SOURCE PROTECTION PLAN

Gorham Water and Sewer Department (EPA # 0921010)
Gorham Hill Spring (EPA # 0921020)

December 2004

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Review Annually and Update Every 3 Years

Date Reviewed	Reviewer	Changes or Comments

Gorham Source Water Protection Plan

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I. INTRODUCTION

A. Background and Purpose

A Source Protection Plan identifies water system vulnerabilities and enumerates techniques to manage potentially contaminating land uses. This Source Protection Plan covers two public water supplies managed by the Town of Gorham Water and Sewer Department. These systems are located in Coos County, New Hampshire and are in the Upper Androscoggin River Watershed. A Public Water System is defined as "a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year" (Chapter Env-ws 300 NH Drinking Water Rules). The public water systems covered by this plan include: Gorham Water and Sewer Department (EPA # 0921010) and Gorham Hill Spring (EPA # 0921020). This Source Water Protection Plan was developed to protect the quality and quantity of these sources and was prepared by the Gorham Source Water Protection Committee with assistance from Northeast Rural Water Association. The objective of this plan is to identify potential contamination sources that occur within the Source Protection Areas of these two public water supplies and to provide specific recommendations to manage these potential threats in order to maintain quality drinking water. A Source Protection Plan consists of the following basic elements:

- A description of the water system
- An inventory of potential contamination sources (PCS's);
- An assessment of risks posed by these PCS's;
- A management plan to minimize risks to the water source(s); and
- A contingency plan for responding to emergency loss of the water supply.

This plan is a working document that will be reviewed at least annually and updated every three years to remain current, active, and viable. A carefully researched and thoughtfully drafted Source Protection Plan is an important first step in source water protection because it sets priorities for actions to take in protecting a water source. Actions taken by water system management, surrounding landowners, and the larger community are key to achieving comprehensive protection.

B. Description of the Water Systems

Gorham Water and Sewer Department

The Gorham Water and Sewer Department provides domestic water to 1052 service connections for a total average population of 2,630 people. The water system serves the downtown area, Upper Village, and Cascade area of Gorham (Skarinka, 2003b). In general the water system is comprised of 2 raw water impoundments, a slow sand filtration plant, 2 gravel packed wells, 2 atmospheric storage tanks, and associated distribution system. The distribution system is comprised of piping ranging from 2-inch to 12-inch diameter. Pipe materials include cast iron, ductile iron, and galvanized pipe. Between 2003-2006, approximately 5,000 feet of 2-inch galvanized pipe are scheduled for replacement. The water system is fully metered and has backflow devices on all services. Reported water usage is 500,000 gallons per day. Berlin Water Works is a

nearby water system. There is emergency connection capability with Berlin Water Works in the Cascade area. Both the Gorham water system and Berlin Water Works are able to assist each other during an emergency situation.

Watershed Sources

The Gorham Watershed is a timbered tract located in the northeastern corner of Randolph and the northwestern corner of Gorham (Figure 1). As of 1992, this area became known as the Gorham Town Forest. The Town Forest serves as a watershed and has been the primary source of water for the Town of Gorham since 1938. Ice Gulch Brook and Perkins Brook are the two major drainages. Ice Gulch and Perkins Brook flow into two different impoundment systems. There are a multitude of secondary and intermittent streams which feed into Ice Gulch and Perkins Brook, forming a contributory drainage area of approximately five square miles, all within the Town Forest boundaries.

The Ice Gulch subwatershed is located entirely within the Town of Randolph. Ice Gulch has a contributory drainage area of 1.5 square miles and a storage capacity of 475,000 gallons. The estimated yield of this source is 90 gallons per minute (gpm). Raw water flows approximately 2,500 feet from the Ice Gulch impoundment through an 8-inch diameter main to the water treatment plant.

Approximately half of the Perkins Brook subwatershed is located in Randolph and the other half in Gorham. Perkins Brook has a contributory drainage area of 3.5 square miles and a storage capacity of 255,000 gallons. The estimated yield of this impoundment is 225 gpm. Raw water flows approximately 4,000 feet through a 10-inch main from the impoundment at Perkins Brook to the treatment plant.

The Town Forest is one contiguous lot, spanning approximately 2,881 acres in Randolph and 1,114 acres in Gorham for a total of 3,995. The lot is broken into compartments for operational and organizational purposes. There are five compartments located in Randolph and four in the Town of Gorham. Most of the area was obtained from the Brown Co. in 1936 for the purposes of drinking water supply and watershed protection. The sale price was based upon the value of merchantable cords of wood plus a value per acre for land. The total purchase price was $41,531, which was returned to the Town of Gorham as a partial payment of company taxes. Management objectives of the Gorham Town Forest include:

- Protection and management of the watershed for municipal water supply and for maintenance of water yields at present levels.
- Develop periodic income on a long-term, sustained basis to offset local property taxes and provide funding for continued management.
- Maintenance and improvement of wildlife habitat (e.g. deer, moose, bear).
- Provide an outstanding example of town forest management on a municipal watershed.

(Source: Gorham Forest Management Plan, 1990)

The water treatment plant was constructed in 1990. The plant's location at the end of Jimtown Road permits gravity flow to most of the distribution system. The only exception is a small service area near the plant and the Cascade area of Gorham. The total capacity of the plant is 1 million gallons per day (MGD). The plant has three slow sand filters, two of which are currently used. After filtration water is collected and conveyed to a 90,000-gallon clearwell. Sodium hypochlorite is added for disinfection, sodium hydroxide for pH adjustment, and sodium bicarbonate for alkalinity adjustment.

Wet harrow methods are used for cleaning the filter beds. Two 10 HP booster pumps provide pressure for the residential area near the plant. Pressure storage is provided by three 550 gallon hydro-pneumatic tanks. A fire pump is available to provide fire flows to this nearby residential area. Excess water from the treatment plant is discharged into a 2.25 MG storage reservoir located north of Route 2 behind Tilcon Sand and Gravel. The reservoir is a circular steel tank with a poly-clad flexible cover. The cover is approximately 6 years old.

During excessive rain or spring thaw event, the reservoirs and dams are monitored twice daily. If the dam overflow becomes excessive, drain gates are opened to relieve the over flow at the crest of the dam structure. The intake gate to the Water Treatment Plant is then closed due to a turbid water situation. This procedure remains in place until the water level subsides. Under normal conditions (except when the roads are closed during the winter) dams are inspected daily by Water & Sewer Department personnel.

Semi-annually both abutment areas are inspected for any bushes and trees that have taken root. If vegetation is found it is removed. All eroded areas at the abutments are repaired by the addition of loam and seeded with ryegrass. Periodically, wildlife such as beaver have been found near the reservoirs. The last beaver sighting was approximately 5 years ago. The animal was removed from the site.

Town Wells

Gravel packed well #1 is located off of Bellevue Road, and southeast of the Gorham airport strip (Figure 2). This well is listed as inactive in the NH DES database and serves as an emergency back-up source. If the Department chooses to reactivate this well, it must contact NH DES staff to discuss the proposal and review the regulatory requirements. This well has an estimated capacity of 200 gpm (Skarinka, 2003b). As of 2002, a new building was constructed over the existing well #1.

Gravel packed well #2 is located approximately 2,000 feet west along Bellevue Road and northwest of an airstrip. Well #2 was constructed in 1976 and has an estimated capacity of 550 gpm. The well is located in a single story brick building that houses a vertical turbine pump and motor, associated valves, flow meter, and chemical feed system. The chemical feed system is flow paced off of the flow meter. Sodium hypochlorite is added for disinfection and sodium hydroxide is added for pH adjustment. The well has a generator that utilizes diesel fuel stored in a 550 gallon steel tank which has 100% containment. Well #2 is used when the surface water sources are offline or during drought conditions that typically occur during July and August.

The distribution system for the wells is comprised of three pressure zones. The primary pressure zone is gravity fed by the water treatment plant. The distribution main extends north along Route 16 to the Cascade area of Gorham. A booster station pumps water to a 100,000-gallon concrete tank located off First Street. This booster station and tank serve approximately 68 service connections. The booster station contains two 10 HP centrifugal pumps, and associated piping and valves. A float level in the tank activates the booster pumps.

Gorham Hill Spring

Gorham Hill Spring system is located in the Town of Randolph and managed by the Gorham Water & Sewer Department (Figure 3). The system provides domestic water and fire service to approximately 22 service connections and serves an estimated population of 55 people. The water system serves the residential population of the Gorham Hill area. The source is located 800 feet east of Randolph Hill Road along the

Church Trail in the Town of Randolph. The system develops its water from a spring source and a bedrock well. The spring source was developed sometime after 1940 following a $5,500 appropriation during the 1940 Gorham Town meeting for the purposes of installing a water system at Gorham Hill. The bedrock well was installed in 1992. Originally the bedrock well was meant to serve as a temporary back-up well until the Gorham Hill System could be connected to Gorham's town water system. The Town has made substantial improvements to the Gorham Hill Spring system eliminating the need to connect to the Town water system. Although the two sources are listed in the NH DES database, they are considered blended.

Water from the spring percolates out of the granite bottom of a covered 20,000 gallon reservoir (walls are constructed of concrete and field stone). Excess water in the spring house is discharged through the overflow. Water flows into the spring box, through a 6-inch main into a 60,000 gallon concrete tank which is divided into 2 halves. A chemical feed building houses a flow meter, chemical feed system, and flow control valve. Treatment includes addition of sodium hypochlorite for disinfection, sodium hydroxide for pH adjustment, and sodium bicarbonate for alkalinity adjustment. Treated water from the tank flows cross-country to Route 2 via a 4-inch diameter pipe. Hydrants are used as blow-offs to flush the distribution system. All of the service connections have backflow devices. Water usage is approximately 28,000 gallons per week.

Alpine Springs

Alpine Springs is located between New Hampshire Routes 2 and 16 near the Center of Gorham (Figure 4). The Department no longer develops water from this system. The Department has, however, assessed the feasibility of developing this system as a source for bottled water. Although not currently a public water supply, the Department expressed an interest in including these springs in this source protection plan.

The Alpine Springs system consists of six brick or stone-lined catchments located in naturally occurring springs, a concrete reservoir, and a wooden-pipe distribution system. These springs were originally developed to supply water to the Town of Gorham. Spring #1 appears to have been the primary source for water at the Site due to its relative size and observed discharge (Atlantic Geoscience Corporation, 2001).

Table 1. Summary of source information managed by the Gorham Water and Sewer Department, Gorham New Hampshire.

WSID	Water System Name	Source Name(s)	Type	Yield (gpm)	Depth (ft)	Date Constructed
0921010-003	Watershed	Ice Gulch	Surface Water	90	N/A	1940
0921010-004	Watershed	Perkins Brook	Surface Water	225	N/A	1938
0921010	Town Wells	Well #1 (back-up)	Gravel packed well	200	48	1930s
0921010-002	Town Wells	Well #2	Gravel packed well	550	72	1976
0921020-001	Gorham Hill Spring	Spring	Spring	10-20*	N/A	1940s
	Gorham Hill Spring	Well	Bedrock Well	30	205	1992
	Alpine Springs	Spring #1 Spring #2 Spring #3 Spring #4 Spring #5 Spring #6	Spring	30	N/A	1892

* Depends on seasonal flow.

II. SOURCE PROTECTION AREAS

There are several different types of protective areas associated with drinking water sources. For example, watersheds are delineated to protect surface water supplies. A watershed can be defined as the entire area that drains into a waterbody either through channelized flow or surface runoff.

The area under which groundwater flows to a producing well is known as the Wellhead Protection Area (WHPA). For bedrock wells, the WHPA is a circle whose radius depends on the maximum daily amount of water withdrawn from the well. For till and gravel wells, the WHPA has been calculated based on existing hydrogeologic information.

Another type of protected area is a groundwater source's Sanitary Protective Radius. The Sanitary Protective Radius is a 75 - 400 foot radius around a well which under current law *must* be controlled by the water supplier through ownership or easement. The extent of the Sanitary Protective Radius depends on the permitted production volume for the well (Table 2). To facilitate protection of the drinking water source, it is necessary to know the delineation of the Sanitary Protective Radius and its boundaries on the ground. Within the Sanitary Protective Radius only activities that are both directly related to the water system and non-threatening to water quality should occur. Regular inspections of the Sanitary Protective Radius help to identify any potentially threatening land use activities.

Table 2. Sanitary Protective Radii

Permitted Production Volume (gallons per day)	Radius (feet)
< 14,400	150
14,401-28,800	175
28,801-57,600	200
57,601-86,400	250
86,401-115,200	300
115,201-144,000	350
> 144,000	400

Source: Env-Ws 378.06 Sanitary Protective Area

Within any of the aforementioned protected areas, land uses and/or naturally occurring materials may cause a public water system to be vulnerable to contamination. While naturally occurring contaminants can usually be controlled by treatment methods, potentially contaminating land uses can be managed by activities outlined in a Source Protection Plan. A Source Protection Plan identifies water system vulnerabilities and enumerates techniques to manage potentially contaminating land uses. Following are descriptions of the drinking water sources and their associated protected areas.

Gorham Water & Sewer Department

Watershed

The land now known as the Gorham Town Forest was purchased on October 8, 1936 for the purpose of protecting the Gorham municipal water supply. In addition to water provision, the watershed is valued for its timber resources and recreational values.

The following paragraphs describe the timbering history, associated land use activities, geology, soils and other environmental conditions, and water quality in the watershed.

Watershed Land Use History

The Ice Gulch and Perkins Brook drainage areas span 3,600 acres of the 3,895 acres owned by the Town of Gorham. Under Brown CO. ownership most of the watershed has been timbered (Figure 5). Under Town ownership during the period of 1936-1990, there was only one harvest which took place in 1957. This harvest was located in the Jericho Brook drainage (Gorham Town Forest Management Plan, 1990). The harvest included portions of Lots 1, 2, and 3 in Range 12 to the Randolph –Berlin town line. This area drains northerly into Berlin, not into Gorham's watershed. Over the past 13 years, harvesting has been proposed in a variety of locations (Table 3).

Following the 1998 Ice Storm, the watershed has been logged to salvage severely damaged timber. Most of the harvesting has taken place in the drainage basin for Perkins Brook (Figure 6). Approximately 50% of the hardwood trees in the watershed have sustained 75% or more live crown loss. It is estimated that at least 50% of the live crown is necessary for long term tree recovery (H. Neal, Pers. Comm.). Of the damaged tree area it was estimated that at least 2,500 acres were suitable for harvest due to slope limitations and accessibility (H. Neal, Pers. Comm.).

Since 1990, harvesting activities have occurred in some environmentally sensitive areas. For example during the 1993-1994 season, when harvesting activities occurred in subcompartment V - northwest harvesting occurred above 2,500 feet elevation (with the permission of the Forest Committee). During the 2001-2002 season, harvesting occurred on steep topography with an average slope of 30%. Harvesting along streams not specifically identified, are typically left to the discretion of the forest manager.

Table 3. Summary of proposed/actual harvesting activities from 1990-2004. (Source: Gorham Forest Operating Plans 1991-2004).

Year	Harvest Locations	# of Acres Harvested	# of Harvested Acres in Watershed
Winter 1990-1991	Subcompartment V Southeast	295	0
Winter 1991-1992	Subcompartment V Northwest Subcompartment V Southeast	20 100	20 100
Winter 1992-1993	Subcompartment V Northwest Subcompartment V Southeast	80 80	80 50
Winter 1993-1994	Subcompartment V Northwest Subcompartment V Southeast	80 40	80 35
Winter 1994-1995	Compartment III and IV East	85 90 40 49	85 90 40 49
Winter 1995-1996	Compartment III and IV East	150 5	150 5
Winter 1998-1999	Compartment V	160	110
Summer 1999	Compartment V	40	0
Winter 1999-2000	Compartment IV (Ice Storm Salvage)	165	165
Summer/Fall 2000	Compartments III (Ice Storm Salvage)	40	15
Winter 2000	Compartment IV	200	200
Winter 2001	Compartment III	195 45	195 45
Winter 2002	Compartment III	120	120
Winter 2003	Compartment II	290	290

Recreational Use

Recreational activities in the watershed include hiking, hunting and snowmobiling. These recreational uses have been enjoyed for decades free of charge and are valued by residents of Gorham. Hiking occurs on the Ice Gulch Trail, Hunter's Pass Trail, Forest Trail and various Water Department and private roads. A local snow-mobile club frequents a trail connecting Tinker Brook with the Randolph Area (Gorham Forest Management Plan, 1990). The following activities are not permitted within the watershed boundaries:

- ATV's, motorized trail bikes, motorcycles
- Bear baiting (by permit only)
- Horses
- Camping

- Campfires

Bedrock Geology and Soils

Approximately two thirds of the Ice Gulch drainage and the Perkins Brook drainage are underlain by biotite granite (Figure 7). Biotite granite is described as pink and moderately to weakly foliated. The remaining one third is underlain by granite porphyry. Granite porphyry contains phenocrysts of smoky quartz and microperthite. Alkalic amphibole, hornblende and hedenbergite may also be present.

Soils in the watershed have been mapped and described in detail in the 1990 Gorham Forest Management. Of particular note are the presence of fine sandy loams along the Perkins Brook Tributary (Figure 8). These soils may be susceptible to erosion, during circumstances of increased overland flow.

Watershed Water Quality

The Gorham Water & Sewer system is required to take 3 coliform bacteria samples per month from the distribution system. According to NH DES records, the system has not had a positive coliform detection since 1992. The system has passed at least six rounds of lead and copper sampling. Sources 003, and 004 have a waiver for synthetic organic compounds and volatile organic compounds (received November 2004).

Although the water treatment plant has not had a turbidity violation, turbid water conditions are a concern for the Ice Gulch and Perkins Brook sources. For example, sediments and organic matter are carried by the tributaries and deposited in the reservoirs. These deposits necessitate the cleaning out of Ice Gulch reservoir every two years. Perkins Brook reservoir is cleaned out annually. For more details on turbid conditions in the watershed see Section III Inventory of Potential Sources of Contamination and Assessment of Threats.

Watershed Environmental Zones

In order to protect the tributaries, high elevations, steep slopes, wildlife habitat, and trail corridors, 5 environmental zones were identified in the 1990 Forest Management Plan (Table 4). According to the 1990 plan, streams have buffer zones in which harvesting is prohibited. Major I streams have 300 foot buffers on each side of the stream in which no harvesting activities are permitted. Like wise Major II and Minor II streams have 200 foot buffers. These areas are depicted on Figure 10. It is prohibited to harvest stands on slopes with a grade of 30% or greater, or in areas of elevation above 2,500 feet. In addition, in order to maintain aesthetic values, it is prohibited to harvest within 50 feet of a trail.

Table 4. Watershed zones, associated acreage, and descriptions.

Zone	Area (acres)	Description
Water Protection – Major Streams	112	Harvesting activities are prohibited within 300 feet of Major I streams and 200 feet of Major II streams.
Minor Streams	108	Harvesting activities are prohibited within 200 feet of Minor II streams.
High Elevation	510	Harvesting activities are prohibited above 2,500 feet in elevation.
Steep Slopes	378	Harvesting activities are prohibited on slopes with a grade of 30% (17◦) or greater.
Wildlife Protection	Not Available	In softwood areas adjacent to streams harvesting is prohibited in the first 100 feet of these zones and limited in the second 100 feet.
Visual / Trail Buffers	46	50 foot buffers on either side of trails. Skid trails may cross, however no harvesting may take place. Slash will be removed 25 feet from gravel access roads within the watershed.

(Sources: 1990 Gorham Town Forest Management Plan; 2004 Forest Operating Plan).

Gorham Town Wells

The Town of Gorham owns approximately 57 acres within the WHPA. Each well has a sanitary radius of 400 feet (Figure 11). Land use activities within the WHPA include a small airport, residences, roads, railroad right of way. Previous land use includes a small gravel pit near well #2.

Most of the bedrock in the WHPA is mapped as Littleton Formation consisting of dark gray slate and dark gray sandstone. On the northwestern edge of the WHPA, the area is mapped as Metavolcanic and metasedimentary rocks of the lower part of the Ammononoosuc Volcanics (Figure 7). According to the Soil Survey of Coos County, there are 17 different soil types within the wellhead protection area (Figure 12). Within the sanitary radii, the majority of the area is classified as Sheepscott Cobbly Fine Sandy Loam. This soil has good infiltration characteristics for groundwater development. These same characteristics can make water sources within this area vulnerable to contamination from activities on the land's surface.

The Moose River runs along the northern boundary of the wellhead protection area. The connection between surface water and groundwater can serve as a conduit for contamination. It is therefore important that land use activities be managed to prevent runoff into the river.

A radiological water sample results from October 9, 2003 found Radon 3,600 pCi/L. At this time there is no Maximum Contaminant Level (MCL) for radon. However, EPA and NH DES are in the process of establishing rules. It is likely that NH DES will set the MCL at 300 pCi/L. Treatment is typically aeration. Well #2 has a waiver for volatile organic compounds and synthetic organic compounds (received November 2004).

Gorham Hill Spring

The Gorham Hill Springs system is located on a 10.62 acre parcel owned by the Town of Gorham Water and Sewer Department. The wellhead protection area is a circle

based on the spring location. The radius is 1,500 feet. The spring and well has a combined sanitary radius of 250 feet. Land use activities within the WHPA include residences and roads (Figure 13).

Approximately two thirds of the wellhead protection area is underlain by biotite granite which is pink and moderately to weakly foliated (Figure 14). This rock formed during the Late Ordovician period, roughly 438 millions of years ago. Biotite granitoids are found in mantled gneiss domes. The remaining one third of the wellhead protection area is underlain by metavolcanic and metasedimentary rocks of the lower part of the Ammonoosuc Volcanics. This rock comes from the Middle Ordivician period, developing approximately 460 millions of years ago. There are approximately six soil types within the wellhead protection area. Most of the area is either a sandy loam or fine sandy loam (Figure 15).

Water Quality

The Gorham Hill Spring system is required to take 1 coliform bacteria sample per month from the distribution system. According to NH DES records, the last positive coliform detection was in 1993. NH DES has granted the system a 3-year waiver for volatile organic compound sampling and a 6-year waiver for synthetic organic chemical sampling. The next waiver renewal date is December 14, 2004. Gorham Hill Spring has passed six rounds of lead and copper sampling. The next round of sampling is due in 2005.

Alpine Springs

The site consists of approximately 54 acres of undeveloped woodland owned by the Gorham Water and Sewer Department. Atlantic Geoscience Corporation delineated a recharge area for the springs (AGC, 2001). The recharge area is that portion of the land surface that contributes water, which is ultimately discharged to the springs (Figure 16). Land use activities within this area include woodlands and gravel extraction. The site is accessible to the public and signs of campfires and trash were evident during a visit in July 2004.

III. INVENTORY OF POTENTIAL SOURCES OF CONTAMINATION

In order to assess current and future impacts from land uses in the watershed and wellhead protection areas, past land use was reviewed, existing zoning was determined, and a review of current property owners and their associated land uses was conducted. Windshield surveys were conducted by David Patry (Gorham Superintendent) and Jennifer Palmiotto (NeRWA) during the course of several site visits in 2004.

A. Ice Gulch and Perkins Brook Watersheds

The dual objectives of timber management and water system operations can be compatible. The open space provided by a forested landscape is beneficial to water yield. However, water quality impacts from silvicultural practices can result from road construction, timber harvesting, operation of mechanical equipment and burning. Increased sediment loads, nutrients, and fuel spills are pollutants commonly associated with forestry activities (Table 4). In addition, timber harvest may typically results in removal of vegetation, changes in surface water drainage patterns and loss of habitat.

Soil Erosion/Turbidity

All timber operations involve some level of risk in regards to soil erosion. For example, road construction and road use typically account for 90% of the total sediment runoff from forestry operations (Donlan and McMillan 2004). Roads, ditches, cutbanks, slope failures, debris flows, stream bank erosion and channel scour, and the diversions of streams at road crossings all are potential sources of fine sediment (Castelle, 2000). Erosion control mechanisms are necessary on skid roads, haul roads, and landings. Proper construction and maintenance are critical in order to prevent the filling of wetlands and stream channels by sediments.

The effects of increased sediment loads are various (Table 5). Increased turbidity levels pose a significant risk to public health. Turbid water conditions can mask the presence of pathogens such as *Cryptosporidium*. *Cryptosporidium* (Crypto) is a parasite commonly found in surface waters such as lakes and rivers, especially where animal wastes and sewage are in contact with water resources. Crypto is resistant to chlorine disinfection, causes intestinal disorders in healthy people, and can result in death for immuno-suppressed people. Although the Gorham watershed has no sewage discharges; wildlife, a potential source of Crypto, are present. Even a well-operated water treatment system cannot ensure that drinking water will be completely free of this microorganism. Notable crypto outbreaks occurred in Milwaukee, WI in 1993, and Las Vegas, NV, in 1994. During the Milwaukee outbreak over 400,000 people were effected. No specific source of the cryptosporidium was ever identified in the Milwaukee outbreak, but runoff from abnormally heavy spring rains most likely carried the crypto to the lake from a variety of sources.

Removing vegetation adjacent to streams and tributaries can destabilize banks, resulting in sedimentation. Increased sediments in streams can lead to turbidity problems associated with surface water supplies. For example, increased turbidity has the potential to damage water treatment pumps, reduce reservoir volume, and increase treatment costs. Harvesting trees along a stream bank also reduces shading which helps to regulate streamwater temperatures and oxygen levels for cold water fisheries.

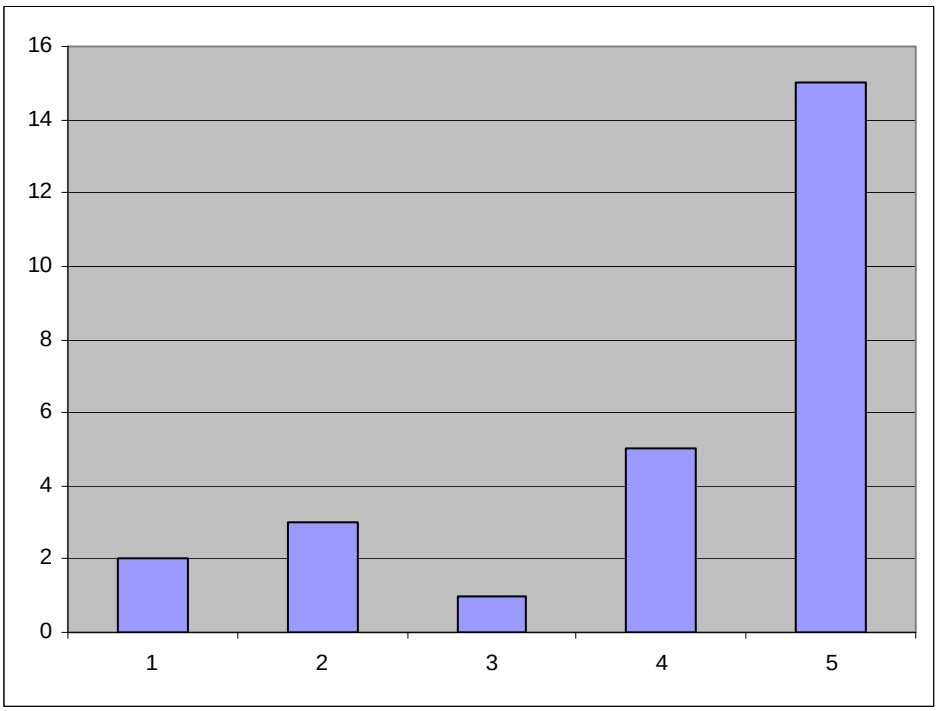
Table 5. Pollutants and impacts associated with typical forestry operations.

Pollutant	Impacts On Fisheries	Impacts on Water Supply	Impacts on Wetlands	Impacts on Recreation
Sediment:	➢ Decreases transmission of light which affects plant production, behavioral activities (nesting, feeding, mating), respiration, digestion, reproduction ➢ Increases surface water temperature decreasing dissolved oxygen concentration in water ➢ Decreases spawning habitat (fills pools and nest sites) ➢ Transports adsorbed contaminants	➢ Damages water treatment pumps, equipment ➢ Increases treatment costs ➢ Reduces reservoir volume ➢ Toxic substances may adhere to sediment ➢ Nutrients increase which stimulates algae growth ➢ Decreases river bottom infiltration which reduces well yields	➢ Reduces flood storage ➢ Increases peak discharges ➢ Alters habitat	➢ Decreases clarity of water (public health and safety) ➢ Reduces aesthetic and recreational value ➢ Reduces sport fishing populations
Phosphous and Nitrogen	➢ Promotes algae blooms which inhibit aquatic plant growth ➢ Favors survival of less desirable species over more desirable (commercial and recreational) species ➢ Reduces dissolved oxygen levels through increased productivity and decays organic matter	➢ Promotes algae blooms which cause odors and poor taste ➢ Increases treatment costs ➢ Increases nitrate concentrations (safe limit is 10 mg/l)	➢ Alters wetland vegetation/habitat	➢ Promotes eutrophication of lakes and rivers ➢ Increases algae growth which may create public health risks ➢ Decreases aesthetic value ➢ Degrades fishing and boating activities ➢ Reduces tourism and property values
Thermal Energy:	➢ reduces vigor and growth of fish ➢ reduces resistance to disease ➢ reduces dissolved oxygen as temperature increases ➢ changes cold water sport fishery to warm water fishery	➢ increased temperature accelerates pump/equipment corrosion ➢ promotes biological activity which produces odors and poor taste ➢ creates a more favorable environment for pathogens		➢ may stimulate growth of algae and aquatic plants which reduces water clarity, aesthetic value, sport fishing populations, tourism
Volatile Organic Chemicals	➢ Fish kills	➢ Disinfection byproducts created ➢ Increase biochemical oxygen demand, leads to oxygen depletion. ➢ Leads to release of iron, manganese, and phosphorus resulting in water quality violations and aesthetic problems	➢ Loss of oxygen, changes aquatic species regimes	➢ Aesthetic concerns

(Adapted from Jeer et al. 1997)

Following significant rain events, Perkins Brook has increasingly experienced turbid conditions. The number of times that the treatment plant had to be shut down due to turbid conditions has increased from 2 times in 1999 to 20 times in 2003 (Figure 17).

Figure 17. Number of times water treatment plant was shutdown due to turbid conditions (1999-2003).



Year Code: 1= 1999, 2=2000, 3=2001, 4=2002, 5=2003

Shutdowns lead to decreases in productivity and increased costs. The treatment plant was off line for a total of 20 days in 2003 due to turbidity issues. In addition to losses of productivity, treatment costs are increased due to increased chlorine usage, additional staff time, and cleaning of filters.

Many treatment plants have volunteered to implement stricter filter effluent turbidity standards as a result of concern about *Cryptosporidium*. For example, in 1996, the Philadelphia Water Department (PWD) voluntarily adopted a 0.1-ntu turbidity goal at all three of its plants as part of its participation in the Partnership for Safe Water. To achieve the 0.1-ntu goal, PWD had to double its coagulant dosages to reduce loading on the filters so they could perform better. PWD began aggressively inspecting and rehabilitating its filters and applying online turbidity instruments for optimizing backwashing techniques.

Timber Operations

Timber harvesting can have the following effects on tributaries:

- Deplete stream oxygen (DO) due to additions of large amounts of fine litter to small low-turbulence streams
- Increase nutrient concentrations (e.g. increases of nitrate following harvest, high concentrations of nitrate observed in harvesting experiments in northern hardwoods of White Mountains (3 mg-N/L)).

As indicated in the Gorham Forest Management Plan, it is important to maintain riparian buffers to protect streams from increased sediment loads, decreased dissolved oxygen concentrations, and increased nutrient concentrations. Currently the Forest manager flags buffers for Major I, II, and Minor II streams prior to harvest. Ideally, riparian buffers for all stream classifications and wetlands should be identified, inventoried, and mapped. Furthermore, it has been many years since property boundaries have been marked. Watershed property boundaries should be clearly demarcated on the ground.

In order to prevent potential contamination from harvesting activities the following procedures are in place:

- Oil arresting pads are stored at the landings.
- Soil from oil/fuel spills is excavated and removed from watershed.
- The Forest manager calls Water Dept immediately upon becoming aware of any spills in the watershed.

In the Spring of 2004, a fuel spill occurred. This spill was found by the Water Superintendent. The Forest Manager was immediately notified and soil from the site was excavated. NH DES was contacted and came to the site to perform soil testing. Ideally all spills should be reported to the Water Superintendent, regardless of location within the watershed. The logging crew should be reminded of the importance of reporting procedures.

Sanitation Concerns

In order to prevent contamination from various types of human waste the following precautions are implemented:

- A garbage can is located on landings and emptied weekly.
- A portable toilet is available on landings during operations. Rules part of logging contract?
- Oil changes and major repairs of logging equipment are not undertaken on the watershed.
- Chainsaw fuel and bar and chain oil are locked up in the lunch shack or other structure overnight and are removed from the watershed each weekend. No more than 5 gallons of fuel and bar and chain oil may be left on the site overnight.
- The loader/crane is removed from the watershed at the end of every day.

B. Gorham Town Wells

A number of potential sources of contamination were identified within the wellhead protection area for the Gorham Town Wells (Figure 18, 19). Properties within the wellhead protection area, and those that intersect it are listed in Table 6 and depicted on Figures 20 and 21. The following paragraphs describe these potential risks.

Airport (PCS #1)

Within the wellhead protection area and approximately 670 feet from well #1 and 1,600 feet from well #2 is an airport and landing strip. There is no re-fueling or maintenance permitted at the airport. Potential contamination sources include airplane storage, and potential spills from an airplane accident. In addition, airplane hangars have

often been used to store other material other than airplanes (e.g. motor boats) during the winter season.

Transportation Corridors (PCS #2)

There are three roads within the wellhead protection area. These roads include Main St., Mascott street, Bellevue Ave, and a multi-modal road (PCS #14). Roads are potential contamination sources because of de-icing materials and automotive chemicals. Volatile organic chemicals (VOCs) volatilize rapidly and thus are less of a concern for surface water supplies. However VOCs have the ability to contaminate groundwater supplies. Perhaps of greatest concern is the potential for MTBE to contaminate a groundwater supply. MTBE is a gasoline additive which is extremely difficult to treat. Data from state environmental agencies in the Northeast find that drinking water supplies for over 15 million Americans are contaminated with MTBE. Even at trace levels, MTBE renders water undrinkable due to foul taste and odor (Environmental Working Group, 2004). Road salt application results in sodium chloride additions to water resources.

Railroad Right-of-Way (PCS #3)

There is a railroad right of way which passes less than 150 feet from well #1. Railroad right-of-ways can be a source of pesticides. Pesticides are often used to eliminate vegetation on the right-of-way. Freight trains pass twice daily. Both rail accidents and freight spillage are potential sources of contamination.

Residential Land Use (PCS #4-12)

There are approximately 9 houses within the wellhead protection area. There are a number of residences whose properties intersect with the wellhead protection area. Only residential properties with the majority of their area within the wellhead protection area are identified on the map.

Potential contamination sources associated with residential land use include residential fuel storage, lawncare, and septic systems. Heating fuel spills are a source of volatile organic chemicals. Heating fuel spills can cause fishkills in rivers and streams and cause toxic disinfection byproducts during the chlorination process. Exposure to fuel oil is not known to cause cancer in humans. However, long-term exposure to benzene, the most toxic component of fuel oil, is known to cause leukemia. Fuel spills can also be a source of metals.

Unlike pesticide use by farmers who must get trained and have a permit to apply chemicals, pesticide use by homeowners is unregulated. Synthetic organic chemicals from lawncare applications can have a variety of carcinogenic effects on public health, depending upon the chemical used. Like pesticides, fertilizers are unregulated for the homeowner. Ideally homeowners should test their soil prior to application in order to determine the amount of fertilizer necessary. In addition, fertilizers should not be applied on rainy days when the application will runoff due to rainwater. Fertilizers are a source of excess nutrients such as nitrogen. Nitrogen concentrations in drinking water greater than 10 ppm can cause blue baby syndrome, a potentially life threatening condition for infants under six months of age.

Septic systems are potential sources of bacteria, viruses, and protozoa which can cause gastrointestinal illness, cholera, hepatitis A, or typhoid if consumed. Septic systems should be maintained regularly by pumping out wastes every 3-5 years.

Snowmobile Trail (PCS #13)

A snowmobile trail intersects the wellhead protection area and crosses into the sanitary protection radius of well #2. Snowmobiles have the potential to leak gasoline, providing a source of volatile organic chemicals and MTBE. MTBE is a gasoline additive which is extremely difficult to treat. Data from state environmental agencies in the Northeast find that drinking water supplies for over 15 million Americans are contaminated with MTBE. Even at trace levels, MTBE renders water undrinkable due to foul taste and odor (Environmental Working Group, 2004).

Pipeline (PCS #14)

A crude oil pipe line bisects the wellhead protection area south of the wells. The pipeline is located approximately 6 feet belowground. Water flows down from the hills in the southern end of the wellhead protection area and flows northward towards well #2. A pipeline rupture has the potential to introduce volatile organic chemicals into the groundwater. The multi-modal road is located on this same right-of-way.

Commercial Business (PCS #15)

There is one commercial business on Main Street within the wellhead protection area which has been identified as a potential source of contamination. The business is a small engine repair shop. Also located on the property is a dug well which is not in use. The dug well can serve as a conduit for contamination from the land's surface to groundwater resources.

Zoning within the Wellhead Protection Area

Land use zoning within the wellhead protection area is a combination of Residential A, Commercial A and Timber/Agriculture.

Table 6. Gorham Town Wells
Inventory of Potential Contamination Sources

PARCEL #	OWNER	PROPERTY ADDRESS	LAND USE	DESCRIPTION	MAILING ADDRESS	CITY	STATE	ZIP	PCS #	Potential Contamination Source(s)
00R1-0001 - 0000	USA	RTE 16	US GOVT	Vacant	300 GLEN RD	GORHAM	NH	03501		
00R1-0004 - 0000	USA	RTE 16	US GOVT	Vacant	300 GLEN RD	GORHAM	NH	03581		
00R2-0001 - 0000	USA	ROUTE 16	COMM BLDG	Vacant	300 GLEN RD	GORHAM	NH	03581		
00R4-0005 - 0000	GORHAM LAND CO	OFF RTE 16	DEVEL LAND	Vacant	P.O. BOX 291	GORHAM	NH	03581		
00R5-0007 - 0000	GORHAM, TOWN OF	S/S BELLEVUE PLACE	TOWN-PROP	Airport	20 PARK ST	GORHAM	NH	03581	1	Plane Chemicals
00U7-0048 - 0000	BAPTIST CHURCH	10 HIGHLAND AVE	RELIGIOUS	Residential	108 MAIN ST.	GORHAM	NH	03581		
00U7-0049 - 0000	SNS, LLC	5 MASCOT ST	RES ACLNDV	Vacant	64 RIVER ROAD	WOBURN	MA	01801	12	Heating Fuel, Lawncare
00U7-0052 - 0000	SNS, LLC	289 MAIN ST	MOTELS	Commercial	64 RIVER ROAD	WOBURN	MA	01801		
00U7-0053- 0000	BISSON, MAURICE	7 MASCOT ST	Single Fam	Residential	7 MASCOT ST	GORHAM	NH	03581		
00U7-0054 - 0000	BROSNAN, MICHAEL	8 MASCOT ST	THREE FAM	Residential	95 VILLAGE ROAD	SHELBURNE	NH	03581	11	Heating Fuel, Lawncare
00U7-0055- 0000	MIDGLEY, THOMAS E	6 MASCOT ST	Single Fam	Residential	24 DEERLICK ROAD	DANVILLE	NH	03819		
00U7-0056 - 0000	ROSATI, LORI A	4 MASCOT ST	Single Fam	Residential	12 ABBOTT ST	DERRY	NH	03038	10	Heating Fuel, Lawncare
00U7-0057 - 0000	SMITH, DOUGLAS	293 MAIN ST	Single Fam	Residential	293 MAIN ST	GORHAM,	NH	03581	9	Heating Fuel, Lawncare
00U7-0058 - 0000	MCCAULEY, RONALD W	297 MAIN ST	STORE/SHOP	Vacant	40 MAIN ST	GORHAM	NH	03581	15	Small Engine Repair, Dug Well
00U7-0059 - 0000	QUALLS, MARGARET B.	309 MAIN ST	Single Fam	Residential	309 MAIN ST.	GORHAM	NH	03581	8	Heating Fuel, Lawncare
00U7-0061 - 0000	KOXARAKIS, EMANUEL	315 MAIN ST	OFFICE BLD	Commercial	420 SWEDEN ST	BERLIN	NH	03570		
00U7-0062 - 0000	GORHAM, TOWN OF	AIRPORT HANGER	MUNICPAL	Vacant	20 PARK STREET	GORHAM	NH	03581		
00U7-0062A- 0000	DESMOND, LOUIS	AIRPORT HANGER	COMM BLDG	Vacant	8 LOSIER RD	SHELBURNE	NH	03581		
00U7-0062B- 0000	CURRIER, REGINALD	AIRPORT HANGER	COMM BLDG	Vacant	103 LANCASTER RD	GORHAM	NH	03581		
00U7-0062C- 0000	JACOBS, GARY	OFF BELLEVUE PLACE	COMM BLDG	Vacant	859 FIFTH AVE	BERLIN	NH	03570		
00U7-0063 - 0000	GUAY, PAUL J.	12 BELLEVUE PLACE	RES ACLNDV	Vacant	8 BELLEVUE PLACE	GORHAM	NH	03581	5	Heating Fuel, Lawncare, Septic System
00U7-0063A- 0000	GUAY, PAUL J.	12 BELLEVUE PLACE	Trailer	Mobile Home	8 BELLEVUE PLACE	GORHAM	NH	03581		
00U7-0063A- 0000	GUAY, PAUL J.	8 BELLEVUE PLACE	Single Fam	Residential	8 BELLEVUE PLACE	GORHAM	NH	03581	6	Heating Fuel, Lawncare, Septic System

PARCEL #	OWNER	PROPERTY ADDRESS	LAND USE	DESCRIPTION	MAILING ADDRESS	CITY	STATE	ZIP	PCS #	Potential Contamination Source(s)
00U7-0064 - 0000	PULSIFER, LAUREL J	4 BELLEVUE PLACE	Single Fam	Residential	4 BELLEVUE PLACE	GORHAM	NH	03581	7	Heating Fuel, Lawncare, Septic System
00U7-0065 - 0000	NEW HAMPSHIRE, STATE OF	319 MAIN ST	COMM-MASS	Vacant	DEPT OF TRANSPORTATION	CONCORD	NH	03301		
0U18-0001 - 0000	GATEWAY TRAILER PARK INC	27 LANCASTER RD	CAMPGROUND	Vacant	27 LANCASTER RD	GORHAM	NH	03581		
0U18-0001 - 0000	PIAZZA, RONALD	4 KEENAN ST	Trailer	Residential	96 PERRY ST	STOUGHTON	MA	02073		
0U18-0001 - 0000	GATEWAY TRAILER PARK INC	6 KEENAN ST		Vacant	11 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 0000	BREWSTER, HAROLD	8 KEENAN ST	Trailer	Mobile Home	2817 EDGEWOOD LANE	SARASOTA	FL	34231		
0U18-0001 - 100	BELANGER, PAUL	1 CENTER LANE	Trailer	Mobile Home	1 CENTER LANE	GORHAM	NH	03581		
0U18-0001 - 1000	EAFRATI, THOMAS (DECEASED)	2 MASON HILL	Trailer	Mobile Home	2 MASON HILL	GORHAM	NH	03581		
0U18-0001 - 0000	CORRIGAN, WALLACE	4 MASON HILL	Trailer	Mobile Home	11 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 1200	GATEWAY TRAILER PARK	8 MASON HILL	Trailer	Mobile Home	11 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 1300	GERATH, REBBECCA	1 MEMORY LANE	Trailer	Mobile Home	1 MEMORY LANE	GORHAM	NH	03581		
0U18-0001 - 1400	AUBE, CONRAD E	2 MEMORY LANE	Trailer	Mobile Home	2 MEMORY LANE	GORHAM	NH	03581		
0U18-0001 - 1500	AVERILL, VIOLET	3 MEMORY LANE	Trailer	Mobile Home	19 PINE ST	GORHAM	NH	03581		
0U18-0001 - 1600	CORRIGAN, NATHAN	4 MEMORY LANE	Trailer	Mobile Home	6 MEMORY LANE	GORHAM	NH	03581		
0U18-0001 - 1700	GATEWAY TRAILER PARK	5 MEMORY LANE	Trailer	Mobile Home	27 LANCASTER RD	GORHAM	NH	03581		
0U18-0001 - 1800	GATEWAY TRAILER PARK	6 MEMORY LANE	Trailer	Mobile Home	27 LANCASTER RD	GORHAM	NH	03581		
0U18-0001 19000	CHOUINARD, PAUL	7 MEMORY LANE	Trailer	Mobile Home	7 MEMORY LANE	GORHAM	NH	03581		
0U18-0001 - 2000	STEELE, LORRAINE B.	2 CENTER LANE	Trailer	Mobile Home	P. O. BOX 38	GORHAM	NH	03581		
0U18-0001 - 2000	GATEWAY TRAILER PARK	8 MEMORY LANE	Trailer	Mobile Home	27 LANCASTER RD	GORHAM	NH	03581		
0U18-0001 - 2100	CURRIER, STEVEN	9 MEMORY LANE	Trailer	Mobile Home	9 MEMORY LANE	GORHAM	NH	03581		
0U18-0001 - 2200	GATEWAY TRAILER PARK	10 MEMORY LANE	Trailer	Mobile Home	27 LANCASTER RD	GORHAM	NH	03581		
0U18-0001 - 2300	COUHIE, JAMES M	11 MEMORY LANE	Trailer	Mobile Home	11 MEMORY LANE	GORHAM	NH	03581		
0U18-0001 - 0000	GATEWAY TRAILER PARK	12 MEMORY LANE		Vacant	11 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 0000	GOHLKE, RICK	13 MEMORY LANE	Trailer	Mobile Home	13 MEMORY LANE	GORHAM	NH	03581		
0U18-0001 - 25A0	HANDRINOS, THEODORE	14 MEMORY LANE	Trailer	Mobile Home	14 MEMORY LANE	GORHAM	NH	03581		

PARCEL #	OWNER	PROPERTY ADDRESS	LAND USE	DESCRIPTION	MAILING ADDRESS	CITY	STATE	ZIP	PCS #	Potential Contamination Source(s)
0U18-0001 - 26A0	BUCCIANO, MARILOU	1A BROOKSIDE DR	Trailer	Mobile Home	1A BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 0000	PERRILLE, JUDY	1 BROOKSIDE DR	Trailer	Mobile Home	1 BROOKSIDE	GORHAM	NH	03581		
0U18-0001 - 2700	GAUTHIER, ROBERT	2 BROOKSIDE DR	Trailer	Mobile Home	2 BROOKSIDE DRIVE	GORHAM	NH	03581-1436		
0U18-0001 - 2800	FRENCH HEIRS, ALBERT	3 BROOKSIDE DR	Trailer	Mobile Home	3 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 2900	GUILBEAULT, MAURICE	4 BROOKSIDE DR	Trailer	Mobile Home	4 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 3000	SAUNDERS, TINA	3 CENTER LANE	Trailer	Mobile Home	101 SMITH AVE	GARDEN CITY	GA	31408		
0U18-0001 - 0000	GATEWAY TRAILER PARK	3 BROOKSIDE DR		Vacant	3 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 0000	PETERS, CHRISTOPHER	5 BROOKSIDE DR	Trailer	Residential	5 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 3100	GATEWAY TRAILER PARK	6 BROOKSIDE DR		Vacant	27 LANCASTER RD	GORHAM	NH	03581		
0U18-0001 - 3200	FLYNN, RICKY	7 BROOKSIDE DR	Trailer	Mobile Home	7 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 3300	SANSCHAGRIN, PATRICK	8 BROOKSIDE DR	Trailer	Mobile Home	8 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 3400	O'NEIL JR, GERALD	9 BROOKSIDE DR	Trailer	Mobile Home	9 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 3500	ST. GERMAIN, DONALD	10 BROOKSIDE DR	Trailer	Mobile Home	10 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 3600	CORRIGAN SR., WALLACE	11 BROOKSIDE DR	Trailer	Mobile Home	11 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 3700	BECKER, AMANDA	12 BROOKSIDE DR	Trailer	Mobile Home	12 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 3800	DEMERS, DEBRA	13 BROOKSIDE DR	Trailer	Mobile Home	8 JIMTOWN RD	GORHAM	NH	03581		
0U18-0001 - 0000	MARCOU, MICHELLE	14 BROOKSIDE DR	Trailer	Mobile Home	14 BROOKSIDE DR	GORHAM	NH	03581		
0U18-0001 - 4000	HAWKINS, NICOLE	1 CORRIGAN ST	Trailer	Mobile Home	1 CORRIGAN ST	GORHAM	NH	03581		
0U18-0001 - 4000	GATEWAY TRAILER PARK	4 CENTER LANE	Trailer	Mobile Home	27 LANCASTER RD	GORHAM	NH	03581		
0U18-0001 - 0000	MOORE, DOROTHY	2 CORRIGAN ST	Trailer	Mobile Home	2 CORRIGAN ST	GORHAM	NH	03581		
0U18-0001 - 4200	DESILETS, RAYMOND R.	3 CORRIGAN ST	Trailer	Mobile Home	387 COOS ST	BERLIN	NH	03570		
0U18-0001 - 0000	LANE, ELEANOR	4 CORRIGAN ST	Trailer	Mobile Home	4 CORRIGAN ST	GORHAM	NH	03581		
0U18-0001 - 0000	LUTZ, STEVE	5 CORRIGAN ST	Trailer	Mobile Home	5 CORRIGAN ST	BERLIN	NH	03570		
0U18-0001 - 4500	DEMERS, ALLEN	6 CORRIGAN ST	Trailer	Mobile Home	12 JEWELL ST	GORHAM	NH	03581		
0U18-0001 - 4600	GARROW, JAIMIE	7 CORRIGAN ST	Trailer	Mobile Home	7 CORRIGAN ST	GORHAM	NH	03581		

PARCEL #	OWNER	PROPERTY ADDRESS	LAND USE	DESCRIPTION	MAILING ADDRESS	CITY	STATE	ZIP	PCS #	Potential Contamination Source(s)
0U18-0001 - 4700	CLARK, ALAN T	1 FRED'S CIRCLE	Trailer	Mobile Home	1 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 5000	GUAY, HENRIETTE	2 KEENAN ST	Trailer	Mobile Home	223 GREEN ST	SOMERSWORTH	NH	03878		
0U18-0001 - 5000	MARTIN, WILMA	4 FRED'S CIRCLE	Trailer	Mobile Home	4 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 5100	ANDREWS, NORMA	5 FRED'S CIRCLE	Trailer	Mobile Home	5 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 5400	LONG, ELLEN	8 FRED'S CIRCLE	Trailer	Mobile Home	8 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 5600	CORRIGAN, NATHAN	10 FRED'S CIRCLE	Trailer	Mobile Home	6 MEMORY LANE	GORHAM	NH	03581		
0U18-0001 - 5700	CORRIGAN SR., WALLACE	11 FRED'S CIRCLE	Trailer	Mobile Home	11 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 5800	JOHNSON, WILLIAM	13 FRED'S CIRCLE	Trailer	Mobile Home	13 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 6000	WALLACE, MICHELLE MACKAY	14 FRED'S CIRCLE	Trailer	Mobile Home	14 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 6100	TANGUAY JR, LOUIS J.	15 FRED'S CIRCLE	Trailer	Mobile Home	15 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 6200	STEPHENSON, SHERREL D	27 LANCASTER RD	Trailer	Mobile Home	27 LANCASTER RD	GORHAM	NH	03581		
0U18-0001 - 8000	MASON JR, PAUL	7 KEENAN ST	Trailer	Mobile Home	49 LAWRENCE RD	MILTON	MA	02186-4751		
0U18-0006 - 0000	GORHAM LAND CO.	EVANS ST	RES ACLNDV	Vacant	P.O. BOX 291	GORHAM	NH	03581		
0U18-0006A-0000	RICH, GORDON C.	25 EVANS ST	Mobile Hom	Residential	25 EVANS ST	GORHAM	NH	03581		
0U18-0001 - 0000	NADEAU, ROBERT	8 CORRIGAN ST	Trailer	Mobile Home	8 CORRIGAN ST	GORHAM	NH	03581		
0U18-0001 - 0000	AVERILL, VIOLET	9 CORRIGAN ST	Trailer	Mobile Home	10 PINE ST	GORHAM	NH	03581		
0U18-0001 - 0000	MAURE, GUY	10 CORRIGAN ST	Trailer	Mobile Home	10 CORRIGAN	GORHAM	NH	03581		
0U18-0001 - 0000	THERIAULT, BETTY	12 FRED'S CIRCLE	Trailer	Mobile Home	12 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 0000	REGAN, ROBERT	2 FRED'S CIRCLE	Trailer	Mobile Home	2 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 0000	POISSON, JOSHUA	3 FRED'S CIRCLE	Trailer	Mobile Home	3 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 0000	WOODFORD, SHIRLEY	6 FRED'S CIRCLE	Trailer	Mobile Home	6 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 0000	WOODFORD, SHIRLEY	6 FRED'S CIRCLE	Trailer	Mobile Home	6 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 0000	FESSENDEN, ERNEST	7 FRED'S CIRCLE	Trailer	Mobile Home	7 FRED'S CIRCLE	GORHAM	NH	03581		
0U18-0001 - 0000	GOODRUM, STEVE	3 CENTER LANE	Trailer	Mobile Home	3 CENTER LANE	GORHAM	NH	03581		
			Transportation	Pipeline, multi-modal road					14	Petroleum products

PARCEL #	OWNER	PROPERTY ADDRESS	LAND USE	DESCRIPTION	MAILING ADDRESS	CITY	STATE	ZIP	PCS #	Potential Contamination Source(s)
			Transportation	Snowmobile Trail					13	Petroleum products
			Transportation	Main St					2	Petroleum products, Road Salt
			Transportation	Bellevue Ave					16	Petroleum products, Road Salt
			Transportation	Mascott St					17	Petroleum products, Road Salt

C. Gorham Hill Spring

Gorham Hill Spring is located in an area of residential development. Approximately 6 categories of potential contamination sources have been identified in the wellhead protection area (Figure 22). Properties within the wellhead protection area, and those that intersect it are listed in Table 7 and depicted in Figure 23.

Transportation Corridors (PCS #1-5)

There are five transportation corridors within the wellhead protection area. These include Randolph Hill Road, Nekal Lane, Boothman Lane, and Pasture Path. Transportation corridors are considered a potential contaminant source because of the potential for vehicular accidents, automotive chemicals, and road salt.

Residential Development (PCS #6)

There are approximately 36 residential properties which are located in or partially in the wellhead protection area. Potential contamination sources associated with residential land use include residential fuel storage, lawncare, and septic systems. Heating fuel spills are a source of volatile organic chemicals. Heating fuel spills can cause fishkills in rivers and streams and cause toxic disinfection byproducts during the chlorination process. Exposure to fuel oil is not known to cause cancer in humans. However, long-term exposure to benzene, the most toxic component of fuel oil, is known to cause leukemia. Fuel spills can also be a source of metals.

Unlike pesticide use by farmers who must get trained and have a permit to apply chemicals, pesticide use by homeowners is unregulated. Synthetic organic chemicals from lawncare applications can have a variety of carcinogenic effects on public health, depending upon the chemical used. Like pesticides, fertilizers are unregulated for the homeowner. Ideally homeowners should test their soil prior to application in order to determine the amount of fertilizer necessary. In addition, fertilizers should not be applied on rainy days when the application will runoff due to rainwater. Fertilizers are a source of excess nutrients such as nitrogen. Nitrogen concentrations in drinking water greater than 10 ppm can cause blue baby syndrome, a potentially life threatening condition for infants under six months of age.

Septic systems are potential sources of bacteria, viruses, and protozoa which can cause gastrointestinal illness, cholera, hepatitis A, or typhoid if consumed. Septic systems should be maintained regularly by pumping out wastes every 3-5 years.

Table 7. Gorham Hill Spring
Inventory of Potential Contamination Sources

Lot #	Owner	Land Use	Mailing Address	Town	State	Zip	PCS #	Potential Contamination Source(s)
R11-62 R11-62A R10-31	Mark Kelley	Residential	98 Randolph Hill Rd	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
R11-84 U4-22	Robert Leclerc	Residential	70 Randolph Hill Road	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
R11-47	Town of Gorham	Water System	20 Park St	Gorham	NH	03581		
R11-48	Sara Glines	Residential	172 Randolph Hill Rd	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
R11-44	Larry Martin	Residential	24 US route 2	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
R11-49	Randolph Church	Religious	417 Heritage Court	Charlottesville	VA	22903		
R11-48A	Town of Randolph	Municipal	130 Durand Rd	Randolph	NH	03598		
R11-10-1 R11-10-2	Robert Erwin	Residential	716 Sabego Rd	Naples	ME	04055	6	Heating Fuel Lawncare Septic System
R11-10-3	Raymond Aube	Residential	540 Durand Rd	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
R11-10-4	Eleanor McLaughlin	Residential	38 Nekel Lane	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
R11-10-5	Denise Nelson	Residential	108 Mary Catherine Drive	Lancaster	MA	01523	6	Heating Fuel Lawncare Septic System
R11-10-6	William Knight	Residential	5221 Sangamore Rd	Bethesda	MD	20816	6	Heating Fuel Lawncare Septic System
U4-17	Robert Onacki	Residential	10 Randolph Hill Rd	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
U4-18	Scott Stimpson	Residential	251 Swan Pond Rd	N. Reading	MA	01864	6	Heating Fuel Lawncare Septic System
U4-19	Lydia Goetze	Residential	36 Salem Street	Andover	MA	01810	6	Heating Fuel Lawncare Septic System

Lot #	Owner	Land Use	Mailing Address	Town	State	Zip	PCS #	Potential Contamination Source(s)
U4-20	William Woodward	Residential	56 Raycrest DR	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
U4-21	John Smithson	Residential	66 Randolph Hill Rd	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
U4-25 U4-10	Stever Risley Co, Inc	Residential	588 Russell Ave	Gaithersburg	MD	20877	6	Heating Fuel Lawncare Septic System
U4-26	Horton Guyford Stever Jr	Residential	56 Randolph Hill Rd	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
U4-9	Gregory Trust H.T	Residential	PO Box 799	Hanover	NH	03766	6	Heating Fuel Lawncare Septic System
U4-11 U4-13	Edward Blatchford	Residential	286 Patten Rd	Shelburne	MA	01370	6	Heating Fuel Lawncare Septic System
U4-12	Barbara Turnbull C/O Anne Pfeffer	Residential	142 Range Road	Nederland	CO	80466	6	Heating Fuel Lawncare Septic System
U4-14	Arlene Eisenberg	Residential	25 Randolph Hill Road	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
U3-11	Thomas Sappington TTEE	Residential	56 Boothman Lane	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
U3-13	Winthrop Smith	Residential	156 Hillyndale Rd	Storrs	CT	06268	6	Heating Fuel Lawncare Septic System
U3-14	Edward Brinton	Residential	424 West Crosslands Dr	Kennett Square	PA	19348	6	Heating Fuel Lawncare Septic System
U3-16	Kenneth Lee	Residential	9 Pasture Path	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System
U3-6	Joan Darlington	Residential	7 Riverwood Dr	Exeter	NH	03833	6	Heating Fuel Lawncare Septic System
U3-7	Sarah Edwards	Residential	275 Steele Road #B424	W. Hartford	CT	06117-2752	6	Heating Fuel Lawncare Septic System
R10-23	Melanie Lark Wood	Residential	128 Randolph Hill Rd	Randolph	NH	03598	6	Heating Fuel Lawncare Septic System

Lot #	Owner	Land Use	Mailing Address	Town	State	Zip	PCS #	Potential Contamination Source(s)
R10-22	Samarjit Shankar	Residential	22 Freeman St	Arlington	MA	02474-8523	6	Heating Fuel Lawncare Septic System
		Transportation					1	Automotive chemicals Road Salt
		Transportation					5	Automotive chemicals Road Salt
		Transportation					3	Automotive chemicals Road Salt
		Transportation					2	Automotive chemicals Road Salt
		Transportation					4	Automotive chemicals Road Salt

IV. MANAGEMENT OF RISK

After reviewing the potential sources of contamination inventory for each of the water systems, the Source Water Protection Committee developed a list of management priorities. These activities are discussed more specifically in the summaries and Table 8 below.

1. Education and Outreach

The Water and Sewer Department and the Town Forester have provided educational opportunities for many years. Activities include educational tours of the water plant and hands-on ecology exercises in the Town Forest. The Source Water Committee plans to encourage local teachers to participate in the Project WET program.

The Water and Sewer Department will conduct an Outreach Campaign. Activities include sending out notification letters in the wellhead protection areas, communication with town boards in Gorham and Randolph, distribution of source water protection brochures, and making available copies of the source water plan. See Table 6 and 7 for list of property owner addresses.

2. Security

Security activities have been completed. These activities include installing security lights at the Gorham Hill Spring chemical feed building, installing fencing around town well #2, and constructing a pump house for town well #1. At the watershed, security gates have been installed at entrances on the Gorham side.

3. Signage

Source water protection signs have been posted at Gorham Hill Springs and the Town wells.

4. Future Water Demand

The Water and Sewer Department will research areas for future water development for both Gorham Hill Spring and the Town. The Department has already received a preliminary estimate for developing additional wells in the Town wellhead protection area.

5. Water Distribution Easement

The Town Manager has a reviewed an easement agreement with a neighboring landowner in regards to Gorham Hill Spring. The feeding pen has been removed from the easement area. If the water main were to break in this area, water would be susceptible t contamination.

6. Observation Wells

After 9/11, the Department installed well caps to improve security of the observation wells for the Town wells. The observation wells have been flagged with hydrant flagging to alert snowmobilers of their location.

7. Town of Gorham Airport

In order to address potential contamination concerns at the Gorham Town Airport, a number of activities have been initiated. These include: review of the hangar lease agreement to ensure that use of the hangars will not jeopardize the wells. The Town of

Gorham has agreed to make sure that the terms of this agreement are enforced. NeRWA researched what types of material are permitted for storage in the hangars. Because the hangars were not built with federal funds, this determination is left largely to the land owner (the Town). Inspections of the contents of the hangars will be performed bi-annually. Lastly the Water and Sewer Department will continue to work with the Fire Department to prevent water contamination during prescribed burning of the fields.

8. Land Acquisition

The Water and Sewer Department will seek right of first refusal, conservation easements, and fee simple purchase of key parcels in the wellhead protection area for the Town Wells.

9. St. Lawrence and Atlantic Railway Right of Way

The water and Sewer Department will write a letter to the Railroad to alert them to the location of the Town wells. In addition, the Department will post signs which inform the Railroad when it is entering the 400 foot no spray zone.

10. Wellhead Protection Area Zoning

The Source Water Committee recommends adoption of a wellhead protection ordinance for the Town wells. NeRWA has provided examples of model ordinances. The Water and Sewer Department has chosen to adapt an ordinance from Walpole, NH for the Town's use (Appendix 7). The Department will present their findings to the Planning Board.

11. Multi-Modal route (Gorham Wells)

The Source Water Committee recommends that the Board of Selectmen adopt a sand only policy for maintaining the multi-modal road in order to prevent contamination from salt.

12. Portland Pipeline

The Water and Sewer Department will communicate with the pipeline company to inform them of the location of the wellhead protection area for the Town wells.

13. Turbidity Monitoring (see Appendix 5)

The Water and Sewer Department will initiate a turbidity monitoring pilot project in the Town Forest. The purpose of this project will be to gain a greater understanding of the character of the turbidity particularly in Perkins Brook. This pilot project will set the stage for possible follow-up steps.

14. Timber Management

A dialogue regarding turbidity in the Town Forest tributaries will continue with the assistance of various agencies such as the County Forester, Forest Water Quality and Watershed experts from University of New Hampshire extension, and soil scientists from the Soil Conservation Service. To date, the Water Superintendent has met with the Town Forester, USDA Soil Scientists, Logging Contractor, Hydrogeologist and Source Water Specialist from NeRWA. USDA Soil Scientists have provided a field report (Appendix 1).

The Source Water Committee recommends that a new forest management plan be developed for the Town Forest and that this plan be updated every 5 years. The Forest

Committee and Water and Sewer Department should be very familiar with these documents. The Source Water Committee also recommends that a forest inventory be conducted and a forest type map be developed.

All wetland and riparian resources should be inventoried, mapped, and demarcated on the ground. Watershed boundaries should be posted.

The following guidelines should be added to the sanitation guidelines in the Forest Operating Plan:

- Fuel equipment only in designated areas
- Supply spill containers on landings
- Review the operating plan with the logging contractor and crew, especially the sanitation guidelines, at the beginning of each harvest season.
- Manager will call the water department office immediately upon the becoming aware of <u>any</u> oil or fuel spills in the Town Forest.

15. Water Conservation Bylaw

NeRWA has supplied the Source Water Committee with information on water conservation bylaws. The Committee will determine whether a bylaw is necessary.

16. Emergency Response Planning

An Emergency Response Plan for Gorham Hill Springs and the Town water system were developed by the Department. This was completed in 2002 and submitted to New Hampshire Department of Environmental Services.

17. Source Water Protection Committee

<u>The Source Water Protection Committee</u> will oversee implementation of the measures outlined in this Source Protection Plan. The Committee may also comment on development proposals that are located in the Source Protection Areas. After the management activities in this plan have been implemented, the Committee will meet once per year, at a minimum, to review the plan. The plan should be updated every three years. The Steering Committee will be composed of members such as:

a. Water System Superintendent
b. Water Commission Members
c. Health Officer
d. Selectmen
e. A member of the Planning Commission
f. A representative from the local school
g. A Gorham resident
h. A representative from the Gorham Highway Department
i. A representative from the Fire Department

The following tables identify management concerns and actions. Responsible parties have been identified to complete these actions.

Table 8. List of Source Water Protection Management Activities for the Town of Gorham, New Hampshire.

Activity	Source	Action	Responsible Party	Funding Source	Date Completed
1. Education / Outreach	All	a. Work with local schools to promote water resources education. In particular, promote availability of Project WET.	Source Water Committee	N/A	
		b. Continue to provide educational tours of the water plant for a variety of grade levels.	Water Department	Water Department	On-going
		c. Celebrate Drinking Water Week by providing tours of water plant.	Water Department	Water Department	
		d. Using the Watershed as a case study, promote water resources education at the freshman and sophomore level. Sample classes include:			
		➢ Freshman forest field day (tree identification, forest floor, soils, wildlife, forest pathology, stream ecology)	Town Forester	Town of Gorham	On-going
		➢ Forest ecology class			On-going
		➢ Forest monitoring, compass & pacing, winter wildlife, forest products, winter survival, snow mobile safety			
		➢ Reforestation (Second graders plant seedlings in Watershed).	Water Department	Water Department	(last completed 2002)
		e. Send letters & maps (see Appendix 3, 4, 5) to residents within wellhead protection area, Town Boards, and Permitting Agencies	Water Department	Water Department	
		f. Distribute brochures which describe source water protection, and the source water plan. Brochure template to be provided by NeRWA.	Town Manager	Town of Gorham	

Activity	Source	Action	Responsible Party	Funding Source	Date Completed
Education/Outreach (Continued)		g. Distribute copies of source water plan to Gorham and Randolph Town Boards. h. Make source water plan available to public (e.g. Town Hall, Library, Town website). i. Review location of Source Protection Area for Gorham Hill Spring and boundary of watershed for reservoir sources with Town of Randolph officials.	Water Department Gorham Selectmen	Water Department N/A	
2. Security	All	a. Install Security lights at Gorham Hill Spring chemical feed building. b. Fencing has been installed at pumphouse for Well #2. A new secure pumphouse has been constructed for Well #1. c. Gates have been installed at the watershed entrances from the Gorham side.	Water Department Water Department Water Department	Water Department Water Department Water Department	1996 1978 2000, 2003
3. Signage	All	a. Post source water protection signs surrounding the Town Wells. b. Signs will be posted at the entrance of the watershed to prohibit motorized vehicles. c. Post source water protection signs at Gorham Hill Spring.	Water Department Water Department Water Department	Water Department Water Department Water Department	Completed Complete
4. Future Water Demand	All	a. Research possible addition of a new source for Gorham Hill Spring to accommodate future water demand.	Water Department	Water Department	

Activity	Source	Action	Responsible Party	Funding Source	Date Completed
Future Water Demand (Continued)		b. Get preliminary estimates for test wells in the Source Protection Area for Wells #1 and #2. c. Research likely areas for future water development to meet Town's needs.	Water Department Water Department	Water Department Water Department	Complete
5. Water Distribution Easement on Dyer Farm	Gorham Hill Spring	a. Review easement agreement with landowner. Request that land owner remove feeding pen from easement area. (If water main breaks in this location, water would be susceptible to contamination from agricultural activities).	Town Manager	N/A	Complete
6. Replacement of Gorham Hill Distribution Line	Gorham Hill Spring	a. Replace pipe that is located 1 foot belowground with new pipe located 6 feet belowground.	Water Department	Water Department	On-going
7. Observation Wells	Town Wells	a. Flag observation wells (5) with hydrant flagging. Cut pvc locator pipes down to grade. b. Install well caps to improve security of monitoring wells.	Water Department Water Department	Water Department Water Department	November 2004 Complete
8. Town of Gorham Airport	Town Wells	a. Review hangar lease agreement to ensure that wellhead protection area for town wells is adequately protected. b. Enforce terms of hangar lease agreement. c. Perform bi-annual inspections of hangars in June and October. d. Research permissible storage in airplane hangars. e. Work with Fire Department to prevent water	Town of Gorham Town of Gorham Public Works Director/Water Superintendent/Fire Chief NeRWA Water Department	N/A Town of Gorham Town of Gorham EPA Water Department	Complete On-going Completed Completed

Activity	Source	Action	Responsible Party	Funding Source	Date Completed
		contamination during burning of fields.			
9. Land Acquisition	Town Wells Watershed	a. Seek right of first refusal, conservation easements, fee simple purchase for parcels as deemed necessary within the welhead protection area for the Town Wells. b. Seek right of first refusal, conservation easements, fee simple purchase for parcels within the watershed boundaries. (See eastern boundary)	Water Department Water Department	Water Department Water Department	
10. St. Lawrence and Atlantic Railway Right of Way	Town Wells	a. Write to Railroad and spraying company to inform them of Source Protection Area for Gorham Wells. b. Post signs to inform Railroad when entering 400 foot no spray zone.	Water Department Water Department	N/A Water Department	
11. Zoning	Town Wells	a. Recommend implementation of wellhead protection ordinance for the Town wells.	Water Department	N/A	
12. Multi-Modal route	Town Wells	a. Establish a sand only policy (no salt) for the multi-model route which goes through the Town wells WHPA.	Selectmen	N/A	
13. Portland Pipeline	Town Wells	a. Communicate with the pipeline company to inform them of the wellhead protection area for the Town wells.	Water Department	N/A	June 2004
14. Turbidity Monitoring	Watershed	a. Develop a pilot monitoring program to assess turbidity issues in the watershed.	Water Department NeRWA	Water Department EPA	
15. Timber Management	Watershed	a. With the assistance of the County Forester and Forest Water Quality expert from UNH Extension, review timber management best management practices, especially for erosion control in the watershed.	Source Water Committee	In-kind	

Activity	Source	Action	Responsible Party	Funding Source	Date Completed
		b. Develop a new forest management plan for watershed and update the plan every 5 years. Plan must be approved Gorham Water and Sewer Commission.	Forest Committee	Town of Gorham	
		c. Update Forest Fire Management. Originally attributed to James River (1990 Forest Management Plan).	Forest Committee	Town of Gorham	
		d. Delineate property boundaries.	Water Department/Forest Committee	Water Department/Forest Committee	
Timber Management (Cont'd)		e. Delineate Environmental Zones on the ground in the watershed.	Water Department	Water Department	
		f. Inventory and map all water courses (including intermittent streams) and wetlands in watershed.	Water Department/Forest Committee	Town of Gorham	
		g. Conduct a forest inventory.	Forest Committee	Town of Gorham	
		h. Develop a forest type map.	Forest Committee		
		i. Update the sanitation guidelines in the forest management plan to include the following: ➢ fuel equipment only in designated areas. ➢ spill containers will be located on landings. ➢ review sanitation guidelines for timber harvest operations in the watershed with Water Department, and logging contractor and crew prior to each harvest season.	Forest Committee	N/A	
		j. Require that all oil and fuel spills be reported immediately to the manager and the Water Department. (Currently it is required that only spills	Forest Committee	N/A	

Activity	Source	Action	Responsible Party	Funding Source	Date Completed
		within 300 feet of a moving watercourse should be reported). ➢			
16. Water conservation bylaw	All	a. Research whether there is a need for a water conservation bylaw.	➢ Source Water Committee ➢ NeRWA	N/A EPA	 Complete
17. Emergency Response Planning	All	a. All spills in the watershed, and Source Protection Areas for Gorham Hill Springs and Town wells will be reported immediately to the Water Department. b. Meet with local Emergency Response Team to discuss response to emergencies that may impact drinking water supplies. c. Emergency Response Plan	Various Water Department Water Department	N/A N/A N/A	On-going 2002
18. Source Water Protection Committee	All	a. Oversee Implementation of source water protection plan. b. Review plan annually and update every three years	Source Water Committee Source Water Committee	Water Department/ Forestry Committee	On-going

V. EMERGENCY RESPONSE PLANS

Emergency Response Plans describe the steps that would be taken if any or all of the sources from these water systems become contaminated, declined in yield, or were lost for any reason. Gorham Water & Sewer Department has established an emergency response plan which addresses both the Town water system and Gorham Hill Spring. This plan was submitted to NH DES in 2002 prior to the March 2003 deadline. See Appendix 6.

VI. REFERENCES

Jeer, S., Lewis, M., Meck, S., and Witten, J. 1997. Nonpoint Source Pollution: A Handbook for Local Governments. Planning Advisory Service, Report Number 476. American Planning Association. Washington, D.C.

Castelle, A. 2000. Riparian Vegetation Effectiveness. Technical Bulletin No. 799 February 2000. National Council for Air and Stream Improvement.

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Skarinka, R. January 28, 2003b. New Hampshire Department of Environmental Services, Sanitary Survey for Gorham Water & Sewer Department EPA # 0921010. Concord, New Hampshire.

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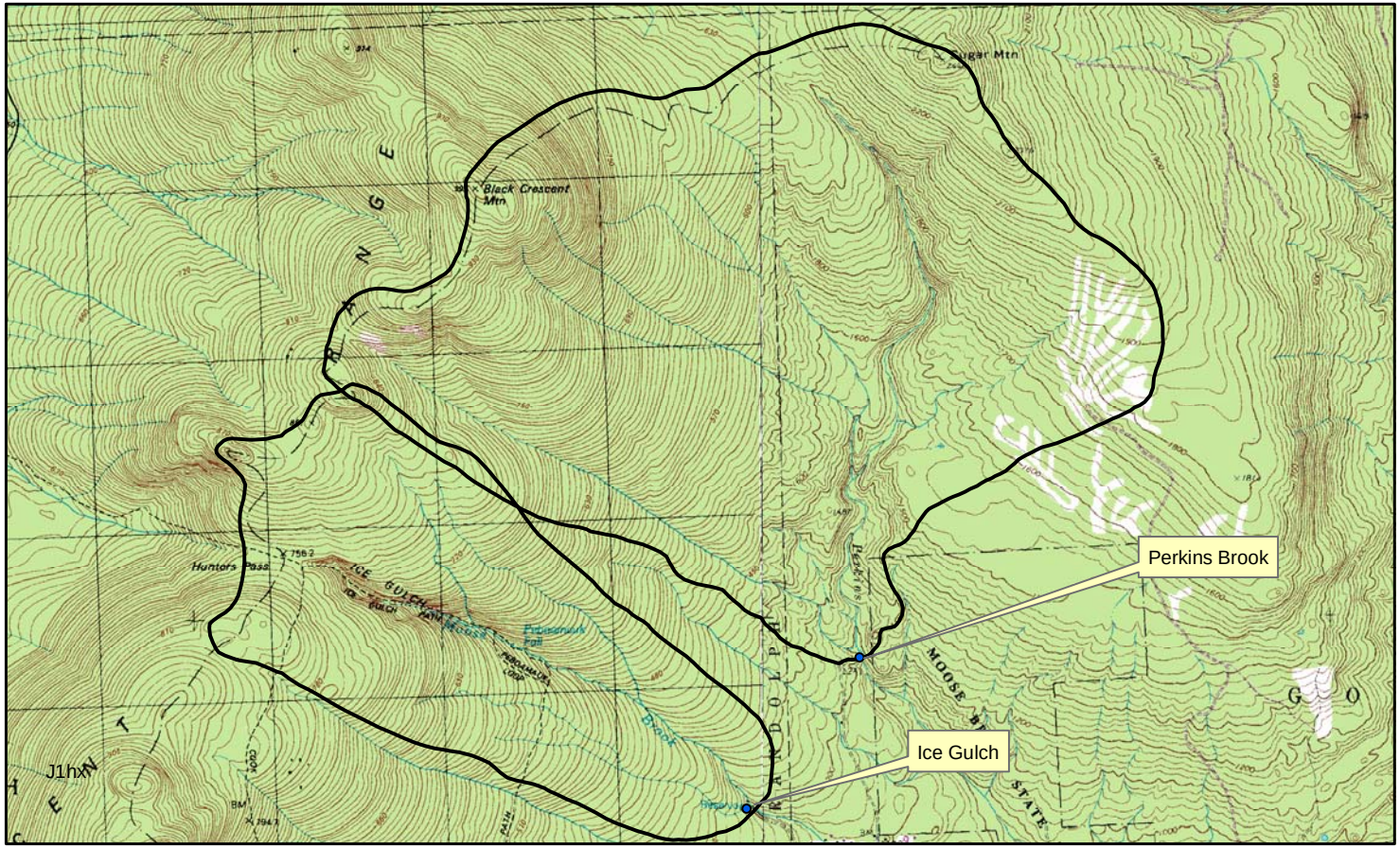
Neal, H. Paul T. Doherty Memorial Town Forest Operating Plan. Winter 2004. Town of Gorham, New Hampshire. Unpublished report.

Best Management Practices to Control Nonpoint Source Pollution: A Guide for Citizens and Town Officials. 2004. Eds. A. Donlon and B. McMillan. New Hampshire Department of Environmental Services. Concord, New Hampshire.

Jeer, S. , M. Lewis, S. Meck, and J. Witten. Nonpoint Source Pollution: A Handbook for Local Governments. American Planning Association. Planning Advisory Service Report Number 476. Chicago, Illinois.

VII. Figures

Figure 1. Ice Gulch and Perkins Brook (0921010)



N
W E
S

0 1,100 2,200 4,400 6,600 8,800 Feet

Legend

Water Source

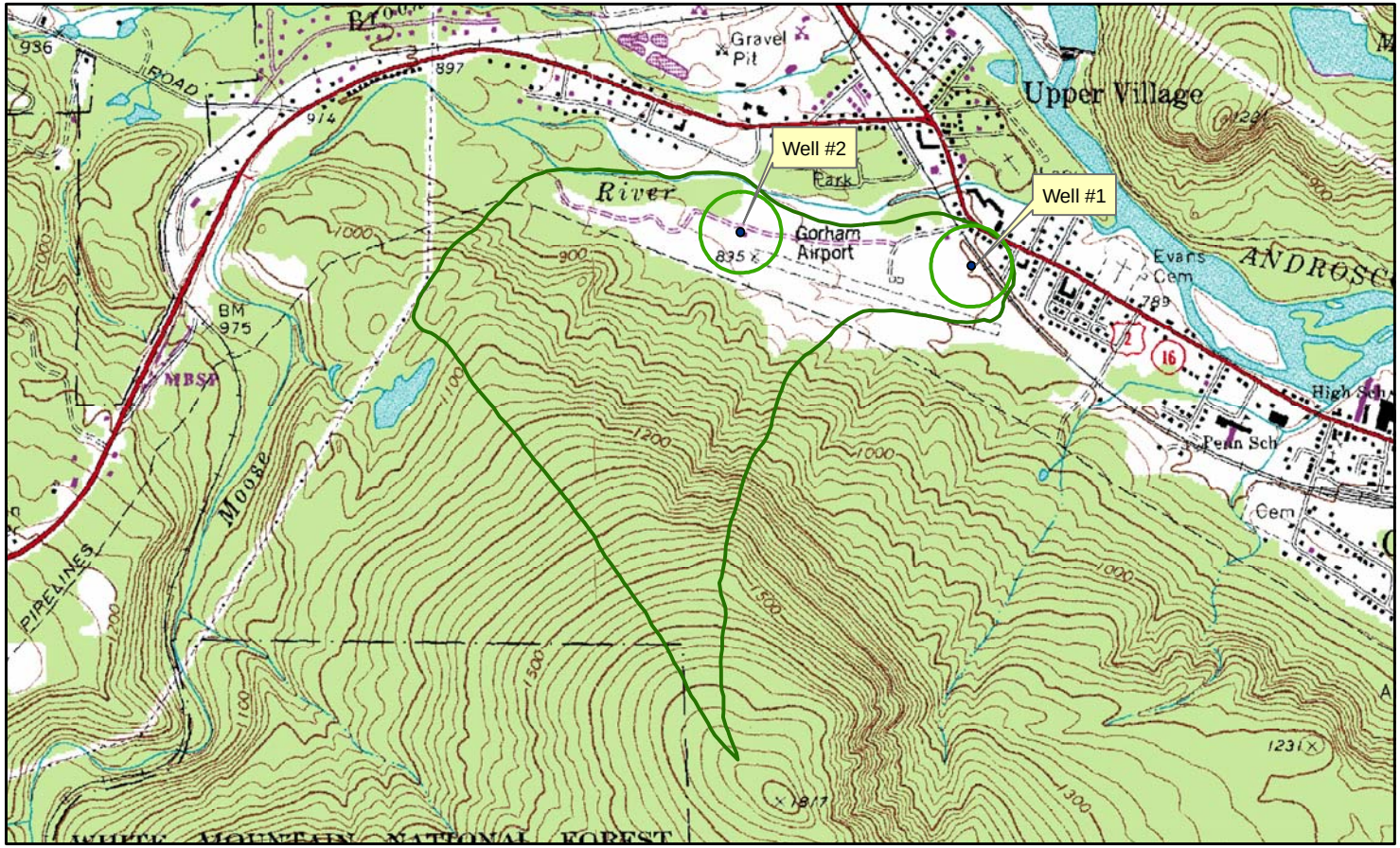
Watershed Boundaries

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 2. Gorham Town Wells (0921010)



N W E S

0 550 1,100 2,200 3,300 4,400 Feet

Legend

400 Foot Sanitary Radius

Well

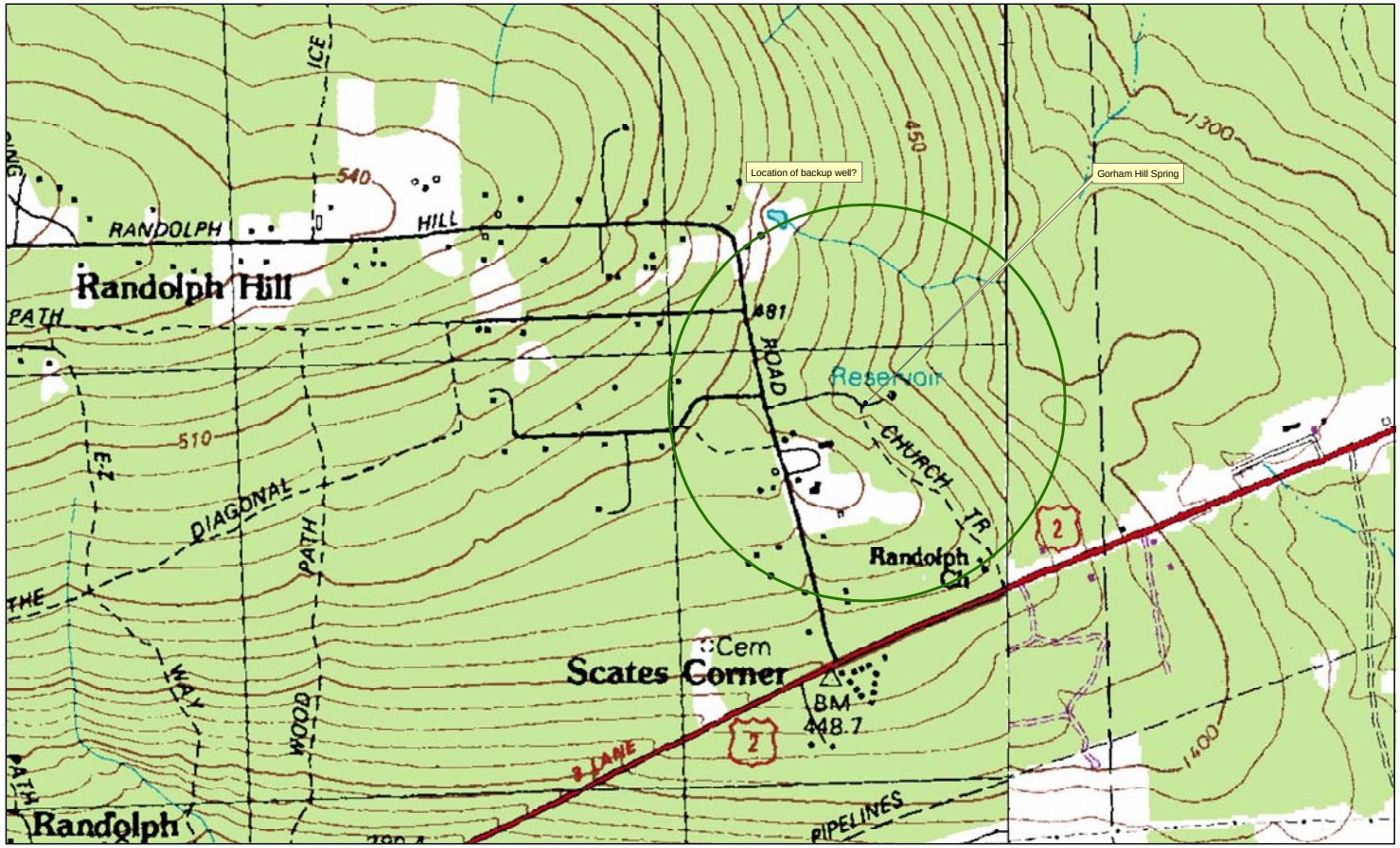
Wellhead Protection Area

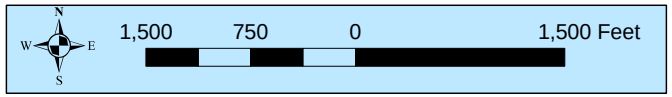
Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 3. Gorham Hill Spring (0921020)





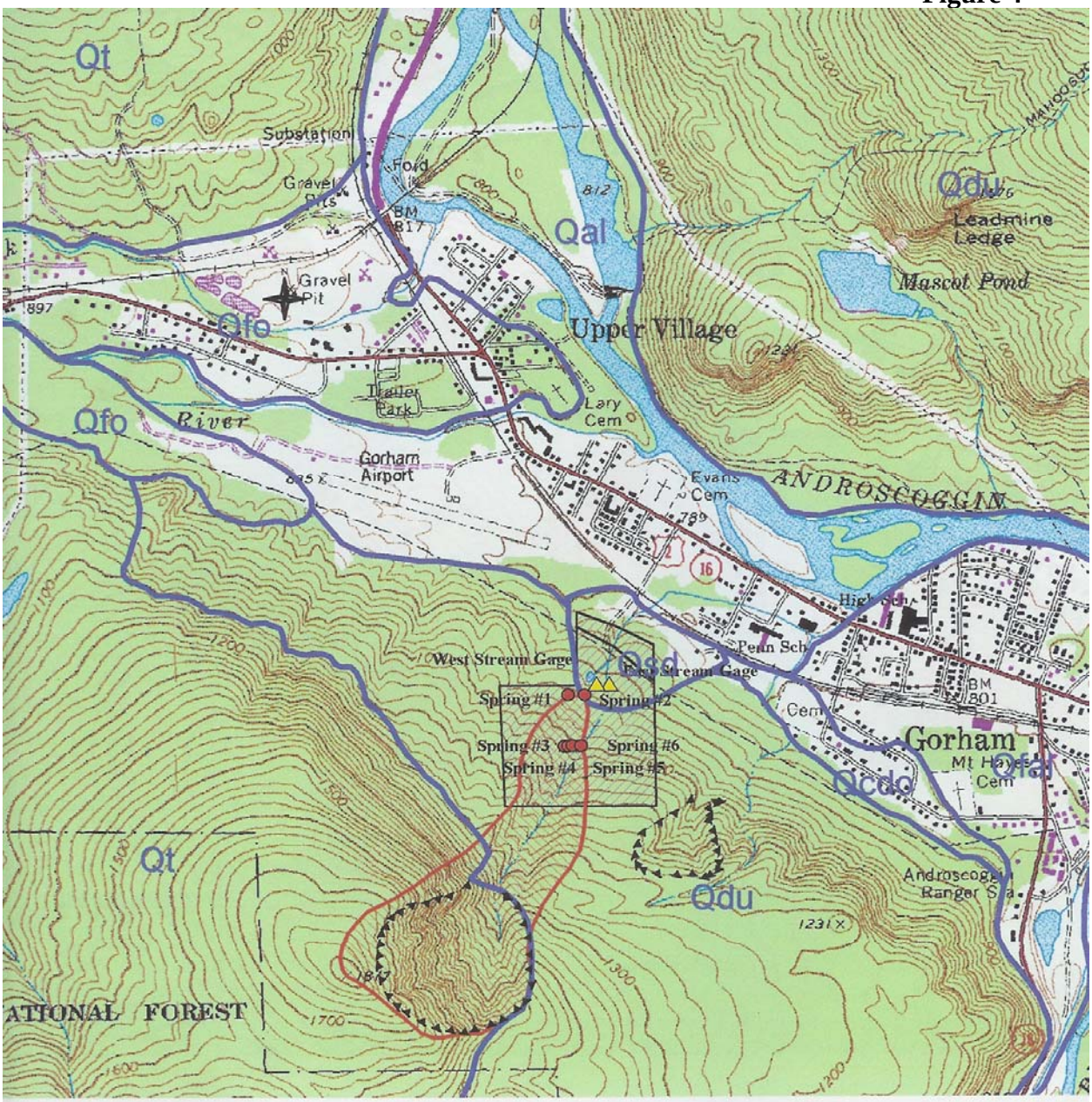
Legend

- Water Source
- Wellhead Protection Area

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association
10/30/04

Figure 4



Explanation:

- Landslide Scarp
- Springs & Gages
  - Gage
  - Spring
- Surficial Geology
- Springs Recharge Area
- Property

Note: Surficial Geology from Robert F. Gerath, 1978, "Glacial Features of the Milan, Berlin, and Sheburne Map Areas of Northern New Hampshire", Masters Thesis, McGill University.

Surficial Geology units:
Qdu = undifferentiated gracial drift
Qt = till
Qsd = landslide deposit
Qcdo = proglacial outwash
Qal = alluvium
Qfo = fan outwash
Qfal = fan alluvium

0 2000 Feet

ATLANTIC GEOSCIENCE

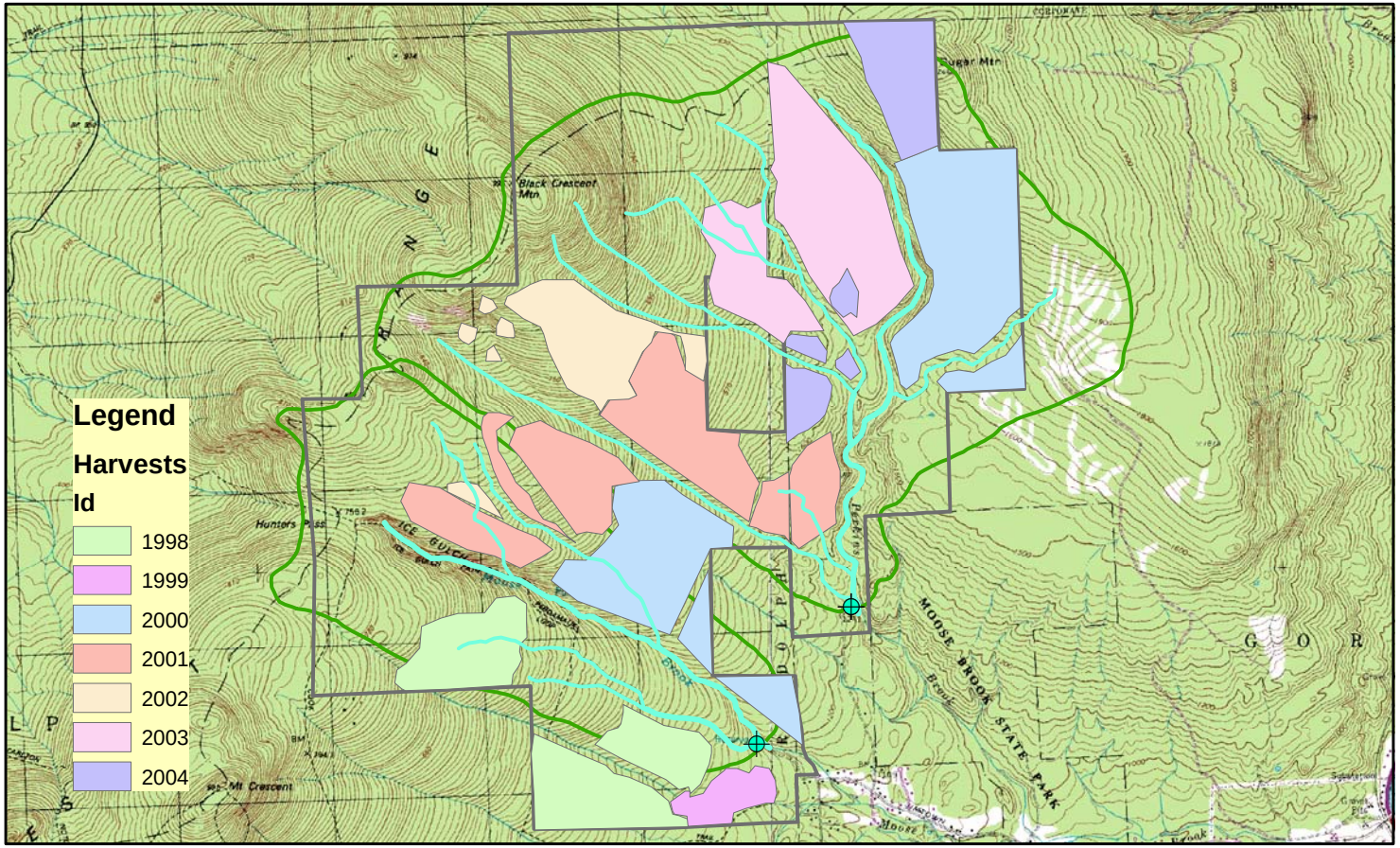
Figure 1.
Site Map with Surfial Geology

Source Development Feasibility Evaluation Alpine Springs, Gorham, New Hampshire

November 2001

Figure 5

Figure 6. Harvested Areas (1998-2004)



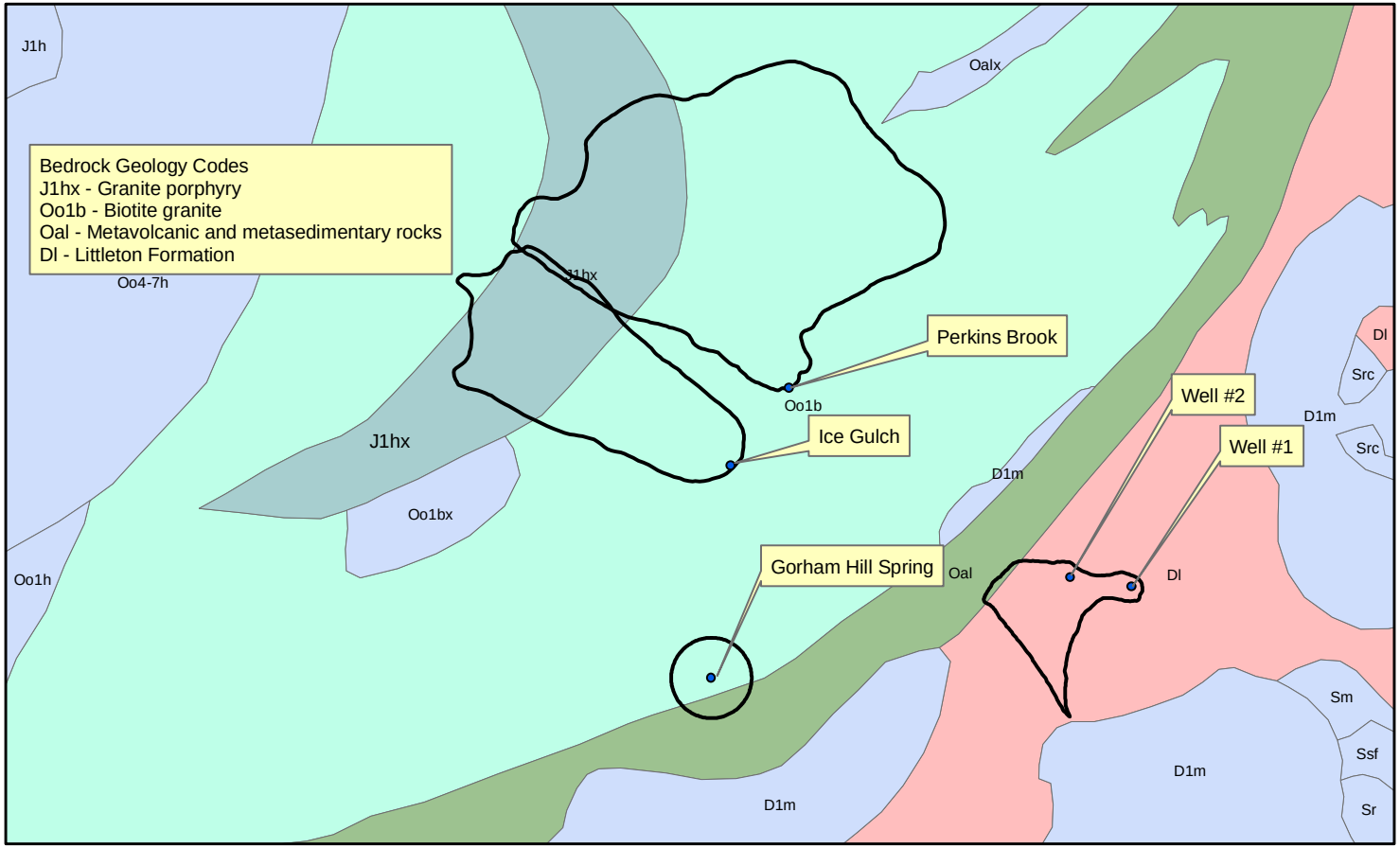
N

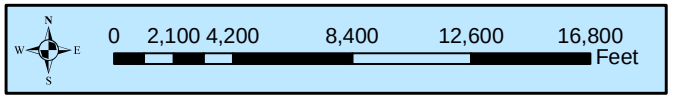
0 1,200 2,400 4,800 7,200 9,600 Feet

Harvest areas are approximate.

Map prepared by
J. O. Palmiotto, NeRWA
October 2004

Figure 7. Bedrock Geology





Legend

- Water Source
- Wellhead Protection Area
- Watershed Boundaries

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 8. Soil Map for Perkins Brook Watershed

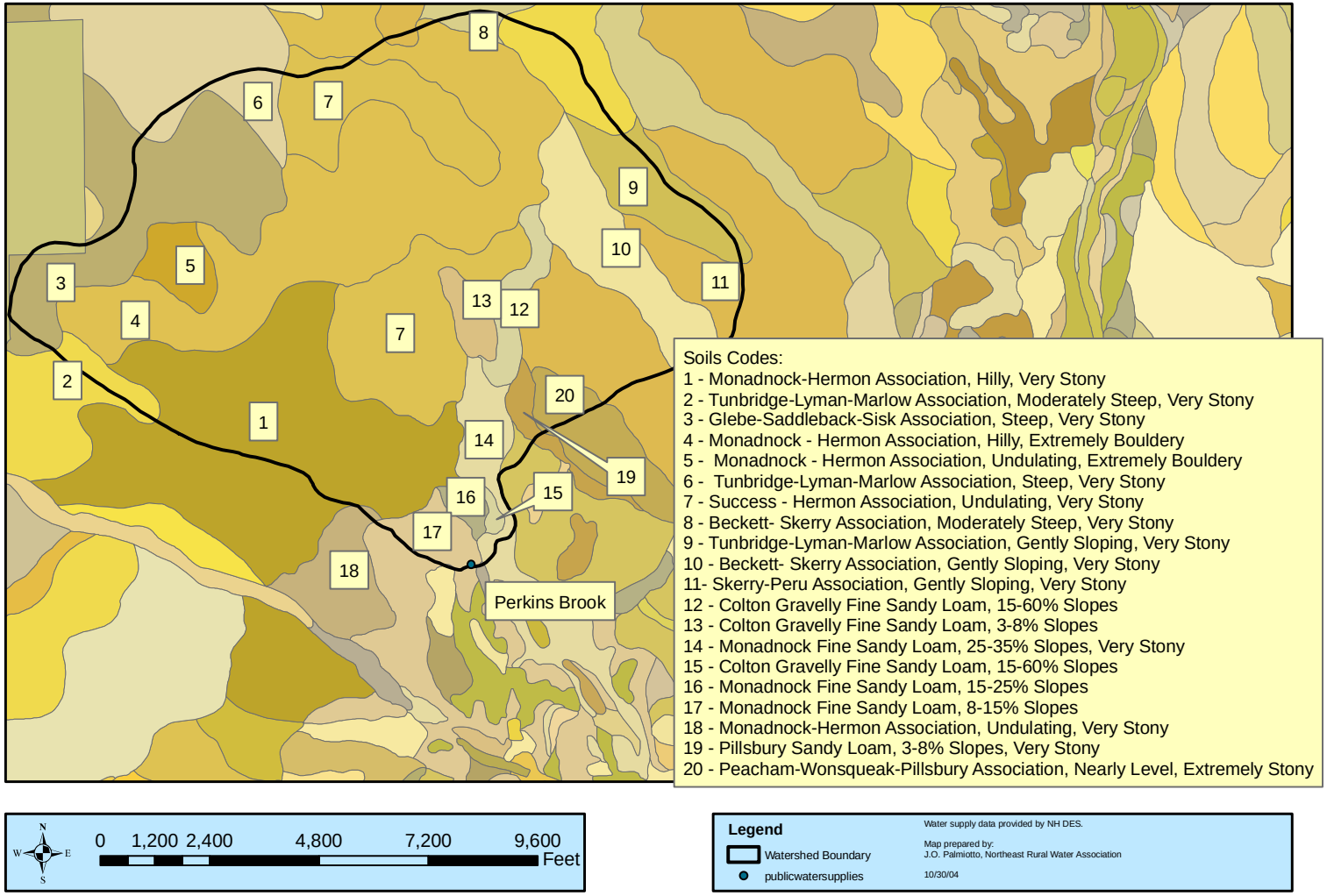


Figure 9. Soil Map for Ice Gulch

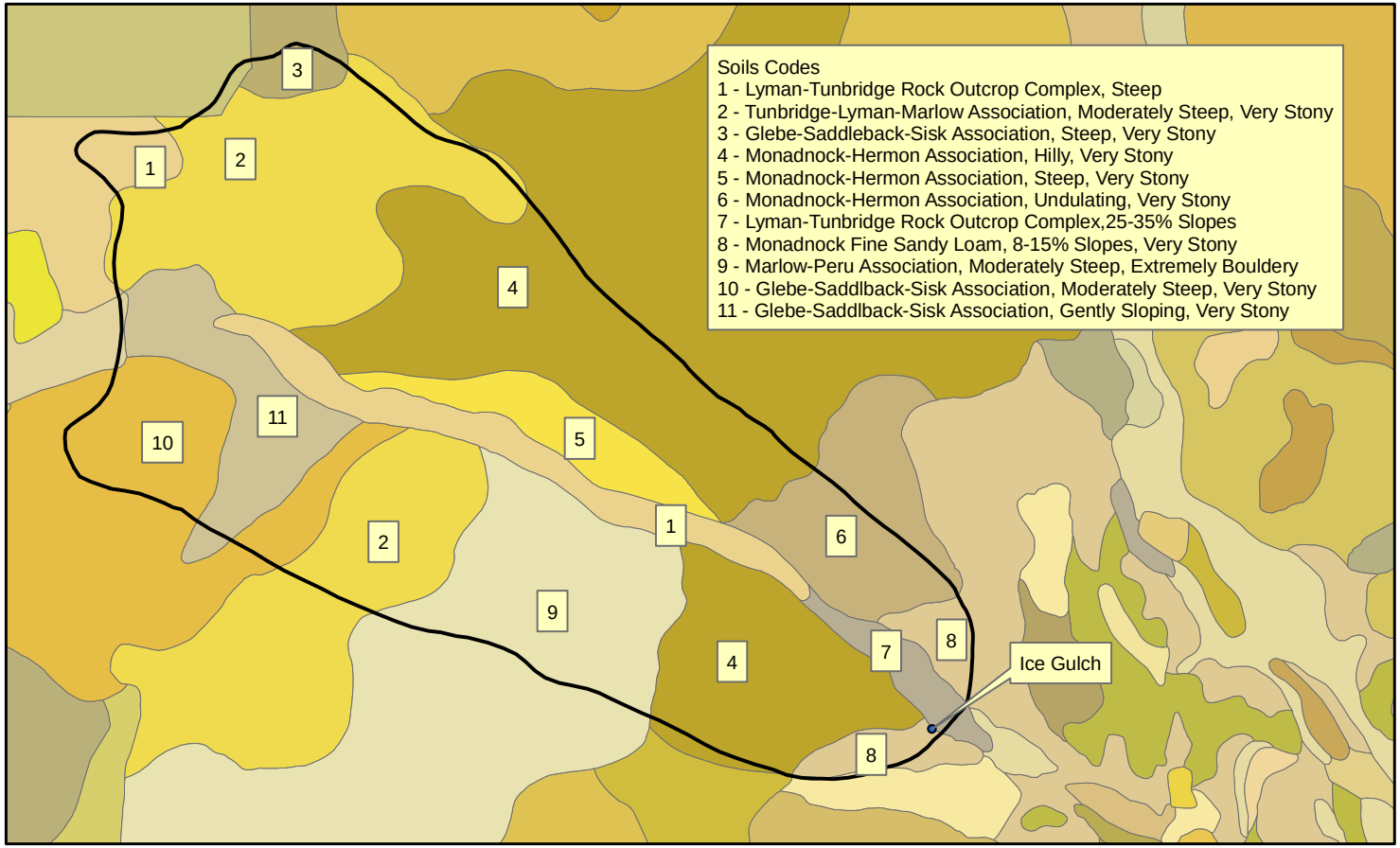
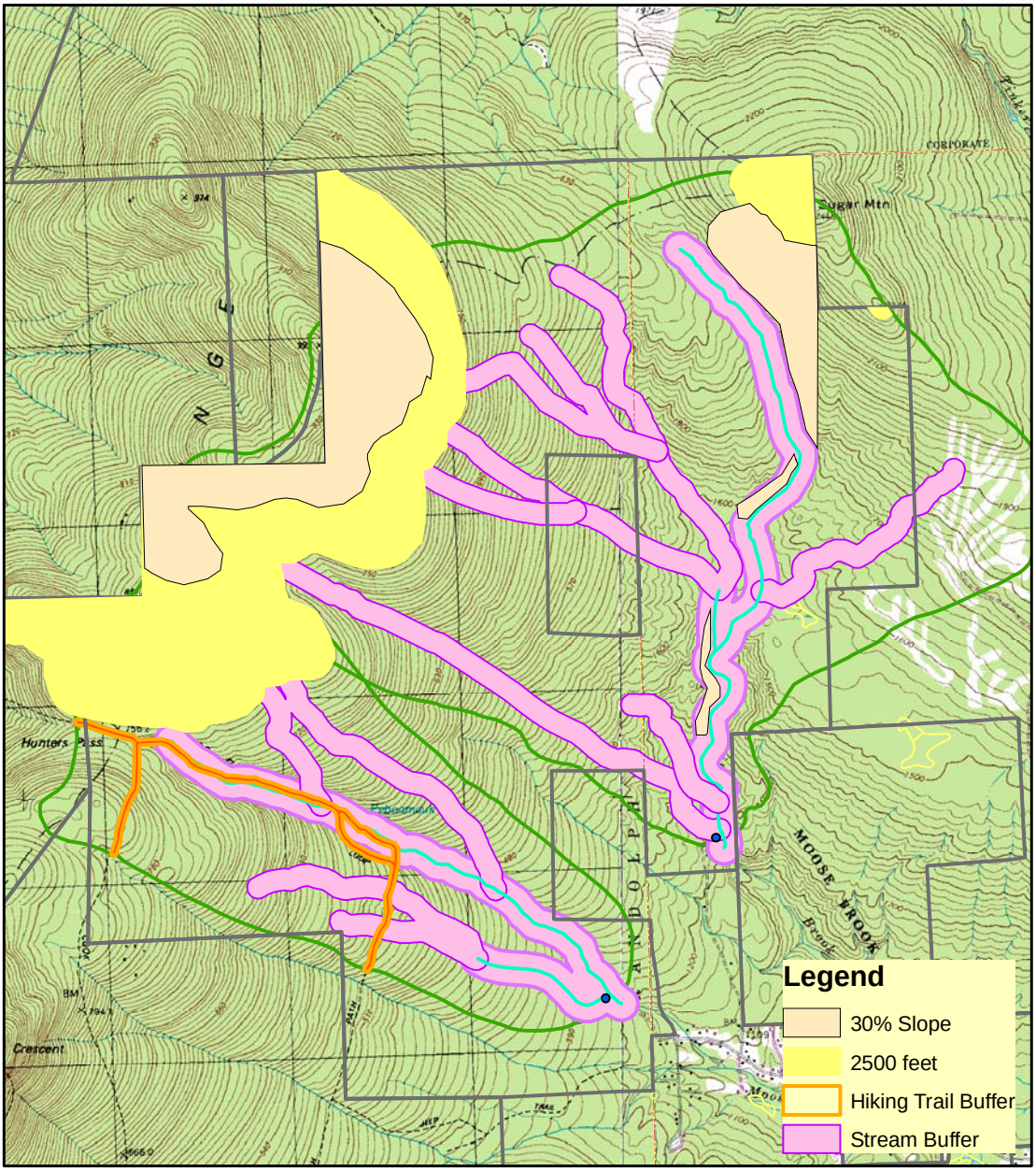


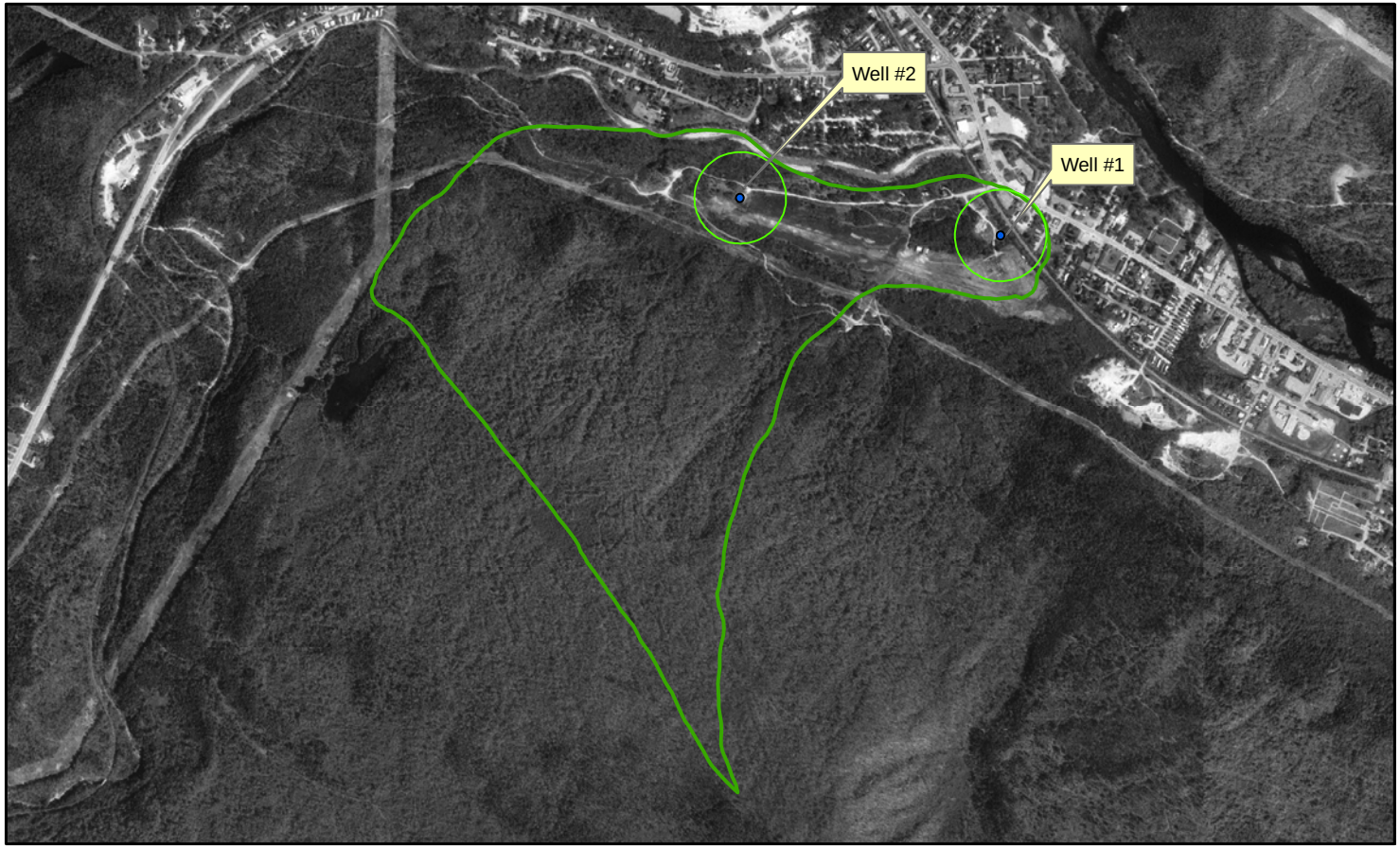
Figure 10. Environmental Zones



Hydrography and water supply data from NH DES.
Environmental Zones from 1990 Forest Management Plan Map.

Map prepared by:
J. O. Palmiotto, NeRWA
October 2004

Figure 11. Potential Contamination Sources



N
W E
S

0 500 1,000 2,000 3,000 4,000
Feet

Legend

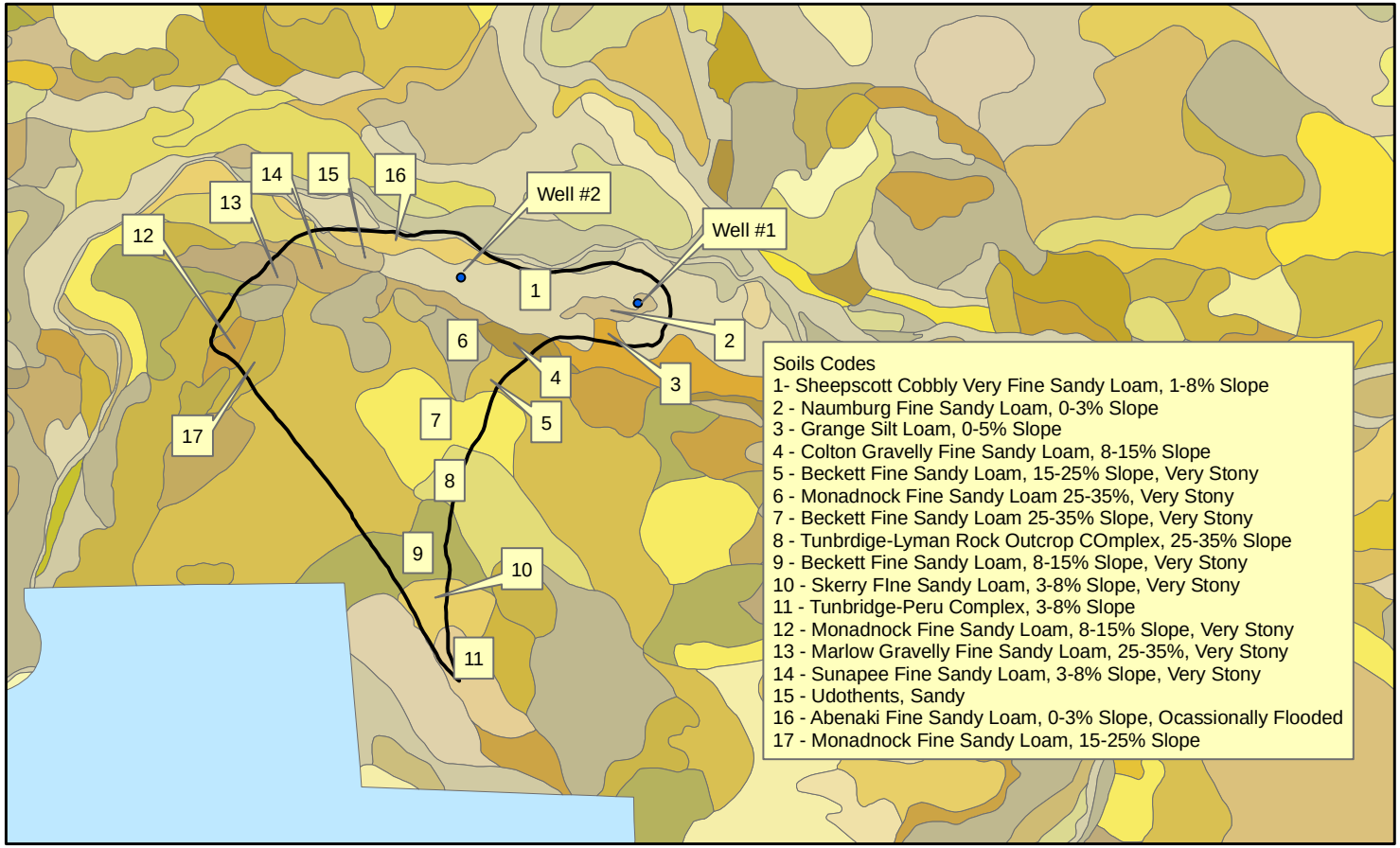
- Water Source
- Wellhead Protection Area
- Sanitary Protective Are (400 foot radius)

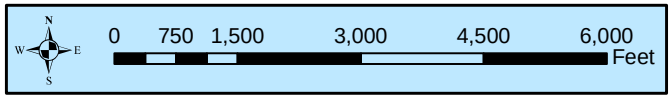
Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 12. Gorham Town Wells: Soils Map





Legend

Water Source

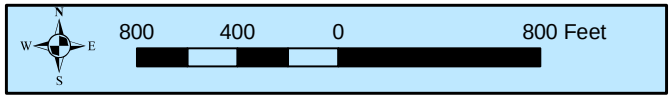
Wellhead Protection Area

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 13. Gorham Hill Spring (0921020)



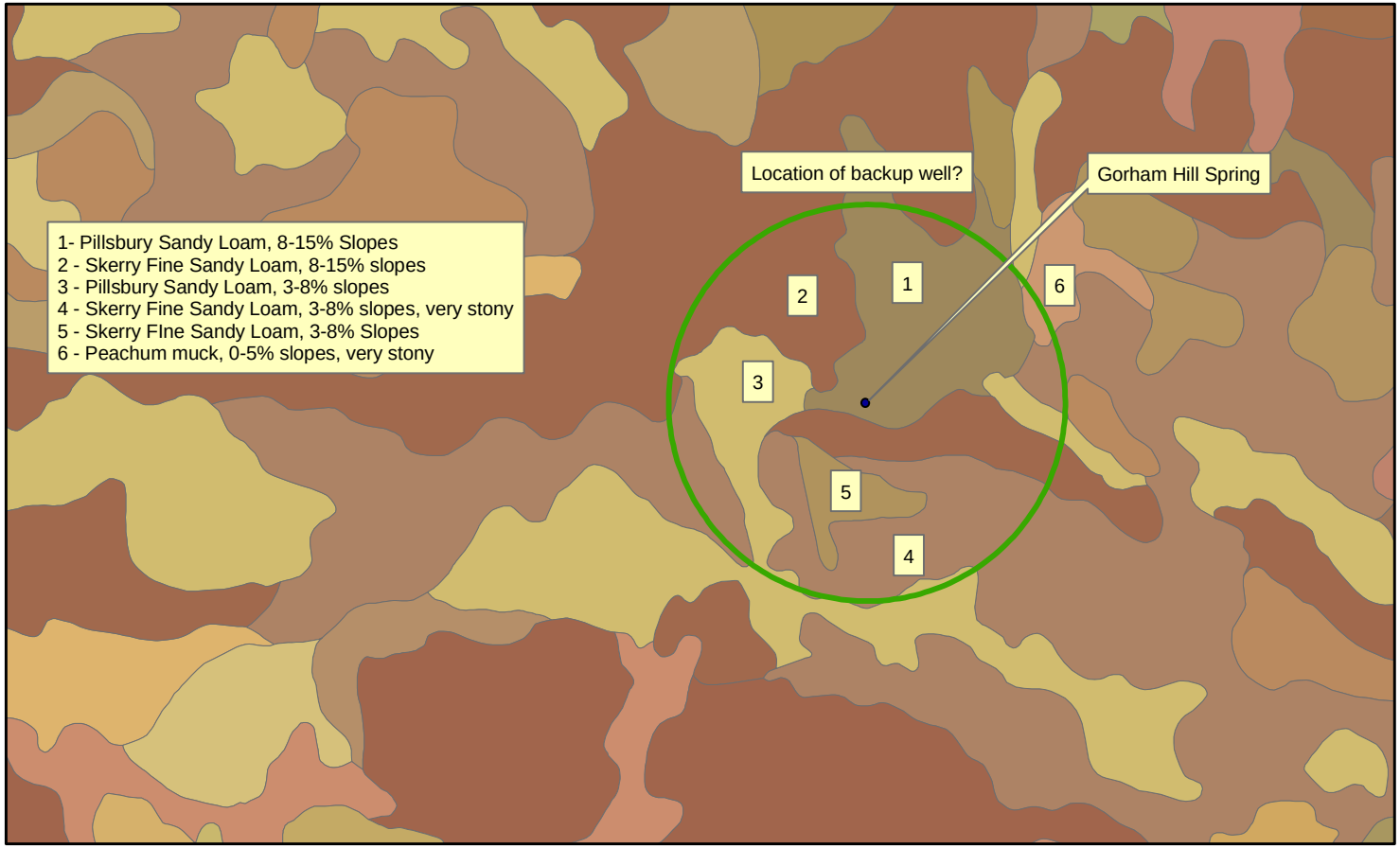
Legend

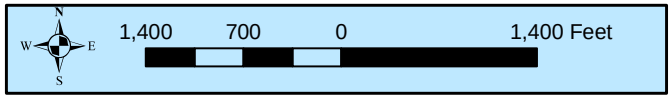
- Water Source
- Wellhead Protection Area
- GHS_Sand_Rad

Water supply data provided by NH DES.
1998 Digital Orthophotos.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association
10/30/04

Figure 15. Soil Map for Gorham Hill Spring (0921020)





Legend

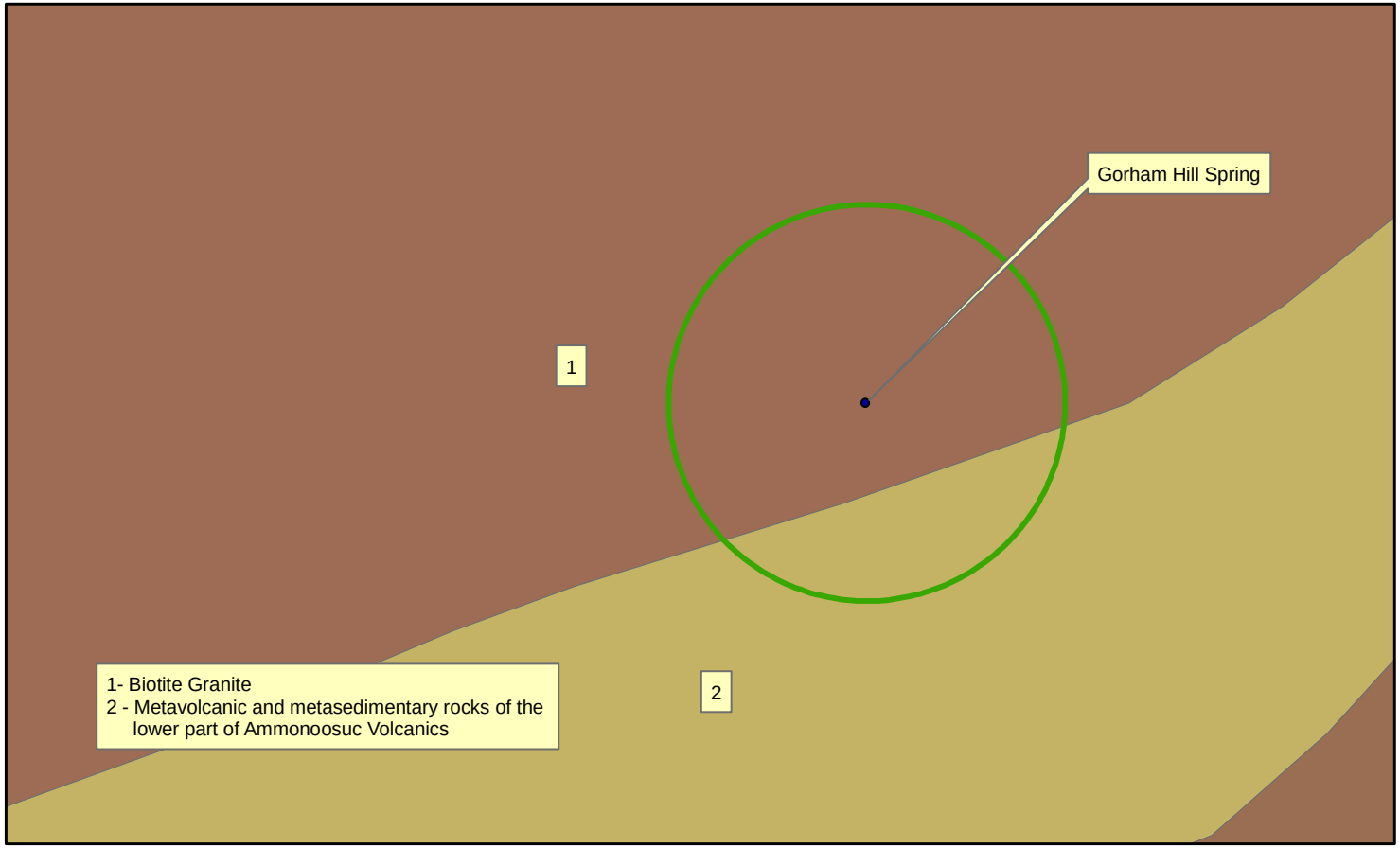
Water Source

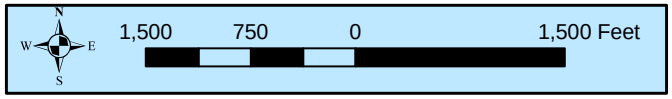
Wellhead Protection Area

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association
10/30/04

Figure 14. Bedrock Geology for Gorham Hill Spring (0921020)





Legend

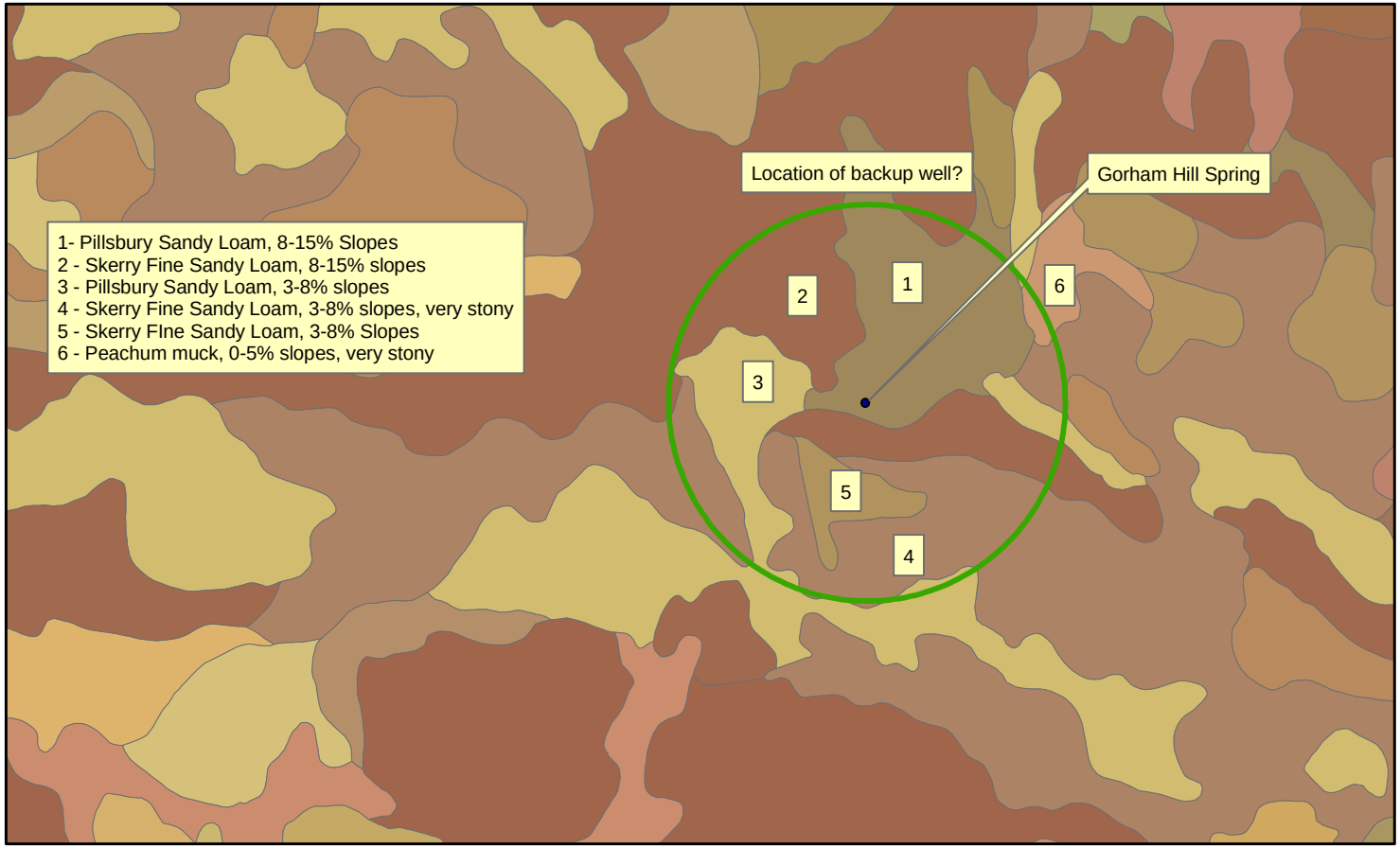
Water Source

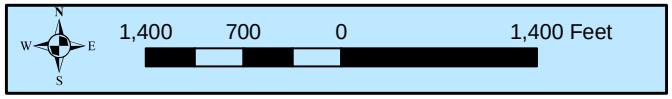
Wellhead Protection Area

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association
10/30/04

Figure 15. Soil Map for Gorham Hill Spring (0921020)





Legend

Water Source

Wellhead Protection Area

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association
10/30/04

Figure 16

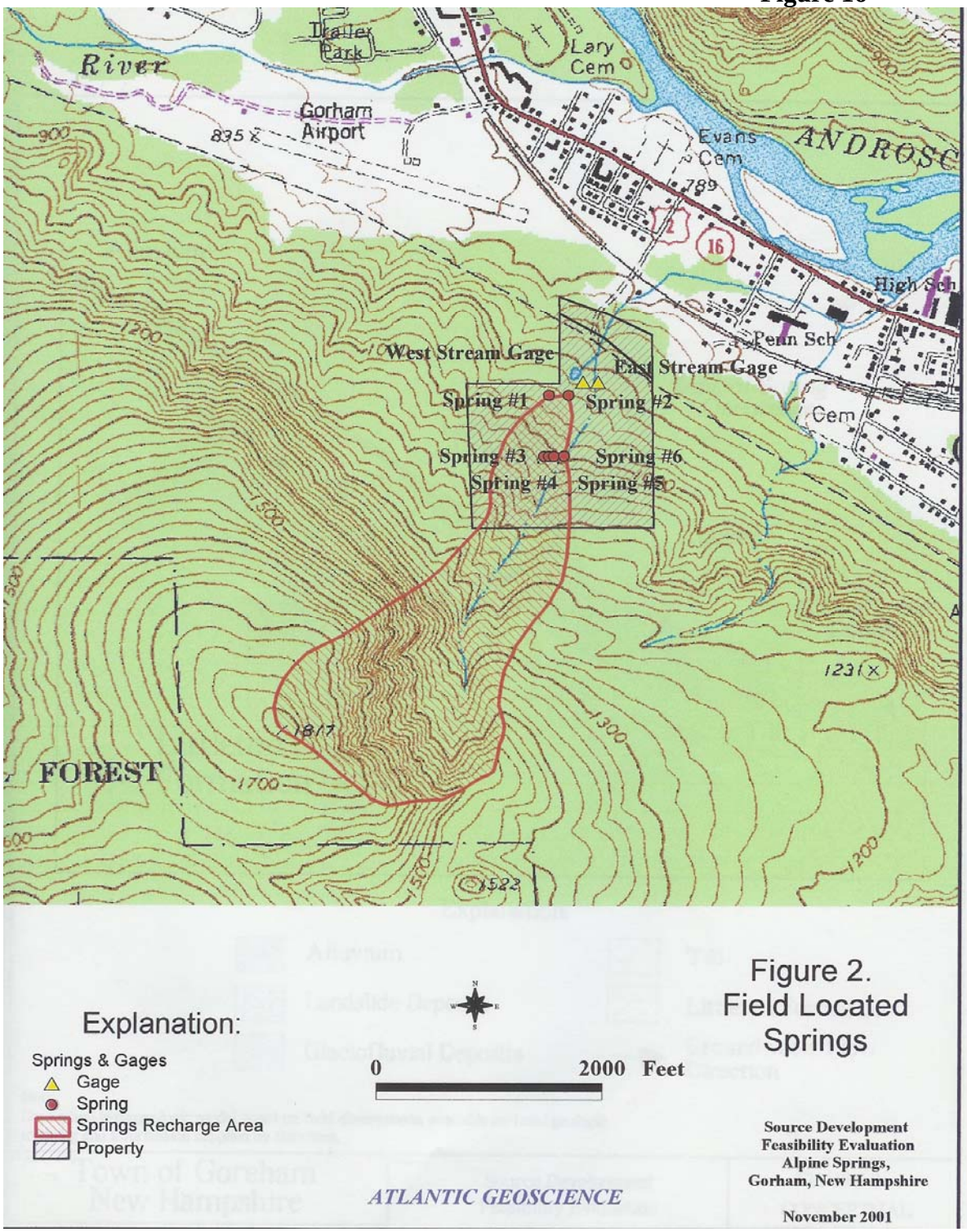
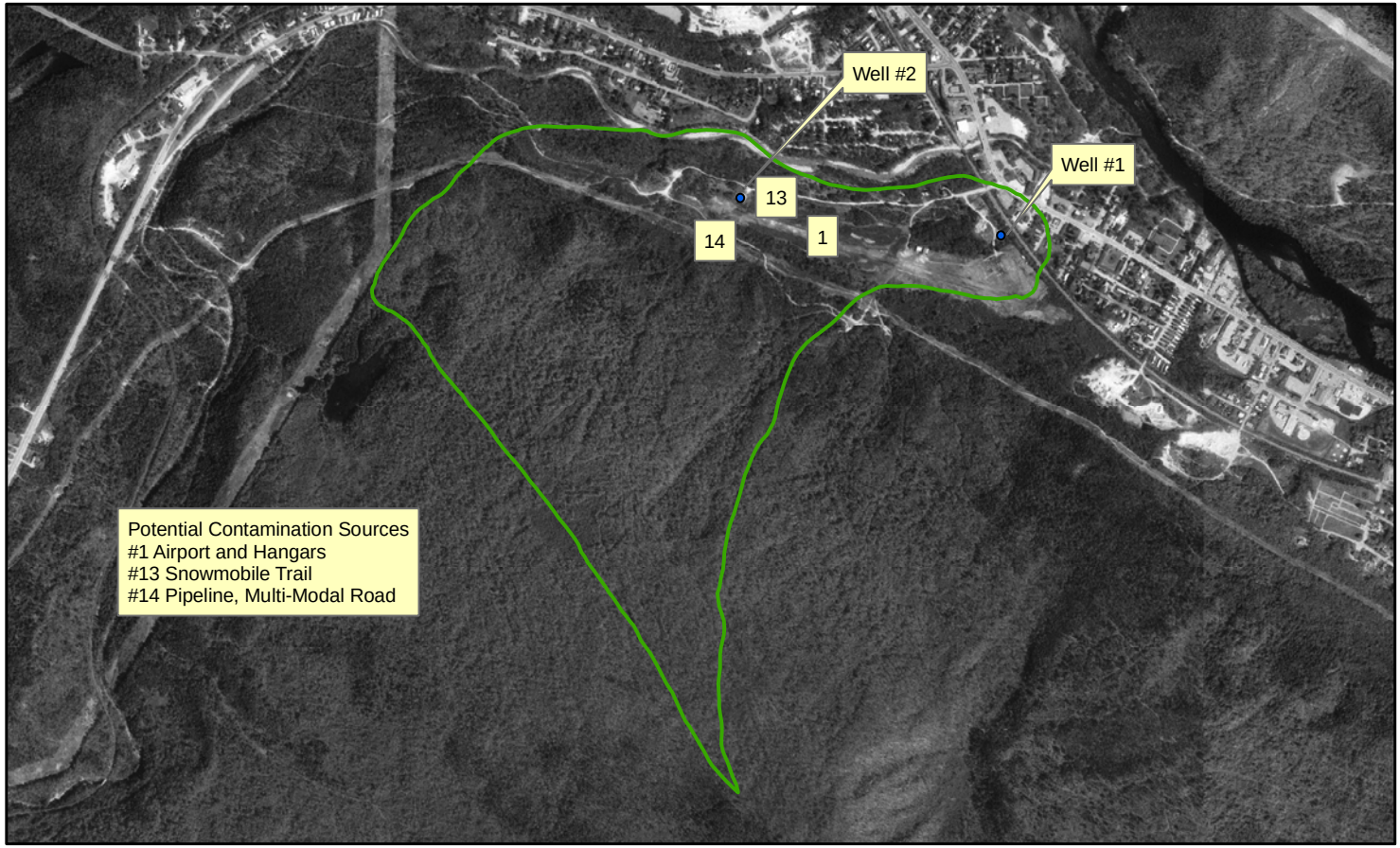

River
Trailer Park
Lary Cem
Gorham Airport
835
Evans Cem
789
ANDROSC
16
High Sch
Penn Sch
Cem
West Stream Gage
East Stream Gage
Spring #1
Spring #2
Spring #3
Spring #4
Spring #5
Spring #6
1200
1500
1300
1700
1817
1231
1522
FOREST
Explanation:
Springs & Gages
Gage
Spring
Springs Recharge Area
Property
0
2000 Feet
Figure 2.
Field Located
Springs
Source Development
Feasibility Evaluation
Alpine Springs,
Gorham, New Hampshire
ATLANTIC GEOSCIENCE
November 2001

Figure 18. Potential Contamination Sources



N W E S

0 500 1,000 2,000 3,000 4,000 Feet

Legend

Water Source

Wellhead Protection Area

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 19. Gorham Town Well #1 and Nearby Potential Sources of Contamination

N W E S

0 85 170 340 510 680 Feet

Legend

Water Source

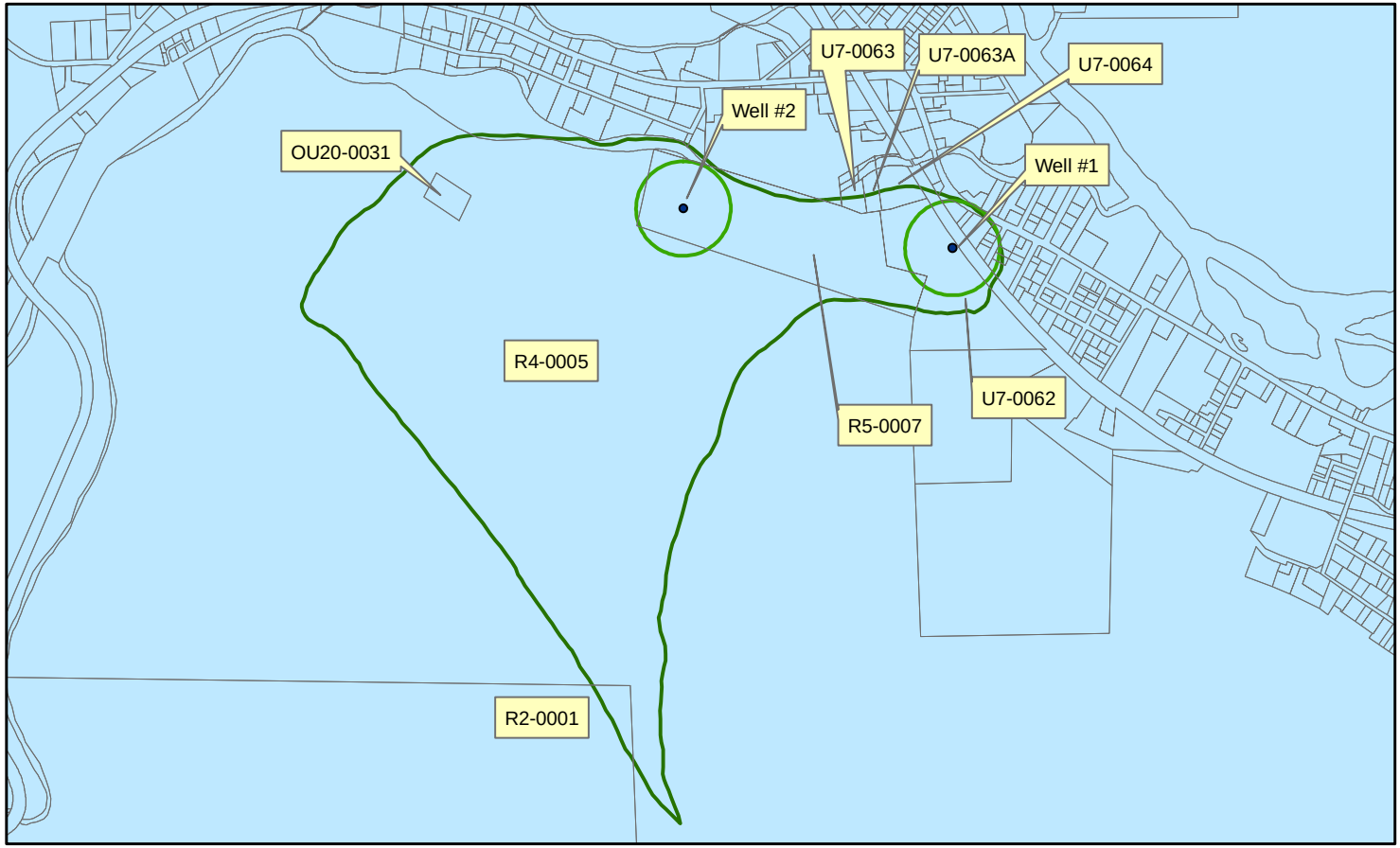
Wellhead Protection Area

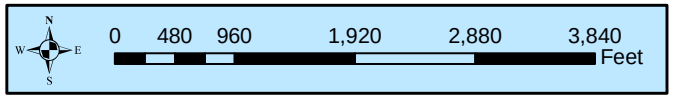
Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 20. Gorham Town Wells (0921010)





Legend

400 Foot Sanitary Radius

Well

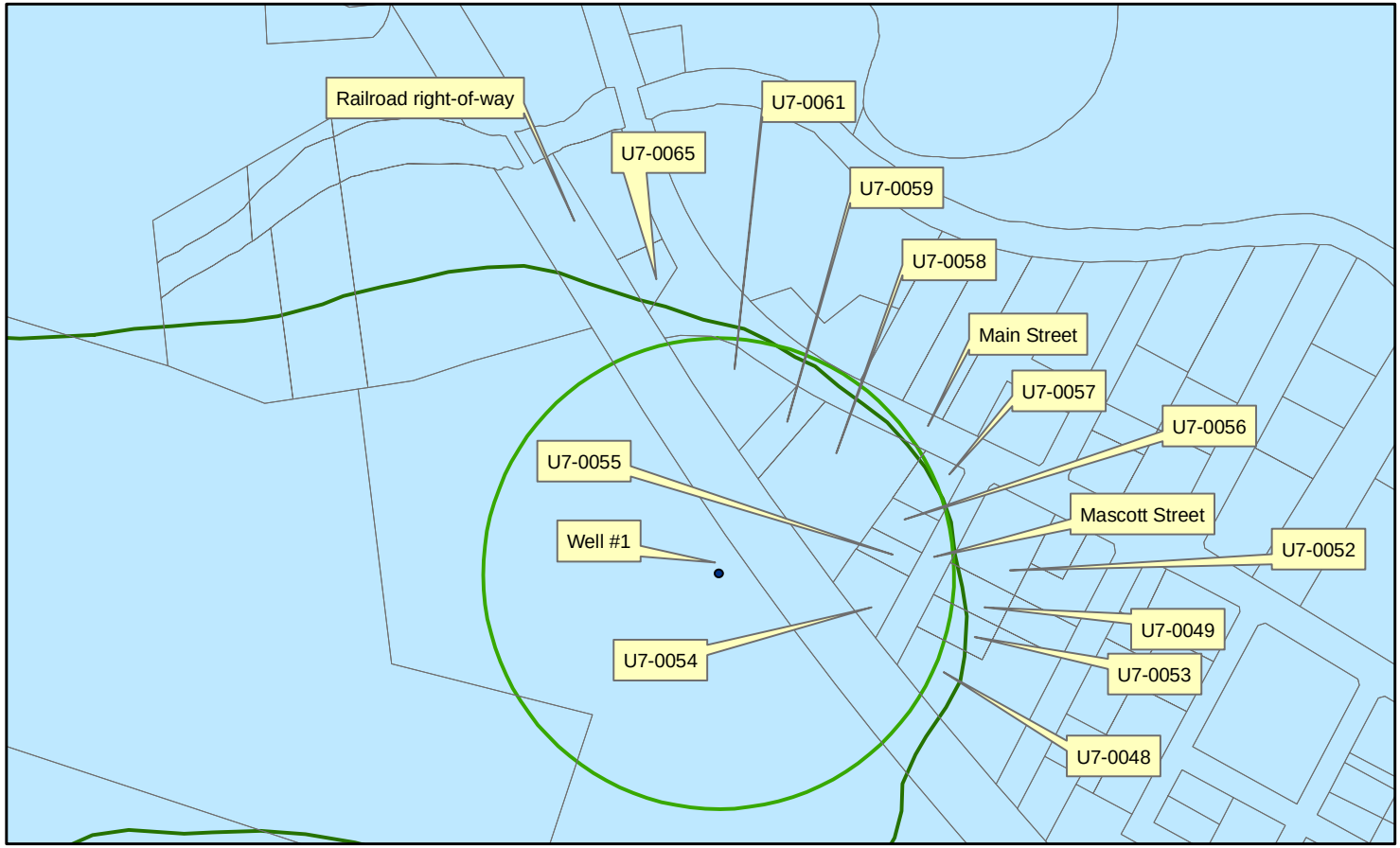
Wellhead Protection Area

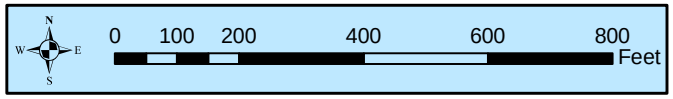
Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 21. Parcels in Sanitary Radius of Well #1 (0921010)





Legend

400 Foot Sanitary Radius

Well

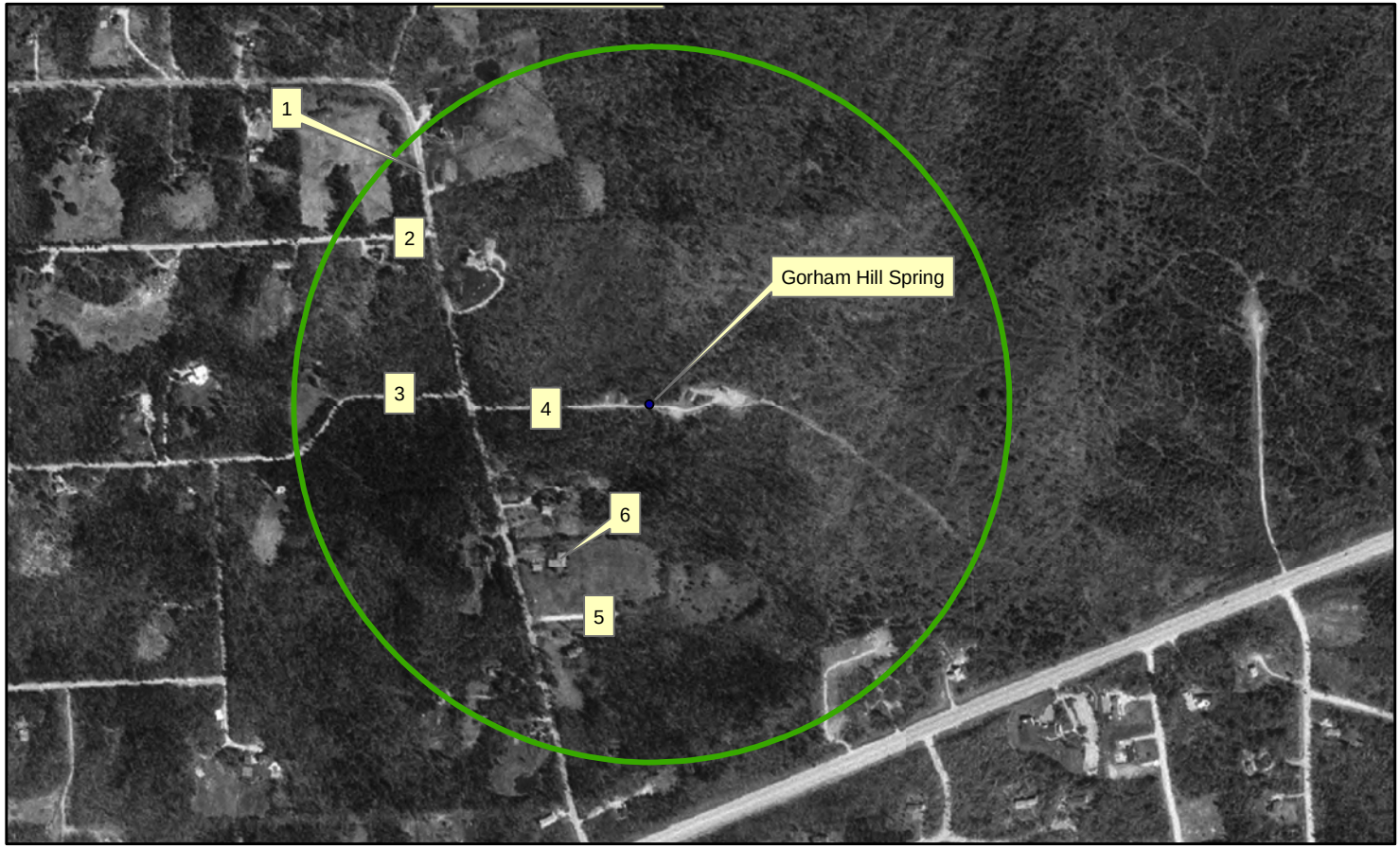
Wellhead Protection Area

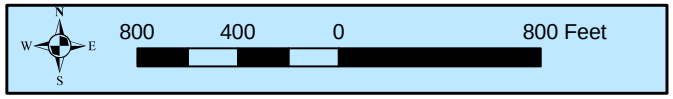
Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association

10/30/04

Figure 22. Map of Potential Contamination Sources for Gorham Hill Spring





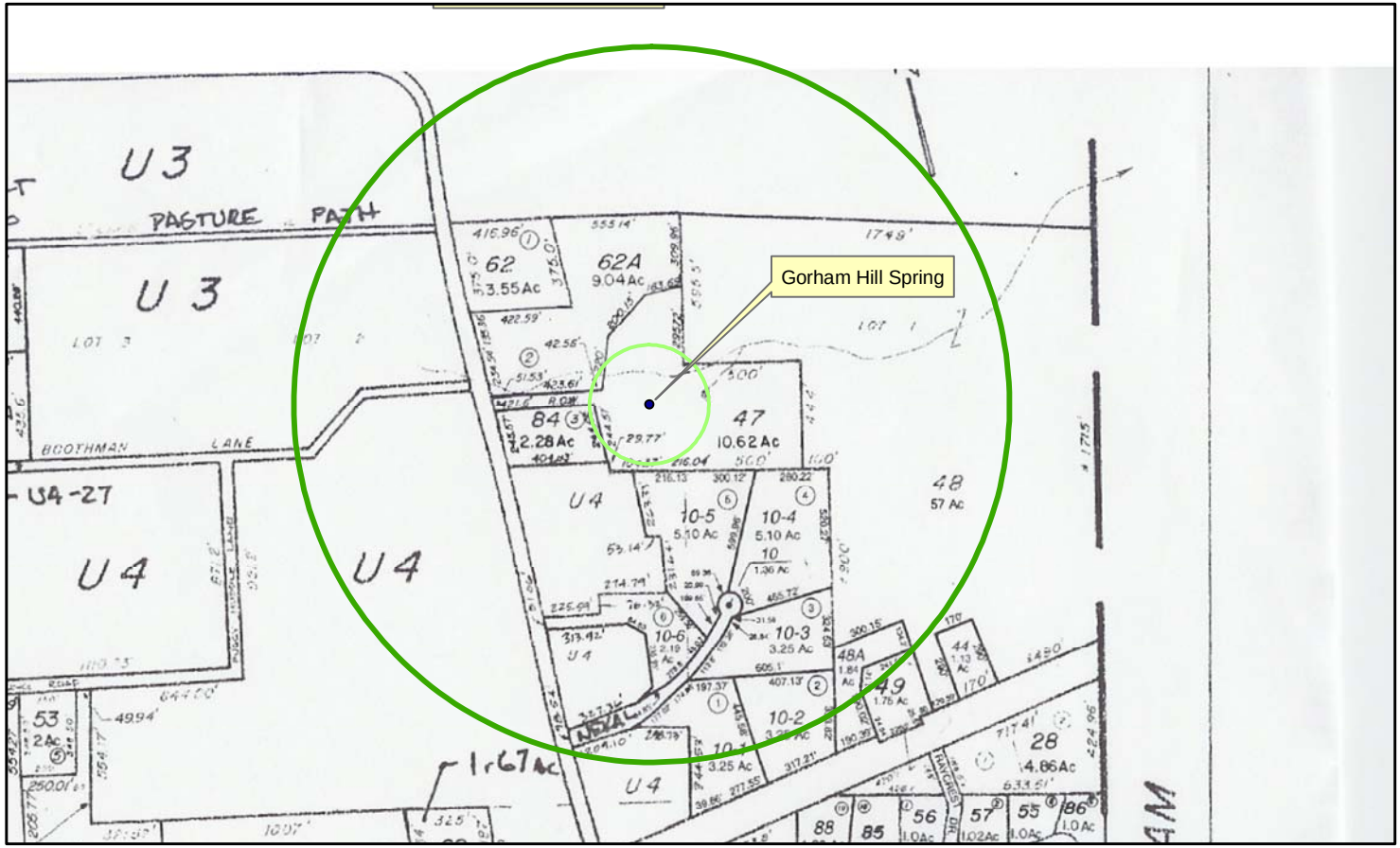
Legend

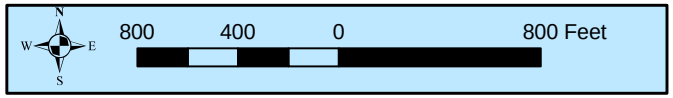
- Water Source
- Wellhead Protection Area

Water supply data provided by NH DES.
1998 Digital Orthophotos.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association
10/30/04

Figure 23. Parcel Map for Gorham Hill Spring (0921020)





Legend

- Water Source
- Wellhead Protection Area
- Sanitary Protective Area (250 foot radius)

Water supply data provided by NH DES.

Map prepared by:
J.O. Palmiotto, Northeast Rural Water Association
10/30/04

VIII. Appendices

Appendix 1

United States Department of Agriculture
NRCS Natural Resources Conservation Service
4 Mayberry Lane, Lancaster, NH 03584-3616 (603) 788-4651 Fax: (603) 788-2538 www.nh.nrcs.usda.gov

August 27, 20(

To: Scott Heckman, USDA – NRCS, District Conservationist
Cc: Attendees
From: Joe Homer and Mike Harrington

Subject: Site review of woods roads in the Gorham Town Forest on 7/22/04, to identify potential cause(s) of turbidity in the Gorham town water supply reservoir.

Attendees: Haven Neal, Gorham Town Forester; Dave Patry, Gorham Water and Sewer Department; Jennifer O. Palmiotto, Source Water Protection Specialist - Northeast Rural Water Association; Mike Heidorn, Northeast Rural Water Association; Mike Kelley Kel-Log, Inc.; Joe Homer, USDA – NRCS, MLRA Soil Survey Project Leader; Mike Harrington, USDA – NRCS, Soil Conservationist

Recent History: This site visit was arranged to determine if excessive erosion from forestry roads or practices could be the cause of turbidity affecting the Town of Gorham, NH water supply. Dave Patry informed the group that the water supply had been experiencing turbidity problems since 2000 but that the levels seemed to be higher recently.

Haven explained that the Town Forest had been heavily affected by the ice storm of 1998, and this, in turn, had affected the harvesting practices scheduled since that time. There was much canopy damage and many more trees had to be harvested than had originally been planned. Most road construction in the inspected area had been done in the summers with all harvesting taking place durin the winter months after the ground had frozen.

The area being inspected had the majority of harvesting done in the 2002-2003 and 2003-2004 seasons. The main haul road will remain open until completion of the harvest, scheduled for the 2004-2005 season, while the side haul road was "put to bed" in the spring of 2004 as the harvest was completed. This entailed removing the culverts, leaving the ditches for water flow with adjacent berms for traffic prevention, and seeding down the road and landing areas. Due to winter harvesting practices there were no evident skid trails or large areas of soil disturbance needing seeding.

There were relatively frequent heavy downpours in the area for the month prior to the site visit.

Comments and observations by Joe Homer: I am quite familiar with the soils in the Gorham Town Forest, as I have conducted a number of soils related workshops there. I was asked by the group to generalize the nature of the soils of the Gorham Town Forest in the vicinity of Perkins Brook. The soils are dominantly glacial tills that have fine sandy loam surface and subsoil layers with loamy sand substratums. Typical soil series observed in the area include the well drained Monadnock, the moderately well drained Sunapee and the poorly drained Moosilauke. A convenient roadcut allowed m to describe the horizons, features and development of a Monadnock soil which is dominant in the watershed. I pointed out that the general concept of this soil is one that has a loamy cap overlying a sandy substratum and that the Monadnock soil series allows 1 to 8 % clay in the surface and subsoil a 1 to 5 % clay in the substratum. I specifically commented on clay content because clay is the most like soil particle that would potentially contribute to turbidity in the reservoir.

During our discussions, Dave Patry commented that following heavy rain events, the water flowing into the reservoir looked like "chocolate milk". I commented that based on the appearance of the woods roads that we looked at that I found it difficult to connect the turbidity he described to the roads we inspected. I added that I was not disputing his observations, but I did not observe conditions on the

The USDA Natural Resources Conservation Service is an equal opportunity provider and employer.

roads or road banks that would lead to the amount of turbidity he described. I asked if the Gorham Water and Sewer Department sampled the water during these heavy rain events to determine if the turbidity was soil related or was possibly organic or biological in nature. Dave replied that they had nc but felt it was a suggestion that they would pursue. I also suggest that doing some tracking upstream from the reservoir during a heavy rain event, may lead them to the source of the turbidity.

During our site visit there were spots identified where small amounts of soil had detached, eroded and settled in flat or concave spots along the woods road and on one wooden bridge. Due to the sensitive nature of this issue, it is in everyone's best interest to stabilize any eroding soil areas, no matter how small. Having said that, in my experience, I've seen very few woods roads on private, state or federal land that have been stabilized as well as has been done in the Gorham Town Forest. Mike Harringtor made specific recommendations to stabilize erosion and will address that in his report.

Comments and observations by Mike Harrington: The roads had very little evidence of erosion wi no rills or gullies present on any road seen, although there was some evidence in a couple of areas of the fine particles on the surface of the road being transported short distances. There were a number c steep road bank cuts that had no, or very little, vegetative cover, but because of particle size and the rock-lined ditches that were at the base of the slopes the sediment appeared to be kept from being transported to the surface waters.

At the bridges seen, there was some evidence of small amounts of road or berm sediment that was being transported to the water, but this was most likely due to recent disturbance of the soil and tl heavy downpours lately.

As the site visit progressed, and after discussions with Haven and Mike K., it was evident that Best Management Practices (BMPs) were exceeded for logging practices. Approximately 50 foot no-c zones were left along each waterway with reduced-cut zones adjacent to the no-cut zones. Winter harvesting practices caused no, or very little, soil disturbance. Good stone-lined ditches and excellen roads seemed to be the matter of course. As harvesting ceased, roads and landings were seeded do to a grass mix. Due to the dry spring and the droughty soils, the grass establishment in some of these areas did not appear to have taken to the desired density.

It was also noted that backflush of the sand filters at the water plant were needed with less frequency than was first anticipated, at the rate of once per year rather than three to four times per ye indicating less particle load than expected during initial testing of the water supply prior to plant construction.

Conclusions/Recommendations: There may have been an increase in sediment load in recent months due to culvert removal and heavy rainfall events, however, there was no evidence of particle transport greater than twenty feet from the source. There was no indication of a source that contribut the amount of sediment necessary to cause the turbity levels described to the group for the length of t that this problem has occurred.

Due to the fact that this watershed provides the water source for the town, extra precautions could be taken to insure the quality of the water. Before expending capital and labor in fruitless pursu several factors should be examined in detail:

1) Qualify and quantify the composition of the turbidity in the embankment pond and water cours prior to entering the filtration system; is it mineral or organic? Fine particles should be easily distinguished from the sand filtration particles after backflushing the system and the extent of fines could be determined by particle-size analysis.

Organic matter could have increased after canopy loss; this fits the time frame of the problem. Heavy rains and steep slopes could carry this lighter matter into the source waters. Larger amour of organics could also be distinguished due to their darker coloration and staining of the water. Analyses, such as filtration and loss-on-ignition of the filtrate, could also help to quantify the amou of mineral versus organic matter present in the water. Plate counts could determine bacterial

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problems although this probably would have been evaluated before present due to this being a water supply for human consumption and this being a standard test.

Determination of turbidity composition should be the highest priority because it will determine the est plan of action. Addressing the wrong material could be costly and irrelevant to the problem.

2) Identify the source of the problem. During heavy rain events, monitor the turbidity levels of individual source waters. Start at the plant and work up the main watercourses. Examine each feeder stream prior to intersection with the main watercourses. Keep records of all findings. These records could help to pinpoint affected areas which would prioritize them for action.

3) Establish a regular maintenance schedule to: remove sediment load from the ditches to keep them operating effectively; examine vegetation establishment and any loss that could be due to excessive water flow; keep diversions such as water bars and broad-based dips correctly shaped and operating as planned. Because this watershed is a drinking water source, these measures, especially, need to be maintained or function will be decreased.

Due to the soils present, vegetation will be difficult to establish, but establishment is necessary to revent erosion of the roads and landings which could provide a source of sediment load to the water. If nalysis of the water or backflush sediment indicates that mineral particles are the primary problem, then her sources may need to be addressed to a larger extent than previously planned. However, at this oint, vegetation establishment and regular maintenance seem to be the most cost effective measures.

Culvert removal may have loosened some particles in the process but the channels appear to ontain enough stone that they will stabilize (reach equilibrium) fairly quickly and not be a long-term roblem.

If specific areas prove to be large sediment contributors, measures such as erosion blankets on ad cuts may increase chances of establishing vegetation, but these measures would probably not be ost effective unless shown to be necessary.

If organic matter amounts due to canopy loss prove to be the cause of the turbidity increases, en vegetation establishment may be the best long term solution with measures such as silt fences in rategic locations the best short term solution.

Appendix 2

Letter #1

Gorham Water and Sewer Department
Letterhead

Date

Dear Resident of Gorham:

The Town of Gorham has developed a Source Protection Plan to protect the Town's public drinking water supplies. The purpose of the plan is to identify potential vulnerabilities of these water sources and to manage these in order to maintain the quality and quantity of our public drinking water sources. Copies of the plan are available at the Town Hall, Town Library, and the Water and Sewer Department.

The purpose of this letter is to ask your cooperation in ensuring safe drinking water. If we are all careful, we can protect our current and future drinking water resources from contamination.

Your property has been identified as being located within the area from which water flows to a public well. Within a wellhead protection area, land uses and/or naturally occurring materials may cause a public water system to become vulnerable to contamination. While naturally occurring contaminants can usually be controlled by treatment methods, property owners can manage potentially contaminating land uses.

Activities such as improperly disposing of household hazardous wastes (i.e. paint thinner) and motor oil, neglecting septic system maintenance, overuse of lawn care products, and the occurrence of home heating fuel spills all have the potential to contaminate a water source. Many of the negative impacts associated with these activities can be avoided with good management. For example, septic systems are designed solely for organic wastes and are not capable of treating household hazardous waste. Instead this waste should be disposed at a Household Hazardous Waste Collection Day. Septic systems should be pumped on a regular basis (approximately every 3-5 years) to avoid septic system failure. By following the Do's and Don'ts on the attached flyer, you can avoid activities which could threaten water quality. Please take the time to review the enclosed flyer. **We need your help to protect this valuable source of drinking water!**

A map showing the location of the wellhead protection area is enclosed. This letter is being sent to all property owners, whose property intersects with the wellhead protection area. Please feel free to contact me for additional information (603) 466-3302.

Thank you for your cooperation in keeping Gorham's drinking water safe.

Sincerely,

Dave Patry
Superintendent
Gorham Water and Sewer Department

Encl. Map
Flyer

Clean drinking water is up to you!

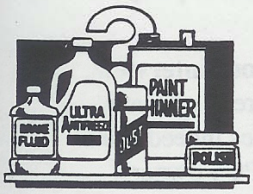
Where does your drinking water come from?

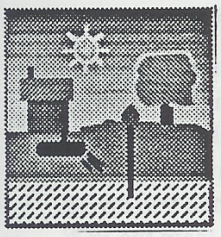
Your drinking water comes from either groundwater or surface water. Groundwater is the water that flows through the spaces between soil particles and through fractures in rock. It comes from rain and snowmelt percolating through the ground. Surface water comes mostly from groundwater seepage into rivers and lakes (including reservoirs).

Why should you be concerned?

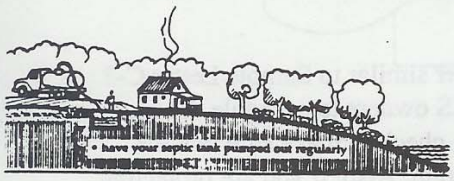
While some pollutants (such as bacteria, viruses, and phosphorus) can be reduced by passing through soil under certain conditions, groundwater can be easily contaminated by chemicals and oils.

What can you do to protect your drinking water?





Do	Don't
Use non-toxic and less-toxic alternatives to household chemicals such as cleaners, oil-based paints, insecticides.	Don't buy more hazardous chemicals than you need.
Take leftover household chemicals to your town's household hazardous waste collection day.	Don't dispose of hazardous chemicals by pouring them down the drain or onto the ground.
Follow package directions on pesticides, fertilizers, and other household chemicals.	Don't over-use household chemicals. More is not better.
Check your underground fuel storage tank (USTs) frequently for leaks. Have an UST removed if it is more than 20 years old; replace it with above-ground storage that has a concrete slab underneath it and a cover over it.	Don't have your tank removed by a contractor who is not familiar with new State guidelines for UST removal.
Take care of your septic system. • Inspect the septic tank every year. • Have the tank pumped out every three years or when the combined thickness of sludge and scum equals 1/3 or more of the tank depth. • Avoid damage to your leach field and distribution lines by keeping vehicles, livestock, and other heavy objects off the leach field.	Don't overload your septic system with solids by using a garbage grinder (unless the system was specifically designed for a grinder). Don't pour chemicals down the sink or toilet. Don't use septic system cleaners or additives containing acids or chemical solvents such as trichloroethylene (TCE).
Fill abandoned wells with cement from bottom to top.	Don't use abandoned wells for waste disposal.



For more information about what you can do, call the Wellhead Protection Program at 271-1168.

Household Hazardous Chemicals

Automotive fluids	Paint thinner
Auto batteries	Other solvents
Used motor oil	Pesticides
Paint	Cleaning products

Reduce - Reuse - Recycle

Appendix 3

Letter #2

Town of Gorham Letterhead

Date

Dear State, Local and Regional Officials:

Enclosed is a map showing the Wellhead Protection Areas and Watershed for two Public Community Water Systems located in Gorham, New Hampshire. A wellhead protection area consists of the surface and subsurface area from or through which contaminants are likely to reach a water supply source. A watershed is delineated to protect surface water supplies. A watershed can be defined as the entire area that drains into a waterbody either through channelized flow or surface runoff.

Land use activities located within these areas have the potential to adversely impact water quality of the associated wells. If the water that supplies our wells, spring, or surface water supply becomes contaminated, it may be impossible to treat the water so that it can continue to be used for drinking water. We are proactively trying to protect are water sources by implementing a source protection plan of which this letter of notification is a part.

We are contacting you to request your assistance in protecting these water supplies. There are a number of ways in which your agency may be able to help with protection that can help reduce the possibility of contamination of the water supply. For example, please keep us informed of any related land use decisions or permitting issues and involve us in the planning and decision process where it is deemed appropriate.

On behalf of the Town of Gorham, I would like to thank you for your attention to this matter. If you have any questions or if I can be of some assistance please feel free to call me at (603) 466-3322.

Sincerely,

Bill Jackson
Town Manager

Encl. Map

Appendix 4

Letter #3

Gorham Water and Sewer Department
Letterhead

Date

Dear Business Owner/Manager:

The Town of Gorham has developed a Source Protection Plan to protect the Town's public drinking water supplies. The purpose of the plan is to identify potential vulnerabilities of these water sources and to manage these in order to maintain the quality and quantity of our public drinking water sources. Copies of the plan are available at the Town Hall, Town Library, and the Water and Sewer Department.

The purpose of this letter is to ask your cooperation in ensuring safe drinking water. If we are all careful, we can protect our current and future drinking water resources from contamination.

Your facility has been identified as being located in the area from which water flows to our wells. Please help us maintain Gorham's excellent water quality by properly using, storing, and disposing of any substances which might represent a potential hazard to our water system. To help you avoid activities which could threaten water quality, I have enclosed an information flyer and a copy of the State Best Management Practices Rules (Env-Ws 421). Compliance with the Best Management Practices rules is mandatory if your business stores, handles, or disposes of regulated substances in greater than household quantities. By complying with these rules and implementing the suggested practices contained on the flyer, you will help protect Gorham's public drinking water supplies and at the same time reduce your environmental liability.

A map showing the location of the wellhead protection area is enclosed. This letter is being sent to all property owners, whose property intersects with the wellhead protection area. Please feel free to contact me for additional information (603) 466-3302.

On behalf of the Town of Gorham, I would like to thank you for your attention to this matter.

Sincerely,

Dave Patry
Superintendent
Gorham Water and Sewer Department

Encl. Map
BMP Rules, Flyer

Disclaimer:

The rules on this page are provided for the convenience of interested parties. While DES has taken care with the accuracy of the files accessible here, they are not necessarily the "official" administrative rules of the N.H. Department of Environmental Services. Administrative rules are periodically revised and readopted. Although every effort is made to see that the rules on this page are the most current versions available, some lapse in time may occur between adoption and the electronic posting of new rules or other files which may alter the meaning or context of those files. An "official" hard copy of all DES-related rules may be obtained from the DES Public Information and Permitting office, (603) 271-2975.

New Hampshire Code of Administrative Rules
Env-Ws 421

PART Env-Ws 421 BEST MANAGEMENT PRACTICES

Env-Ws 421.01 Purpose. The purpose of these rules is to establish the minimum required management practices to be employed when performing activities that require the use of regulated substances, so that the risk of groundwater contamination is minimized.

Source. #5543, eff 12-24-92, EXPIRED: 12-24-98

New. #6947, eff 2-25-99

Env-Ws 421.02 Applicability.

(a) Subject to (b), below, these rules shall apply only to potential contamination sources listed in RSA 485-C:7 that purchase, handle, or store any regulated substances in regulated containers.

(b) Pursuant to RSA 485-C:11, I, these rules shall not apply to:

(1) Potential contamination sources listed in RSA 485-C:7, II(j); or

(2) Those regulated substances defined as pesticides under RSA 430:28 ,XXVI.

(c) Potential contamination sources shall be subject to inspections by the department in any area.

Source. #5543, eff 12-24-92, EXPIRED: 12-24-98

New. #6947, eff 2-25-99

Env-Ws 421.03 Definitions.

(a) "Department" means the New Hampshire department of environmental services.

(b) "Floor drain" means an opening in a floor that is not specifically included in an authorized discharge under one or more of the following regulatory mechanisms:

(1) A NH groundwater discharge permit;

(2) A registration required by Env-Ws 1500;

(3) A national pollutant discharge elimination system permit; or

(4) A local authorization to discharge to the local wastewater treatment facility.

(c) "Impervious surface" means a surface through which regulated contaminants cannot pass when spilled. The term includes concrete and asphalt unless unsealed cracks or holes are present, but does not include earthen, wooden, or gravel surfaces or other surfaces which could react with or dissolve when in contact with the substances stored on them.

(d) "Potential contamination source" means "potential contamination source" as described in RSA 485-C:7, I, namely, "human activities or operations upon the land surface shall be considered potential contamination sources if the activity or operation poses a reasonable risk that regulated contaminants may be introduced into the environment in such quantities as to degrade the natural groundwater quality." The term includes those sources listed in RSA 485-C:7, II.

(e) "Regulated container" means any device in which a regulated substance is stored, transported, treated, disposed of, or otherwise handled, with a capacity of greater than or equal to 5 gallons. The term does not include fuel tanks attached to and supplying fuel to a motor vehicle.

(f) "Regulated substance" means either:

(1) "Oil" means "oil" as defined pursuant to RSA 146-A:2, III; or

(2) A substance listed in 40 CFR 302, 7-1-90 edition, with the following exclusions:

a. Ammonia;

b. Sodium hypochlorite;

c. Sodium hydroxide;

d. Acetic acid;

e. Sulfuric acid;

f. Potassium hydroxide; and

g. Potassium permanganate.

(g) "Secondary containment" means a structure, such as a berm or dike with an impervious surface, which is adequate to hold any spills or leaks at 110% of the volume of the largest regulated container in the storage area.

(h) "Storage area" means a place where a regulated container is kept for a period of 10 or more consecutive days.

(i) "Work sink" means a sink necessary for the performance of activities that require use of a regulated substance, excluding the following instances:

(1) When there are flow through process systems involving a steady, variable, recurring, or intermittent flow of materials during operation; and

(2) When discharge from the sink is not authorized to discharge into the environment under one or more of the following regulatory mechanisms:

a. A NH groundwater discharge permit;

b. A registration required by Env-Ws 1500;

c. A national pollution discharge elimination system permit; or

d. A local authorization to discharge to the local wastewater treatment facility.

Source. #5543, eff 12-24-92, EXPIRED: 12-24-98

New. #6947, eff 2-25-99

Env-Ws 421.04 Storage of Regulated Substances.

(a) All hazardous wastes shall be stored in compliance with applicable federal regulations and state requirements as specified in RSA 147-A and rules adopted pursuant thereto.

(b) Regulated containers, other than all on-premise use heating tanks or aboveground or underground storage tanks regulated under Env-Wm 1401 and Env-Wm 1402, shall be stored in an area having an impervious surface. The impervious surface shall be inspected to ensure no cracks or holes exist prior to storage of any regulated containers and annually thereafter during continued use of the storage area.

(c) Storage areas, for other than all on-premise use heating tanks or aboveground or underground storage tanks regulated under Env-Wm 1401 and Env-Wm 1402, shall be secured against

unauthorized entry by personal surveillance, physically-restricted access, or a combination of personal surveillance and physically-restricted access.

(d) Storage areas shall be inspected weekly for signs of spills and/or leakage from regulated containers. The aisle space between regulated containers which cannot be moved by hand shall be of ample size to allow an inspector to determine the condition of individual regulated containers.

(e) Regulated containers, other than on-premise use heating tanks or aboveground or underground storage tanks regulated under Env-Wm 1401 and Env-Wm 1402, in outside storage areas shall be kept covered at all times unless substances are actively being added to or removed from the regulated container or the regulated containers are in the process of being transferred to another location. If a regulated container is kept in an area with secondary containment, the covering shall be sufficient to keep bermed areas beneath it free of rain, snow, or ice.

(f) Regulated containers, other than on-premise use heating tanks or aboveground or underground storage tanks regulated under Env-Wm 1401 and Env-Wm 1402, in outside storage areas, shall not be stored within any of the following:

(1) For surface waters, 50 feet;

(2) For private wells, 75 feet; or

(3) The protective radius of any public water supply well.

(g) Regulated containers, other than on-premise use heating tanks or aboveground or underground storage tanks regulated under Env-Wm 1401 and Env-Wm 1402, in outdoor storage areas, shall have secondary containment. Aboveground storage tanks shall also be subject to secondary containment requirements contained in 40 CFR 112, where applicable.

(h) Regulated containers, other than on-premise use heating tanks or aboveground or underground storage tanks regulated under Env-Wm 1401 and Env-Wm 1402, in outdoor storage areas, shall not be closer than 50 feet to a storm drain unless there is secondary containment as specified in Env-Ws 421.04(g).

(i) Each regulated container shall be clearly and visibly labeled with the chemical and trade name of the material stored within.

(j) Each regulated container shall remain closed and sealed at all times except to add or remove regulated substances. Regulated containers equipped with spigots, valves, or pumps shall be considered closed and sealed, provided that drip pans are placed and maintained under the spigots, valves, or pumps.

(k) Spill control and containment equipment, including as a minimum, absorbents to pick up spills and leaks, shall be readily available.

Source. #5543, eff 12-24-92, EXPIRED: 12-24-98

New. #6947, eff 2-25-99

Env-Ws 421.05 Use of Regulated Substances.

(a) Funnels and drip pans shall be used when transferring regulated substances from or to regulated containers.

(b) Fueling or transferring regulated substances from or to containers shall be done only over an impervious surface.

Source. #5543, eff 12-24-92, EXPIRED: 12-24-98

New. #6947, eff 2-25-99

Env-Ws 421.06 Floor Drains. Interior floor drains shall discharge to a holding tank registered in accordance with Env-Ws 1500.

unauthorized entry by personal surveillance, physically-restricted access, or a combination of personal surveillance and physically-restricted access.

(d) Storage areas shall be inspected weekly for signs of spills and/or leakage from regulated containers. The aisle space between regulated containers which cannot be moved by hand shall be of ample size to allow an inspector to determine the condition of individual regulated containers.

(e) Regulated containers, other than on-premise use heating tanks or aboveground or underground storage tanks regulated under Env-Wm 1401 and Env-Wm 1402, in outside storage areas shall be kept covered at all times unless substances are actively being added to or removed from the regulated container or the regulated containers are in the process of being transferred to another location. If a regulated container is kept in an area with secondary containment, the covering shall be sufficient to keep bermed areas beneath it free of rain, snow, or ice.

(2) The method by which the designated person should be contacted, such as by phone, or in person at the main office when there is a release;

(3) The procedure for spill containment; and

(4) Emergency phone numbers including:

a. State police;

b. Local police and fire department;

c. Local hospital;

d. Department of environmental services;

e. Poison control center; and

f. Office of emergency management.

Source. #5543, eff 12-24-92, EXPIRED: 12-24-98

New. #6947, eff 2-25-99

Env-Ws 421.10 Waivers.

(a) The rules contained in this part are intended to apply to a variety of conditions and circumstances. It is recognized that strict compliance with all rules prescribed herein might not fit every conceivable situation. Thus, persons subject to these rules may request a waiver of specific rules outlined in this part in accordance with this section.

(b) All requests for waivers shall be submitted in writing to the department and include the following information:

(1) A description of the facility or site to which the waiver request relates, including the name, address, and identification number of the facility or site;

(2) A reference to the specific section of the rules from which a waiver is being sought;

(3) A full explanation of why a waiver is necessary;

(4) A full explanation with supporting data of the alternative(s), if any, proposed to be implemented or used in lieu of the section's requirements; and

(5) A full explanation of how the proposed alternative(s), if any, is consistent with the intent of RSA 485-C and would adequately protect human health and the environment.

(c) The department shall approve a request for a waiver upon finding that the provisions of RSA 485-C will be met and human health and the environment will be protected under the terms of the requested waiver.

(d) No waiver shall be granted which, in the judgment of the department, contravenes the intent of RSA 485-C or these rules.

(e) The department shall issue a written response to a request for a waiver within 90 days of receipt of the request. If the department denies the request, the reasons(s) for the denial shall be clearly stated in the written response.

Source. #5543, eff 12-24-92, EXPIRED: 12-24-98

New. #6947, eff 2-25-99

Env-Ws 421.11 Compliance by Political Subdivisions.

(a) The rules in this chapter have been developed and are intended to protect public health and the environment. All entities who engage in the activities regulated under these rules are encouraged to fully comply with the rules. Regardless of any exemption(s) from specific requirements of these rules pursuant to (b), below, all entities that engage in the activities regulated by these rules remain fully responsible for complying with all applicable statutes, such as those which prohibit the discharge of pollutants to groundwater.

(b) No specific requirement in these rules that is new, expanded or modified as compared to any requirement in effect prior to November 28, 1984, shall apply to a political subdivision unless such requirement:

(1) Is fully funded by the state;

(2) Is approved for funding by a vote of the local legislative body of the political subdivision;

(3) Does not necessitate local expenditures in addition to those already required for compliance with the requirement in effect prior to November 28, 1984; or

(4) Implements a federal statute or regulation with which the political subdivision would otherwise be required to comply by the federal government.

Source. #6947, eff 2-25-99

Clean drinking water is up to you!

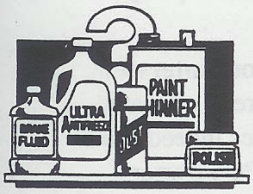
Where does your drinking water come from?

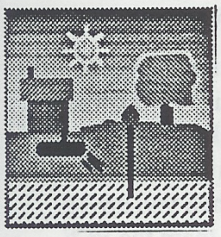
Your drinking water comes from either groundwater or surface water. Groundwater is the water that flows through the spaces between soil particles and through fractures in rock. It comes from rain and snowmelt percolating through the ground. Surface water comes mostly from groundwater seepage into rivers and lakes (including reservoirs).

Why should you be concerned?

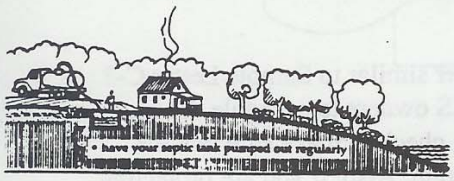
While some pollutants (such as bacteria, viruses, and phosphorus) can be reduced by passing through soil under certain conditions, groundwater can be easily contaminated by chemicals and oils.

What can you do to protect your drinking water?





Do	Don't
Use non-toxic and less-toxic alternatives to household chemicals such as cleaners, oil-based paints, insecticides.	Don't buy more hazardous chemicals than you need.
Take leftover household chemicals to your town's household hazardous waste collection day.	Don't dispose of hazardous chemicals by pouring them down the drain or onto the ground.
Follow package directions on pesticides, fertilizers, and other household chemicals.	Don't over-use household chemicals. More is not better.
Check your underground fuel storage tank (USTs) frequently for leaks. Have an UST removed if it is more than 20 years old; replace it with above-ground storage that has a concrete slab underneath it and a cover over it.	Don't have your tank removed by a contractor who is not familiar with new State guidelines for UST removal.
Take care of your septic system. • Inspect the septic tank every year. • Have the tank pumped out every three years or when the combined thickness of sludge and scum equals 1/3 or more of the tank depth. • Avoid damage to your leach field and distribution lines by keeping vehicles, livestock, and other heavy objects off the leach field.	Don't overload your septic system with solids by using a garbage grinder (unless the system was specifically designed for a grinder). Don't pour chemicals down the sink or toilet. Don't use septic system cleaners or additives containing acids or chemical solvents such as trichloroethylene (TCE).
Fill abandoned wells with cement from bottom to top.	Don't use abandoned wells for waste disposal.



For more information about what you can do, call the Wellhead Protection Program at 271-1168.

Household Hazardous Chemicals

Automotive fluids	Paint thinner
Auto batteries	Other solvents
Used motor oil	Pesticides
Paint	Cleaning products

Reduce - Reuse - Recycle

Appendix 5

Turbidity Monitoring
For the Perkins Brook and Ice Gulch Drainages

To date, turbidity monitoring has not been conducted in the Gorham Town Forest. Because this area serves as the drainage area for the Perkins Brook and Ice Gulch sources, an understanding of turbid conditions is of paramount importance.

The approach for this pilot study was developed in consultation with Mike Heidorn (NeRWA Hydrogeologist), Chris Eager, (Hubbard Brook Project Leader), and Scott Bailery (Hubbard Brook Geologist).

To begin a basic monitoring approach:

Conduct four rounds of samples. Samples should be collected at the inlets and outlets of the two reservoirs and after the filtration system at the plant. One round of sampling should occur during non-turbid conditions to establish some baseline conditions. Three rounds should be conducted during turbid conditions following rain events. Samples should be tested fortotal suspended solids, total organic carbon (TOC), dissolved organic carbon (DOC), turbidity, and iron.

No samples will be conducted in the tributaries unless the inlets show obvious turbidity problems. If this occurs, the monitoring program will progress into stage 2, a more intensive monitoring program. No bacteria identification/testing should occur until sediment and organics are ruled out as causes. Based upon the results of this study, a long-term monitoring will be developed.

eastern analytical, inc.

professional laboratory services

Quotation 1002835

Jen Palmiotto
NE Rural Water
PO Box 338
Walpole , NH 03608

Quotation Date: 8/11/2004

Project ID: Gorham Reservoir Storm Water
Project Specific Pricing

EAI Project ID:

Dear Ms. Palmiotto:

Thanking you in advance for the opportunity to provide this quotation.

Qty.	Description	Discountable Y/N	List Price	Disc Unit Price	Net Ext Price
1	Solids, Total Suspended	N	$15.00	$15.00	$15.00
1	TOC (Aqueous)	N	$35.00	$35.00	$35.00
1	DOC (Aqueous) (sample will need to be filtered at lab)	N	$35.00	$35.00	$35.00
1	Turbidity	N	$15.00	$15.00	$15.00
1	Metals Aqueous Prep ICP	N	$10.00	$10.00	$10.00
1	Iron	N	$10.00	$10.00	$10.00

Gross Quotation Amount $120.00-

Total: **$120.00**

Please reference Quotation Number on COC when submitting samples.
Quoted prices are based on standard 10 day turnaround time.

Sincerely,

Scott B. Kelley
Eastern Analytical, Inc.

This quotation is valid for 90 days from the date quoted.

25 Chenell Drive Concord, NH 03301 **www.eailabs.com** TEL **800-287-0525** (603) 228-0525 Fax (603) 228-4591

Appendix 6

Copies of the Emergency Response Plan are available for review at the Gorham Water and Sewer Department and New Hampshire Department of Environmental Services.

Appendix 7

GORHAM, NEW HAMPSHIRE

TOWN WELL SOURCE PROTECTION ORDINANCE

SECTION 1. PURPOSE AND AUTHORITY

A. Pursuant to the authority granted under RSA 674:16, in particular RSA 674:16, II relative to innovative land use controls, the Town of Gorham hereby adopts the following regulation. The purpose of this ordinance is to enhance public health, safety and general welfare, to protect, preserve and maintain existing and potential groundwater supply and groundwater recharge areas within the known aquifer from adverse development, land use practices or depletion. This is to be accomplished by regulating the uses of land over certain known aquifers and their recharge areas so as to protect them from contamination caused by adverse or incompatible land use practices or developments. The Source Water Protection Plan Ordinance is intended to limit the uses of land so designated to those that will not aversely affect water quality by contamination or water quantity by preventing recharge of the aquifer.

B. The Town of Gorham has adopted a "Source Water Protection Plan" to oversee the protection areas around the Well #1 and the Well #2 both of which are located on Town of Gorham land comprising the so-called Gorham Airport. The Source Protection Plan contains within it maps and/or other exhibits that define the areas involved. The Plan is to be reviewed annually and updated every 3 years by the Gorham Source Water Protection Committee.

SECTION 2. DISTRICT LOCATION.

A. The extent of the area of the Source Protection Plan shall follow the Well Head Delineation Area as defined by the NH Department of Environmental Services shown on the Source Protection Plan map(s) included in the Gorham Source Water Protection Plan.

B. Incorrectly Designed Zones: Upon any well founded information that the actual boundary of the Source Water Protection Area is incorrectly mapped, the Planning Board or the owner of any land may engage a professional geologist or hydrologist or other professional, recognized by the Planning Board as being qualified to perform such work, to determine more accurately the precise boundary of the Source Water Protection Area. The Planning Board may, based upon appropriate findings and evidence, adjust the boundary or area designation of the Source Water Protection Area or reduce or expand the designation area to more correctly define the location and the extent of the aquifer on a site-specific, case by case basis, with concurrence of the evidence by the N.H. Department of Environmental Services.

SECTION 3. PROHIBITED USES

The following uses shall not be permitted in the Source Water Protection Area:

A. Disposal of solid waste. Brush and stumps are permitted only if generated from clearing land and buried on the same site. A copy of the site plan which is required to be filed with the Commissioners of the Department of Environmental Services, in accordance with RSA 149-M for on site burial of stumps, must be submitted to the Planning Board for its files, and only, if permitted and, if required, a permit is actually issued Pursuant to RSA 149-M.

B. Subsurface storage of petroleum and other hazardous materials

C. Industrial uses which discharge contact type process waters on site. Non-contact cooling water is permitted.

D. Storage of road salt or salted sand.

E. Dumping of snow containing de-icing chemicals brought from outside the Aquifer Protection District.

F. Commercial animal feedlots.

G. Mining except for earth excavation carried out in compliance with the Town of Gorham's Regulation Governing Earth Excavation including any subsequent amendments and a Conditional Use Permit issued under Section 5 of this Ordinance and RSA 155-E.

H. All on site handling, disposal, storage, processing or recycling of hazardous or toxic materials.

I. Automotive service and repair shops, junk and salvage yards.

J. "Any other use or activity that, based upon the following findings of fact:

1. Will have detrimental effect on the quality of the groundwater contained in the aquifer by directly contributing to pollution or by increasing the long term susceptibility of the aquifer to potential pollutants;

2. Will cause a significant reduction in the long-term volume of water contained in the aquifer, or in the storage capacity of the aquifer;

3. Will discharge wastewater on site other than that which is permitted under the provisions of this article."

K. "Manure, agricultural compost and chemical fertilizer shall be handled in accordance with RSA 431:33, to 35, as amended. See Manual of Best Management Practices in Agriculture in New Hampshire as prepared by the New Hampshire Department of Agriculture, August 1993, as amended."

L. SECTION 4. CONDITIONAL USES

A. Permit Required:

All subdivision proposals and other development proposals located within the Aquifer Protection District shall be reviewed by the Planning Board and/or Zoning Board of Adjustment and shall conform to the provisions of this ordinance. No conditional uses shall be conducted within the Aquifer Protection District unless a Conditional Use Permit has been issued by the Planning Board. The Planning Board is hereby authorized to attach any reasonable conditions to such permit regarding construction and operation. Conditional uses shall include but are not limited to:

1. Industrial, commercial, institutional and governmental uses not otherwise prohibited in Section 3 of this Ordinance.

2. Multi-family residential development where served by municipal sewer system connections.

3. Sand and gravel excavation carried out in compliance with the Town of Gorham's Regulation Governing Earth Excavations including any subsequent amendments, provided that such excavation is not carried out within 8 vertical feet of the seasonal high water table and that periodic inspections are made by the Planning Board or its agent to determine compliance.

4. Replacement of underground petroleum product storage tanks existing as of the time of adoption of this ordinance, subject to all applicable permitting under state or local environmental laws or regulations.

B. Standards:

The Planning Board may grant a Permit for a conditional use only after written findings of fact are made that all of the following are true:

1. The proposed use will not detrimentally affect the quality of the groundwater contained in the aquifer by directly contributing to pollution or by increasing the long-term susceptibility of the aquifer to potential pollutants;

2. The proposed use, either alone or on a cumulative basis, will not cause a significant reduction in the long-term volume of water contained in the aquifer or in the storage capacity of the aquifer.

3. The proposed use will discharge no wastewater on site other than that typically discharged by domestic wastewater disposal systems and will not involve on-site storage of disposal of toxic or hazardous material as herein defined;

4. Sufficient recharge to the aquifer will not be inhibited or prevented; and any use that covers over 20% of the lot with impervious material shall submit a "Storm water Management Plan" that satisfies the Planning Board requirements and the Best Management Practices for Urban Storm water Runoff, per current NHDES regulations.

5. The proposed use complies with all other applicable sections of this ordinance.

6. "Septic system design and installation. In addition to meeting all local and state septic system requirements, all new on-lot sanitary wastewater disposal systems installed in the Source Water Protection Area shall be designed by a septic system designer and installer licensed in New Hampshire. These systems shall be installed under the supervision of the Board of Selectmen or their designee, who shall perform a basic area inspection, in person, as part of said supervision."

"The Board of Selectmen, or their designee, shall inspect the installation of each new system prior to covering, and shall certify that the system has been installed as designed.

Septic systems are to be constructed in accordance with the most recent edition of Chapter Env-Ws 1000, Subdivision and Individual Sewage Disposal System Design Rules as published by the New Hampshire Water Supply and Pollution Control Division, or as amended"

The Planning Board may require that the applicant provide data reports prepared by a professional engineer to assess any potential damage to the aquifer that may result from the proposed use. The Planning Board and the Board of Adjustment, if an appeal is filed, shall engage such professional assistance as is required to adequately evaluate such reports and to evaluate, in general, the proposed use in light of the above criteria. Costs for any of the above mentioned services shall be paid by the applicant.

SECTION 5. ENFORCEMENT

It shall be the duty of the Board of Selectmen or its authorized agent to enforce the provisions of this Ordinance and to see that its requirements and restrictions are duly complied with. A Conditional-Use Permit may be withdrawn by the Board of Selectmen or to the Planning Board Pursuant to RSA 676:4-a, if a site plan has been approved if the use is not conducted in accordance with the regulations of this Ordinance of the conditions of the permit.

The Board of Selectmen or its authorized agent shall institute or cause to be instituted, in the name of the Town, any and all actions, legal and equitable, that shall be appropriate or necessary for the enforcement of the provisions of this Ordinance.

SECTION 6. APPEALS

Any person who is aggrieved of an administrative decision made under the provisions of this ordinance may appeal to the Board of Adjustment, under the provisions of RSA 674:33. In any such appeal, the Board of Adjustment shall request from the Planning Board, the Water and Sewer Commission, and the Conservation Commission and advisory decision before rendering any decision on an appeal under this Section.

SECTION 7. NON-CONFORMING USES

A. Any non-conforming lot, dwelling, or business may continue in its present use or be maintained, repaired, replaced and improved unless such use is determined to be an imminent hazard to public health and safety by the Board of Selectmen.

B. When any existing non-conforming use of land or building has been discontinued for one year the land and building shall thereafter be used only in conformity to this Ordinance, if such use otherwise is in compliance with all applicable laws and regulations.

SECTION 8. DEFINITIONS

The definitions contained in the Zoning Ordinance and the Subdivision Regulations shall apply to the Aquifer Protection ordinance, where applicable. As used in the Ordinance, the following terms shall have the meaning indicated:

A. Animal Feedlot: A commercial agricultural establishment consisting of confined feeding areas and related structures for the raising of livestock.

B. Aquifer: For the purpose of this Ordinance, aquifer means a geologic formation, group of formations, or part of a formation that is capable of yielding quantities of groundwater usable for municipal or private water supplies.

C. Aquifer Protection District: The direct recharge areas of a designated aquifer. The Aquifer Protection District is shown on the Aquifer Map included in the Gorham Source Water Protection Plan.

D. Best Management Practices (BMP): Management practices as defined by the USDA and the NH Dept. of Agriculture.

E. Direct Recharge Area: The area immediately overlying the stratified-drift aquifer. The boundary of the direct recharge area is the contact between the stratified drift and adjacent till or bedrock.

F. Groundwater: Water in the Sub-surface zone at or below the water table in which all pore spaces are filled with water.

G. Groundwater Recharge Area: That area from which water is added to the saturated zone by: 1) natural processes such as infiltration or precipitation, or by 2) artificial processes such as induced infiltration.

H. Hazardous or Toxic Materials: Material which may pose a present or potential hazard to human health or the environment when improperly stored, transported or disposed of or otherwise managed including without exception hazardous materials identified and listed in accordance with Section 3001 or the Resource Conservation and Recovery Act of 1976.

Examples of hazardous materials include:

1) Toxic (poisonous
2) Flammable (paint, varnish remover, solvents and oils)
3) Reactive
4) Corrosive (acids)

I. Induced Infiltration: The process by which water in a stream or lake moves into an aquifer because of a hydraulic gradient from the surface water body toward a pumping well or wells.

J. Leachable Wastes: Waste material, including solid wastes, sludge and agricultural wastes that are capable of releasing contaminants to the surrounding environment.

K. Mining: The activities performed in the extraction of minerals including the excavation of pits, removal of mineral, removal of dimension stone, disposal of overburden and the construction of roads for the haulage of mining materials.

L. Non-Contact Cooling Water: Water which flows through a heat exchanger providing a physical barrier between the water and the process being cooled.

M. Potential High Yield Aquifers: Area inferred to be underlain by medium to very coarse sand or sand and gravel with sufficient saturated thickness to have high potential to yield water. Included are areas with fine grained surficial deposits, which are inferred to be underlain by medium to very coarse sand or sand and gravel.

N. Potential Medium Yield Aquifers: Areas inferred to be underlain by relatively this saturated sections to medium to very coarse sand or sand and gravel that have medium potential to yield water.

O. Process Water: Wastewater from and industrial process.

P. Saturated Zone: The zone beneath the land surfaced in which all open spaces are filled with water.

Q. Sludge: Residual materials produced by water and sewage treatment processes and domestic septic tanks.

R. Solid Waste: Any discarded or abandoned material including refuse, putrescible material, septage, or sludge as defined by New Hampshire Solid Waste Rules He-P 1901.03. Solid waste includes solid, liquid, semi-solid, or contained gaseous waste material resulting from residential, industrial, commercial, mining, and agricultural operations and from community activities.

S. Stratified Drift: Unconsolidated, sorted sediment composed of layer of sand and gravel deposited by meltwater from glaciers.

T. Stratified-Drift Aquifers: Stratified-drift deposits that are capable of yielding usable amounts of water.

SECTION 9. VALIDITY AND SEVERABILITY

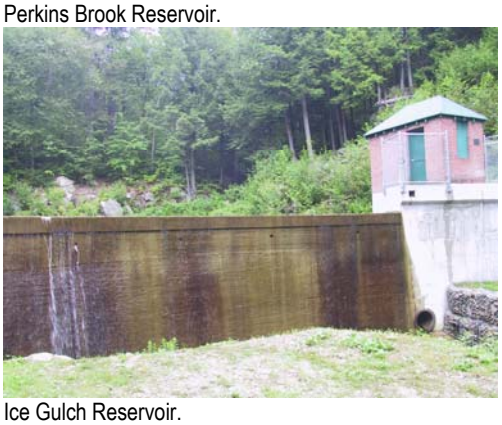
Should any provision of this Ordinance be declared by the courts to be invalid, the decision shall not invalidate any other provision of this Ordinance which can be given effect without the invalid provision and to this end the provisions of the ordinance are severable.

11/23/04

Appendix 8

Perkins Brook Reservoir.

Entrance to Perkins Brook Reservoir.


Ice Gulch Reservoir.

Ice Gulch Reservoir.

Water Treatment Plant on Jimtown Rd.

Lagoon settling basin .

Road bank in watershed.

Example of a silt fence in the watershed.

Appendix 8 (Continued)

Pumphouse for Well #1.

Pumphouse for Well #2

View of Gorham Airport near wells.

Gorham Hill Spring Chemical Feed Building.

Gorham Hill Spring Reservoir.

One of the many springs at Alpine Springs.