6 NATURAL RESOURCES

6.1 Topography

Kensington's terrain is predominantly rolling, with gentle slopes which generally range from 0-8%. Greater slopes are located on and surrounding the predominant hills. The hills are known as drumlins, which are formations left from the glacial period. These features are often characterized by steeper slopes, with gradients up to 25%. The elevation ranges from a few feet above sea level at the Great Meadows at the northern end of Town to a high of 318 feet at Indian Hill, bordering South Hampton at the southwestern corner of Kensington. For a graphic depiction of the topographic outlay, see the Town of Kensington Topographic Map, Geologic Survey, 1973, 1:24000 (Exeter, NH). See Appendix H.

6.2 Geology

The small share of bedrock that Kensington sits upon is relatively stable and covered in vegetation, with minimum exposure to the elements. Most of the bedrock consists of Merrimack group schists with possible intrusions of the Exeter pluton diorite, which is close to granite in composition.

Although metamorphosed to some degree in the past by upheavals and volcanic action, the major recent disturbances to Kensington's landscape were caused by a series of ice ages, the latest of which receded fourteen thousand years ago. The ice scraped slowly across New Hampshire, picking up frozen soil and rotten rock and later excavating some fractured bedrock. Unsorted glacial debris or glacial till was formed as a result of the glacier's action. It is composed of fragments of all sizes and was deposited as the ice moved or melted away. Chief characteristics of fill are an extreme diversity in the size of materials, ranging from fine clays and silts to coarse sand and cobbles; a lack of any sorting; angular shapes as opposed to the well-rounded pebbles found in stream or beach deposits; and extreme density and impermeability.

Kensington has certain oval hills of glacial till deposited and shaped by the ice sheet, called drumlins. In form, they resemble an inverted bowl of a teaspoon, with the long axis parallel to the ice motion. The drumlins form a series of three roughly parallel ridge lines oriented west to east across the town. At the northeast edge of town is York Hill. To the east, Shaws Hill lies above the southeast edge of the Great Meadow. Moulton Ridge, Hoosic Hill and Round Hill divide the northern and the middle parts of town. Meetinghouse Hill rises east of the town center. Running northwest to southeast through the central part of town are Gove Hill, Weymouth Hill, Pevear Hill, Cottage Hill and Horse Hill. Across the Southern part of town are Martin's Hill, Palmer Hill and Towle Hill. In the far southeast corner, straddling the town line, are Hogg Hill and Indian Ground Hill.

The glacial till usually provides adequate loading capacity for building foundations and is generally suitable for development purposes. However, if an impermeable layer in the till is located within two feet of the ground surface, the area may not be suitable for placement of septic disposal systems.

Marine silt and clay deposits resulted from several processes, including the melting glacier, causing the rise in sea level which inundated most of southeastern New Hampshire. Marine sediments were also deposited along the bottom of the ancient sea as well as in its bays and estuaries. As the weight of the glacier decreased, the land elevation gradually rose to its present level, leaving marine deposits in what are now upland areas. Swamps fill the low lying areas between the hills. The largest of these is Great Meadow, which covers more than 500 acres in the northeast corner of town and extends over the Exeter line. Smaller marine deposits can be found throughout town. These materials are unsuitable or marginally suitable for development because of impermeability of the silt and clay deposits, producing a water table at or near the ground surface.

As the glacier melted and retreated, sediments were released to form layers of sand and gravel called ice contact deposits or stratified drift. These materials have good drainage and permeability, with a high water-bearing capacity. These areas may be a source of excavation materials and may also contain large quantities of groundwater or aquifer. The coarse material allows for large volumes of water to be stored, and high porosity allows groundwater to flow readily through. For these reasons, stratified drift aquifers are a prime source of water for large volume users.

6.3 Soils

As a result of glacial action and proximity to the coast, Kensington's soil types range from glacial till to stratified drift to marine clays and silts. The marine and silt deposits are generally located in the low-lying areas, stratified drifts in the surrounding hills, and glacial till in the remaining areas.

Since Kensington lacks municipal water and sewage facilities, siting development on suitable soils is critical. Kensington has adopted residential lot size by soil type for determining areas capable of supporting a private water supply and individual septic/sewage facility without the threat of contamination. Soils provide the means of absorbing and filtering sewage pollutants. Soils with the dense, impermeable layers, characteristic of glacial till, are not well-suited for placement of septic systems, especially when the till layer is within two feet of the ground surface. In addition, marine clays and silts produce a water table at or near the ground surface, causing poor drainage. Sand and gravel or stratified drift deposits have good drainage and permeability, yet these soils are also the greatest source of groundwater and potential prime water supply.

Official town maps prepared by the USDA Soil Conservation Service depict the various soil types and wetlands. See Appendix H for Soils and Wetlands Maps. Prior to land alteration for development, soil boundaries are field verified, and soils are classified by their potential to support development.

6.4 Water Resources

[Following is a copy of the Groundwater Resources Plan, prepared for Kensington by the Rockingham Planning Commission in 1989].

DRAFT

KENSINGTON MASTER PLAN AMENDMENT

GROUNDWATER RESOURCES SECTION

November 16, 1989

This document prepared with assistance from the Rockingham Planning Commission, 121 Water Street, Exeter, New Hampshire.

DRAFT

KENSINGTON MASTER PLAN AMENDMENT
Groundwater Resources Section

I. INTRODUCTION

The protection and wise use of water resources are of critical concern to the Town of Kensington. With virtually all homeowners dependent on individually owned wells for water supply, it is clear that the Town must pursue every reasonable means to ensure the long-term viability of groundwater as a public and private water supply. Groundwater should be recognized as a common property in the town, to be used by all and degraded by none.

Kensington's valuable and relatively abundant groundwater sources are threatened principally by the over-exploitation of sand and gravel resources in the community. In order to protect the resource for future generations, major efforts must be focused on establishing adequate controls on existing gravel mining operations and on the subsequent uses of old pits.

II. GROUNDWATER RESOURCES

Only in relatively recent times has the need for groundwater protection been widely recognized. Perhaps because it is an "invisible" resource, groundwater has been treated as if it were in-exhaustible and somehow immune from the activities of man. Well publicized problems, many from nearby communities, such as improper hazardous waste disposal, poorly designed septic systems, contaminating landfills and other problems have drawn attention to the need for preventative measures that will protect the resource. In the Town of Seabrook, which is totally dependent on groundwater for its municipal water supply, at least one well has been closed down due to contamination. This well is only [KPB: ???? feet] from the Kensington line.

A. Groundwater Concepts

Simply stated, groundwater is water stored in the void spaces of "loose" surficial materials (such as sand, gravel, silt and till) and in the fracture spaces of bedrock. The water table is defined as the upper surface of the saturated portion of these materials. The volume of water within the saturated portion makes up the potential groundwater supply. Groundwater and the saturated material it is formed within are jointly refered to as an "aquifer."

Types of Aquifers

There are three distinct types of groundwater formations or aquifers in Kensington: stratified drift aquifers, till aquifers, and bedrock aquifers. The differences between them are determined by the nature of their constituant material, and are summarized as follows:

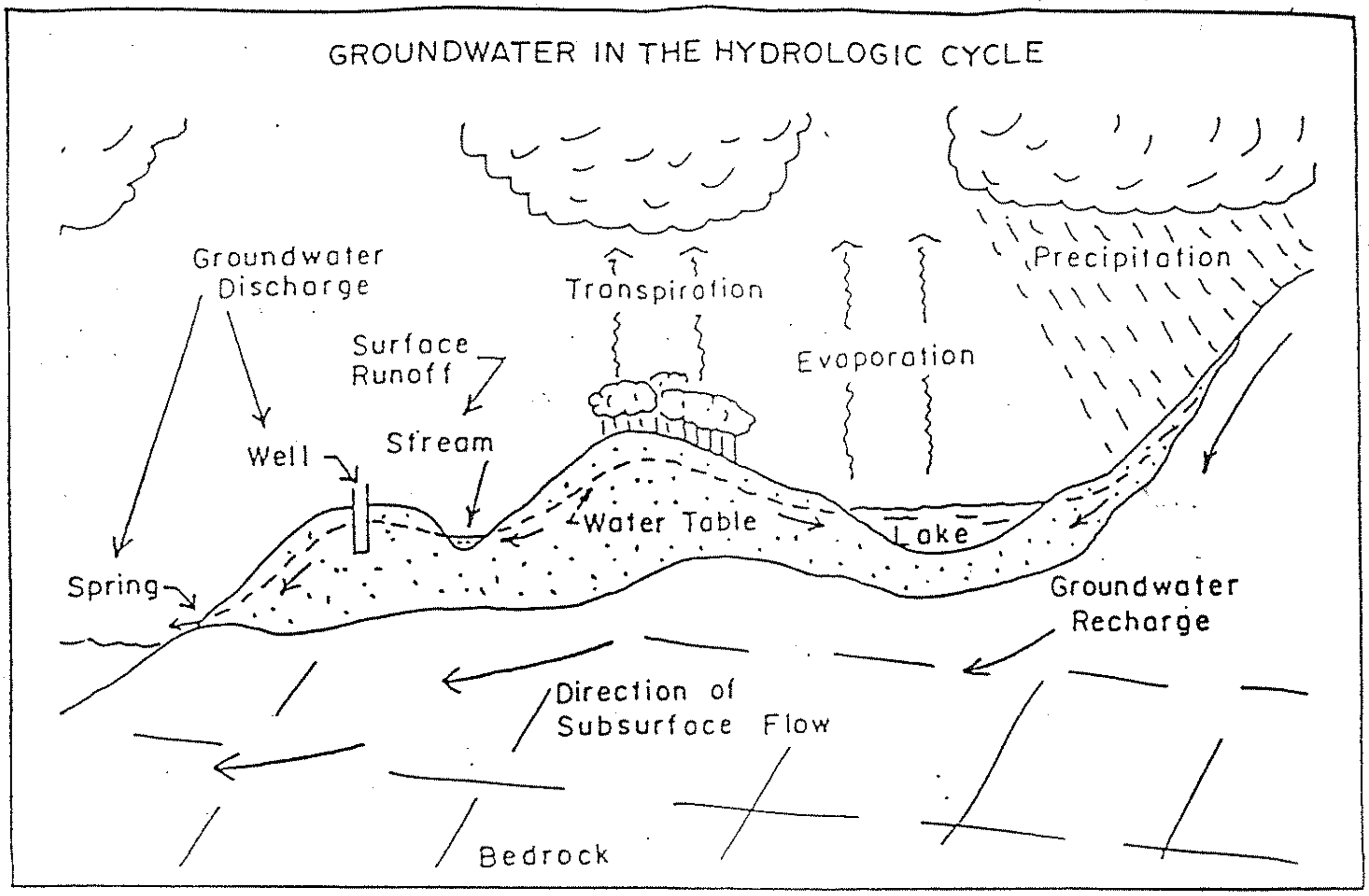
- Stratified Drift: Stratified drift aquifers are made up of sand and gravel materials. The materials were deposited by the melting of glacial-ice similar to rivers depositing sand or gravel bars today.

The deposits may be quite extensive, and are layered or "stratified". Their coarse texture allows for large volumes of water to be stored. High porosity allows groundwater to flow through quite readily. For these reasons, stratified drift aquifers are a prime source of water for municipal and other large-volume users. They have a potential to yield large volumes of water to a well.

Till: Till is a mixture of clay, silt, and gravel materials. These materials were ground-up from solid rock by the glacier. Because there is a mixture of different sized particles, the pore spaces are very small. Little groundwater can be stored in or flow through such small spaces. In addition, till deposits are relatively thin compared to those of stratified drift, so they contain relatively small volumes of groundwater. However, till material does usually yield enough water for private wells. Therefore, this type of groundwater formation is very important given the wide distribution of private wells in Kensington.

Bedrock: Bedrock aquifers are composed of fractured rock or ledge. Groundwater is stored in the fractures. These aquifers are very complex because of the extensive network of fractures that typically exists in bedrock. Wells drilled in bedrock that do not "hit" a fractured area will come up dry. If the well encounters an extensive fracture system, then groundwater yields will be high. On the average, bedrock aquifers yield smaller volumes of groundwater than wells drilled in stratified drift, but again, they are usually adequate for private residential use.

Groundwater is not an isolated resource, but part of an interconnected system known collectively as the "hydrologic cycle" (See Figure 1). Although large aquifers may be identified as having a specific location it is important to keep in mind that groundwater may travel from statified drift aquifers to till and bedrock aquifers. Since wells in Kensington are almost certainly located in all three types, groundwater protection efforts must be directed toward the entire resource. Aquifers with high yield potential, however, may warrant special protection measures to ensure their possible future use as a public drinking water supply.



Groundwater Recharge

Groundwater is replenished by precipitation filtering down through the soil to a saturated zone below the water table. The process of replenishment is referred to as "groundwater recharge". An aquifer recharge zone delineates the total surface area that provides a source of water to the underlying aquifer. In most sand and gravel aquifers in New Hampshire, groundwater recharge zones directly correspond to the boundaries of the aquifer. This fact is significant in that the land surface that will potentially contribute contaminants to the aquifer is relatively easy to define. This is generally true of till aquifers as well, however, the boundaries of till aquifers are less pronounced and definable.

Recharge to bedrock aquifers is much more complex. Water may travel greater distances through the network of bedrock fractures to a given well. Bedrock aquifers also draw on the water stored in overlying unconsolidated materials (sands, gravels, clays, etc.) as a source of water. Defining the land area which may contribute contaminants to bedrock aquifers is correspondingly more difficult.

Groundwater is constantly moving, driven by gravity and by displacement from upgradient recharge. The rate of movement is usually very slow, on the order of inches per day or less. In shallow sand and gravel aquifers, the direction of groundwater flow usually corresponds in general to the surface topography and drainage.

B. Aquifer Locations in Kensington

In order to develop groundwater protection strategies for specific aquifers, it is necessary to develop a basic understanding of aquifer boundaries, and if possible, their recharge characteristics, and rate and direction of flow.

The groundwater resources of the southeast region of New Hampshire have been investigated by the U.S. Geological Survey (USGS) and the U.S. Army Corps. of Engineers (COE) in three major studies over the past fifteen years. These studies have all been limited in scope to stratified-drift aquifers. No comprehensive study has been made of bedrock or till aquifers, although several communities in the region have undergone extensive searches for high yield bedrock wells. These searches have generated extensive information regarding bedrock aquifers yields in specific areas. No information however, is known to exist on the broader picture of how bedrock aquifers interconnect or how they interrelate with stratified drift aquifers in the region.

Stratified Drift Aquifers

There are five sources of information which can be used to identify the location of important stratified drift aquifers in and around Kensington:

- USGS Groundwater Availability Maps (Cotton, 1977)
- USGS Aquifer Delineation Study (to date, northern portion of town only)
- USGS/DRED Surficial Geology Maps (USGS and DRED)
- Southeastern N.H. Water Resources Study (U.S. Army Corps of Engineers, 1982)
- SCS Soil Survey and Parent Material Data (SCS, S.Pilgrim, 1986)

The content, origin and potential usefulness of these sources is summarized as follows:

1. USGS Groundwater Availability Maps SEE Appendix H.

   The earliest comprehensive inventory of groundwater associated with stratified drift aquifers in the Town and the region was completed by John E. Cotton (USGS) in 1977. Data for Kensington is found on two maps prepared at the scale of 1:125,000 which cover the entire southeast part of New Hampshire. The are titled respectively, Availability of Groundwater in the Lower Merrimack River Basin, Southern New Hampshire and Availability of Groundwater in the Piscataqua and Other Coastal River Basins. Data from these maps has been transferred and re-compiled on a regionwide basis by the Rockingham Planning Commission and is shown on Map W-1. The Cotton maps are useful in showing the regional context of major goundwater resource in and around Kensington, but they are no longer the best available groundwater information. It is not accurate enough to infer actual aquifer boundary locations.

The USGS Groundwater Availability Maps locate general areas that potentially will yield significant amounts of groundwater. These studies involve only stratified drift (sand and gravel) aquifers.
The study was designed to be a reconnaissance of potential groundwater production. Their intent is to show general areas of low-to-high potential for groundwater yield. The Groundwater Availability maps do not show the full surface area of stratified drift aquifers. In many cases, the actual intent of the aquifer is larger than depicted on these maps. Experience in the Nashua region where the more detailed USGS Aquifer Delineation study has been completed has been that, in most instances, areas shown on the Groundwater Availability maps are validated by the more detailed study.

2. **USGS Aquifer Delineation Study**

In 1985, the N.H. Legislature approved a $2 million bond issue to pay for the detailed mapping of significant aquifers statewide. Under the study, managed by the N.H. Water Resources Board (WRB) the U.S. Geological Survey (USGS) is preforming the study in phases over a five (or more) year period. Where completed, this information is by far the best available data for determining the boundaries, depth and potential yield of stratified drift aquifers.

The phased study areas are defined by major watershed areas. Kensington is divided by two of the project's study areas: the Lamprey/Exeter River Watersheds and the Coastal/Lower Merrimack Watersheds. As of November 1989, mapping and analysis for the Lamprey/Exeter study area has been completed, approved and awaits publication. Until publication, mapped data can be viewed at the USGS New Hampshire field office in Bow, N.H. Mapping has also been completed in the Coastal Lower Merrimack study area but is not yet available for public review. This means that aquifer delineation data is presently available only for the northern half or so of Kensington. The remainder is not expected to be available the latter half of 1990.

The type of groundwater mapping undertaken for these studies will reveal extremely valuable information about stratified drift aquifers. Based on the Aquifer Delineation Study completed in the Nashua region, Kensington can expect to obtain the following detailed aquifer information:

a) the location and extent of the stratified drift material, (both surface area and depth);
b) water table elevation;
c) saturated thickness of stratified drift deposits;
d) individual aquifer characteristics including type of material, transmissivity and direction of groundwater flow; and
e) groundwater quality sampling results.

The maps that accompany the study are prepared at the scale of 1:24,000 to match the 7.5' USGS topographic base maps. Map W-2 of this Section ("Stratified Drift Aquifers, Kensington, NH") utilizes this data for identifying aquifer boundaries in the portion of Town located in the Exeter River watershed.

Map W-2 - Stratified Drift Aquifers, Kensington, NH may be found in Appendix H. (An up-to-date aquifer map (2001) can be found at the Town Office.)

Availability: The Exeter/Lamprey portion of the Aquifer Delineation is now scheduled for complete publication in the Winter of 89-90; the Lower Merrimack/Seacoast portion is expected in the Winter of 90-91.

3. **USGS/DRED Surficial Geology Maps**

Existing USGS and DRED surficial geology maps may be used to assist in the definition of the surface area of stratified drift aquifers. The surface area definition is usually better than that provided in the Groundwater Availability (Cotton) maps and correlates closely to those shown on the Aquifer Delineation maps that have been produced to date. In fact the Aquifer Delineation studies use the stratified drift areas identified in the surficial geology maps as the basis to initially identify aquifer boundaries. The principal limitation of using surficial geology maps in aquifer identification is that they do not indicate whether the material is saturated with water. In Kensington's case, the surficial geology map of the Exeter quadrangle (unpublished, but available for viewing at the State Geologist's office at UNH) is the best available aquifer identification data for the portion of Kensington in the Lower Merrimack watershed.

Map 2 of this Section ("Stratified Drift Aquifers, Kensington, NH") utilizes surficial geology data for identifying aquifer boundaries in the portion of Town located in the Lower Merrimack watershed.

4. **Southeastern N.H. Water Resources Study: Groundwater Assessment**

In 1980 the U.S. Army Corps of Engineers (COE) published a two volume report with the above title which identified aquifers that COE believed to have yield potential high enough for use as a municipal water supply. Sixty-one aquifers were identified in the 50-town study area. Two aquifers were identified for Kensington. They roughly correspond to the aquifers shown in the southeast corner and the north central areas of town and are shown on Map W-3. (See Appendix H.)

The aquifer delineation made by COE was based largely on existing data, including USGS Groundwater Availability maps, well drilling data, some seismic and topographic mapping and review on engineering reports. The report includes aquifers that are unconsolidated deposits (i.e. stratified drift) containing at least 20 feet of saturated material which would yield significant quantities of water to wells for public usage (generally in the range of 50 gallons per minute or more).

The aquifer locations identified are generally consistent, though smaller in size and fewer in number than those shown on the USGS Groundwater Favorability Maps. Much of the difference in size can be attributed to the minimum thickness and yield criteria used in the study.

The study cited Kensington as one of twelve communities within the RPC region which had the potential to develop and/or use groundwater for future municipal supply purposes.

5. **SCS Soil Survey and Parent Material Data**

Soil Conservation Service (SCS) soils information developed from field mapping for the County Soil Survey may also be used to help identify the surface area of stratified drift materials. The Soil Survey distinguishes between the coarser sand and gravel soils normally associated with underlying stratified drift, and the parent material, and the less permeable (porous) soils that develop from underlying till material. The parent materials, from which the identified soils developed, often correlate well with the stratified drift deposits appearing on the USGS and DRED surficial geology maps.

In 1986 the N.H. State Soil Scientist (Sidney A. Pilgrim) developed a list of the soil types in each County that potentially overlay unconsolidated aquifer deposits. Table 1 depicts the 22 soil type which tend to correlate with such deposits.

TABLE 1
Soils Associated with Statified Drift Aquifers

Symbol	Map Unit Name	Slope Class	Drainage Class
12A	Hinckley Fine Sandy Loam	A	EWD
12B	Hinckley Fine Sandy Loam	B	EWD
12C	Hinckley Fine Sandy Loam	C	EWD
26A	Windsor Loamy Sand	A	EWD
26B	Windsor Loamy Sand	B	EWD
26C	Windsor Loamy Sand	C	EWD
313A	Deerfield Fine Sandy Loam	A	MWD
313B	Deerfield Fine Sandy Loam	B	MWD
395	Chocorua Mucky Peat	AA	VPD
510A	Hoosic Gravelly Fine Sandy Loam	A	SEWD
510B	Hoosic Gravelly Fine Sandy Loam	B	SEWD
510C	Hoosic Gravelly Fine Sandy Loam	C	SEWD
510D	Hoosic Gravelly Fine Sandy Loam	D	SEWD
13 Soil Types		TOTAL	

Although soils data should not be used as a primary identifier of stratified drift aquifer locations, it is useful in identifying potential areas of further investigation in cases where no primary information is available or is in doubt.

C. General Assessment of Groundwater Resources

Kensington has relatively abundant groundwater resources. Thanks in part to its heavily glaciated terrain, there are at least four well defined stratified drift aquifers, or portions of them, located in Kensington that have the potential to provide significant amounts of water for municipal and community water systems. (Note: As this Master Plan went to press, an up-to-date Water Resources Map showing "Aquifers, Watersheds and Wetlands" has been produced by Granit and the RPC. It can be viewed at the Town Office. It should supercede all previous aquifer maps mentioned above.)

Groundwater Potential

Neither the USGS Aquifer Delineation Study nor the surficial geology maps attempt to assess the exact potential yield of these aquifers quantitatively. Aquifers shown in the Exeter watershed portion of Town have been identified in the delineation study as having a relatively low transmissivity or flow rating. The Army Corps of Engineers study does contain estimates of maximum sustainable yield for both of the aquifers identified. The total sustainable yield from these aquifers (identified as "KE-1" and "KE-3" on Map 3) was estimated to be 0.47 and 0.32 million gallons per day (mgd), respectively, for a total of approximately 0.8 mgd. For comparison the N.H. Water Supply Task Force has estimated that current average daily demand for Kensington is currently 0.10 mgd and is projected to rise to 0.19 mgd by the year 2000.

III. POTENTIAL THREATS TO GROUNDWATER

Groundwater quality can be impaired by a variety of materials. Sources of groundwater contaminants include landfills, commercial and industrial wastes, agricultural fertilizers, human sewage, road salting, etc. Groundwater quantity is reduced by contamination of available groundwater supplies, over-pumping in the aquifer zone, increasing impervious surfaces such as roof tops and parking lots (thereby preventing recharge of the aquifers) and actual removal of the aquifer-bearing materials from earth excavation.

Nonpoint Sources

Nonpoint sources of pollution involve the diffuse discharge of wastes from sources which are widely spread, difficult to identify, and hard to control. Nonpoint pollution is typically produced from land runoff and infiltration during times of rain and snowmelt.

The following is a general list which briefly describes potential nonpoint pollution sources, and their associated mitigation techniques, within the Town of Kensington.

Table 2

Nonpoint Pollution Sources and Remedies

Source	Remedy
subsurface sewage disposal	replacement and/or relocation;
agricultural runoff and infiltration	best management practices, e.g., concrete manure pits, limited winter manure-spreading, etc.;
road salt storage and application	salt sheds, decrease salt to sand ratio, emphasize mechanical snow removal using plows, graders, etc., reduce frequency of application; increase use of calcium chloride and other de-icing chemicals;
storm runoff from construction sites	erosion control measures e.g., haybales, silt fences, straw mulch, etc.;
storm runoff from parking lots	catch basins which trap grit, oil and/or grease;
sediments from silted-in catch basins and detention ponds	maintenance programs
application of fertilizers and pesticides to farmland, gardens and lawns	integrated pest management, e.g., soil testing, biological pest control, timing of lawn care, etc.
runoff/leachate from junkyards and abandoned landfills	drainage collection/treatment systems, and proper disposal of hazardous materials, e.g. battery acid, gasoline, etc. with a certified hauler;
leaking underground storage tanks	remove abandoned tanks, monitor and regulate existing tanks;
roadside application of insecticide for mosquito control	biological pest control, e.g. use of non-toxic insecticides such as bacteria which attacks mosquito larvae.

In 1982, the Water Supply and Pollution Control Division (of the N.H. Department of Environmental Services (DES) published a report entitled: Inventory of Groundwater and Surface Water Potential Nonpoint Pollution Sources. The report's scope covered most of Strafford and Rockingham counties. Kensington was cited as having the following potential nonpoint pollution sources:

- 1 uncovered salt pile, storing 60,000 lbs of roadsalt, located southeast of the intersection of Routes 150 and 84;
- abandoned landfill located on Weymouth Road.

Other potential nonpoint pollution sources within Kensington, but not identified by the 1982 DES inventory, are described below.

--Underground Fuel Storage Tanks:

-Harold Boldwell - 2000 gallons, Diesel

-Operations & Eng. Facility - Drinkwater Road
- 4000 gallons gasoline
- 3000 gallons gasoline
- 5000 gallons fuel oil
- 2000 gallons diesel

-Peter Kuegel Trucking - Route 108

Source: N.H. DES, Underground Storage Tank Inventory

--Pesticide Application Sites: 11 known sites since 1964

Source: Complex Systems Research Center, UNH; N.H. Dept of Agriculture

--Former truck working facility at intersection of Routes 107 and 150

[KPB: I need your help identifying potential non-point sources in town, such as other underground fuel storage, failing septic systems, etc. Thanks!]

IV. GROUNDWATER PROTECTION

The protection of groundwater is achieved through reasonable controls over land use activities taking place in groundwater recharge areas. Certain types of land uses once considered environmentally benign can, in certain circumstances, lead to serious and long-lasting contamination of groundwater.

Despite this fact, development per se need not be prohibited from aquifers and related recharge areas. Doing so might make for even worse environmental problems by forcing development to lands which are only marginally developable. (Surficial aquifers" typically underlie land which is considered highly developable from a soil condition standpoint.) Certain types of land uses, such as landfills, septage lagoons, and industries which handle toxic substances or which discharge process waters on site, should be excluded from the recharge zones of known aquifers because they carry with them a high risk of causing contamination. However, the majority of land uses which carry much smaller risks may be permitted, provided certain precautions are taken.

Such precautions can be built into the Town's land use regulations in the form of performance standards. Performance standards place conditions on proposed development prior to approval. The conditions are designed to preclude any use that would impair either the quantity or quality of the aquifer targeted for protection.

In Kensington, a two-tiered approach to groundwater protection is advisable. One tier should be aimed at protecting groundwater in general (i.e., in all areas of Town). This is necessary because private wells exist all over town. At this level, specific land uses are not ruled out, but performance standards would be used to try to prevent groundwater contamination.

The performance standards would address the following:

(1) on-lot waste water disposal, including septic system installation, lot size, soil and slope conditions, minimum distance to seasonal high water table or open water;
(2) the use and storage of road salt or other de-icing chemicals;
(3) waste disposal sites, including landfills, septage lagoons, or landspreading sites;
(4) commercial or industrial discharges or runoff (ex: waste oil and solvents from auto repair shops; chemicals used in businesses, such as photo development labs, dry cleaners);
(5) underground fuel storage;
(6) sand and gravel excavation;
(7) agricultural and/or domestic use pesticides, herbicides, and fertilizers;
(8) the percentage of lot covered by impervious material;

There are existing standards in the Town's regulations which govern septic system installation and sand and gravel excavation. Each of the others should be evaluated to determine if further regulations are called for.

The second "tier" of groundwater protection would be aimed at known aquifers capable of being developed as a community or a municipal water supply. This level of protection would be implemented in the form of an aquifer protection ordinance (or elements of one) and would be part of the Town's Zoning Ordinance.

Based on the available information described above, it appears that there are three discrete aquifers potentially developable as municipal water supplies. The first area, as shown on Map W-2 Stratified Drift Aquifers, extends in an irregular band from the center of Town (near Round Hill) extending southeasterly to the Seabrook and South Hampton lines.

The second aquifer, only a small portion of which is in Kensington is located just west of Drinkwater Road at the Exeter line. The third and probably least significant is located in the vicinity of Kimball Road.

Sufficient evidence exists concerning the location and production potential of these aquifers so that they should be designated as aquifer protection zones or in some way granted special protection. The Town would be justified in taking this action for two reasons. First, both the identified aquifers are located in unconsolidated materials (sand and gravel) relatively near the surface. For such aquifers, there is generally a simple relationship between the boundary of the aquifer and the boundary of the overlying primary recharge area. They are, for practical purposes, one in the same. Since aquifer protection means regulating land use in the recharge area, we have a ready description of at least the primary area that should comprise the protection zone.

The second justification for creating aquifer recharge zones is the need for long-range planning. It would be unwise for the Town to allow potential water supplies to be lost by unintended contamination even though there is no immediate need to develop a municipal water system. To do so would severely limit the ability of the Town to meet future potential need for community or public water supply.

An aquifer protection ordinance differs from the more general provisions of groundwater protection (i.e., the performance standards of the first tier) in that it applies to specific zones and is more restrictive. An ordinance would typically prohibit outright certain uses from the zone(s). Other less risky uses would be conditionally permitted. Uses such as the following would generally be prohibited due to the risk of groundwater contamination:

- solid waste or septage disposal;
- storage or disposal of hazardous waste;
- underground petroleum fuel storage;
- use or storage of road salt;
- sand and gravel excavations; other mining;
- animal feedlots;
- large impervious (paved) areas.

In addition, an increase in the minimum residential lot size within the recharge zone(s) would probably be warranted.

6.5 Wetlands

Wetlands today typically exist as transitional zones between surface water and upland sites, encompassing marshes, bogs, swamps, ponds, streams and hydric soils. Wetland soils or hydric soils are those soils having a high water table. Wetland soils are categorized into two main categories: poorly drained, or hydric B, and very poorly drained, hydric A. Generally, hydric B soils are those in which the water table rises to within 6 inches of the surface for six to nine months in a year. Hydric A soils are those in which the water table is at or near the surface for more than nine months in a year. The New Hampshire Wetland's Board further defines wetlands as "...those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal conditions do support a prevalence of vegetation typically adapted for life in saturated soil conditions."

Kensington is comprised of 1,060 acres of Hydric A soil, 13.8% of the total acreage, and 1,156 acres of Hydric B soil, 15.1% of the total. Wetland types found in Kensington include shrub swamps, shallow and deep marshes, a bog pond (Muddy Pond is a unique floating bog pond), wet meadows, forested swamps, and streams. The Great Meadows contains an extremely rare Swamp Oak stand.

The Kensington Wetland Conservation District encompasses specific areas mapped by the USDA Soil Conservation Service. The purpose of the District is to preserve and protect wetland areas, since they provide critical ecological and socially valuable functions, including: 1) acting as flood water storage areas; 2) absorbing and filtering sediments and pollutants; 3) helping to maintain groundwater and surface water levels; 4) providing habitat for plants and wildlife; 5) providing unique opportunities for recreation and education; and 6) contributing to rural character and scenic value.

Since the 1950s, we have become more aware of the need to protect our environment from man-made pollutants, exploitation and environmental exhaustion. In his 1945 introduction to the History of Kensington New Hampshire, the author, Reverend Roland D. Sawyer, considered only one body of water worth mentioning, Muddy Pond, named, he said, for its underlying "twenty to thirty feet of thin black mud." An up-to-date Geological Survey map shows more than two dozen unnamed small bodies of water and shifting beaver ponds, together with Winkley, Mill, Spring, Great, Back, and Hobbs Brooks, some of which contribute to the genesis of the Exeter and Taylor Rivers. These ponds and streams in turn originate in the springs and boggy wetlands that cover a third of the ground surface of Kensington, a resource of inestimable importance to the balance of our ecology.

The enclosed Wetland Composite map, see Appendix H, was produced at Rockingham Planning Commission on 8/28/01 showing Hydric Soils along with surface water and other wetlands features. National Wetlands Inventory (NWI) data was developed by the US Fish and Wildlife Service using infrared aerial photography and the Cowarding System of wetlands classification, which classifies wetlands by the type of vegetation. Soil boundaries are from SCS county soil surveys and all other features from USGS Digital Line Graphs.