

3. PCS Inventory & Threat Assessment

Active Public Water Systems in New Boston

A total of 18 active water wells are currently operating within the Town of New Boston (see the Well Summary Report provided in Section 6). Eleven of the wells are sources of water for public water systems as defined by NH DES. Five of the remaining are town/government owned, one is the public library and the remaining one is a restaurant. The eleven wells identified by NH DES are split into the following groups:

- **Community Systems:** a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents;
- **Non-Transient/Non-Community Systems:** a public water system designed to serve at least 25 people, for at least 6 months per year. Examples include day care, schools, and commercial property: and
- **Transient/Non-Community Systems:** a public water system designed to serve at least 25 people, for at least 60 days per year. Examples include restaurants, campgrounds, motels, recreational areas and service stations.

Of the public water systems identified in this Plan, 11 of these water supply systems are located within 9 water systems that have been identified on the NH DES in the Source Water Assessment Report prepared for the Town of New Boston (see Appendix C). These systems include: four (4) non-transient, non-community wells and seven (7) transient wells. There are no community wells located in New Boston.

In addition to the 11 systems identified by NH DES in the Sourcewater Assessment Report, the Town of New Boston's Source Water Protection Advisory Committee has identified six additional water systems which have been included in this Plan. These six additional wells are town/government owned and do not, by definition (found in Appendix A), count as a public water supply well. However, they do serve the employees working in these buildings and the buildings are host to meetings and functions, so as a result, were included in this Plan. These wells include:

- 1) Town Hall (shared with fire station)
- 2) Library/Community Church (same well)
- 3) Damien's Restaurant
- 4) Police Station
- 5) Highway Department
- 6) Transfer Station

All the public water systems were included in this Plan after consultation with the New Boston Source Water Protection Advisory Committee.

Wellhead Protection Areas in New Boston

A total of four wellhead protection areas (WHPAs) are mapped (see Map 1 in Appendix F) for the following public water system wells:

1. New Boston Central School
2. New Boston Library/Community Church
3. Strong Beginnings Day Care
4. New Boston Air Force Station

WHPAs are not delineated for transient, non-community wells under state and federal requirements. These include the following systems.

1. 4-H Fairgrounds
2. Damien's Restaurant
3. Friendly Beaver Campground
4. New Boston Transfer Station
5. New Boston Air Force Station

PCS Inventory and Threat Assessment

A combination of GRANIT and NH DES GIS layers as well as field surveys and aerial photography (orthophotos) were used to identify Known Contamination Sources (KCS) and Potential Contamination Sources (PCS) found within each of the 4 wellhead protection areas identified in this Plan. The wellhead protection areas are designated on the maps in Appendix F. In addition, the SNHPC conducted field reconnaissance in March 2007 at each wellhead site and utilized the knowledge of Town officials to locate each well and gather data on them. The boundaries of all four WHPAs and the site locations of each identified PCS and KCS are shown on the maps provided in the appendix.

The location of KCSs in New Boston is provided through the NH DES One Stop web data base. In conducting the PCS Inventory, the SNHPC utilized DES's Fact Sheet WD-WSEB-12-3 (which is depicted in Table 1) as a guide for conducting the field inventory and identifying Potential Contamination Sources.

Many of the land use activities and/or facilities identified in Table 1 typically use, produce, handle, or store regulated substances which, if improperly managed, could find their way to a source of public drinking water. However, a release or discharge to groundwater may never occur from a PCS provided the facility is employing Best Management Practices (BMPs) as required currently under State Rule ENV-Wq-401 (BMPs for Groundwater Protection) for all regulated substances in regulated containers. While the table examples of PCSs, a PCS may include any activity that poses a risk to human health or the environment.

Table 1: NH DES List of Potential Contamination Sources

Potential Contamination Sources (PCS)		
Vehicle Service and Repair Shops	General Service and Repair Shops	Metal Working Shops
Salt storage and use	Snow Dumps	Storm water infiltration ponds or leaching catch basins
Manufacturing Facilities	Underground or above ground storage tanks	Cleaning Services
Waste and scrap processing and storage	Food Processing Plants	Transportation Corridors
Septic Systems (at Commercial and Industrial Facilities)	Laboratories and certain professional offices (medical, dental, veterinary)	Use of agricultural chemicals
Fueling and maintenance of earth moving equipment	Concrete, asphalt, and tar manufacture	Cemeteries
Hazardous Waste Facilities		

(Source: NH DES WD-WSEB-12-3)

Vulnerability Assessment

As described in the Planning Approach and Methodology section of this Plan, a threat and vulnerability assessment of each PCS and KCS was conducted. All of the threats found as a result of the PCS Inventory are summarized in Table 2 and are shown on the maps in Appendix F. The threats identified within the WHPA of each public water system are ranked as either “low”, “medium” or “high” based upon SNHPC’s best field judgment. This decision-making process includes, as applicable, consideration of the vulnerability rankings found within the NH DES Assessment of Public Water Supply Sources (Appendix C).

DES vulnerability rankings apply to the existence, relative proximity and density of certain land uses in relationship to the public water system including: lagoons, animals, agricultural and urban land cover, septic systems, pesticides, highways and railroad lines, and known chemical releases into the ground. The overall size and operation of the activity on the site and what impact the land use could have within the WHPA as well as the character of the surrounding physical terrain was also considered by SNHPC in assigning the vulnerability ranking. Additional information was obtained through contact with landowners and operators of each active public water system.

Table 2: PCSs Located Within Wellhead Protection Areas

Map Location	Type of Site	Contamination Source	Threat Level	Use	Zoning	Inside WHPA
1	Agricultural Chemicals	Hazardous Fertilizers	Low	Garden Center	Comm.	Yes
2	Dental Office	Hazardous Substances	Low	Dentist Office	Comm.	No
3	Animals	Animal Waste	Low	Small Horse Farm	Comm.	No
4	Cemetery	Cemetery	Low	Cemetery	RA	No
5	Catch Basins	Source Water	Low	Catch Pool / Standing Water	RA	No
6	Fueling Station	Diesel Fuel / Oil & Chemicals	Medium	Gas Station	Comm.	No
7	Salt Storage	Salt	Medium	Salt Shed	RA	Yes

(Source: SNHPC Field Survey)

Inventory of Wellhead Protection Areas

The location and description of the threats to groundwater are identified within or near the four delineated wellhead protection areas are summarized in Table 2 and described as follows:

PCS #1: The Garden Center is located on Central Square within the Village area. The garden center sells herbicides and fertilizers in bulk. These bags are stored outside over an impervious surface which drains into the nearby Piscataquog River as well as surrounding storm drains that then drain into the river. Because of the proximity of the site to the Piscataquog River; the large quantity of bags stored outside on the property; and because the site is located within the New Boston Central School WHPA; it is considered to present a Low level threat.

PCS #2: New Boston Dental Care is located on NH Routes 136 and 77, or High Street. It is a small practice. While the site is not directly located within a WHPA, it is still located near the New Boston Central School's well and as such it is considered to be a Low level threat.

PCS #3: A small horse farm is located off of High Street. The farm is not located within a WHPA. However, because it is located near the New Boston Central School WHPA, it is considered to be a Low level threat. The farm currently has less than ten animals on the property. The primary threat to groundwater is the storage of animal waste and horse manure. However, based upon the results of the "windshield survey", the storage of this waste appears to be contained within an enclosed building. While animal waste itself is not a regulated substance, it is subject to agricultural Best Management Practices (BMPs) as determined by the NH Department of Agriculture. As a result, it is important that the landowner be

made aware of the need to implement these BMPs to safeguard against improper animal waste storage and runoff.

PCS #4: A large cemetery is located on Cemetery Road. While this cemetery is outside of the nearest WHPA, it is located near the New Boston Central School WHPA. It is only considered to pose a Low level threat as there are currently no commercial applications of herbicides and/or pesticides at the cemetery. Because these chemicals can wash off and seep into the groundwater, the Town should consider testing the soil as necessary to evaluate and control the amount and application of these regulated substances so they do not exceed a safe limit.

PCS #5: At the foot of Cemetery Road are two catch pools. These catch pools are small ponds where water has collected and are located at the bottom of a street and two hills. The pools appear to be the result of snow melt and stormwater run off. The pools are fenced off from farm animals in the area. They have drains in both of them. While these pools are not located within a WHPA, they are considered to be a Low level threat as they have the potential to flood and become a higher threat level. The pools should be tested to see what types of contaminants, if any, may concentrate there. If the pools are a catch basin for road salt, fertilizers, and animal waste then the collected water could be polluting the groundwater in the area. It is recommended that testing be done in these areas on a periodic basis.

PCS #6: The gas station is located at the intersection of River Road and Molly Stark Lane. This site is an auto fueling station and includes a truck storage and above ground oil / fuel facility located across the street. The fueling pumps at the gas station are located on an impervious surface and the above ground tanks are covered and set in containers. While the gas station and fuel oil storage facility across the street is not located within a WHPA, it should be considered a Medium level threat to groundwater because of the amount of regulated substances stored on site, including both underground and above ground storage tanks.

PCS #7: On Depot Street is a small sized salt storage shed. It is within the New Boston Central School WHPA. The shed is on an impervious ground and is covered with a roof and three walls. It does not appear to be a high traffic shed or frequently used supply. There are no known releases into the ground and it has no contaminated water supplies. Because of these reasons, this salt shed is considered to present a Medium level threat.

Maintaining Best Management Practices

Many of the above identified sites should be monitored so that they remain a low risk for becoming a contamination source to the Town's groundwater. This can be done by conducting Best Management Practice (BMP) Compliance Surveys. These surveys, established by NH DES, are routinely conducted on commercial sites that store over five gallons of a regulated substance.

The BMP Compliance Surveys reflect a set of standards regarding how regulated substances must be stored, transported, labeled, and protected in accordance with Env-Wq 401 (NH DES Administrative Rule). These standards help to minimize release of regulated substances that can contaminate groundwater. If a site is not able to meet the standards within Env-Wq 401, the site owner or representative must correct the deficiency and make improvements.

A total of three BMP Compliance Surveys were conducted in New Boston as part of the preparation of this plan. The surveys were completed at the Highway Department, the Transfer Station, and the New Boston Air Force Station by SNHPC staff and/or members of the Town's Source Water Protection Advisory Committee. Each site met all of the BMP Compliance Survey standards and no infractions were identified. At all of the sites, the storage and transport of regulated substances met the regulatory standards for the BMP Compliance Surveys. More information about the Best Management Practice (BMP) Compliance Survey can be obtained from NH DES and copies of the completed surveys for each of the three sites surveyed in New Boston can be obtained from the New Boston Planning Department.¹⁰

For the PCS sites identified in Table 2 as presenting Medium threats to groundwater (identified as Map Location #6 – Fueling Station and Map Location #7 – Salt Storage Shed), it is recommended that the Town of New Boston consider conducting BMP Compliance Surveys at these sites on a regular basis. These surveys would ensure that all regulated substances are safely stored, labeled adequately, and handling procedures are correct and safe. The Town's Building Inspector, Code Enforcement or Health Officer can readily be trained by NH DES to perform these surveys.

Village Center

As is common in small New Hampshire towns, the Village Center in New Boston has a much denser housing population than other parts of the community. As a result, there is a higher density of septic systems located within the Village Center than in other areas. While no formal village center septic system study was conducted for this Plan, a special inventory or monitoring program of the condition, proximity and density of septic systems located in this area should be considered by the Town of New Boston. This would help to ensure that these systems are not impacting groundwater and private well water quality. This program could also be used as an opportunity to educate residents in the area of the potential pollution issues that can come with improper septic maintenance.

A Village Center Study would also aid in monitoring the use and disposal of common household chemicals. In the future as the Town continues to grow, the use of pesticides, fertilizers, motor oil, and other chemicals used frequently in daily life could become a threat to the groundwater. With the village center

¹⁰ NH DES BMP Survey Homepage,
<http://des.nh.gov/organization/divisions/water/dwgb/dwspp/bmps/index.htm>

having a higher concentration of houses the amounts of these chemicals would be larger here, making it necessary for them to be monitored.

4. The Need for Aquifer Protection

New Boston's Aquifers

Like many towns in the area, New Boston's primary source of drinking water is supplied by (aquifer) groundwater sources. These groundwater sources include bedrock aquifers (commonly known as deep or artesian aquifers) and stratified drift aquifers (commonly known as sand and gravel aquifers).

Most of the wells drilled in New Boston since the 1970s have been bedrock wells. In comparison to stratified drift wells, bedrock wells are typically deeper, tend to have lower yield, and can have a variety of water quality concerns such as iron, manganese and arsenic.

Stratified drift aquifers are composed of coarse to fine consolidated glacial meltwater deposits and are typically found adjacent to or within the basins of major streams and rivers. In many municipalities these aquifers have been the principal high yielding aquifers for community water system wells. Stratified drift aquifers also are a valuable commodity providing coarse aggregate material used for construction.

In 1990 and 1995, the U.S. Geological Survey (USGS) produced two significant groundwater studies which apply to the Town of New Boston. These studies are available at the following site: [USGS Groundwater Studies](#) and are referred to as:

“Geohydrology and Water Quality of Stratified-Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern New Hampshire” (1990);

“Geohydrology and Water Quality of Stratified-Drift Aquifers in the Middle Merrimack River Basin, South-Central New Hampshire” (1995).

These two aquifer studies identified the more productive aquifers in New Boston as the stratified-drift aquifers. The Middle Branch Piscataquog River Aquifer is one of the highest yielding aquifers within New Boston. Its saturated thickness exceeds sixty feet in some areas. New Boston's aquifers are associated with the overall drainage system of the Piscataquog River. The Piscataquog River also feeds aquifers for other surrounding towns like Goffstown, Frankestown, and Weare¹¹. Because New Boston's aquifers are fed by and lead into such a major water system, contaminated groundwater could have an impact on much more than New Boston's own wells. It could also impact the overall water quality of the Piscataquog River and the drinking water of surrounding towns.

¹¹ Geohydrology and Water Quality of Stratified-Drift Aquifers in the Middle Merrimack River Basin, South-Central New Hampshire. USGS Geological Survey Water-Resources Investigations Report 92-4192. Joseph D. Ayotte and Kenneth W. Toppin.

While many communities have limited distribution of stratified drift aquifers with varying yields, New Boston is unique as a large percentage of the lands overlying the Town's aquifers have not been developed, thus making these aquifers important sources to accommodate future water needs. The transmissivity, T , of an aquifer is directly proportional to aquifer thickness and provides a fairly realistic measure of how much water can be transmitted horizontally by a pumping well. However, in a generally confined aquifer the water table can fluctuate, which changes the transmissivity of the aquifer.

The most recent Transmissivity Map prepared for the Town of New Boston is shown in Appendix F. These aquifers have been mapped by the USGS as part of the 1995 geohydrology and water quality study of the Merrimack River Basin. This data is available through the Complex Systems Research Center at the University of New Hampshire. As reported by NH DES, municipalities may use this existing USGS technical study and more recent updates or new USGS aquifer mapping as a basis for municipal groundwater and aquifer protection.

As indicated by the transmissivity map, the most prevalent transmissivity level in the Town of New Boston ranges from 0 to 1000 feet squared per day. The highest levels of transmissivity basically follow the Piscataquog River along NH Route 13. Similar levels are also found in the eastern and northwest corners of the Town. Transmissivity levels of 2000 to 4000 can also be found in the center of Town and on the Goffstown and Lyndeborough town lines.

At the present time, the Town of New Boston is fortunate to have an adequate supply of drinking water as a result of these high yielding aquifers. However, as the community continues to grow and develop, it will become increasingly important that these critical resources be protected from risky land uses which have the potential to pollute the Town's primary drinking water supply.

Well-Yield Probability

In addition to this aquifer mapping information, the United States Geological Survey (USGS) completed the following analysis of well-yield probability for the State of New Hampshire (2000 and 2001):

“The Bedrock Study”, in cooperation with the NHDES. (1994 – 2002)

The resulting Well-Yield Probability Map prepared for the Town of New Boston is shown in Appendix F the results of this modeling effort. The well-yield parameters for the study indicate the odds of obtaining 40 gallons per minute or more of water from a 400-foot deep bedrock well as seen in the following map. While this well-yield probability data may be useful for community wide planning purposes (i.e., estimating water probability in future subdivisions), it should not be used by the Town of New Boston as justification for groundwater or aquifer protection regulations.

Conclusions

Actions to provide for aquifer protection within the Town of New Boston should focus on aquifer transmissivity. The data compiled by the USGS and maintained by the Complex Systems Research Center at the University of New Hampshire is the most current aquifer mapping available for New Boston.

The transmissivity map (and any future updates to this map or new aquifer studies prepared for New Boston) should be used to form the basis of the Town of New Boston's aquifer protection overlay district. This map currently provides the most realistic estimate of the approximate location and distribution of the important stratified-drift aquifers located within the community.

New Boston should aim to protect groundwater throughout the community to ensure adequate drinking water quality for all residents. As such, it is critical that both the Town's aquifers and overall groundwater quality be protected to ensure a plentiful supply of public drinking water for current and future generations.