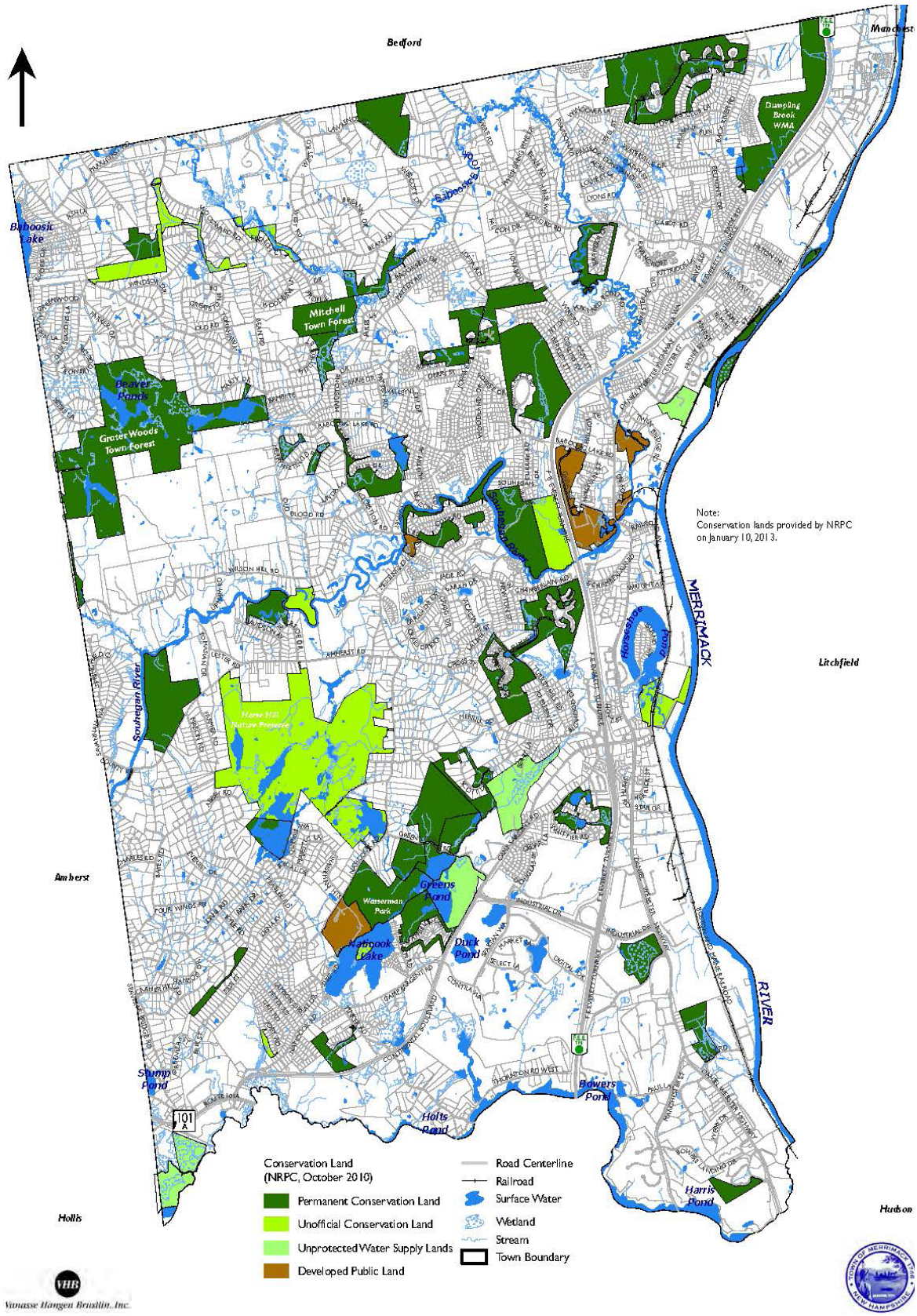
Figure 5-7: Merrimack's Conservation Land



The MVD owns and manages several large parcels, most of which are in the vicinity of Greens Pond and Naticook Brook. These parcels are generally not open to the public.

Publically and privately owned conservation lands in Merrimack have been identified on a map prepared by the Merrimack Conservation Commission, along with a listing of each parcel and it size. The 2002 Master Plan listed a number of conservation priority parcels for the Town, a number of which have since been purchased or preserved. The remaining parcels from this list can be found in **Table 5-2**. **Figure 5-8** depicts the Town of Merrimack's Conservation Priorities.

Table 5-2: Conservation Priorities

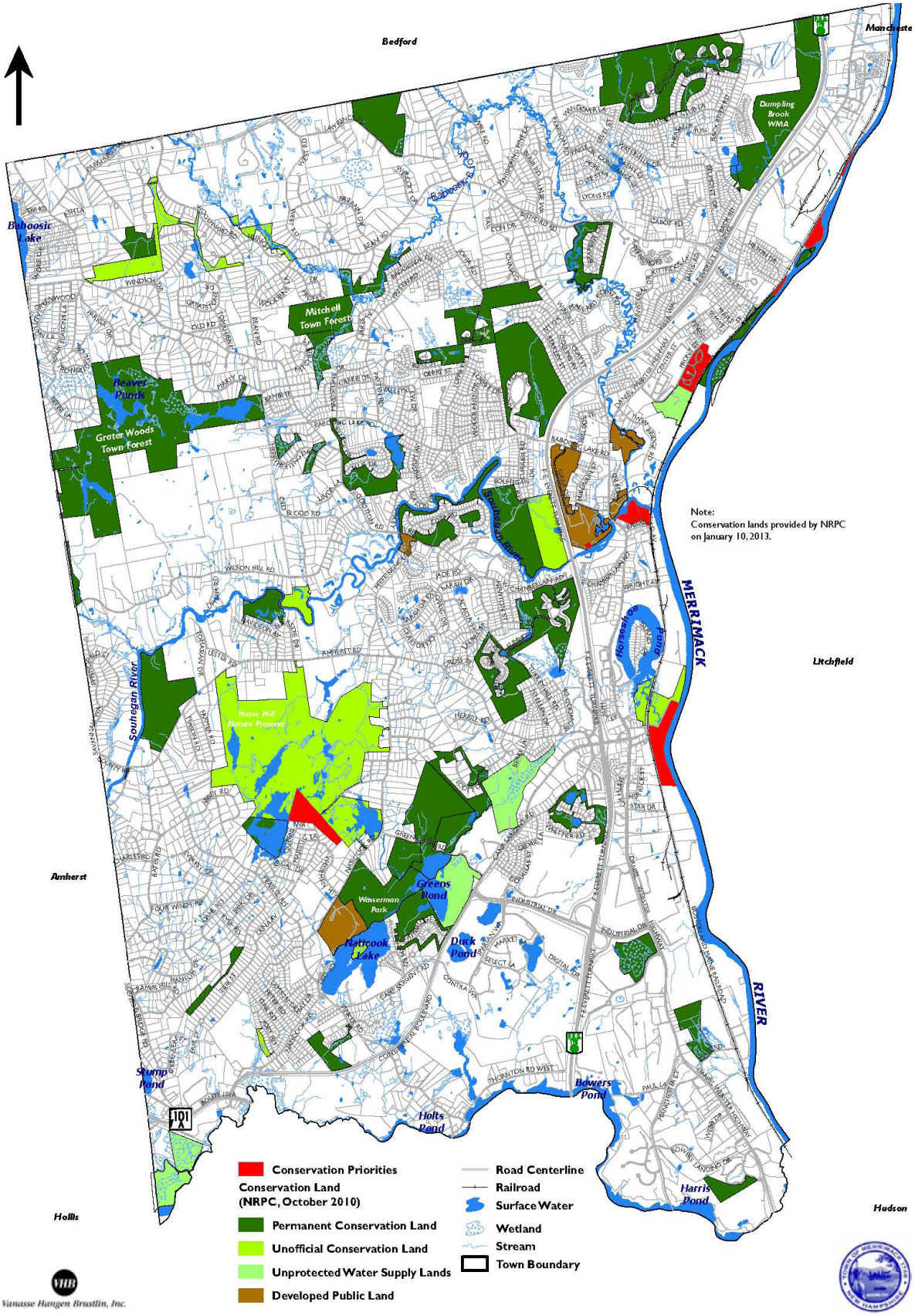
Tax Map and Lot #	Size in Acres	Description
3B/201	26.0	Abuts Horse Hill Nature Preserve, and would provide buffer from residential development for these parcels.
6E-1/64	1.8	Small thin parcel located on the bank of the Merrimack River.
3D-1/3	30.8	A key shoreline parcel along the Merrimack River. Historically the Thornton's Ferry area.
5D-1/3	4.7	Located at the confluence of the Souhegan and Merrimack Rivers. Key parcel for trail network.
5D-4/78	8.6	Located at the confluence of the Souhegan and Merrimack Rivers. Key for greenway network.
5D-4/100	1.0	Small parcel along Souhegan River. Trail potential.
5D-2/4	23.1	Located on the northern bank of the Souhegan upgradient and in the WHPA for wells # 4 and 5. Very important for groundwater recharge.
6E/6	7.9	This parcel would provide additional access to the Merrimack, with potential for trails & boat access.
6E/8	0.8	This thin parcel could be a link in a potential Merrimack R. greenway/trail system.
Total Acreage:	104.7	

5.6.2 Priorities for Future Conservation Efforts

As part of a state-wide effort with funding provided by the New Hampshire Department of Environmental Resources (DES), the Nashua Regional Planning Commission has been working with member communities, regional and state organizations to identify the natural and cultural resource protection needs and priorities for the region.

The Land and Community Heritage Commission (LCHC) was established "to determine the feasibility of a new public-private partnership to conserve New Hampshire's priority natural, cultural and historic resources." The LCHC is implemented by a program called the Land and Community Heritage Investment Program (LCHIP). The LCHIP is an independent state authority that makes matching grants to NH communities and non-profits to conserve and preserve New Hampshire's most important natural, cultural and historic resources. The LCHIP could provide resources to Merrimack to protect important natural resources through the acquisition of development rights on these properties.

Figure 5-8: Merrimack's Conservation Priorities



In addition to the LCHIP, the Regional Environmental Planning Program (REPP) was created in response to statewide conservation efforts. The 2005 Nashua Region Open Space by Nashua Regional Planning Commission creates a region-wide inventory of New Hampshire's most significant unprotected water, land, forest, historic, cultural, ecological, geological and public resources. The Nashua Region Open Space strategy looks at open space and prioritization of key open space resources from a regional scale and places conservation importance on critical forest land blocks (over 500 acres) and vital river corridors such as the Merrimack and the Souhegan River Corridor which both pass through Merrimack. The Plan also notes that one of the objectives of the Merrimack Conservation Commission is to locate a land trust organization to assist with funding, provide technical expertise, and to hold conservation easements within Merrimack.[13]

5.6.3 Merrimack River Parcels Proposed for Protection

Parcels 6E-1/64, 6E-6 and 6E-8 are a group of long and narrow parcels located between the Merrimack River and the Boston and Maine railroad tracks. Because of the shape of these parcels, and the absence of public access due to the railroad barrier, it is unlikely that these lots are developable. Acquisition or protection of these parcels through conservation easement(s) would allow the Town to extend trails north along the Merrimack River, with the eventual goal being a greenway or trail network along the entire length of the river.

Parcel 3D-1/3 is a key shoreline parcel in Merrimack. At nearly 31 acres, it is one of the largest undeveloped parcels located on the Merrimack River. The parcel is the site of Thornton's Ferry, an historic river crossing connecting Merrimack to Litchfield. This would also be an ideal site for a boat launch.

Parcel 5D-2/4 is located between Route 3 and the Merrimack River and abuts land owned by the MVD containing wells 4 and 5. It is upgradient from the wells and development of this site could adversely affect the wells by decreasing groundwater recharge and increasing the potential of groundwater contamination. According to a study conducted by the University of New Hampshire in 1996, "This parcel has the highest recharge potential after accounting for the number of acres, the greatest potential sources of pollution, the highest buffering capacity when taking into account the highest value for protection feasibility." Protection of this parcel is thus a key component in safeguarding the Town's vulnerable groundwater supply.

5.6.4 Souhegan River Greenway Parcels

Parcels 5D-1/3, 5D-4/78, and 5D-4/100 are a group of parcels located along and near the confluence of the Souhegan and Merrimack Rivers. The purchase of parcel 5D-1/3 would be key to opening a large segment of hiking trail along the Souhegan River by enacting an existing easement that requires ownership of abutting lands. Protection of these parcels would help to bring about a greenway, connecting protected land and trails along the Souhegan River with similar land along the Merrimack River. Discussions are underway to acquire these easements.

13 Nashua Regional Planning Commission, Nashua Region Open Space Strategy, December 2005, pg. 22.

5.7 Water Resources

5.7.1 Surface Water Resources

Surface water resources include lakes, ponds, streams, rivers, and wetlands. Surface water resources serve many important functions in a community. A community's surface waters provide for water storage, aquifer (groundwater) recharge, water supply and wildlife habitat.

Surface water resources comprise 1,048 acres of land in Merrimack. The Town's most prominent surface water resource is the Merrimack River. The Merrimack River forms the entire western boundary of the Town and serves as a regional recreational resource and as a water supply source for Pennichuck Water Works. The Merrimack River also receives discharge from the Town's Wastewater Treatment Plant and much of its stormwater system. Another critical surface water resource is Pennichuck Brook and its associated ponds. The Pennichuck Brook system is the primary water supply source for Pennichuck Water Works who serves portions of Merrimack, the City of Nashua and other communities. Pennichuck Brook forms the southern boundary of the Town flowing between Merrimack and the City of Nashua. The Souhegan River, which bisects the Town in northern and southern halves, is also an important resource, particularly for recreation and wildlife habitat.

Wildcat Falls on the Souhegan River

Other critical surface water resources include Naticook Lake and Greens Pond. The lake and pond, along with portions of Naticook Brook are situated above one of the Town's most important aquifers in the vicinity of three of its most productive public water supply wells. Naticook Lake is also one of the Town's most important recreational resources. The Lakefront area includes the Town's only public beach and a major summer day camp at Wasserman Park; a YMCA summer camp and beach area; Veteran's Park; two public boat ramps; a private beach; and several private residences. Private beaches, public boat ramps and many private residences are also located on Baboosic.

This section of the natural resources chapter briefly examines Merrimack's surface water resources, with an emphasis on water quality, threats to water quality, and what can be done to safeguard and enhance water quality. In this endeavor, it has been discovered that a comprehensive watershed-based approach is the most effective in safeguarding water quality. Therefore, this discussion will start with a description of the major watersheds in Merrimack, followed by a discussion of rivers, streams and other water resources located within the major watersheds. Data and background information on Merrimack's surface and groundwater resources is found in the Merrimack Water Resources Management and Protection Plan. Although this plan was prepared in 1989, much of its data is still current.

Watersheds, Rivers and Streams

A watershed is defined as a geographic area consisting of all land that drains to a particular body of water. Watersheds vary in size, shape, and complexity. Watersheds are delineated by identifying the highest topographic points in a given area, and determining the direction in which water will flow from these high points. All water bodies have their respective watersheds. Major rivers, such as the Merrimack River, not only have their own overall watershed, but also typically contain many sub-watersheds for each of their tributaries. For example, the Souhegan River, a tributary of the Merrimack River, has its own watershed and is one of several sub-watersheds making up the entire Merrimack River watershed.

The water quality of a water body is directly related to the land use and activities that take place within its watershed. Because the drainage area of any given water body may extend beyond a town's borders, intermunicipal coordination of land use management is important in ensuring effective management and protection of the water resource. A case in point is Baboosic Lake, which is located in both Merrimack and Amherst, with about half of its watershed area in each town.

The entire Town of Merrimack is located in the greater Merrimack River watershed, which extends from the White Mountains in northern New Hampshire southward to the northeastern corner of Massachusetts. The Merrimack's 5,010 square mile watershed is the fourth largest in New England, with 76 percent of this area (3,810 square miles) in New Hampshire and the remainder in northeastern Massachusetts. As with most large rivers, the Merrimack River has numerous subwatersheds – the Merrimack has seventeen. **Figure 5-9** shows these watershed areas, as well as their associated floodplains. **Table 5-3** below provides area statistics for each watershed.

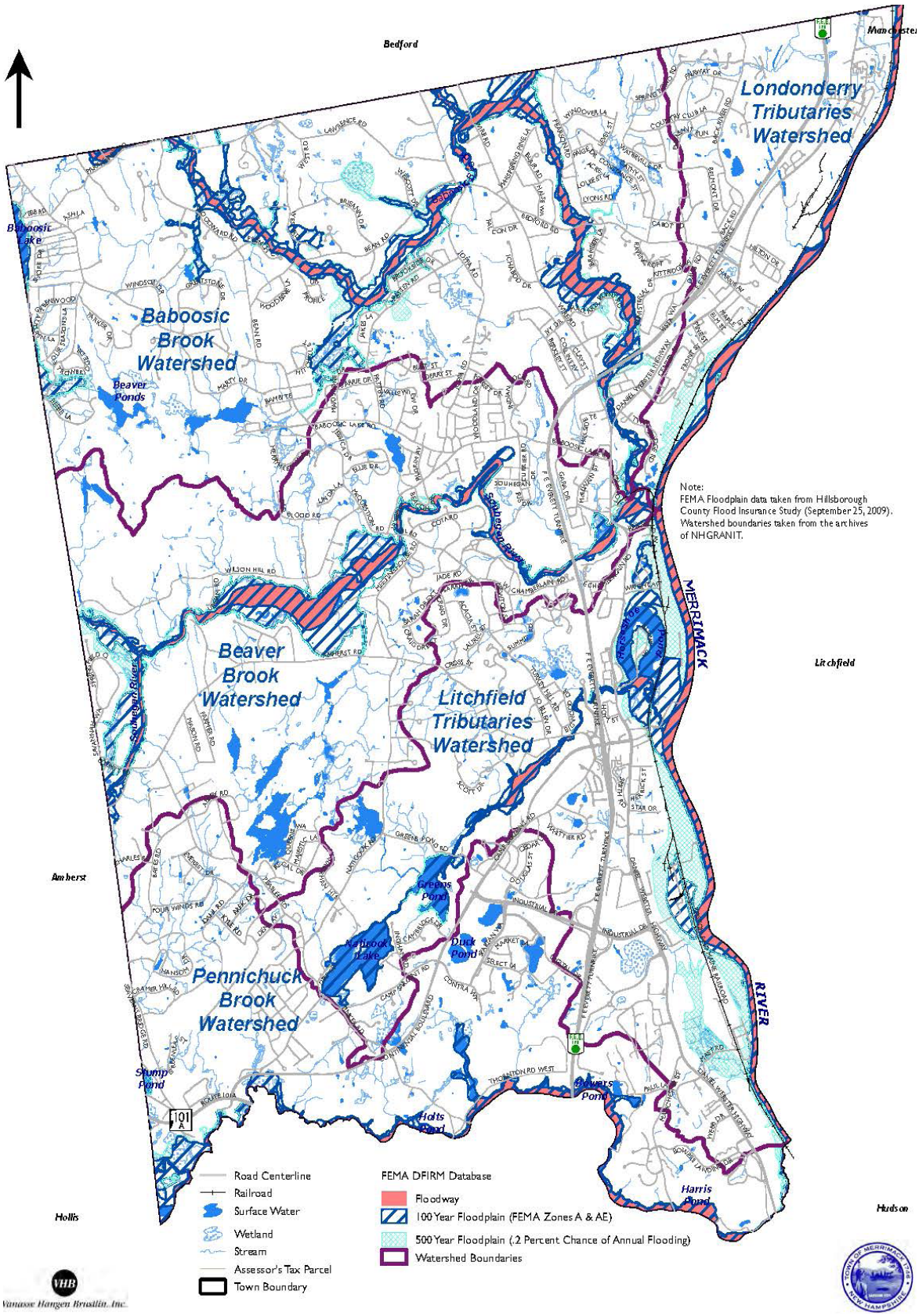
Table 5-3: Watersheds in Merrimack

Watershed	Acres in Merrimack
Baboosic Brook watershed	6,575
Londonderry tributaries watershed	1,853
Beaver Brook watershed	5,077
Litchfield tributaries watershed	4,393
Pennichuck Brook watershed	3,515
Total area:	21,413 acres

Note: The information reflects changes in watershed mapping and designations since the 2002 Master Plan.

Source: NHGRANIT data

Figure 5-9: Merrimack's Watersheds and Floodplains



The most significant local regulatory mechanism to safeguard Merrimack's surface water resources is the Town's Shoreland Conservation District Ordinance. In most ways, the ordinance parallels the State Shoreland Protection Act. The Shoreland Protection District applies to all lands within 250 feet of the shoreline of Baboosic Lake, Baboosic Brook, Bowers Pond, Greens Pond, Holts Pond, Horseshoe Pond, Harris Pond, Stump Pond, Supply Pond, Naticook Lake, Merrimack River, Pennichuck Brook, Pennichuck Pond, and the Souhegan River. The most significant features of the Ordinance are a 50 foot building setback requirement from the shoreline, a limitation on tree cutting within 150 feet of the shoreline and limitations on septic system locations and impervious surface coverage.

Additional protection is given to the Lower Merrimack River and the Souhegan River as New Hampshire protected rivers, designated in 1990 and 2000, respectively, by the NH DES Rivers Management and Protection Program. The Lower Merrimack River is designated as a community river, defined as those where the natural, scenic, recreation, and community values of the river are to be protected, while still accepting of agricultural, residential, and commercial uses that do not impact public instream uses. Most of the Souhegan River is designated as a rural river which are those adjacent to lands that are partially or predominantly used for agriculture, forest management and dispersed or clustered residential development, and where some instream structures may exist. Other parts of the Souhegan River are designated as a rural-community river or a community river.

As protected rivers, the Local Advisory Committees for each river are tasked with preparing and adopting local river corridor management plans pursuant to RSA 483. The ***Lower Merrimack River Corridor Management Plan*** was prepared in May 2008. The ***Souhegan River Watershed Management Plan*** was prepared in March 2006. In general, these two plans are intended to guide communities adjacent to these rivers in decision-making that may have the potential to affect the river itself, the river corridor, and the watershed. In addition to the preparation and adoption of river corridor management plans, the Local Advisory Committees are also tasked with considering and commenting on any local government plans to approve a license, fund, or construction facilities which may alter the resource value and characteristics of the designated river.

The Souhegan River Watershed Management Plan was instrumental in identifying the key concerns and issues facing the recreationally and ecologically important Souhegan River. In particular, the Plan noted that it would be important for Corridor communities, including Merrimack, to adopt the Plan to implement its river management strategies. These strategies range from maintaining and restoring vegetated buffers along the river to adopting site design practices that protect aquatic resources.

Characteristics of Merrimack's perennial streams are summarized in **Table 5-4**. Stream location, length and elevation were determined from United States Geological Survey (USGS) quadrangles. All streams flowing through Merrimack have been designated by the New Hampshire Legislature as Class B waters (must meet the fishable/swimmable criterion) except for Pennichuck Brook which is Class A. Class A waters must be suitable, with treatment, for use as a public drinking water supply.

A detailed discussion of water quality issues facing Merrimack's rivers and streams is found in the "Threats to Surface and Groundwater Resources" section of this chapter.

Table 5-4: Perennial Streams in Merrimack

Name	Total Length (miles)	Length In Merrimack (miles)	Generalized Begin Elevation (aMSL)	Generalized End Elevation (aMSL)	Dammed or Free-flowing	Class
Baboosic Brook	9.7	7.6	240	100	dammed	B
Pointer Club Brook	0.5	0.5	—	—	free	B
Dumpling Brook	1.8	1.8	250	100	free	B
Unnamed Stream	1.2	1.2	240	200	free	B
Merrimack River	116.0	7.9	—	—	dammed	B
Unnamed Stream	1.2	1.2	340	190	free	B
Souhegan River	34.8	6.6	940	100	dammed	B
Naticook Brook	2.0	2.0	180	100	dammed	B
Unnamed Stream	1.0	0.7	270	190	free	B
Pennichuck Brook	7.9	6.4	190	100	dammed	A

Source: USGS Quadrangles.

Table 5-5: Lakes and Ponds in Merrimack[14]

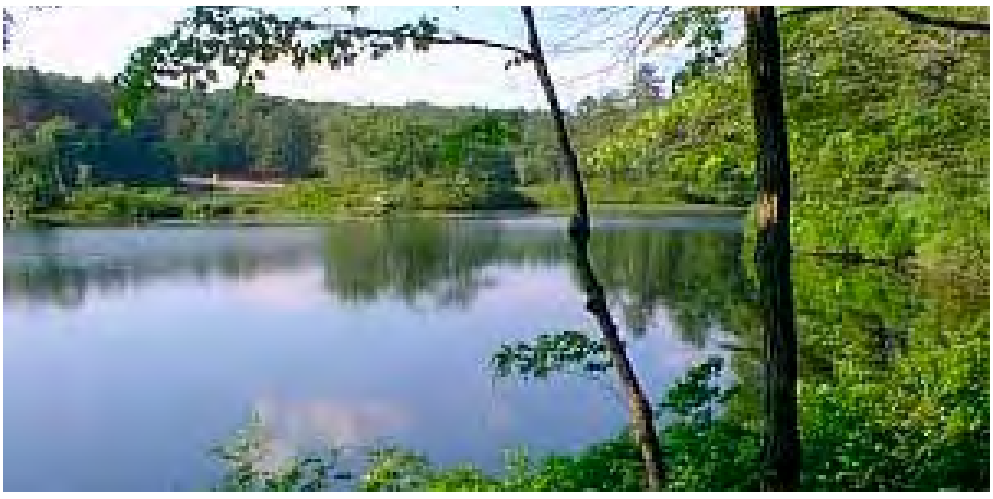
Name	Length (miles)	Area (acres)	Elevation (aMSL)	Average Depth (feet)	Maximum Depth (feet)	Trophic Class "Year"	Trophic Class "Year"	Type
Baboosic Lake	4.3	222	231	16	26	Eutrophic (1998)	Mesotrophic (2008)	Natural
Naticook Lake	2.1	72	206	N/A	20	Mesotrophic (1989)	Mesotrophic (2000)	Natural
Greens Pond	0.4	40	195	N/A	14	N/A	Eutrophic (1997)	Dammed
Horseshoe Pond	1.8	37	95	N/A	23	Eutrophic (1979)	Eutrophic (1997)	Natural
Duck Pond	0.2	8	200	N/A	N/A	N/A	N/A	N/A
Stump Pond	0.5	18	195	N/A	6	N/A	Eutrophic (1990)	Manmade

Source: NH DES, Water Division, Survey Lake Data Summary, September 2009.

14 http://des.nh.gov/organization/divisions/water/wmb/lakes/documents/summary_data.pdf

Lakes and Ponds

Merrimack contains all or part of five (5) lakes and ponds. **Table 5-5** provides some general information on Merrimack's lakes and ponds. The trophic class of a lake indicates its stage in the natural aging process, called eutrophication that all water bodies undergo. Generally, three classifications are used: oligotrophic—high transparency with low levels of nutrients and vegetation and high levels of dissolved oxygen; mesotrophic—elevated levels of nutrients and vegetation and decreased levels of dissolved oxygen; and eutrophic—low transparency, rich in nutrients, abundant aquatic vegetation and low levels of dissolved oxygen. The trophic classes also represent the manner in which most lakes age, with "young" deep lakes tending to be oligotrophic, middle-aged lakes tending to be mesotrophic, and older, shallower lakes and ponds tending to be eutrophic. The natural aging process by which lakes age and fill in with organic sediments can be accelerated by excessive nutrient loading. This encourages weed and algal growth, which in turn speeds up the deposition of decaying vegetation as organic sediments on the lake's bottom.



Perhaps the most significant finding from the above table is the reclassification of Baboosic Lake from eutrophic in 1998 to mesotrophic in 2008. This is indicative of improving water quality over the past decade. Previously Baboosic Lake was classified as mesotrophic in 1993, but experienced accelerated eutrophication through 1998 due to increased nutrient loading as a result of increasing development in the watershed. Excess phosphorus is the nutrient most likely responsible for the previous decline in the lake's water quality. The phosphorus originates from geologic materials, atmospheric deposition, waterfowl waste, fertilizer runoff, and domestic septic systems. Water clarity decreases due to algal blooms feeding on the high concentrations of phosphorus. The improved water quality may be the result of comprehensive planning and site design requirements which reduce impervious surfaces, erosion, and maximize stormwater systems. Continued implementation of best management practices such as proper septic maintenance, reduced fertilizer application, and improved buffers around the lake should be encouraged.

According to the most recent (July 2008) lake report from the New Hampshire Department of Environmental Services, the color scale (clear, transparent water has low values, darker, cloudier water has higher values) of Baboosic Lake averaged at 23, a decrease from 42 in the eight-year period, and the chlorophyll-A content, an indicator of algae growth, also decreased to a value of 2, from a high of 16. These decreases after a sharp increase prior to 2000 indicate that Baboosic Lake is improving, but remains susceptible to short-term algae blooms.

In the eleven-year period from 1989 to 2000, Naticook Lake's color scale increased from 21 to 23 and its chlorophyll-A content increased from 2 to 5, but its trophic class remained the same. While those increases are not significant, there is no data available in the twelve years since Naticook Lake was last tested. One fact brought out by the NH DES data is that many lakes and ponds in the State have not been tested in many years. While Baboosic Lake was recently tested in 2008, Greens Pond, Horseshoe Pond, and Naticook Lake were last tested well over twelve years ago. Water quality can change rapidly, and it is in the Town's interest to have up-to-date water quality data for all its water bodies. The Town's Parks and Recreation Department should ensure that Naticook Lake is tested on a regular basis, especially considering its value as a municipal recreational resource.

A recent concern for the Naticook Lake is recently discovered infestation of the lake with variable milfoil, an exotic aquatic plant first found in the lake in July 2012. It has been confirmed by the NH DES. According to the NH DES, "Freshwater exotic aquatic plants are those that are not naturally found in New Hampshire's lakes, ponds and rivers, and because they are not naturally found here, they have no predators or diseases that keep them in check, allowing them to grow quickly."[15] While the recent discovery is reported to be difficult to remove due to advanced stage of growth, the NH DES does have a number of practices to prevent its further spread including the proper boat cleaning and removal of materials on boat equipment. The Town could post signage at the boat docking areas on Naticook and Baboosic Lakes that educates boat owners of the danger of invasive species and measures to prevent their spread.

15 New Hampshire Department of Environmental Services, DES Warns of Expanding Infestations of Exotic Aquatic Plants. January 2012.

Wetlands

Wetlands have recently received much scientific and regulatory attention as recognition of their role in hydrologic and ecological processes has increased. Among the functions wetlands perform are aquifer recharge, flood control, erosion and sedimentation control, water purification, and provision of nursery grounds and habitat for numerous species of plants, animals and fish. A number of endangered and threatened species are found only in wetlands.

Wetland definitions vary according to the agency or organization delineating the wetland. The US Fish and Wildlife Service definition of wetlands is based on the location of the water table and the presence of standing water, the presence of plant species commonly found in wetland habitats, and soil type. Four federal agencies (the US Department of Agriculture, Natural Resource Conservation Service (NRCS); the Army Corps of Engineers and the Environmental Protection Agency) agreed on a definition of wetlands that considers three parameters: soils, wetland vegetation and hydrology. The NH Wetlands Board uses a three-part definition for wetlands based on hydric (saturated) soils, hydrology (water table at or near the surface), and wetland vegetation. For purposes of regulation, Merrimack, like many communities in New Hampshire, defines wetlands as areas of poorly and very poorly drained soils.

White Pine Swamp

Wetlands in Merrimack represent 509 acres of the land area of the Town.[16] Most of the wetlands are located near major water bodies, although several large isolated wetlands also exist. The two largest wetlands, encompassing 150 and 250 acres, are located in the Baboosic Brook watershed. Another significant wetland area, approximately 60 acres, is White Pine Swamp in southwestern Merrimack.

Regulatory methods of protecting wetlands from pollution and destruction include requirements for erosion and sedimentation control plans and enforcement of those plans, minimum setbacks for buildings and septic system leach fields, minimum vegetative buffer requirements and prime wetland designation. Merrimack's Wetland Conservation District zoning prohibits dredging, filling, erection of structures or any alteration of the terrain in areas of poorly or very poorly drained soils. Merrimack enforces the State's minimum setback

16 Town of Merrimack

requirement of 75 feet for septic leachfields. All buildings or structures which require building permits must be set back at least 40 feet from any wetland boundary.

New Hampshire Revised Statutes Annotated, Chapter 482-A:15, enables a municipality (acting through its Conservation Commission) to designate certain areas as prime wetlands. Prime wetland designation accomplishes the following:

- Identifies wetlands considered important locally by virtue of their size, unspoiled character, uniqueness, fragility and/or other special characteristics.
- Notifies landowners, developers, and the NH Wetlands Board that the municipality strongly believes that certain wetlands should remain in their natural state.
- Provides assurance that the Wetlands Board will give special consideration to applications for dredge and fill permits in prime wetlands (as long as the Conservation Commission notifies the Board that the permit application is for a proposed project in a prime wetland.)

Proposals for prime wetland designation must follow inventory and evaluation criteria as well as report and map formats established by the New Hampshire Wetlands Board. To date, the Town has not designated any prime wetlands. The Merrimack Conservation Commission should consider performing a functional evaluation of the Town's wetlands, which may lead to designation of prime wetlands.

5.7.2 Floodplains

Floodplains are areas adjacent to water bodies and watercourses that are susceptible to flooding during periods of excessive water runoff. Merrimack contains extensive floodplain areas, many encompassing large wetlands which facilitate flood storage. A 100-year flood is a base flood having a one percent chance of occurring in any year. As recently updated by the Federal Emergency Management Agency (FEMA) the 100-year floodplain in Merrimack includes approximately 2,204 acres of the Town. The 500-year floodplain (0.2 percent chance of annual flooding) represents 758 acres of land.[17] Significant floodplains border the Merrimack River and Horseshoe Pond, the Souhegan River, Baboosic Brook, and Naticook Brook below Greens Pond.

Merrimack's Flood Hazard Conservation District is an overlay district designed to minimize loss of life and property due to flooding. It prohibits fill or encroachments that would increase the base level of a flood as well as the removal of soil or other natural objects. The ordinance also contains 500-year floodplain provisions regarding the storage of industrial chemicals and hazardous materials, and the design and siting of septic systems. Merrimack's 100- year and 500-year floodplains are shown on **Figure 5-9**.

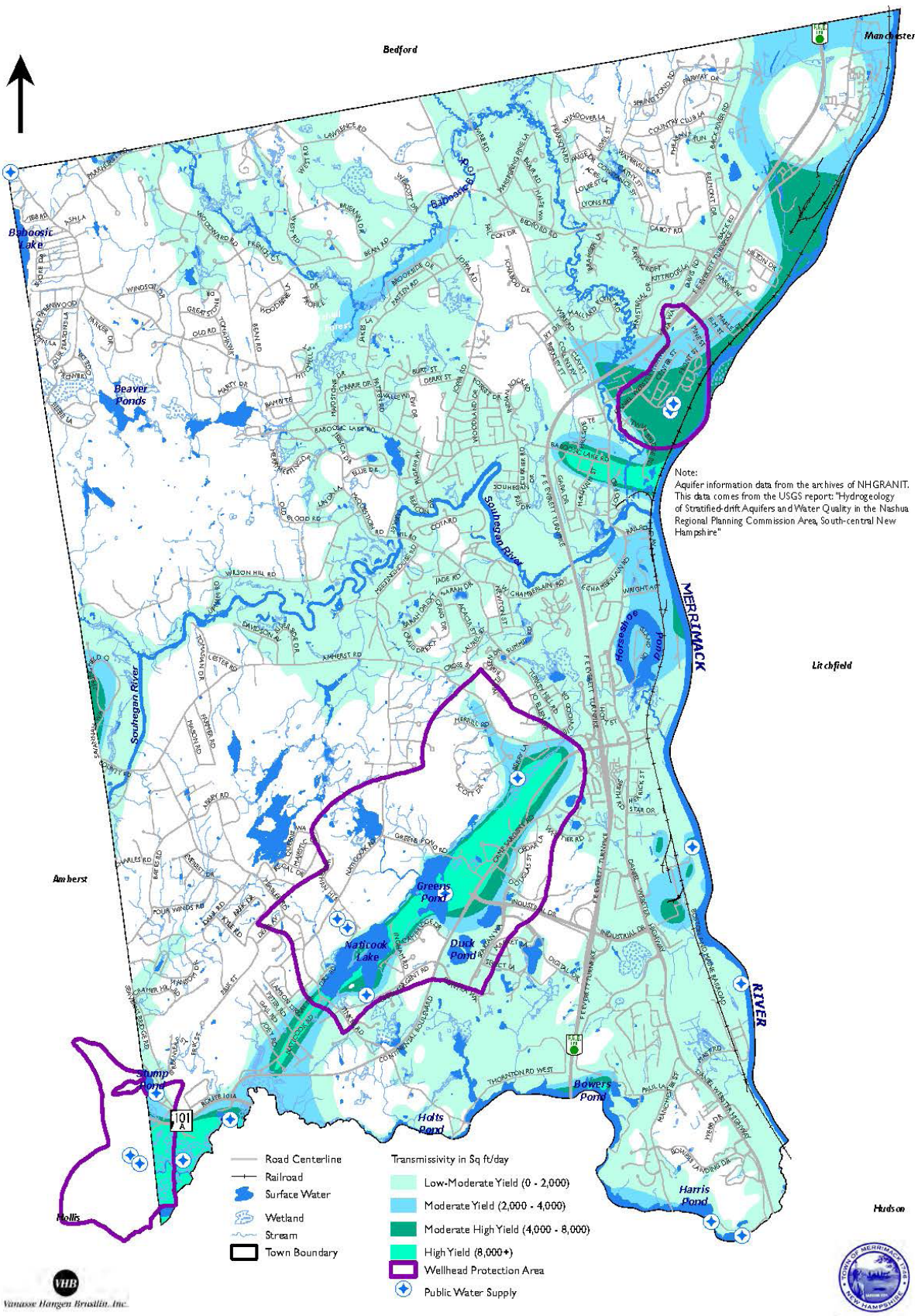
17 Federal Emergency Management Agency and GRANIT, 2012

5.7.3 Groundwater Resources

Groundwater is a very important resource in Merrimack, as 85 percent of the Town obtains its drinking water from wells operated by the MVD. These wells are located in areas called aquifers, which, in the case of MVD's wells, consist of coarse sand and gravel deposits (stratified drift) that hold and have the ability to transmit large quantities of water. Though bedrock aquifers are also found in Merrimack, they are not currently being used as a source of municipal water supply. Stratified drift aquifers, which generally have the greatest potential to yield large quantities of water, underlie approximately 19 square miles or 57 percent of the Town. The location of these aquifers is shown on **Figure 5-10.**

Merrimack has adopted an aquifer conservation (overlay) district is "created to protect, preserve and maintain the existing potential groundwater supply and recharge areas within known aquifer and wellhead areas from adverse impacts that may result from inappropriate development or land use practices." The district is divided into two sub-areas: (1) the wellhead protection areas; and (2) the balance of the aquifer district. The regulations and standards for the wellhead protection areas are stricter than those for the remainder of the district. The district allows recreation, residential development and commercial operations that do not discharge wastes on site. Discharge of wastes is limited to septic system leachate from one- or two-family residences. Use of septic systems by commercial and industrial operations is not specifically allowed but may be permitted by action of the Zoning Board of Adjustment. Several types of businesses are prohibited (e.g. junkyards, automotive service and repair shops). Storage and handling of toxic materials is also restricted (e.g. no underground storage tanks within 1,000 feet of a municipal well, no storage of toxic chemicals for sale or distribution) in addition to the provisions regarding underground storage tanks and toxic materials administered by the Merrimack Fire Department and the New Hampshire Department of Environmental Services.

Figure 5-10: Merrimack's Aquifers



Merrimack's groundwater resources are part of an extensive system of stratified drift deposits that extend beyond the Town's corporate boundaries. The use of the groundwater, and of the land overlying it, in one community may affect the quality and quantity of the ground water in other communities.

The deposits along the brook northeast of Naticook Lake and the South Merrimack deposits in the southwestern corner of town form the most important aquifers in Merrimack.[18] The Naticook Brook aquifer is located along Naticook Brook northeast of Naticook Lake in Merrimack. This coarse, thick, extensive deposit lies under the Route 101A corridor, which is extensively developed through Nashua and Merrimack and is rapidly developing westward. The Merrimack-Merrimack River aquifer is a deposit spanning the Merrimack River into the northern sections of Merrimack and Litchfield. In Merrimack, industrial and commercial land uses predominate over the aquifers, and much of the land over the aquifers is zoned for commercial uses.

The Merrimack Village District Wells and the Future of Merrimack's Water Supply

As previously mentioned, most of Merrimack obtains its drinking water from wells operated by the Merrimack Village District (MVD). The MVD's Master Plan has three major goals:

- Assure an adequate quantity of water for the long-term planning period
- Improve the quality of water delivered and protect water sources from contamination
- Plan for emergencies

The MVD supplied just over 800,000,000 gallons of water in 2011 via 169 miles of pipe to approximately 9,300 building units and 6,500 connections. The MVD operates seven high-yield wells (six active and one inactive), three of which are located in the Naticook Brook aquifer, which is roughly aligned with the Silver Lake fault zone which extends northeasterly into Merrimack from Silver Lake in Hollis. MVD owns or leases approximately 278.89 acres of land in Merrimack and Hollis for wellhead protection. The Naticook Brook aquifer portion of the Silver Lake fault zone is Merrimack's most important groundwater resource, supplying over half of Merrimack's total drinking water supply. Due to the type of sand and gravel deposits found along the fault zone, it is the only place in Merrimack where major production wells are possible.

Currently, MVD believes it has sufficient capacity to meet expected current and future annual average daily demand based on projections through 2030. However, at times, maximum day demands cannot be met. In addition, the MVD projects challenges meeting summer average day demands by the year 2020. Since there are limited additional well sites within Merrimack that can easily be used, it is critical to limit peak demand. There are also no feasible surface water sources that are not cost-prohibitive. Strategies to reduce demand are discussed below, following a discussion of Merrimack's most important aquifer, where peak demand is perhaps having the greatest adverse impact on groundwater levels.

18 U.S. Geological Survey. Hydrogeology of Stratified-Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area. South-Cental New Hampshire. 1997. http://pubs.usgs.gov/wri/1986/4358/report.pdf. Accessed January 2012.

The MVD formed the Naticook Aquifer Advisory Ad Hoc Committee in 1999 to address groundwater issues. The Committee developed a list of recommendations to prevent losses from the aquifer and to address increasing demand for water. These recommendations include:

- Address imperviousness in subdivision and site plan regulations.
- Develop a review checklist for subdivisions and site plans that incorporates recharge protection and demand management protections. The checklist would address best management practices (BMPs) for stormwater control and treatment.
- Identify opportunities to improve infiltration in existing impervious areas.
- Evaluate limitations on further sewering in the Naticook basin.
- Address existing and future large quantity withdrawals in the basin, especially by commercial and industrial users.
- Investigate the effectiveness and feasibility of raising Greens Pond for enhancing storage in the aquifer.

This Master Plan recommends that the Planning Board investigate regulations or landscape design guidelines that would require or encourage developers to leave more topsoil and vegetation in place when sites are developed. In this way, irrigation demand may be reduced, which will help to address the wider problem of declining groundwater levels. The MVD also utilizes odd/even watering restrictions for outdoor watering activities.

The other major issue facing groundwater quantity and quality is impervious surfaces and stormwater runoff. The presence of large areas of impervious surfaces on a site reduces the ability of water to percolate into the ground, and increases the chances for groundwater contamination due to contaminants in stormwater runoff. It is estimated that approximately 15-20 percent of the land area in the Naticook Brook aquifer wellhead protection area is impervious. Any further increase in impervious coverage in this area and throughout Merrimack could contribute to degradation of groundwater quality. The subdivision and site plan regulations could be amended to better address this issue by:

- Reducing the amount of impervious surfaces (such as parking lots and other paved areas) that can be placed on the land
- Requiring adequate treatment of stormwater before it reaches surface and groundwaters, and
- Ensuring that post-development total runoff does not exceed pre-development total runoff.

The MVD is constantly working to improve water quality and supply. Future projects may include treatment to improve the water quality of the wells in the south (#6, #7, and #8). In addition, the MVD is routinely investigating the possibility of bringing new cost-effective groundwater sources online.

5.7.4 Threats to Surface and Groundwater Resources

Rivers, streams, lakes, ponds and groundwater resources face a myriad of threats. The two main categories of pollution are point source and non-point source pollution. Point sources of pollution are those that can be traced back to an identifiable source, such as a pipe or sewer outfall. Non-point sources of pollution are more diffuse in origin, such as agricultural and urban stormwater runoff, septic system effluent, snow dumps, road salt, soil erosion, etc. The State of New Hampshire, Department of Environmental Services, in its publication New Hampshire Nonpoint Source Management Plan, lists the various forms of non-point source pollution in order of priority for abatement efforts. The list is based on the following factors:

- Danger to public health
- Magnitude and pervasiveness of the potential threat
- Potential impacts to receiving waters
- Professional judgment
- Ability of existing regulatory programs to control pollution
- Adequacy of existing education programs to promote pollution control
- Public perception
- Comments of Non-Point Source Management Plan Subcommittee

The list, in order of priority, is: 1) urban (stormwater) runoff; 2) hydrologic and habitat modifications; 3) subsurface systems; 4) junk, salvage, and reclamation yards; 5) construction activities; 6) marinas; 7) road maintenance; 8) unlined landfills; 9) land disposal of biosolids; 10) land disposal of septage; 11) agricultural activities; 12) timber harvesting; 13) resource extraction; 14) storage tanks (above ground and underground); and 15) golf courses and landscaping.[19]

According to the 2011 MVD Annual Report, only seven substances (out of 20 tested) were detected in its water. All were below the highest levels allowed by law. These include lead, copper, nitrate, nitrite, chloride and sodium (see road salt discussion below for more information on chloride and sodium levels).

This section briefly examines some of the issues and trends in point and non-point source pollution and actions that can be taken to address this pollution. The focus is on non- point source pollution, and urban runoff in particular, now acknowledged as being the most serious threat facing surface and groundwater resources today. The recommendations that follow this discussion mention several "best management practices" (BMPs) that address non- point source pollution and stormwater runoff in particular. BMPs are variously defined as technical guidelines for preventing pollution caused by particular activities, and recommended treatment or operational techniques to prevent or reduce pollution. Some of the major sources of surface and groundwater contamination include:

19 New Hampshire Nonpoint Source Management Plan, New Hampshire Department of Environmental Services, October 1999

Road Salt

Excessive salting of roads creates the potential for sodium, calcium and chloride contamination of the ground water, which can pose health threats to humans, endanger animals and plants, and corrode metal and concrete. Increased concern about water quality led Merrimack to adopt a reduced salt use policy in 1984. No-salt routes generally encompass areas adjacent to public water supplies, the MVD wells and Pennichuck Brook as well as areas where on-site wells are located near roadways. Other areas are treated with a mixture of salt and sand. Merrimack has been a leader in the use of liquid calcium chloride, which melts ice and snow faster than salt, to pre-wet the sand or salt applied to roadways.

Through a Local Source Water Protection Grant, MVD commissioned a study to address sodium and chloride loading within its Wellhead Protection Areas (WHPA), which was completed in May 2012. The report calculated salt loading from state, local and private roads; parking lots; residential driveways; residential septic systems; and atmospheric deposition (although that was minimal). The study concluded that sodium and chloride levels have steadily increased over the last ten years in each of the Town's wells, leading to exceedance of applicable EPA standards on numerous occasions.[20]

To that end, the report recommends a number of mitigations strategies including:

- Revising the Subdivision Regulations to remove regulatory roadblocks to reducing impervious cover, such as parking requirements
- Encourage buildings and grounds design to minimize impervious cover requiring treatment with sodium chloride, reduce drainage onto surfaces that require such treatment, and maximize winter sunlight exposure to those surfaces
- Design parking lots to separate foot and vehicular traffic areas
- Conduct outreach and educational efforts to property managers about sodium chloride issues
- Review existing plow routes to determine whether to expand areas with reduced or no salt applications
- Provide annual in-house training on deicing best practices
- Coordinate with Amherst, Hollis and Nashua, as well as NHDOT to encourage reduced salt applications within the WHPAs, particularly on Route 3, Route 101A, Industrial Drive, and Continental Drive
- Continue to monitor drinking water wells for sodium and chloride levels.[21]

20 According to the MVD 2011 Annual Report, the average levels detected for sodium and chloride were below the highest level allowed by EPA.

21 Sodium and Chloride Loading Study of the Merrimack Valley District Wellhead Protection Areas, Emery & Garrett Groundwater, Inc., May 2012

Subsurface Sanitary Waste Disposal

Septic system failures from improper design, installation, or maintenance allow nutrients, particularly nitrogen, phosphorus, and sometimes bacteria and viruses, to leach into water resources. The first receptor of these contaminants is often a nearby private well, but surface waters may also be affected. Septic system leachate, along with stormwater runoff, may contribute to excessive algae growth in surface waters which, in turn, decreases the amount of oxygen available to fish, decreases sunlight penetration and clogs waterways. In most cases, older septic systems and cesspools pose the greatest threat to groundwater and surface water quality. The EPA considers new systems that meet today's heightened standards to be passive and durable systems that can provide acceptable treatment despite a lack of attention by the owner.

Approximately 60 percent of Merrimack's land area is served by on-site sanitary waste disposal systems. Building Department records show that septic system replacements have increased from 36-37 annually in the late 1970s to over 50 per year since 1987. It can be presumed that most of these were replacements of failed systems although the precise causes of failure are not known. System failure may result from improper design, installation, or maintenance.

Stormwater Runoff

The development of land for residential, commercial or industrial purposes necessarily increases the amount of impervious surface area within any given site due to the construction of buildings, roads, driveways, parking lots and other improvements. Impervious surfaces reduce the natural infiltration of stormwater into the ground, thereby, reducing recharge of groundwater resources. This is particularly true where stormwater is discharged into a storm drainage system that exports stormwater off site and out of a watershed. Development can also reduce groundwater recharge through increased evaporation that can result from land clearing. Where increased imperviousness results in direct stormwater discharges into streams and rivers, the result is often alteration of the natural flow of the stream, causing erosion and sedimentation, loss of aquatic wildlife habitat and increased flood hazards. Stormwater runoff is also a principal nonpoint contamination source of surface and groundwaters.

Potential contaminants found in stormwater runoff include: nutrients, such as phosphorous, heavy metals, floatables and solids, pathogens such as virus and bacteria, organic compounds including oils, grease, MBTE, and pesticides and herbicides. All of these materials singly and in combination can lead to the degradation of surface and groundwaters. The MVD has had challenges with stormwater runoff at some of their wells due to drainage features nearby.

To control stormwater discharge within Merrimack, the Merrimack Town Council adopted Stormwater Management Standards as Chapter 412 of the Town Code on July 21, 2012. The purpose of the Stormwater Management Standards is to protect water quality within the town. The standards apply to any project which results in a total disturbance of 20,000 or more square feet. A project that meets or exceeds that threshold must submit a Stormwater Management Plan which describes how stormwater runoff would be managed through site

design, pollutant source controls, structural BMPs, and construction phase practices, and should be consistent with the requirements of the New Hampshire Stormwater Manual.

The United States Environmental Protection Agency (EPA), through a program called the National Pollutant Discharge Elimination System (NPDES), aims to prevent and control non-point pollutant sources.

MS4 Permit

An MS4 is a Municipal Separate Storm Sewer System, which transports polluted storm-water runoff through a municipal stormwater system where it is then discharged into local waterbodies. The majority of Merrimack is designated an MS4 community as of the 2000 Census. The Phase II rules, requires regulated small MS4s that are designated by the permitting authority to obtain a NPDES permit for their stormwater discharges. The Phase II rules went into effect in March of 2003, and the permits issued under these regulations remain in effect for authorized Operators until a new permit is issued. The U.S. Environmental Protection Agency (U.S. EPA) is currently revising its 2008 Draft New Hampshire Small MS4 Permit and will issue it as a new draft permit for public comment in the summer of 2012. The final permit will not be issued until late 2012 or early 2013 to allow for the public to comment on the draft permit and for the U.S. EPA to respond to those comments. A Notice of Availability for the new draft New Hampshire Small MS4 general permit will be published in the Federal Register as well as information about any scheduled public meetings or hearings.

Underground Storage Tanks

Leaks in improperly equipped underground storage tanks (USTs) are difficult to detect and may go unnoticed for a long time. Even a small leak of only a few gallons can contaminate millions of gallons of ground water. The State regulates USTs where the cumulative volume of all tanks at the facility is 1,100 gallons or more. Some tanks, including those containing non-petroleum based chemicals and those containing heating oil for on-site residential consumption are exempted. As of 2012, 74 active USTs and 168 closed USTs in Merrimack have been registered with the NH Department of Environmental Services, Water Supply and Pollution Control Division.

Waste Sites

Contaminants from waste disposal sites and sites contaminated by industrial activities can leach into surface and ground waters. From 1962 to 1985, the New Hampshire Plating Co. (NHPC) conducted electroplating operations on its more than 13 acre parcel in Merrimack. The property is an EPA-designated Superfund site undergoing cleanup efforts by the NHDES. The NHDES Site Remediation and Groundwater Hazard Inventory also identified 110 other waste sites in Merrimack, many of which have been remediated.[22] The Corbin Property was at one time a private dump, and sludge is known to be buried on site. In addition, the MVD's Well Number 6 is currently closed due to the presence of volatile organic compounds in the vicinity, although the remediation effort is underway. Many of the other listed sites are the result of leaking underground storage tanks, as mentioned above.

22 http://www2.des.state.nh.us/OneStop/ORCB_All_Sites_Results.aspx?Town=MERRIMACK

5.8 Conclusions and Recommendations

The management and protection of Merrimack's surface and groundwater resources is important to protect the Town's major aquifers and to increase access to and protection of the Souhegan and Merrimack Rivers. The preservation of forest and woodlands and open space is also of particular concern. By enhancing conservation and management of these resources, other objectives can be achieved as well, including wildlife conservation, retention of rural character and increased recreational opportunities. The recent Biodiversity Conservation Plan presents a new approach to resource protection in Merrimack through its establishment of five CFAs for priority protection. Additionally, it recommends coordination with surrounding communities, particularly Amherst and Bedford since there share unfragmented lands.

Because many of the threats to priority resources are directly related to land development, a key element in achieving preservation of these natural resource priorities is strategic land acquisition. State, federal and private grants and assistance should be pursued where possible. In addition to direct land acquisitions, the Town can adopt or revise land use regulations to enhance the protection of important natural resources. Where land acquisition or regulation is not practical or appropriate, the Town can encourage public education and private conservation initiatives. The recommendations provided below address each of these natural resource management and protection approaches.

5.8.1 Land Acquisition

The Town has placed a priority on land acquisition to provide for open space preservation, retention of rural character, access to and protection of surface waters (especially the Merrimack and Souhegan Rivers), preservation of wildlife habitats, protection of groundwater resources and recreation. Land acquisition can be accomplished either in fee or through the acquisition of easements. The resources of the Town are, of course, limited and with land ownership come certain duties of management, maintenance and care. Also, land acquired for conservation purposes may no longer be available for alternative public or private uses. The Town should work with the MVD, however, to preserve the ability to use these lands for public water supply whenever practicable.

The Biodiversity Conservation Plan recommends the use of a Parcel-based Ecological Assessment to prioritize parcels for protection. This approach considers and assigns points for such criteria as parcel size (especially unfragmented land), the presence of wetlands and watercourses, ecologically significant habitats, the presence of rare and endangered species, consistency with wildlife action plans, agricultural or forest resources, proximity to other conserved land or CFAs, and the amount of land in the parcel that is currently developed or in some other use. That plan recommends focusing conservation efforts within the Grater Woods and Horse Hill CFAs due to anticipated development pressures and existing biodiversity in these areas.

The 2002 Merrimack Master Plan identified almost 620 acres of priority parcels to acquire and a number of those parcels have since been preserved through purchase or easements. Just over 100 acres remain from that list and discussions have been underway to protect some of that land from future development (see **Table 5-2**). The recommendations provided below address each of these natural resource management and protection approaches.

Land Acquisition Initiatives

NR-1 Continue the Town's land acquisition strategy, placing the highest priority on the acquisition of lands that can, when managed for conservation purposes, accomplish the widest range of objectives, especially those found in the Biodiversity Conservation Plan. The Town should prioritize the following parcels for acquisition, as noted in the 2002 Plan:

Undeveloped lands along the Merrimack River

- The Town currently owns a number of parcels along the shores of the Merrimack River that include two boat ramps, and three islands within the river that contain another 25 to 30 acres of land. In addition, the Town currently has a public access easement in an area south of the confluence of the Merrimack and Souhegan Rivers. Another riverfront parcel adjacent to Town-owned land is owned by the Merrimack River Watershed Association. Merrimack riverfront lands include extensive wooded areas that provide for a variety of wildlife including bald eagle perching and roosting sites. A number of undeveloped areas are comprised of prime agricultural soils. These lands offer recreational opportunities for hiking, boating, fishing and other recreational activities. Conservation of these lands can help to protect the River from contaminants contained in stormwater runoff, protect the banks from erosion and preserve the natural beauty of the shoreland.

Undeveloped lands along the Souhegan River

- The Town and School District currently own several acres of land on the both sides of the Souhegan River including three parks, conservation land and undeveloped land behind the High School. Conservation and access easements have also been obtained from two shoreland residential developments. In addition, there are extensive areas of privately held conservation and recreational land along the river including a Boy Scout camp and land held as common open space as a part of residential cluster developments.

- The land adjacent to the Souhegan River provides a varied landscape from heavily wooded areas to wetlands to open meadows with habitat for a diversity of wildlife. The remaining undeveloped land along the Souhegan River together with existing public and privately owned conservation and recreational land, offers the opportunity for the development of a corridor of conservation and recreational land that would bisect the Town from the large forest blocks at its western border with Amherst to the Merrimack River.

- This greenway or greenbelt would also provide a wildlife corridor preventing the fragmentation of important wildlife habitats while offering numerous recreational opportunities for hiking, canoeing, fishing and other recreational activities. As with the Merrimack River, conservation of these lands would also help to protect the river from sediment and contaminants, protect the banks, and preserve the natural beauty of the shoreland and surrounding areas.

5.8.2 Regulatory Initiatives

NR-2 Assess the Town's zoning ordinance and the subdivision and site plan regulations regarding the integration between biodiversity protection and land use as recommended by the Biodiversity Conservation Plan.[23] The Plan recommends that a natural resources audit be conducted to provide an overall assessment of the Town's zoning ordinance and the subdivision and site plan regulations regarding the integration between biodiversity protection and land use. Particular attention should be paid to the areas containing Ecologically Significant Habitats. Specifically recommended sections of the ordinance include the Wetlands Overlay District, Flood Hazard Conservation District, Aquifer Protection District, Shoreland Protection District, Cluster Residential Development (see additional discussion below), and Wellhead Protection Areas. This effort can enhance the protection of natural features such as rare species, critical habitats, rare natural communities, and rare unfragmented lands.

Stormwater Management

The construction of buildings, roads, driveways, parking lots, and other land developments increases the amount of impervious surface area. The increase of impervious surfaces reduces the natural infiltration of water into the ground inhibiting the recharge of groundwater resources and increasing the amount and volume of water that is discharged into a storm drainage system that exports stormwater off of a site and out of a watershed. Development can also reduce groundwater recharge through increased evaporation that can result from land clearing. Where increased imperviousness results in direct stormwater discharges into streams and rivers. Excess stormwater alters the natural flow of streams and rivers, causing erosion and sedimentation, impacts to aquatic wildlife habitat, and flooding hazards. Stormwater runoff is also a principal nonpoint contamination source of surface and groundwater. In addition to the Stormwater Management Standards mentioned above, the Town can use its Subdivision and Site Plan Regulations and Zoning Ordinance to encourage environmentally beneficial stormwater management through road, driveway and parking lot design. The following recommendations are provided:

NR-3 Ensure that post-development runoff does not exceed pre-development runoff by requiring on-site stormwater retention. Where on-site retention is not possible or practical, efforts should be made to retain the stormwater within the same watershed.

NR-4 Reduce imperviousness in site design, where appropriate, by encouraging design features such as smaller parking lots, reduced road and driveway dimensions, the use of parking garages on larger sites, the use of pervious paving materials where practical and other measures to reduce overall imperviousness. Certainly, any changes made to existing regulations should not compromise public safety.

NR-5 Develop a review checklist for subdivisions and site plans that incorporates recharge protection and water demand management protections. The checklist would address best management practices (BMPs) for stormwater control and treatment.

NR-6 Ensure adequate treatment of stormwater before it reaches surface and groundwater.

23 See the Conservation Commission webpage (http://www.merrimacknh.gov/town/boards_and_committees/conservation_commission) to find the Biodiversity Conservation Plan.

NR-7 Establish an inspection system to ensure continued operation of required private stormwater management systems.

Open Space, Landscaping & Design

NR-8 Consider adopting an Open Space Residential Development Ordinance for low-density subdivisions using septic systems, in which a certain percentage of the tract being subdivided must be set-aside as permanently protected open space without increasing overall densities. Currently, the Town permits residential "cluster" developments that allow open space to be set aside by permitting smaller individual lot sizes and reduced frontages. Such developments, however, are not permitted for developments on septic systems. If developed carefully, low-density open space developments can result in significant open space conservation, helping to reduce fragmentation of forests and wildlife habitat while also reducing impervious surface areas by requiring less road and driveway development. Conservation or open space developments also result in less land clearing and, due to increased flexibility in design, can minimize impacts to wetlands and other natural features. The Biodiversity Conservation Plan further recommends that this type of development be encouraged within the CFAs.

NR-9 Consider amending the site plan and subdivision regulations to minimize disruption of natural vegetation. Clear cutting or the near clear cutting of vegetation should be restricted, especially within the wellhead protection areas. Excessive removal of natural vegetation, especially large trees, can reduce groundwater recharge through increased evaporation, increase erosion and sedimentation impacts to surface waters during construction and increase stormwater runoff. Further, the removal of natural vegetation frequently results in its replacement with extensive lawn areas and nonnative plant species. Large lawns and extensive landscaping with nonnative plant species often require increased watering in the summer months which increases pressure on water supply during peak demand periods. Such landscaping also often requires the increased use of fertilizers that can adversely impact surface and groundwater. The retention of existing natural vegetation also helps to protect wildlife habitat and preserve the rural character and natural beauty of much of Merrimack.

NR-10 Consider amending the subdivision and site plan regulations to limit or prohibit the removal and export of topsoil. Failure to adequately replace topsoil in areas intended for landscaping increases the difficulty of establishing new lawns and planting areas, thereby requiring more water and fertilizer to be used, especially during summer months. Increased outdoor watering places increased stress on the public water supply and increased fertilizer use can degrade surface and groundwater resources

NR-11 Consider amending the subdivision and site plan regulations to encourage increased use of native and drought resistant plant species. Native plant species and other drought resistant plant species are more capable of surviving during summer months with little or no additional watering. Such species also typically require little or no additional fertilizer. Native plant species are particularly adapted to the area's climate and also tend to be more beneficial to wildlife than foreign plant species. Lists are available from state resources and other communities such as Londonderry.

NR-12 Consider amending the subdivision and site plan regulations to limit the use of deicing compounds and to require that any pesticides or insecticides to be applied in new commercial, industrial or multi-family residential projects are applied by a licensed professional so as to protect the Town's water supply from contamination.

NR-13 Perform an analysis of existing landscaping buffer regulations and consider additional landscaping requirements for commercial properties.

5.8.3 Non-regulatory Initiatives

Open Space and Forest Conservation

NR-14 Consider implementing an educational and assistance program, most likely through the Conservation Commission, to encourage larger landowners to maintain privately held forest land and open space through the development of forest management plans and estate planning, especially for parcels in current use. Sound forest management plans can enable landowners to derive some economic return from undeveloped woodland while often improving the health of forests themselves. Tax advantages can also be realized through the imposition of voluntary easements and other development restrictions on property to provide for permanent conservation. Through such measures, the pressure to sell land for development purposes could be reduced. Educational materials and assistance are available from a variety of sources including the Society for the Protection of New Hampshire Forests and the University of New Hampshire.

Invasive Species

NR-15 Prepare an invasive species management plan as recommended by the Biodiversity Conservation Plan. This type of effort can be volunteer-based led by a professional ecologist in order to identify, contain and replace invasive species.

NR-16 Post signage at boat docking areas on Naticook and Baboosic Lakes that educates boat owners of the danger of invasive species and measures to prevent their spread.

5.8.4 Conservation and Protection Initiatives

NR-17 Identify opportunities to improve infiltration and stormwater management in existing developed areas. Amending subdivision and site plan regulations as recommended above could minimize potential adverse impacts to surface and groundwater that could result from future development. However, surface and groundwater resources have already been impacted and will continue to be impacted by existing development. Improvements to existing public and private stormwater systems can reduce existing threats to water resources. Grants available for this purpose should be pursued whenever practical.

NR-18 Evaluate limitations on further sewering in the Naticook basin. The extension of public sewer further into the Naticook Basin could impact this important water resource area primarily through the potential for the net export of water out of the basin. Existing high-density residential development on septic systems adjacent to

Naticook Lake, however, may pose a threat to both surface and groundwater. These areas may benefit from the extension public sewer. The potential threats and benefits of further sewer extensions into the Naticook Basin should be evaluated before any improvements are implemented. This can be evaluated in conjunction with the ongoing sewer master planning process.

NR-19 The Town and the Merrimack Village District (MVD) should work with the State to address existing and future large quantity groundwater withdrawals in wellhead areas, especially within the Naticook basin, by commercial and industrial users. Large quantity private withdrawals of groundwater can significantly impact the public water supply, however, such withdrawals are not currently regulated or controlled at the local level.

NR-20 The MVD should investigate the effectiveness and feasibility of raising Greens Pond for enhancing storage in the Naticook Basin aquifer.

NR-21 The Town and the MVD should continue to work with residents and businesses, especially in wellhead and shoreline areas, to encourage individual water resource protection measures such as water conservation, proper septic system maintenance and proper waste disposal practices.

NR-22 Develop a set of criteria for the use of deicing materials throughout the Town.

NR-23 The Town and the MVD should implement the recommendations from the 2012 Sodium and Chloride Loading Study.

NR-24 The Town and MVD should collaborate when acquiring conservation land such that it could be used for future groundwater supply.

NR-25 The Merrimack Conservation Commission should consider performing a functional evaluation of the Town's wetlands, which may lead to designation of prime wetlands.