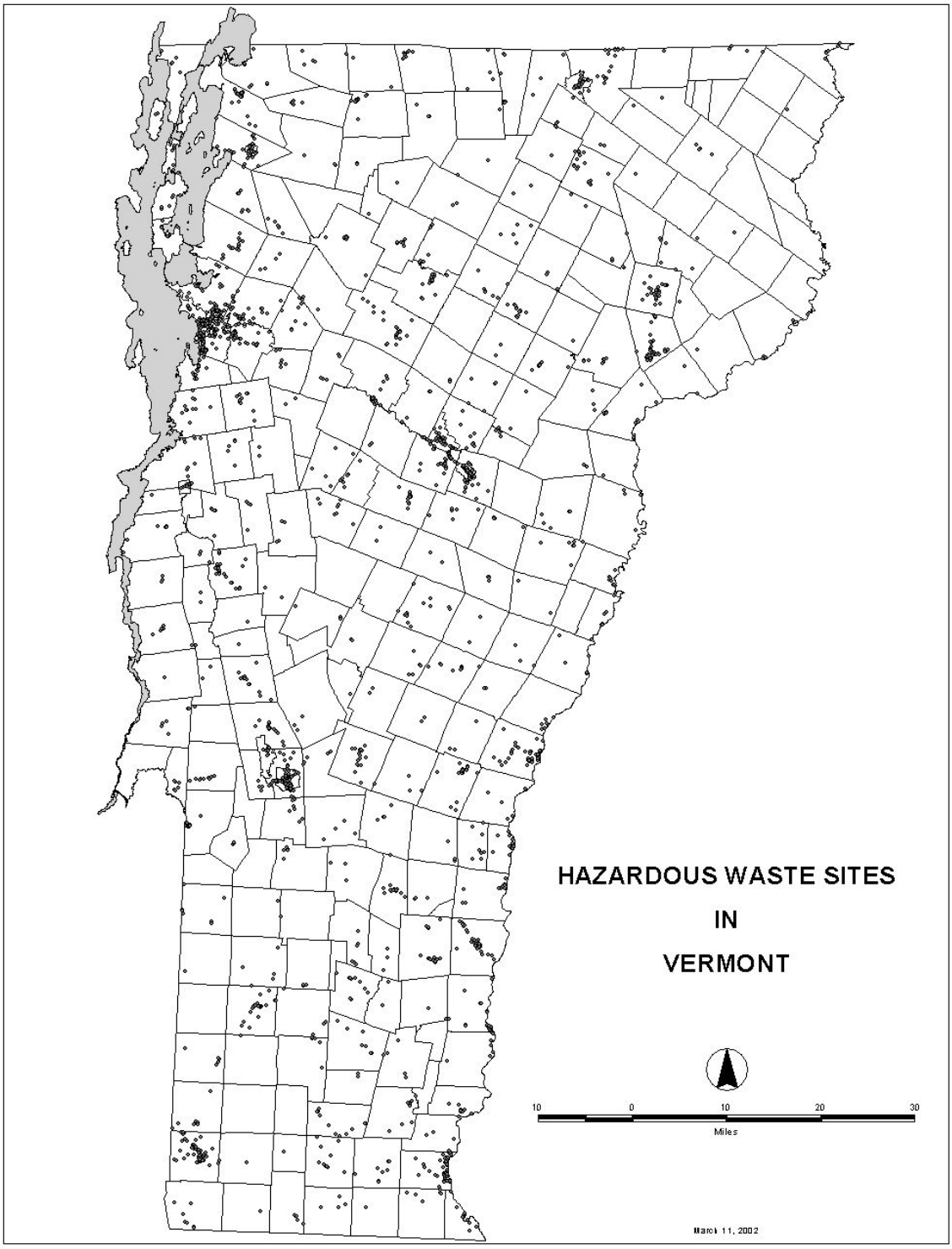

Figure IV.1. Hazardous Waste Site Locations.

private wells and threatens an additional 80 wells.

Several well known examples of contaminated groundwater exist in the state: the *Pine Street Barge Canal* in Burlington, the *Unifirst site* in Williamstown, and *unlined landfills* across the state. Many of these hazardous sites have not only contaminated groundwater, but also private and public drinking water sources. The cleanup of public drinking water supplies is especially costly due to the difficulties in locating groundwater in adequate quantities to serve the community. As an example, the Unifirst Site in Williamstown required the replacement of a public water supply well, extending water lines to several homes served by private wells which were contaminated, and the installation of a groundwater collection and treatment system. The operation and maintenance costs of the collection and treatment system alone totals $75,000 per year. The cost of developing and installing a new groundwater source for a public water supply is estimated between $500,000 and $1,000,000.

Although historic industrial practices have polluted groundwater, other activities, such as improper disposal of household hazardous waste, leaking home heating oil tanks, inappropriate use of pesticides and fertilizers, excessive road salting, and failing septic systems can also lead to groundwater pollution. Many of these problems can be prevented through education and improved management practices.

Efforts to Protect Groundwater

Vermont is working at the state, regional, and local level to protect groundwater. Many communities have local zoning ordinances to protect public drinking water supplies. The majority of Public Community Water Systems have plans in place to protect their water sources. The twelve Regional Planning Commissions are working to provide information on groundwater protection to their respective communities. At the state level, the Department administers permit programs designed to protect groundwater and public health, provides education on groundwater issues, and manages the cleanup of contaminated sites. The Vermont Department of Agriculture, Food, and Markets, in cooperation with VDEC, has established Acceptable Agricultural Practice rules to protect groundwater and surface water. The Vermont Agriculture Department also monitors numerous drinking water wells for pesticide and nitrate contamination to protect public health and determine groundwater vulnerability to contamination. Numerous other state agencies, such as the Vermont Department of Health, also provide services to protect groundwater and public health. The coordination of many of these activities occurs through the Groundwater Coordinating Committee, an inter-agency organization, which is managed through the Agency of Natural Resources.

Efforts to Protect Drinking Water

As part of the requirements of the Federal Safe Drinking Water Act Amendments of 1996, Vermont is implementing a Source Water Assessment Program (SWAP). Vermont has taken a unique approach of integrating the federal SWAP requirements with the state's long-established Source Water Protection Program. Under the Source Water Protection Program, all Public Community and Non-transient, Non-community Public Water Systems develop a Source Protection Plan. Among other things, the Source Protection Plan identifies actual and potential

sources of contamination. The Source Protection Plan also assesses the risk of these potential sources of contamination in relation to the drinking water source. For Transient, Non-community Public Water Systems, the Water Supply Division of the Department of Environmental Conservation is preparing Source Water Assessments that also include the inventory of potential sources of contamination and the assessment of risk.

The Source Protection Plan information provides a comprehensive look at the anthropogenic threats within each water system's Source Protection Area. These plans can become a vital tools for water systems to use in prioritizing protection activities.