

GROUNDWATER, LAND USE AND MUNICIPAL ZONING
IN RHODE ISLAND

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INTRODUCTION

Public awareness of the need to protect groundwater from toxic chemical contamination has grown as a result of the controversy surrounding the management of hazardous waste. Indeed, the hazardous waste management controversy has catapulted groundwater protection into the national consciousness. In many parts of the country, people are asking, "Is my well contaminated?" or, "Is the water from my town's public water supply really safe?"

This report, which concerns groundwater quality in Rhode Island, cannot claim to answer the questions posed above. Strictly speaking, the report is not a groundwater quality assessment. Rather, it explores the relationship between land use and groundwater quality in some of Rhode Island's major stratified drift aquifers. All of the aquifers the report examines in depth are located in the South County area. Some of these aquifers are already used extensively for public water supply; others have a significant potential to serve as public water supplies as the population of the South County area grows and expands in the coming decades. Regardless of their current use, these aquifers deserve the attention of local and state authorities.

The purpose of this report is to analyze and to provide recommendations concerning land use as it affects groundwater quality in the South County aquifers. Local zoning and state land use decisions can have serious impact on the quality of these aquifers, and it is hoped that the analysis and recommendations contained in the report will help to guide decision making so as to preserve existing groundwater quality and to avoid the kind of land use management that has resulted in groundwater degradation elsewhere in Rhode Island.

While concern over the improper management of hazardous waste as a source of groundwater contamination is responsible for most of the public interest in groundwater protection, the report encompasses a much broader range of groundwater contaminant sources. In addition, the report explains the physical and chemical mechanisms of stratified drift aquifers and the interaction of these mechanisms with groundwater contaminant sources. Some of these contaminant sources, such as road salt storage, have been demonstrated to be responsible for certain instances of groundwater contamination in Rhode Island. Other contaminant sources, such as pesticides, have been shown to cause significant groundwater contamination in other states, and may threaten some of Rhode Island's groundwater aquifers.

Groundwater contamination incidents known to be caused by the improper management of hazardous waste are confined mainly to those caused by dumpsites in northern Rhode Island. Though the South County aquifers appear to have been spared contamination from hazardous waste landfills, it does not follow that they are immune from hazardous-substance contamination. As the report suggests, some groundwater contaminant sources may appear a good deal more innocuous than the awful spectacle of a mismanaged hazardous waste landfill and yet may pose a threat of similar magnitude to groundwater. A broad approach, which accounts for various types of land use, is therefore necessary in order to derive realistic projections regarding the interaction between land use and groundwater quality.

The scope of the report, along with financial considerations and time constraints, ruled out the collection of new data on land use and water quality. While this may represent a shortcoming, the report raises significant issues to which future research might be directed. As such, the report is a valuable first step toward understanding and managing the concomitant problems of land use and groundwater quality.

The report was prepared by Mr. Bruce Hawkins and Ms. Cynthia Vagelos, Brown University student interns, working under the general supervision of Mr. Charles Gauvin, Legal/Institutional/Financial Analyst. Melvin Feldman, Professor of Sociology and Urban Studies at Brown University, served as faculty sponsor and provided copious expert guidance and scholarly advice for the duration of the project. Financial support for the project was provided by the United States Environmental Protection Agency through funds allocated under Section 208 of the Clean Water Act.