

GWPC New Hampshire Demonstration Project: Local Source Water Protection Measures

Final Report

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1.0 Overview

In order to more effectively direct state source water protection programs and to provide support to local source water protection programs, states need to have a complete picture of existing local source water protection measures. The New Hampshire Department of Environmental Services (DES) initiated this project in response to the Ground Water Protection Council's (GWPC's) invitation for proposals to demonstrate cost-effective approaches to developing such data on a statewide basis.

DES's Drinking Water Source Protection Program emphasizes local implementation of source water protection in addition to state-level activities. Prompted by USEPA's annual request for system-specific information on source water protection, DES had developed a fairly complete picture of protection measures implemented by water suppliers. What was missing was information on the extent to which municipal zoning ordinances help protect public water supply sources.

In New Hampshire, municipalities are the primary regulators of land use. This presents a challenge to developing a comprehensive picture of land use regulations. The N.H. Office of Energy and Planning (OEP) maintains a database regarding local land use planning, zoning ordinances, and regulations, and each year surveys municipalities to partially update the database. At DES's request, OEP modified its 2005 survey to include a series of questions concerning local ordinances to protect aquifers, groundwater, stream buffers, and water supply watersheds.

DES then worked with a GWPC contractor to review the relevant local ordinances and regulations identified in the OEP survey. DES then obtained additional zoning maps or data regarding the geographic extent of local zoning districts of interest, digitized or geographically referenced the spatial data to correspond to local ordinances, and identified the extent to which local ordinances provide protection for groundwater sources used by public water systems.

The project consisted of the following tasks:

1. OEP mailed out its annual survey of municipal land use regulations in June 2005. OEP added several source water protection-related items to the survey at DES's request. OEP's survey normally has a response rate of approximately 40 percent.
2. DES followed up the survey from July through early September 2005 to obtain a response rate in excess of 80 percent.

3. NHDES developed a Microsoft Access database, with input from all project participants, to manage data on the provisions of various local ordinances of interest related to source water protection.
4. GWPC hired a contractor who, guided by responses to the OEP survey, obtained copies of the relevant ordinances from the responding towns, reviewed the ordinances, entered data into the database, and began the process of obtaining maps and electronic data regarding the geographic extent of the local protection districts.
5. The contractor completed its work in early June 2006.
6. From June through September 2006, DES reviewed and corrected the contractor's work and completed the task of geo-referencing the data regarding local groundwater, aquifer, and wellhead protection districts (referred to collectively in this report as groundwater protection districts). DES also performed a spatial analysis of the data to determine the extent to which the identified local ordinances provide protection for public water supply sources.
7. DES presented the results of the project, along with a discussion of challenges encountered and lessons learned, at the GWPC Annual Forum in October 2006.
8. Compiling and summarizing data on local ordinances that protect surface water sources and their tributaries, in particular identifying the geographic extent of the relevant protection districts, has proven to be a far more challenging task. This work is still ongoing.

2.0 Results

The project produced the following results:

2.1 Information regarding provisions of local water resources protection ordinances.

For the 80 percent of New Hampshire communities that responded to the OEP survey, the project database includes a summary of the major provisions of their ordinances. (Figures 1 and 2) The following table summarizes the major provisions.

259	Towns and other municipal units in New Hampshire	
134	Have shoreland protection and/or aquifer/groundwater/wellhead protection ordinances identified through the survey	
	113	Shoreland protection ¹
	70	Aquifer/groundwater/wellhead protection
	62	Prohibit some or all six high-risk ² land uses of concern
	54	Prohibit USTs
	52	Require special exceptions for certain land uses
	46	Limit impervious surfaces

¹ The total number of local shoreland ordinances increases to 140 if all "wetland" and "water supply watershed" ordinances are included.

² Six land uses presenting a high risk of groundwater contamination are identified in New Hampshire's Groundwater Protection Act, RSA 485-C: hazardous waste disposal facilities, solid waste landfills, outdoor bulk storage of road salt, junkyards, snow dumps, and wastewater or septage lagoons.

		29	Have environmental performance standards
		14	Have all of the major provisions included in NHDES's model ordinance (BMPs, prohibition of six high-risk uses, and limits on impervious lot coverage)

This information has already been of use to municipalities in water resources protection planning. Specifically, DES has been able to identify communities with particular provisions – UST bans in aquifer protection districts, for example – in response to requests by communities considering similar provisions.

Geo-referencing zoning information adds another dimension to its potential usefulness for local, regional, and state source water protection planning. Now that DES has a statewide GIS coverage of local groundwater protection ordinances, maps can be used to depict, for example, areas where all, some, or none of the six high-risk land uses are prohibited. A GIS user can also click on an area of interest to see a summary of the local aquifer protection provisions. As of late November 2006, the geo-referenced information is only being used internally by DES's Drinking Water Source Protection Program while the geographic information is being verified. Once this process is complete, DES will make the information available to planners statewide.

2.2 Information regarding the extent to which local ordinances provide protection for public water supply sources.

Obtaining this information was the primary aim of the project. Geo-referencing the information on local groundwater protection districts enabled DES to determine the extent to which each wellhead protection area is protected through local ordinances. Table 1 includes a sample of the information produced. Note that the last row represents a well whose wellhead protection area (WHPA) extends into two towns with different provisions in their groundwater protection ordinances.

Table 1

PWSID	% WHPA with BMP Rule Provision	% WHPA with Minimum Lot Size Provision	% WHPA with UST Ban Provision	% WHPA with 6 Land Use Ban Provision	% WHPA Haz Limit Provision
0022010-001	0%	0%	11%	11%	11%
0043040-003	0%	0%	13%	13%	0%
0061010-001	0%	0%	0%	33%	33%
0061010-002	0%	0%	0%	17%	17%
0061010-003	0%	0%	0%	10%	10%
0062010-001	0%	0%	0%	33%	33%
0062050-001	0%	0%	0%	22%	22%
0062050-003	0%	0%	0%	14%	14%
0063020-001	0%	0%	0%	79%	79%
0063020-002	0%	0%	0%	88%	88%

0063030-002	0%	0%	0%	0%	0%
0065020-001	0%	0%	0%	0%	0%
0065020-002	0%	0%	0%	0%	0%
0071010-001	0%	0%	72%	72%	72%
0071020-001	0%	0%	73%	73%	73%
0072070-001	0%	0%	84%	84%	84%
0072070-002	0%	0%	84%	84%	84%
0072080-001	0%	0%	21%	21%	21%
0073030-001	0%	0%	24%	24%	24%
0073030-002	0%	0%	25%	25%	25%
0076040-001	0%	0%	63%	63%	63%
0076070-001	14%	0%	100%	100%	86%

For the purpose of measuring the extent of local source water protection, DES was particularly interested in identifying which wellhead protection areas could be considered at the “initial implementation” stage. Initial implementation is important to state source water protection programs because the U.S. Environmental Protection Agency (EPA) asks states to track the percentage of community systems (or their WHPAs) with initial implementation of source water protection. While EPA provided guidance to the states in defining the term, each state has developed its own definition. According to New Hampshire DES’s definition, any of a number of local protection approaches constitutes initial implementation. In terms of local land use regulations, DES determined that a source could qualify as having initial implementation if at least 50% of its WHPA is in one or more groundwater protection districts with land use restrictions.

Table (2) shows the effect that this criterion has on the number of groundwater sources with initial implementation. The table shows that while DES had already determined that 80 percent of community (C) and non-transient, non-community (NTNC) wells had initial implementation through other approaches such as education programs implemented by water suppliers, this project revealed that 14 percent are protected through local land use restrictions. Because of the overlap between those sources protected with “other local wellhead protection” and those protected with land use restrictions, the total comes to 83 percent.

Table 2

System type (#)	Other Local Wellhead Protection		Land Use Restrictions		Total Sources Protected	
	#	%	#	%	#	%
C sources (1293)	1086	84%	159	12%	1111	86%
NTNC sources (566)	397	70%	94	17%	424	75%
Total (1859)	1483	80%	253	14%	1535	83%

Figure 3 shows the relationship between local groundwater protection districts and wellhead protection areas with other local protection in one region of New Hampshire, where most district boundaries are based on mapped stratified-drift aquifers.

3.0 Project Costs

Table (3) summarizes project costs, through the completion of the spatial analysis of groundwater protection provisions.

Table 3

Project Staff	Hours
Contractor (\$20,000)	400
Program Assistant (survey follow-up)	35
GIS Analyst	300
Planner	215
Project Manager (including 40 hours pre-contract)	110
Total	1060

4.0 Project Management and Technical Issues

The following is an overview of the issues encountered.

1. While following up the contractor's work to obtain data on the geographic extent of local groundwater protection districts, DES discovered that the contractor had mis-classified a number of the ordinances. Specifically, while the contractor identified 70 towns as having such ordinances, DES determined that nine of those towns did not have such ordinances. DES and OEP also discovered an additional nine that did have such ordinances but were not identified as such by the contractor. The latter may have been overlooked by the contractor because they did not respond to the OEP survey.
2. The contract did not budget for enough time for the contractor to ensure accuracy of the data entered into the database, or to ensure accuracy of information about the geographic extent of the districts. DES had to perform these tasks, which proved to be very time-consuming and resulted in some duplication of effort. In the end, DES reviewed the text of all groundwater and shoreland protection ordinances (in this report, this term includes wetland protection ordinances) to determine accuracy of data regarding provisions and to ascertain the geographic extent of districts. DES also obtained maps from the towns where available, derived geographic data from available GIS data where possible, and produced and distributed draft maps for town officials to review for accuracy. The duplication of effort might have been avoided if DES had monitored the contractor more closely.
3. In reviewing the language of individual ordinances to determine the intended geographic extent of the districts, DES discovered numerous instances of vague intent or references to obsolete maps or to maps that could not be located, even after consulting with the respective towns. Because of these issues, DES was able to obtain definitive data on the geographic extent of groundwater protection districts in only 62 of the 70 communities with groundwater ordinances. One of the benefits of the project is that it uncovered these

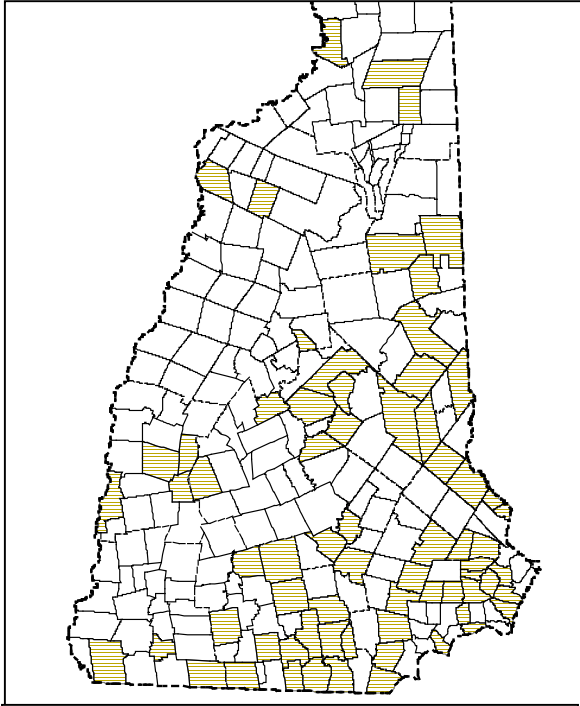
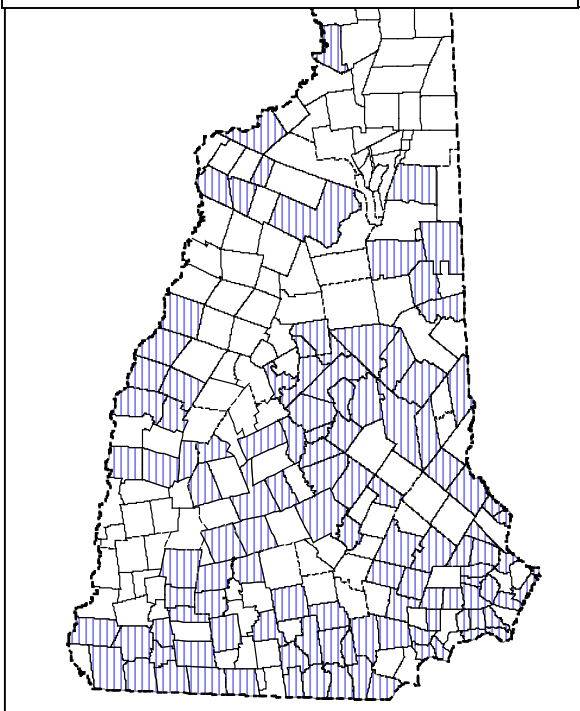


Figure 1 Municipalities with groundwater, aquifer, or wellhead protection ordinances as indicated by the contractor's survey.

Figure 2 Municipalities with shoreland protection ordinances as indicated by the contractor's survey.



issues. DES is providing revised guidance regarding groundwater protection zoning to help communities address these issues.

4. With respect to shoreland protection ordinances, the contractor had difficulty consistently applying DES's working distinction between setbacks (distance between a land use and a protected natural feature) and buffers (an area where clearing or removal of vegetation is restricted to protect a natural feature). Some local ordinances misused these terms, either referring to a setback when in fact it was a buffer, or vice-versa. In order to confirm the contractor's database entries, DES needed to develop more specific working definitions of the various categories of protection in its database. Some of these categories are "undisturbed buffer" and "limited-use buffer."
5. As with the groundwater ordinances, DES's ongoing work to develop data on the areas affected by the shoreland protection ordinances is complicated by ordinances' reliance on terms that are not clearly defined, particularly "wetland."

