

# **WATER RESOURCES MANAGEMENT AND PROTECTION PLAN:**

**A SUBSECTION OF THE FREMONT NATURAL RESOURCES MASTER PLAN CHAPTER**

Fremont, NH  
October, 2010

This report was paid for in part by a grant from the NH Office of Energy and Planning

## **WATER RESOURCES MANAGEMENT AND PROTECTION PLAN:**

### **A SUBSECTION OF THE FREMONT NATURAL RESOURCES MASTER PLAN CHAPTER**

#### **X.1 INTRODUCTION AND AUTHORIZING LEGISLATION**

The protection and wise use of the water resources are of critical concern to the Town of Fremont. With every person in Town dependant on private wells, or small scale public water systems drawn from local sources, for domestic, public, and business use, the quality and quantity of Fremont's groundwater must be protected from depletion and/or contamination. In general, there is a direct relationship between land use and water quality. Uses in areas with poor suitability can degrade and contaminate both surface and groundwater resources, increase flood hazards, destroy water-based wildlife and interfere with scenic and recreational values. It is the responsibility of the Town to take reasonable precautions to protect all water resources from incompatible uses and, in doing so, protect the health and general welfare of the community.

In addition to a desire to protect and manage the existing water resources the Town is also obligated to create a Water Resources Management and Protection Plan (WRMPP). The Municipalities of New Hampshire were given the authority to create a WRMPP, according to the following legislation:

#### **4-C: 22 Local Water Resources Management and Protection Plans.**

I. A municipality may include in its master plan a local water resource management and protection plan, hereafter referred to as the local water plan. Once the local water plan has been adopted, it shall be placed on file with the office in accordance with RSA 675:9. The plan shall be made available to the public upon reasonable request and payment for any costs incurred in the duplication of the report.

II. Implementation of local water plans shall be through the adoption and enforcement of municipal ordinances consistent with the plan and through such other measures as are appropriate and legally available to municipal government as tools to further the water protection objectives set forth in the plan. Assistance shall be available through the water protection assistance program established in RSA 4-C: 19 and programs of the department of environmental services as provided in RSA 21-O: 3, IX, to advise municipalities on appropriate implementation measures.

III. If a municipality determines there is an immediate need to develop or amend subdivision or site plan review regulations in the manner provided by RSA 675:6 or to prevent deterioration of a critical water resource through a zoning ordinance or amendment in the manner provided by RSA 674:23, II, it may adopt such temporary measures for protection of water resources. Such measures shall be valid as provided in RSA 674:23, III.

*Source. 1987, 283:3. 1989, 346:2, 3. 1997, 196:3, eff. Aug. 17, 1997.*

Reference to a water protection plan is also made in RSA 674:2.III (Master Plan; Purpose and Description).

III. (d) A natural resources section which identifies and inventories any critical or sensitive areas or resources, not only those in the local community, but also those shared with abutting communities. This section provides a factual basis for any land development regulations that may be enacted to protect natural areas. A key component in preparing this section is to identify any conflicts between other elements of the master plan and natural resources, as well as conflicts with plans of abutting communities. The natural resources section of the master plan should include a local water resources management and protection plan as specified in RSA 4-C: 22.

## **X.2 HOW TO APPROACH REVISING THE EXISTING WRMPP?**

The last time the Fremont's WRMPP was updated it was in the early 1990's and it was a standalone document. The last WRMPP that has an identifiable date is a paper document from July, 1992. As stated in the RSA above the WRMPP, or local water resources management and protection plan, is now a subsection that should be included within the Natural Resources Section of the Town's Master Plan. The Town of Fremont incorporated A Natural Resources Inventory (NRI) into a new natural resources master plan chapter. The existing natural resources chapter covers many of the topics previously covers in the WRMPP. These include a discussion of existing wetlands, surface water and groundwater. The wetlands section (4.7) covers the existing wetlands in Fremont by type and area, discusses the largest wetland complexes in or part of town, and has an extensive look at the Town's first prime wetland, Spruce Swamp. This section also reviews the existing wetland buffer requirements. The Surface Water section (4.8) examines the Town's two watersheds (Exeter River and Piscassic River), catalogs the Town's named rivers and streams, and defines and explains vernal pools of Fremont. The Groundwater section (4.9) examines the Towns existing groundwater resources including details on the existing stratified drift aquifers in Fremont, then explores drinking water, contamination sources and the threats imposed by impervious surfaces in succession. The existing Natural Resources chapter also makes several recommendations regarding Fremont's resources. Other topics covered in the existing (1990's) WRMPP include an examination of existing and future land use, septic system limitations, utilities and other infrastructure. Current questions about land use can be answered by the town's recently adopted revised Land Use master plan chapter that includes a future land use subsection. The Fremont Vision Section states clearly that the Town is currently not interested in developing a municipal water or sewer system. So, as for issues with existing septic and possible water or sewer infrastructure, is currently not a focus of the community. The issue of a future need for either municipal water or sewer infrastructure should be explored and addressed in the Town's future update of the Public Utilities chapter of the master plan.

Because many of the topics formerly covered by the WRMPP are now contained in more extensive, standalone document the role of this Document can be more plastic. This subsection of the Natural Resources chapter will therefore explore the current policies and recommendations concerning water resource management and protection of regional and state agencies and how these statements affect the municipality in its role as steward of the local water resources. This chapter will also explore some new research and

documentation that could affect the water resources of Fremont. The recommendations of the Natural Resources chapter, as they pertain to the WRMPP are reviewed and room is left for additional recommendations. Lastly, a section of suggested additions to the parent natural resources chapter are included.

The Local Government Center (drawing strongly on the Department of Environmental Services (DES) New Hampshire Water Resources Primer (December 2008) has stated their opinion<sup>10</sup> of the role of municipalities when it comes to managing and protecting the water resources. This is reprinted for review below. In addition the Intro to the DES Water Resources Primer is also included for the review and education of the Fremont Planning Board.

From the Local Government Center:

While numerous state and federal programs and nonprofit organizations play important roles in understanding and addressing the state's water resources challenges, municipalities also play a crucial role in managing and protecting water resources, primarily through subdivision and site plan review regulations and ordinances related to wetlands, shoreland, stormwater and groundwater. DES and its partner organizations have published a number of model ordinances and guidance documents over the years to aid municipalities interested in addressing these issues. The most recent of these is Innovative Land Use Planning Techniques: A Handbook for Sustainable Development (October 2008), prepared by DES in partnership with the New Hampshire Association of Regional Planning Commissions, the New Hampshire Office of Energy and Planning and the New Hampshire Local Government Center.

While municipalities can help manage and protect water resources, municipal land use regulations can also encourage—or fail to discourage—patterns of development that threaten the quality of water resources and exacerbate problems such as flooding, dam safety, the loss of riparian habitat, high seasonal water demand and low stream flows during dry periods.

Stormwater management is an excellent example of the municipal role. While DES's Alteration of Terrain Program regulates projects that disturb 100,000 square feet or more (50,000 square feet is the threshold in protected shorelands), smaller projects are not effectively regulated unless a municipality takes on this role. As described in detail in Chapter 10 of the Primer, conventional approaches to stormwater management like detention ponds have caused significant degradation of surface water quality while reducing recharge to groundwater. While DES's new Alteration of Terrain regulations incorporate the latest understanding of effective stormwater management techniques, local land use regulations that require only conventional management practices fall short of what is needed to protect our water resources into the future. The Handbook contains a model ordinance that municipalities can use to implement state-of-the-art

---

<sup>10</sup> <http://www.nhlgc.org/LGCWebSite/InfoForOfficials/townandcityarticles.asp?TCArticleID=156>

stormwater management practices, along with a broad array of other model ordinances and related information.

Stormwater management is also an example of how municipal actions cut across many water resources issues. Proper stormwater management contributes to water quality and, consequently, recreational value, replenishment of groundwater and preservation of natural streamflow while limiting the impact of development on flooding potential and on stormwater infrastructure.

Another example of the municipal role is in the protection of groundwater. While state laws and programs do address the location and management of land uses that pose the greatest hazard to groundwater, it is left to municipalities to restrict many other land uses that potentially threaten groundwater. Many municipalities recognize the importance of this hidden resource, which supplies 60 percent of New Hampshire residents with their drinking water, and have adopted aquifer protection or groundwater protection ordinances. Some have also worked with adjoining communities to protect shared groundwater resources.

In many ways, the role of municipalities extends into areas where the Legislature has been reluctant to extend the regulatory arm of state government. An example of this is the quality of water supplied by private wells. These wells supply water to 36 percent of the state's residents, but DES estimates that approximately 20 percent of the state's private wells supply water that contains levels of naturally-occurring arsenic that poses a public health risk. So far, there is no state requirement dealing with the testing of water from private wells, but a handful of municipalities have adopted regulations to address the issue.

The Primer points out again and again the need for improved cooperation between municipalities to protect shared water resources. Although the legal mechanisms exist for watershed-based or other regional approaches to land use regulation, and the experts agree that effective management must include this approach, it has not been widely embraced. Municipalities are clearly in the driver's seat in terms of improved water resource protection through coordinated actions.

#### What Do Municipal Officials Think About Water Issues?

As noted previously, DES and its partner organizations conducted a survey of legislators and local officials during October and November of 2008. The purpose of the survey was to gain perspectives in addition to those provided by the DES staff and reviewers involved in preparing the Water Resources Primer. Respondents to the survey included 114 state legislators; 175 members of local governing bodies; and 131 municipal planners, chairs of planning boards or conservation commissions, and their designees. The survey, whose results can be viewed and/or downloaded on the State Water Resources Plan Process website (see Resources, page 15), contains a wealth of information about issues of

importance, water-related capital investment plans and opinions regarding policy questions. The survey revealed the following.

Asked in an open-ended format about the top three water resources issues respondents would like to discuss with the governor, respondents most often mentioned the following:

- Water quality and protection (groundwater and aquifers being mentioned twice as often as either rivers and streams or lakes and ponds)
- DES enforcement and funding
- Water withdrawals, usually groundwater
- Wetlands

Of the 32 water resource issues that respondents were asked about in a multiple-choice format, the issues that more than 70 percent of respondents were very or somewhat concerned about were:

- Impact of development on water quality (82 percent)
- Potential contamination of existing wells and aquifers (77 percent)
- Loss of wetlands (75 percent)
- Water quality of streams and rivers (74 percent)
- Increased flooding (73 percent)
- Shoreland development (73 percent)
- Climate change (71 percent)

Percentages of respondents who indicated that their communities have plans to make major capital investments in each of the following categories in the next five years:

- Land conservation (33 percent)
- Wastewater treatment (25 percent)
- Water supply (23 percent)
- Stormwater system (18 percent)
- Wetlands mitigation (14 percent)
- Dam construction/maintenance (13 percent)

More than 50 percent of respondents answered “yes” to the following policy questions:

- Should the state direct more funds toward collecting and analyzing data necessary to determine water resource conditions in order to adequately develop water policy? (65 percent)
- Would you support raising additional money through user fees to protect land around vital water resources? (60 percent)
- Should additional state regulatory controls be enacted to minimize the impacts of new development on rivers, wetlands and groundwater? (59 percent)

- Should homeowners be required to test private wells when homes are sold? (57 percent)
- Should new developments be required to implement standards for lawn irrigation conservation? (56 percent)

More than 50 percent of respondents agreed (strongly or somewhat) with the following policy statements:

- Water resource protection is worth the investment. Eighty percent of respondents disagreed with the statement, “Sometimes it is okay to reduce water quality to promote economic development.” Eighty-eight percent agreed that, “It is important to protect water resources even though it costs money.”
- Cluster subdivisions with open space should be encouraged (79 percent agreed).
- [The respondent] knows enough about water resources in New Hampshire to make informed policy decisions (60 percent agreed).
- Local aquifer and groundwater protection programs/ordinances are inadequate (55 percent disagreed with the statement that they are adequate).

Of note is the significant alignment between the concerns of policy makers surveyed and the issues and key recommendations identified by experts and stakeholders in the Primer. New Hampshire is fortunate to have well informed policy makers at all levels of government.

### Next Steps and the Municipal Role

Fortunately, New Hampshire has a tradition of constructive involvement by dedicated volunteers—as local officials and as members and directors of regional planning commissions, lake associations, local river advisory committees, volunteer river and lake monitoring groups, sporting groups, and the like. DES solicited the contributions of many of these groups when drafting the Water Resources Primer and plans to tap into this vein of citizen involvement as it holds a series of “road show” meetings throughout the state. (See sidebar, page 14.) DES’s hope is that between the Primer, the survey and the public meetings, the Water Resources Plan process will benefit from a wide range of perspectives and result in an informed public discussion about the challenges New Hampshire faces and what needs to be done to address them.

While the public meetings do not represent the first or the last opportunity for the involvement of municipal officials, the meetings present a great opportunity to begin a discussion that can continue on several levels. First, reviewing the Primer and participating in the State Water Resources Plan discussions can help inform local water resources planning. Second, municipalities have a tremendous stake in the outcome of the State Water Resources Plan process. The issues with the most direct impact on municipalities include infrastructure funding needs and the respective roles of state and local governments in various aspects of land use management such as stormwater management and shoreland protection. However,

the most important issue for all concerned is how to ensure the protection and enhancement of the high quality environment that makes New Hampshire a desirable and economically vital place to live and work.

*This article draws heavily upon the New Hampshire Water Resources Primer, (N.H. Department of Environmental Services, December 2008), edited by Sarah Pillsbury, Paul Currier and Paul Susca. For more information, visit:*

<http://des.nh.gov/organization/divisions/water/dwgb/wrpp/sessions.htm>.

From the New Hampshire Water Resources Primer:

New Hampshire is a unique state with a quality of life that consistently rates among the highest in the nation (Public Service of New Hampshire, 2008). The water running through, over, and by New Hampshire has shaped the state's history and will influence its future. The wise management and protection of water resources is critical to New Hampshire's economic prosperity, public health and environment.

New Hampshire is a small state with plentiful, high quality water resources compared to other parts of the country. New Hampshire has almost 17,000 miles of rivers and streams, nearly 1,000 lakes and large ponds, and 238 miles of ocean and estuarine coastline. Groundwater in New Hampshire is found in fractured bedrock and in the sands, gravels and till left by past glaciers. There is great connectivity among New Hampshire's waters and both water quality and quantity are greatly influenced by what occurs on the landscape (see Figure 1-17, the fold-out graphic).

New Hampshire is also the fastest growing of all the New England states and our landscape will continue to change to accommodate the projected 260,000 new people that are expected to move to the state between 2005 and 2030 (New Hampshire Office of Energy and Planning [NHOEP], 2006). Hundreds of thousands of tourists come to New Hampshire each year to enjoy the state's beautiful lakes, rivers, mountains and coast in the summer and its ski areas, snowmobile trails and ice-fishing spots in the winter. Whether it is needed for drinking, manufacturing, recreating, waste assimilation, or ecosystem health, water is a cornerstone of New Hampshire's beauty and prosperity.

In 2003 a statutory Water Resources Committee was established in the Legislature to study water related issues. The New Hampshire Department of Environmental Services (DES), in conjunction with this committee, sought and acquired limited funding to begin development of a comprehensive water resource plan to ensure the sustainability of New Hampshire's water resources. Development of this primer to inform policy makers and citizens is an initial step toward development of a statewide water resource plan. Thanks to legislative actions and the hard work of many stakeholders, for the first time a description of



New Hampshire specific issues and topics related to surface water, groundwater, water quantity, water quality, water use and conservation, and water related infrastructure will be contained in one document.

New Hampshire has long been a national leader in the protection of water resources. Foresighted leadership by policy makers at the state and local levels on many water related issues has been occurring for more than a century in New Hampshire, starting with the protection and treatment of drinking water and other early regulatory and non-regulatory approaches to address septic systems, wastewater disposal, wetlands, surface waters, groundwater and dams. The primer was developed to provide policy makers with the information they will need to continue to protect water resources given the current and future challenges of increasing water demand, a changing landscape as economic and population growth occurs, multiple water users with competing needs, climate change, and aging water infrastructure for water supply, stormwater, wastewater and dams.

### **X.3 RECOMMENDATIONS**

**The recommendations from two documents, the 1992 WRMPP and the Existing Natural Resources Chapter have been reviewed and those that have yet to be accomplished or are ongoing have been included below.**

In an effort to protect and wisely manage the water resources of Fremont, the Town can pursue a number of regulatory and non-regulatory efforts. Reliance on a single method is not advised. Rather, it is recommended that the Town use a combination of strategies. The following listing should not lead one to believe that every single suggestion needs to be implemented; rather, the items described below are an attempt to provide the Town with a variety of options for protecting and managing its water resources in a sound, rational manner.

#### **Non-Regulatory Programs**

1. The Planning Board should continue to keep in close contact with the Rockingham Planning Commission in order to keep accompanying inventory information up to date. The Board should consult with the Commission on new data sources to incorporate into this document, as well as use the Commission as an information source on new State and Regional developments concerning water resource issues and water resource plan requirements. This is an ongoing relationship in which the Rockingham Planning Commission and Planning Board effectively and regularly provide formal document reviews and updates as necessitated by ever changing infrastructure needs.
2. The Planning Board currently has a good working relationship with the Conservation Commission; this should be maintained and encouraged. The Boards often seek advisement from each other on a variety of planning issues. The result of this cooperation is an expanded perspective when dealing with planning issues and reviewing

development proposals. The interactions of these governing bodies can only enhance the Town's effort to plan for the future.

Specific issues which the Boards should cooperate on include; development plans which could have a substantial impact on wetlands, water quality, wildlife habitats, and other natural resources; water quality monitoring efforts; regulatory reviews and rewrites; and identifying lands which should be protected. The conservation commission has already protected several key parcels of land within Fremont, including Glen Oakes conservation lands. The Planning Board and Conservation Commission have maintained good working relationships and acknowledge the importance of the synergy between the two governing bodies. A number of volunteers share membership across multiple boards. This is an ongoing relationship that both organizations foster that helps identify other significant areas of Town to be protected.

3. The local School Board should consider instituting a stream study and water quality assessment curriculum. This is a program which can be set up with the assistance of the Biology Bureau of the NH Department of Environmental Services. The program is designed for grades five through eight, and involves indoor classroom activities and outdoor field observations. Aspects of the program include stream monitoring, water testing, and water resource protection methods. For more information please contact the DES Biology Bureau directly.

4. The local School Board should consider instituting the "Discover Spring Wetlands" curriculum designed by the Non-game Wildlife Program and the outdoor education Unit of the NH Fish and Game Department. The program is designed for fourth and fifth grade students, and involves indoor and outdoor activities related to wetlands education. For more information please contact the Information and Education Division of the NH Fish and Game Department.

5. A pamphlet on the proper maintenance of septic systems and leach fields has been prepared by the Granite State Septic System Designers and Installers Association in concert with the University of New Hampshire Cooperative Extension Service. The Town should consider obtaining this pamphlet for distribution on a community-wide basis. Perhaps it could be sent along with the property tax bills, or the Building Inspector could distribute the pamphlet when inspecting new or replaced septic systems. Current information is available on the Town's website. For more information please contact the University of New Hampshire Cooperative Extension Service. (603-228-1231)

6. Opportunities for household hazardous waste disposal are infrequent in the Rockingham Planning Region. Much of this can be attributed to the Rockingham Planning Commission's decision to suspend its household hazardous waste collection program due to costs. However, the Town should be encouraged to participate in any intra-community or regional household hazardous waste collection effort.

7. Educational programs on the proper storage and disposal of household hazardous waste should be considered. The pamphlet entitled "Hazardous Materials in Your Home",

prepared by the University of New Hampshire Cooperative Extension Service in conjunction with the Governor's Energy Office, is something which could be distributed on a Town-wide level. Perhaps sending the pamphlet along with the Town's property tax bills would be of benefit. For more information, please contact the University of New Hampshire Cooperative Extension Service. (603-271-2047 or [hhw@des.nh.gov](mailto:hhw@des.nh.gov))

8. The Town should consider establishing a water quality monitoring effort at several locations: Loon Pond, the potential surface water contamination site along Midnight Sun Drive, and the two areas of septic system concentrations along the Exeter River. As mentioned previously, samples could be taken of the River at a point before the septic system concentration and at a point directly after. This should provide an assessment of what effect these concentrations are having on the River.

The previously mentioned areas should be tested at the very least on an annual basis; however, a semi-annual or quarterly testing program would be more appropriate. In terms of setting up a cost effective program, the water sampling should be conducted by the Town and the samples sent into a laboratory for evaluation.

The Town's Health Officer or the Conservation Commission would be a logical person (s) to undertake such an endeavor, however, any interested volunteer can be trained in the basics of water sampling. Water quality monitoring programs can be set up with the assistance of the Biology Bureau of the NH Department of Environmental Services, or the Freshwater Biology Group at the University of New Hampshire.

This recommendation recognizes that the availability of resources will directly affect its implementation.

9. The Fremont Conservation Commission should continue to work with owners of properties containing critical water resources to obtain such areas by gift, grant, or bequest, and/or obtain covenants or easements. This is a great way to protect environmentally sensitive lands at a minimal cost to the community in terms of tax dollars. It is possible the only costs associated with land protection efforts involving gifts, grants, bequests, and the establishment of covenants and easements would pertain to legal and recording fees. The outright purchase of environmentally sensitive would obviously entail substantial costs.

Fremont should make use of state land acquisition programs such as the Land Conservation Investment Program as a means of protecting environmentally sensitive lands. Semi-public and regional land protection organizations (such as the Society for the Protection of New Hampshire Forests and the Rockingham Land Trust) may also be helpful. As may be appropriate in certain circumstances, the Conservation Commission should consider including in the Capitol Improvements Program recommended funding for acquiring land within critical resources areas. This strategy should be pursued when non-fee land or easement acquisition effort are unsuccessful.

10. The Town should continue its efforts to stay informed on the Mottolo Superfund Site clean-up effort. Since hazardous materials from the site have found their way into the Exeter River, it would be wise of the Town to stay apprised of the remediation process

currently underway. In an ongoing relationship with the Exeter River Local Advisory Committee, the Planning Board currently remains informed on the progress of clean-up, as well as on other developments effecting the River.

11. The Town should endeavor to compile an inventory of all underground storage tanks throughout Town. Currently, only the ones registered with the State (1,100 gallons or more) and a few abandoned tanks are known about. Examples of such a data collection effort are limited in New Hampshire, however, the Town may want to consider the example of a neighbor. The Town of Hampstead recently sent out an underground storage tank inventory form to all property owners, and the results were better than expected. The Hampstead Conservation Commission is currently involved in mapping all of the tanks identified through the inventory. For more information, please contact the Hampstead Conservation Commission.

In conjunction with the above task, the Town should consider developing an assistance program for the removal of underground storage tanks. Perhaps a pamphlet could be distributed which addresses the following items: tank placement and replacement, tank construction, leak detection methods, proper procedures for removal, and a description of the state program which offers limited financial assistance for tank removal and contamination remediation. The Town should coordinate its program with the Groundwater Protection Bureau of DES.

This recommendation recognizes that the availability of resources will directly affect its implementation.

The cost of putting these non-regulatory programs in place are expected to be variable and, in some cases, not possible to estimate at this time without further investigation. It is possible the Rockingham Planning Commission could provide technical assistance on the implementation of the recommendations listed above.

Any water resource protection effort worth pursuing will require the commitment of human and financial resources. It is recommended the Town make full use of interested civic groups and other volunteers as a cost effective means of enacting the above mentioned non-regulatory programs. It should not be necessary for the Town to hire additional personnel to conduct or oversee any of the above recommendations.

### **Regulatory Programs**

Most of the regulatory program recommendations in the 1992 WRMPP have been accomplished. Below are the few that have not been completed and may warrant future attention by the community:

1. In an effort to aid firefighting efforts, the site plan review regulations should be amended to require all applicants to clearly mark the content of all above ground storage tanks with a minimum capacity of forty (40) gallons. This will cover the majority of above

ground storage tanks while exempting the small containers associated with outdoor barbecue units.

2. The site plan review regulations should be amended to give the Planning Board the power to require applicants wanting to establish a land use which utilizes potentially hazardous substances to submit a risk assessment study as part of their application, when appropriate. Items to address in such a study should include, but are not limited to:

A. The proximity of the proposed use to surface waters, wetlands, floodplains, aquifers, and public water supplies;

B. The susceptibility of the above mentioned water resources to contamination by the proposed use;

C. An estimate of the abutting population likely to be affected by the proposed use; and

D. Emergency plans and a clean-up strategy (including an emergency response plan) in the event of an accident.

3. Article IV of the zoning ordinance should be amended to require new or replaced septic systems comply with all applicable Town standards as well as the standards of the NH Water Supply and Pollution Control Division. Under the Town's current regulatory framework, the above conditions can only be applied to septic systems proposed as part of a subdivision or site plan. There is no mechanism in place which allows the Town to apply the above referenced standards to replaced systems or to new systems, unless the new systems are proposed as part of a subdivision or site plan. Adoption of this recommendation would be beneficial in terms of addressing the septic system concentration problem along the Exeter River. This is not meant to convey that existing septic systems be required to be replaced.

*The recommendations from the Existing Natural Resources Chapter are:*

**Water Resources - Wetlands**

- Strengthen local land use regulations to increase protection around wetlands, including vegetative buffers around wetlands.
- Improve enforcement of existing wetland protection regulations.
- Strengthen wetland zoning regulations to reduce the number of special exceptions and variances that are being granted.
- Protect wetland “clusters”.
- Determine the contributing areas for Spruce Swamp and prevent stormwater runoff from harming this area.
- Work with the NH Trails Bureau to put up a gate at the Route 107 entrance to the north section of the rail trail to prevent OHRV access.

**Water Resources – River and Stream Corridors**

- Preserve and restore riparian buffers along river corridors.

- Insure enforcement of the NH Shoreland Protection and Rivers Protection Act.
- Expand perennial stream buffers from a 100 foot naturally vegetated buffer to include all of the 100 year floodplain, steep slopes and freshwater wetlands near the stream.
- Identify and implement Best Management Practices for managing storm water runoff.

#### **Water Resources – Drinking Water Supply and Groundwater**

- Develop a future public water supply plan for Fremont.
- Develop a process and timeline for integrating “grandfathered” businesses in the aquifer protection district into compliance with the new regulations.
- Ensure strict enforcement of septic system design to prevent future septic failures. There have been several septic system failures in Tuck Woods.
- Restrict chemical pesticide and herbicide use in the aquifer protection district.

#### **X.4 SUGGESTED ADDITIONS TO THE NATURAL RESOURCES MASTER PLAN CHAPTER.**

*The Aquifer section of the NRMP chapter should be revised to include the following descriptive information on Aquifers:*

Groundwater is a concentration of subsurface water, occurring in unconsolidated earth materials and fractured bedrock formations. It is recharged through precipitation, snowmelt, and surface water infiltration. Aquifers are found where these materials and fractures are filled or saturated with water. If excessive compaction of the earth surface or extensive impervious cover occurs, the amount of surface water that infiltrates the saturated zones or groundwater recharge is reduced.

Aquifers having medium to high potential for groundwater yield occur in the seacoast region as glacial deposits of sand and gravel (unconsolidated materials) or in fractured bedrock. In terms of the hydrologic cycle, approximately one half of the average annual precipitation in the seacoast region is returned to the atmosphere as evapotranspiration, while the other half flows to surface waters or infiltrates as groundwater storage.

##### *Stratified Drift Aquifer*

Unconsolidated materials, called stratified drift deposits, contain sorted layers of gravel, sand, silt and clay. These deposits have high potential groundwater yield due to their permeability, or the abundance of interconnected pore spaces where water is stored.

In 1993, the United State Geological Survey (USGS) completed a study of the region’s groundwater resources. The report, Geohydrology and Water Quality of Stratified Drift Aquifers in the Lower Merrimack and Coastal River Basins, Southeastern NH, identified a large 110 acre stratified drift aquifer located roughly in the central area of Hampton, and extending into North Hampton. As shown on Map 6-Groundwater Resources (refer

to Appendix G), most areas in the aquifer have transmissivities ranging from 1,000-2,000 gallons per day and 2,000-4,000 gallons per day, with isolated areas having transmissivity of greater than 4,000 gallons per day (data source from a study by the U.S. Geological Survey and NH Department of Environmental Services, Water Supply Engineering Bureau, 2002).

#### *Bedrock Aquifer*

Fractured bedrock typically does not yield high quantities of groundwater compared with stratified drift deposits. Bedrock aquifers are more productive when the bedrock is covered by a layer of sand and gravel, which allows recharge to occur directly from the surface. These aquifers are usually adequate for domestic wells serving a small population, and therefore should not be overlooked as a contributing source of a community's water supply needs.

***The following information should be added to the NRMP section on Groundwater Resources:***

#### Water Use and Conservation

The Water Use Registration and Reporting Program was initially authorized by Chapter 402 Laws of 1983, and is implemented by the Department of Environmental Services (DES). The objective of the program is to gather accurate data on the major uses of the state's water and the demands placed upon individual aquifers, streams and rivers. To accomplish this objective, all facilities that use more than 20,000 gallons of water per day, averaged over a seven-day period, must register with DES. "Use" of water means the withdrawal of water from a source, transfer of water from one location to another, return of water to the environment, and facilities which may receive water from a public supplier or return water to a community wastewater treatment plant. The program is important for several reasons in that it provides: 1) basic baseline information regarding major water uses; 2) improved management of water resources through understanding of water use trends and projection of future water demands and associated effects, and 3) a tool for ensuring compliance with laws, regulations and water rights.<sup>11</sup>

***The following information should be added to the existing Surface Water Resources section of the NRMP chapter:***

#### Surface Water Quality Assessments

The NH DES Surface Water Quality Assessment Program produces two surface water quality documents every two years, the "305(b) Report" and the "303(d) List". As the two documents use the same data, the 305(b) Report and 303(d) List were combined into one Integrated Report starting in 2002. The Integrated Report describes the quality of New

---

<sup>11</sup> NH Department of Environmental Services, Fact Sheet CO-GEO-4 Water Use registration and Reporting in New Hampshire (2007)

Hampshire's surface waters and an analysis of the extent to which all such waters provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water. Results of the 2008 305(b) report (after section 305(b) of the Clean Water Act) for the Hampton segments of the Taylor-Hampton River and Hampton Harbor are summarized below.

#### *Designated Uses*

All surface waters of the State are either classified as Class A or B, with the majority of waters being Class B. NH DES maintains a list that includes a narrative description of all the legislative classified waters. Designated uses represent the uses that a waterbody should support. Below are the Classification Designated Uses for Class A and Class B waters as described in RSA 485A:8.

- |                |   |
|----------------|---|
| <b>Class A</b> | These are generally of the highest quality and are considered potentially usable for water supply after adequate treatment. Discharge of sewage or wastes is prohibited to waters of this classification. |
| <b>Class B</b> | Of the second highest quality, these waters are considered acceptable for fishing, swimming and other recreational purposes, and, after adequate treatment, for use as water supplies.                    |

*Criteria.* The second major component of the water quality standards is the "criteria". Criteria are designed to protect the designated uses of all surface waters and may be expressed in either numeric or narrative form. A waterbody that meets the criteria for its assigned classification is considered to meet its intended use. Water quality criteria for each classification may be found in RSA 485A:8, IV and in the State's surface water quality regulations (NHDES, 1999).

*Antidegradation.* The third component of water quality standards is antidegradation which are provisions designed to preserve and protect the existing beneficial uses and to minimize degradation of the State's surface waters. Antidegradation regulations are included in Part EnvWs 1708 of the State's surface water quality regulations (NHDES, 1999). The NHDES is currently developing specific antidegradation standards for water quality, which may be released in 2010. According to EnvWs 1708.03, antidegradation applies to the following:

- any proposed new or increased activity, including point and nonpoint source discharges of pollutants that would lower water quality or affect the existing or designated uses;
- a proposed increase in loadings to a waterbody when the proposal is associated with existing activities;
- an increase in flow alteration over an existing alteration; and
- all hydrologic modifications, such as dam construction and water withdrawals.

#### Effects of Development on Surface Water Quality

Studies conducted in the northeast have documented that by converting as little as ten percent of a watershed to impervious surfaces, stream water quality, stream channel structure, and species habitat begins to deteriorate. Above 25 percent impervious surface,



water quality is seriously degraded. The 2005 report *The Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001-03*<sup>12</sup> found sites with between 8 and 14 percent impervious surface in the watershed generally showed changes in stream quality as measured by reductions in the combined water quality, habitat condition and biological condition score for these sites. The Center for Watershed Protection (Ellicott City, Maryland) reports similar findings of the correlation of percent impervious surface coverage with degradation of water quality and in-stream habitat.

***The Following should be added to the Shoreland and wetland buffer section of the NRMP Chapter:***

NH Comprehensive Shoreland Protection Act

The NH DES Shoreland Program implements RSA 483-B, the Comprehensive Shoreland Protection Act (CSPA). The CSPA establishes minimum standards for activities within the Protected Shoreland – land within 250 feet of the state’s larger water bodies - that are designed to protect the water quality and to fulfill the state’s role as trustee of those waters. Effective July 1, 2008, the state legislature amended the CSPA to revise existing and include additional standards to protect water quality. These standards include new requirements for clearing trees and other vegetation within the Woodland and Waterfront Buffer, limitations on impervious surface coverage, restrictions on the use of fertilizer and pesticides, and setbacks for primary structures. For more information, refer to the NHDES Shoreland Program website at <http://des.nh.gov/organization/divisions/water/wetlands/cspa/index.htm>.

***The following section should be added to the surface water resources section of the NRMP Chapter:***

**Designation of the Exeter River as a Rural River (*designation complete*)**

Broad wetlands, forested riverbanks, and gently-flowing waters, interrupted by short stretches of rapids and falls, combine to make the Exeter River an important scenic resource as well as habitat for a variety of wildlife species in southeastern New Hampshire. As a major tributary to the Great Bay National Estuarine Reserve, the Exeter River also plays a vital role in maintaining the overall health of the bay's environment. For these reasons, the river has been recognized not only by the NH Rivers Management and Protection Program, but as part of the NH Resource Protection Project. Great Bay is one of six high priority areas in the state recognized as a resource protection site. This designation places an emphasis on protection of healthy resources (rather than restoration of impaired resources) throughout that ecosystem. A high level of water quality must be maintained in the Exeter River not only because of these designations, but because it is the primary source of municipal water supply for Exeter.

---

<sup>12</sup> Deacon, Jeffrey, R., Soule, Sally A., and Smith, Thor E., *Effects of Urbanization on Stream Quality at Selected Sites in the Seacoast Region in New Hampshire, 2001-03*, U.S. Geological Survey Scientific Investigations Report 2005-5103.

The Exeter River begins in the town of Chester and flows east and north to Exeter where it becomes tidal and changes name to the Squamscott River, before emptying into Great Bay. Its drainage basin encompasses an area of 126 square miles. The upper 33.3 miles of the river, from its headwaters to its confluence with Great Brook in Exeter, were designated into the NH Rivers Management and Protection Program in August 1995.

Land use along the Exeter River is primarily rural. In the upper reaches of the river, through Chester, Sandown and Danville, there are scattered farms and single family homes and the riverbank is well forested and interspersed with large areas of wetlands. In the lower reaches of the river, from Fremont to Exeter, there is more industrial and commercial land use.

The following should be added to the NRMP chapter:

The most current water use information available to date for the communities in the coastal watershed is the result of a cooperative effort by the NH Department of Environmental Services, the U.S. Geological Survey and local municipalities. These entities combined resources to develop groundbreaking information on groundwater resources in the 44 municipalities found in the NH Seacoast Region. Two publications were prepared as a result of this study and these documents give us the most comprehensive evaluation of the area's groundwater resources ever developed.

The first document, Methods For and Estimates of 2003 and projected Water Use in the seacoast Region, Southeastern NH, Scientific Investigations Report 2007-5157, USGS 2008 developed a methodology for determining water usage, as well as projecting water usage out to 2017 and 2015 for each community.

The second document, Assessment of Ground-Water Resources in the Seacoast Region of New Hampshire, USGS, New Hampshire Coastal Program and the New Hampshire Department of Environmental Services, Scientific Investigations Report 2008-5222, 2009, developed a mechanism to study groundwater flow in order to evaluate current and future groundwater availability.

These studies offer a wealth of data for the groundwater resource in the seacoast and serve to allow communities to have a much clearer picture of current water usage as well as sound scientifically supported indications of future groundwater availability. This enables communities to do water resource planning with a degree of sophistication that was unavailable in the past.

**RIVER CLASSIFICATIONS**

**Rural**

**Activities Allowed**

**Dams & Encroachments**

Construction of New Dams

No

Reconstruction of Breached Dams

Yes

(within six years)

Channel Alterations

Yes (with conditions)

**Water Quality/ Water Quantity**

Water Quality

Class B

Interbasin Transfers

No

Protected Instream Flow

Yes

**Waste Disposal**

New Landfills

No (within 250 ft.)

New Hazardous Waste Facilities

No (within 250 ft.)

Other New Solid Waste Facilities

No (within 250 ft.)

New Septic Systems

No (within 75 ft.)

New Auto Junk Yards

No (within 250 ft.)

**Fertilizer**

Limestone

Yes

Sludge and Septage

No (within 250 ft.)

Conditions apply

Low Phosphorus, Slow Release Nitrogen

No (within 25 ft.)

*[http://des.nh.gov/organization/divisions/water/wmb/rivers/exeter\\_river.htm](http://des.nh.gov/organization/divisions/water/wmb/rivers/exeter_river.htm)*