



# 5. Natural Resources and Open Space

## 5.1 Introduction

Merrimack boasts many natural resources, and it is particularly known for its rivers, open spaces, wetlands, forests, farmland, and wildlife. From forests to ponds and the Merrimack and Souhegan Rivers, these resources add to the town's rural character, providing residents and visitors with scenic views and recreational opportunities. These resources have been long valued and seen as an integral part of the community. While Merrimack has experienced significant land use changes over the years, the town strives to maintain its character and traditions as it manages its growth going forward.

This chapter examines the current state of Merrimack's natural environment, the threats and opportunities facing that environment, and offers recommendations as to how the Town's remaining significant natural resources and open spaces can be safeguarded and managed in the years ahead. Although much of Merrimack is now suburban in character, there is still

ample opportunity for the Town to wisely plan for a future that balances environmental protection with economic development and the demands of a growing population. The preservation of natural assets is key to achieving this goal.

Merrimack still has a wealth of open spaces and natural resources worthy of protection and wise stewardship. As of 2005, approximately 60 percent of Merrimack was forested, though much of that area is comprised of relatively small forest tracts. The Merrimack and Souhegan Rivers are much cleaner today than they were 40 years ago. The Town has adopted aquifer protection zoning and a wellhead protection program to safeguard its primary sources of drinking water.

## 5.2 Natural Resources Goals

- Continue to preserve significant parcels of land to along the Merrimack and Souhegan Rivers, Grater Woods and Horse Hill to enhance biodiversity, recreational opportunities, and water quality.
- Integrate biodiversity protection and land use through Merrimack's land use regulations.
- Protect the quality of water in Merrimack's rivers and ground water supplies through effective stormwater management practices, subdivision regulations, and design.
- Develop community-wide environmental awareness of open space and forest conservation and practices that protect water.

## 5.3 Topography

Topography can be described in terms of elevation and slope. Elevations range from several hills over 450 feet above mean sea level (MSL) in western Merrimack north and south of the Souhegan River to less than 150 feet MSL along the Merrimack River. One of the highest hills, reaching 502 feet MSL, north of Greens Pond, is the location of one of the Merrimack Village District's (MVD) water tanks. Although elevation alone does not necessarily constrain development, higher elevations tend to coincide with thinner topsoil and steeper slopes.

The slope of the land is an important determinant of development capability. Slopes of less than 8 percent are generally the most suitable for building. The erosion potential of such slightly sloping land is low, their ability to absorb runoff is high, and soils are usually of adequate depth and composition for septic systems. Exceptions are extremely flat areas, some of which may be classified as wetlands, where drainage is poor. Areas with slopes of less than 8 percent are also among the most suitable for non-development purposes: agricultural production, aquifer recharge and wildlife habitat.

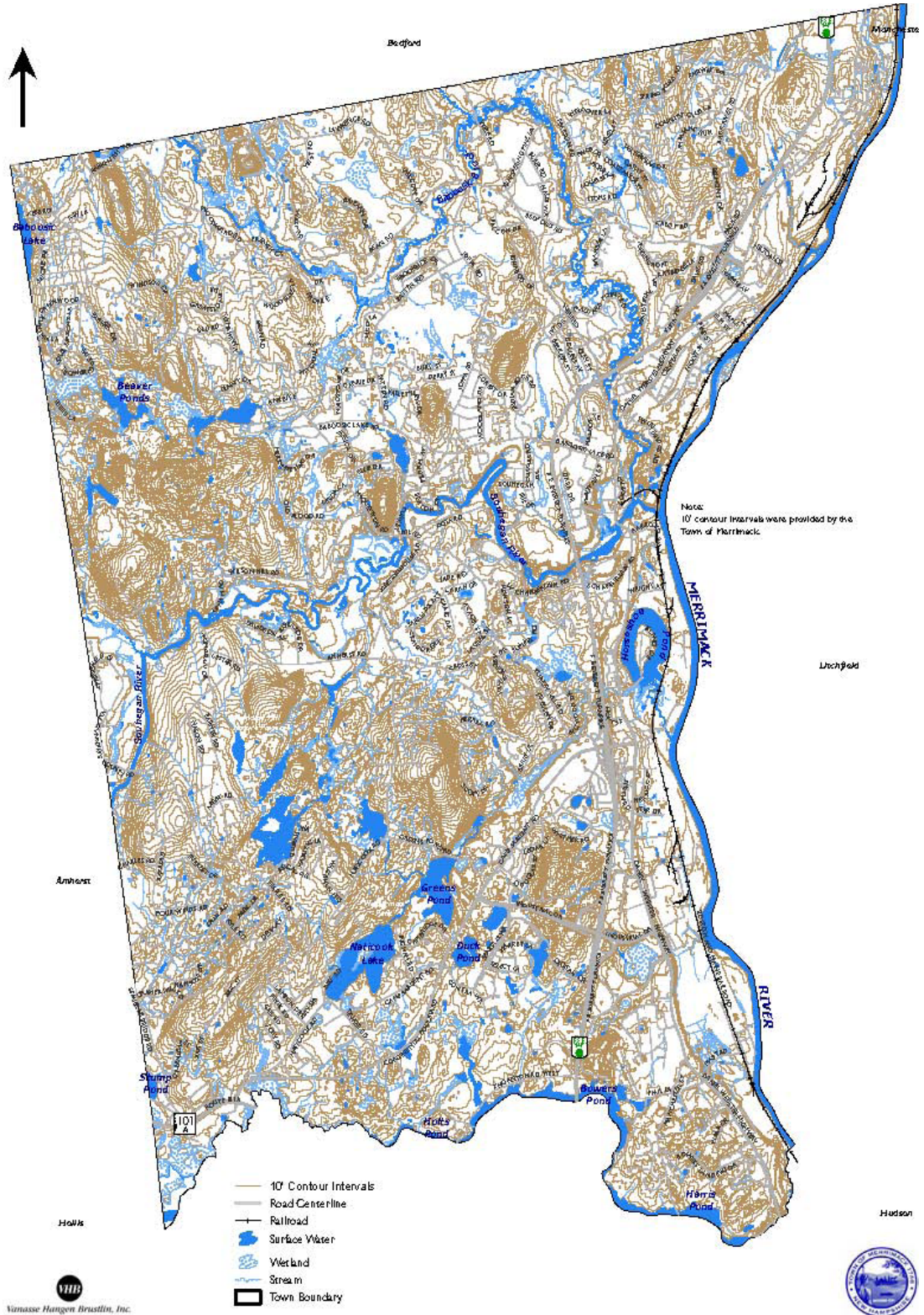
As slopes increase, the suitability of the land for development decreases. In areas of steep slopes, the velocity of runoff and, therefore, the erosion potential, increases. The ability of the soil to filter septic system leachate is decreased. Overcoming site constraints becomes increasingly costly. Generally slopes ranging between 8 and 15 percent are considered to have moderate capacity for development. Slopes of 15 to 25 percent present significant constraints, and lands exceeding 25 percent slope are considered unbuildable. Merrimack's



rolling terrain consists primarily of moderate slopes ranging from 0 to 15 percent. Slopes are greatest in northwestern and southwestern Merrimack.

Merrimack's topography at 25-foot contour intervals is depicted on **Figure 5-1**.

**Figure 5-1: Topography in Merrimack**



## 5.4 Soils

### 5.4.1 Soils in General and Limitations for Septic Systems

Soils are the most important determinant of the land's development capability, especially in unsewered areas. A soil's depth to water table, susceptibility to flooding, slope, depth to bedrock, stone cover, and permeability present potential constraints to the construction of roads, buildings and septic disposal systems.

The U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), completed a soils survey of Eastern Hillsborough County in 1972. This survey classifies and maps soil types and interprets their suitability for various purposes. The mapping was based on extensive field investigation and sampling and is suitable for general planning purposes. More detailed investigation is required for site-specific planning as soil conditions may vary.

Soils with severe limitations for septic systems cover approximately 70 percent of Merrimack. Concentrations of "severe" soils are found in the northwestern, south-central, and north-eastern parts of Merrimack. Areas of moderate limitation are located primarily in central Merrimack south of Amherst Road; and in the area of southwestern Merrimack bounded by Peaslee, Naticook, Bates and Bridge Roads. Slight-limitation soils can be found in only a very few, small, scattered areas.

In certain parts of Town that lack public sewer, Merrimack bases minimum lot sizes for residential development on the presence of water and sewer service facilities and the soil limitations for septic systems. A single-family residence on Town water and sewer, for example, requires a minimum lot size of 40,000 square feet (0.92 acres). Without public water and sewer, the house requires 40,000 square feet, 80,000 square feet or 100,000 square feet, depending on whether soil limitations are slight, moderate or severe, respectively. In addition, Merrimack requires that septic systems be placed in the least severe soils on the lot and prohibits placement within 20 feet of lot lines.

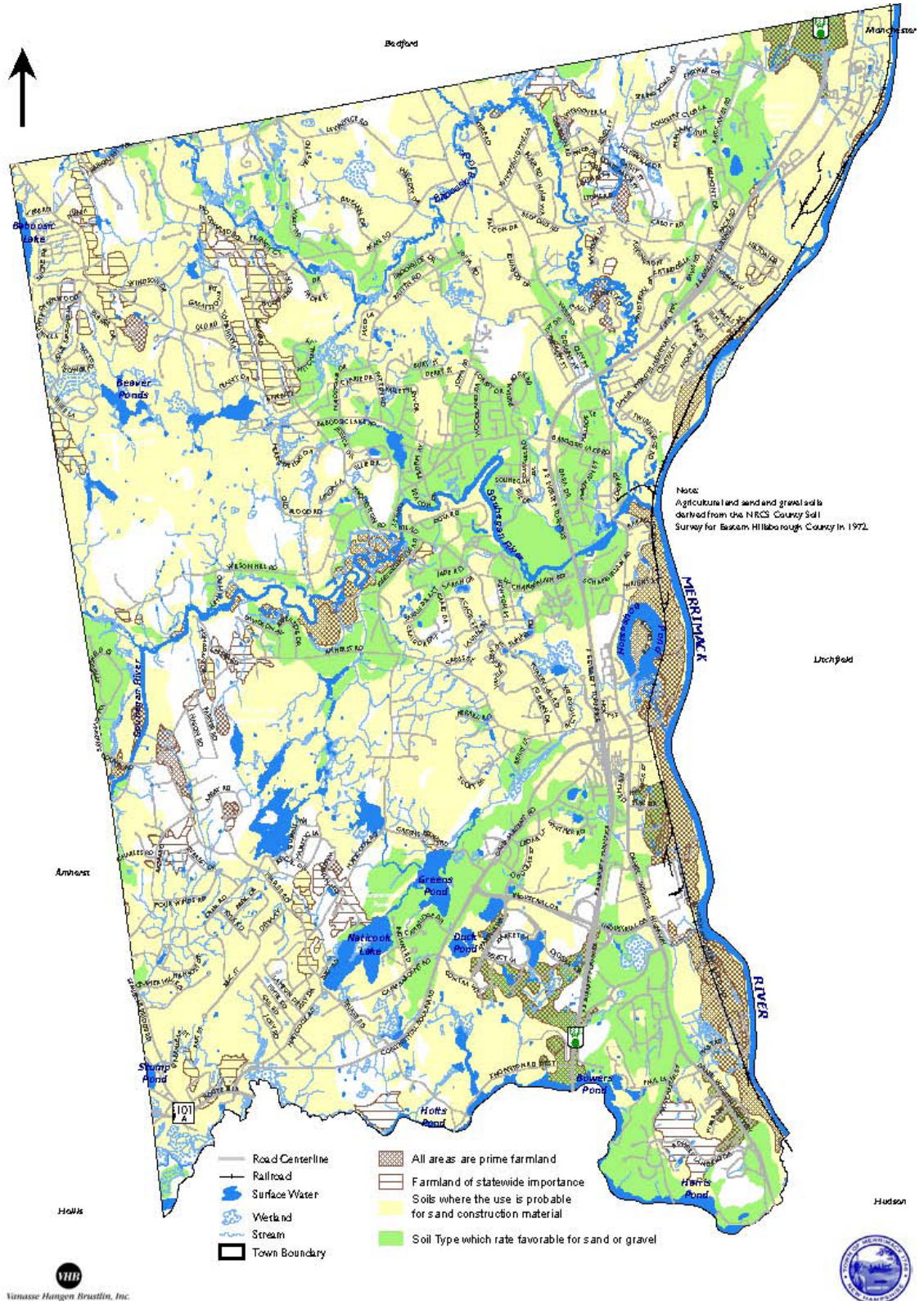
### 5.4.2 Agricultural Land and Soils

The U.S. Department of Agriculture has identified soil types that are best suited to crop production based on soil quality, growing season and moisture supply. These areas, called prime farmlands, are likely to produce the highest crop yields using the least amount of economic resources and causing the least environmental impact. In addition, the State of New Hampshire has identified soils having statewide importance. The location of these soils is shown on **Figure 5-2**. Some of these soils have high water tables or are susceptible to flooding and may require drainage or flood control measures before they are suitable for agricultural use.



**Figure 5-2: Farmland Soils and Sand and Gravel Soils in Merrimack**

As seen on **Figure 5-2**, important agricultural soils in Merrimack, located primarily along the Merrimack and Souhegan Rivers, are fairly limited. Most of these areas however, especially east of the F.E. Everett Turnpike, have been developed for nonagricultural purposes or are not currently used for agricultural purposes.



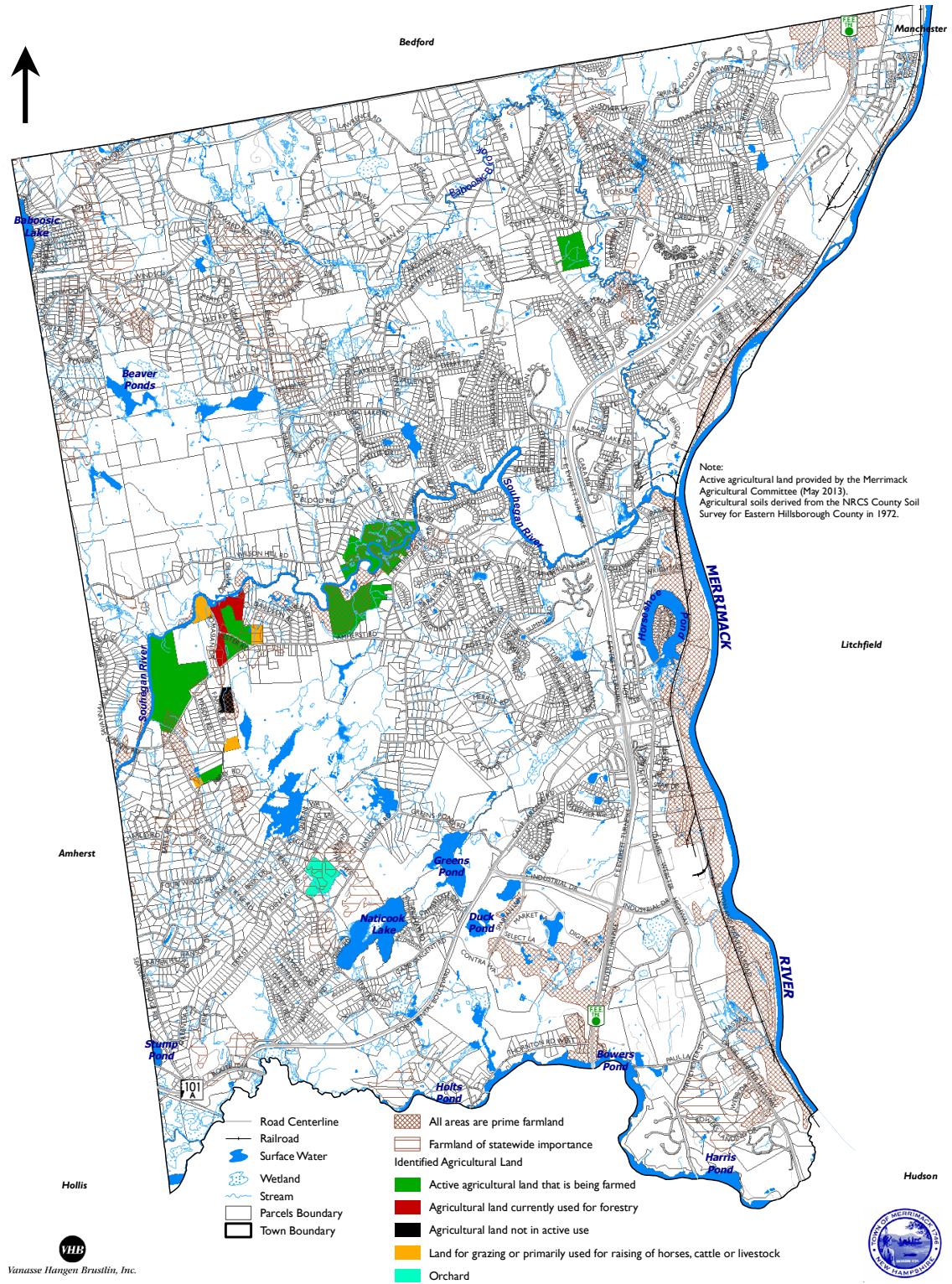
Merrimack allows agricultural activity in any part of Town. Although agriculture is not extensive in Merrimack, the remaining agricultural areas are still an important resource that provide local seasonal produce and planting materials; provide open space; serve as an educational resource and contribute to the rural character of the Town. Preservation and enhancement of agricultural lands is important to the Town and is the primary goal of the Agricultural Commission. To that end, the Commission's purpose is to protect agricultural lands, preserve rural character, provide a voice for farmers, and encourage agriculture-based businesses. The Commission actively supports the farmer's market and community garden in Merrimack. The Commission advocates for the implementation of the New Hampshire Department of Agriculture best management practices (BMPs)<sup>1</sup> designed to control nonpoint pollution from agricultural sites. These BMPs provide guidance to landowners and town officials to help maintain the agricultural base and protect water quality. This includes the handling of manure, agricultural compost and chemical fertilizer as related to farm operations, natural resource conservation, water quality, and human, animal and plant health. Agricultural lands are shown in **Figure 5-3**.

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1 See <http://agriculture.nh.gov/divisions/markets/documents/bmp.pdf>, Manual of Best Management Practices for Agriculture in New Hampshire, New Hampshire Department of Agriculture, June 2011.



Figure 5-3: Agricultural Lands



### 5.4.3 Construction Materials

The U.S. Department of Agriculture, Soil Conservation Service (SCS) rates the suitability of soils as sources of construction materials. Sand and gravel resources are particularly important materials for road construction; however, active excavation sites are few in Merrimack. Most of the probable sources of sand and gravel deposits shown on **Figure 5-2** are within developed areas of Town.

New Hampshire Revised Statutes Annotated, Chapter 155-E, Local Regulation Excavations, stipulates that, with some exceptions, all earth excavations in the State are subject to regulation from the local municipality in which the operation occurs.

Merrimack permits excavation of topsoil and subsoil material in any part of Town. Excavation regulations adopted by the Planning Board under the authority of RSA 155-E require a permit from the Planning Board for any clearing, grading, transporting, removal, excavation or other disturbance of land. A permit application must include a conservation plan that includes a soils map of the site and provisions for vehicular traffic and visual screening. Among the conditions of approval are adequate signage, parking, and fencing; provisions for drainage during and after completion of operations; control of siltation, noise and dust; and limitations on standing water. The Merrimack Planning Board requires grandfathered sites to provide reclamation plans when the excavation is nearing completion or when environmental problems or potential environmental problems become apparent.

## 5.5 Biodiversity in Merrimack

### 5.5.1 Biodiversity Conservation Plan

Merrimack recently completed the Biodiversity Conservation Plan in 2010. This Plan provides guidance on the identification and protection of open space for significant natural resources within the town. The Merrimack Conservation Commission uses the plan to focus the conservation efforts of wildlife habitats and to make informed decisions about land use from an ecological perspective. Merrimack is home to a variety of ecologically sensitive areas (ESA). A total of sixteen ESAs were identified in the plan based on the following criteria:

Wildlife habitats mapped by the New Hampshire Wildlife Action Plan, including marshes, peatlands, open water bodies, grasslands, floodplain forests, hemlock-hardwood-pine forests, and Appalachian oak-pine forests.<sup>2</sup> **Figure 5-4** illustrates the highest ranked wildlife habitats as noted by the New Hampshire Wildlife Action Plan.

Additional wildlife habitat identified by the Biodiversity Planning effort including rivers and smaller streams, riparian buffers, heron rookeries, deer wintering areas, forested swamps, vernal pools, active agricultural lands (hayfields/pastures, orchards, and row crops), shrublands, and ledge outcroppings Rare and uncommon natural communities defined by New Hampshire (NH) Natural Heritage Large unfragmented forest blocks with wetlands and other habitat in close proximity to each other Habitat known to support rare species. **Figure 5-5**

<sup>2</sup> The 2005 New Hampshire Wildlife Action Plan (updated in 2010) is a planning and resource for making land use decisions and for land management planning.



shows the current amount of unfragmented land cover within Merrimack which helps to support wildlife habitat in Merrimack. This land is adjacent to and within residential areas showing its vulnerability to residential land development.

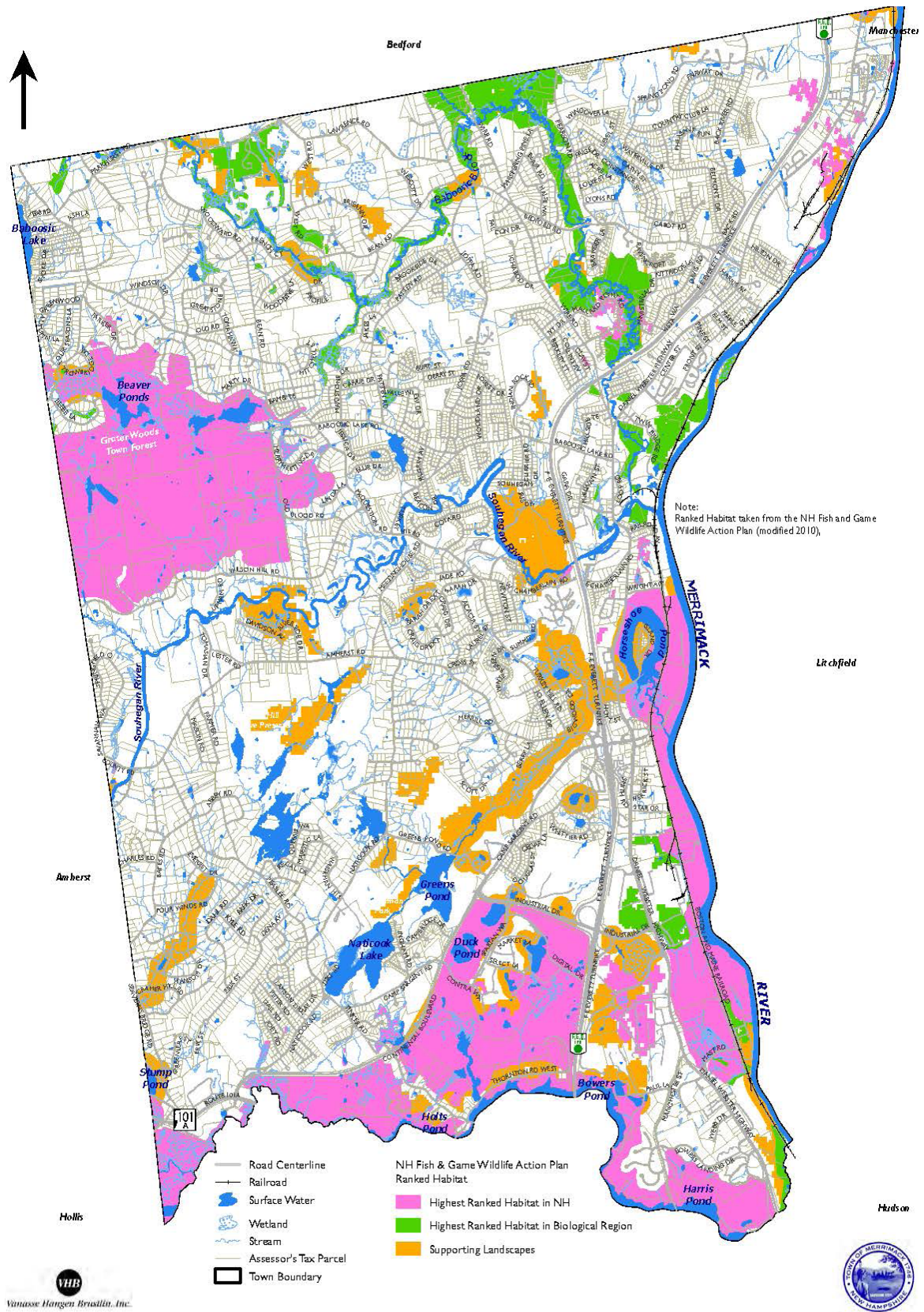
The Biodiversity Conservation Plan provides the most up to date information regarding important natural resources and wildlife habitat within Merrimack and is referred to throughout this chapter. It also establishes general guidelines designed to promote the integration of natural resource protection and land use planning, including:

- › Protection of large unfragmented areas of land with high quality plant and wildlife habitats
- › Protection of rare species populations and their habitats
- › Protect wetlands and streams and promote restoration of degraded areas
- › Support biodiversity protection
- › Expand protected lands and connect critical habitat and conservation corridors.<sup>3</sup>

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<sup>3</sup> Biodiversity Conservation Plan, 2010.

Figure 5-4: Highest Ranked Wildlife Habitat in Merrimack







## 5.5.2 States of Forests in Merrimack

Forests, or woodlands, are among the most prominent of the natural resources discussed in this chapter due to their prevalence in the landscape and to the wide range of benefits that can be derived from them. Perhaps the most apparent function of forests in a community such as Merrimack is their aesthetic value. Forests contribute significantly to the natural beauty and rural character of the Town while also serving as buffers between differing developed areas. Equally important, forestlands provide open space for passive recreation and for other outdoor activities. Depending on the types of trees available, forests also serve as an important source of building materials, materials for wood products, firewood, sap for maple syrup and other products. In addition, forests and woodlands provide critical habitat for a diversity of wildlife.

South-central New Hampshire receives approximately 43 inches of precipitation per year. Most of this precipitation is evenly distributed throughout the year, though there can be occasional droughts in the summer. The area's climate is ideal for the growth of forest trees. Because the natural climax vegetation is mixed-hardwood/coniferous forest, any open fields left undeveloped and untended will eventually revert to this forest type. The most common forest types within Merrimack are the hemlock-hardwood pine forest and the Appalachian pine forest. Common tree species found in these forests are eastern hemlock, white pine, white oak, red oak, American beech, white birch, black birch, sugar maple, and red maple.

## 5.5.3 Forest Facts

**Table 5-1** provides a summary of Merrimack forest facts from the Biodiversity Conservation Plan. The most immediate threat to forestland within Merrimack is new roadways, which fragment wildlife habitat and core forest habitat for certain area sensitive species.<sup>4</sup> Other threats to forest habitat include residential development, the introduction of invasive plants, which can alter species composition and diversity of native trees, shrubs, and other plants, and the invasion of pests such as the hemlock wooly adelgid, a particular danger to the eastern hemlock tree species.<sup>5</sup>

**Table 5-1: Merrimack Forest Facts**

<b>Total Area of Merrimack in Acres</b>	<b>21,412</b>
<b>Area and Percentage in Forest (2010)</b>	12,933 acres/60.4% of Town
<b>Hemlock-Hardwood-Pine Forests*</b>	6,650
<b>Appalachian Oak-Pine Forests*</b>	6,283

Source: Biodiversity Conservation Plan, 2010.

\* Wildlife habitats mapped as part of the NH Fish and Game Wildlife Action Plan, 2005.

Although approximately 60 percent of Merrimack was forested in 2005, the Biodiversity Conservation Plan notes that this estimate includes smaller forest blocks that are situated among areas of residential development. Eliminating the small pockets of forest abutting residential development would result in only 8,611 of contiguous forest cover, or about 40 percent of Merrimack.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

## 5.5.4 Forest Fragmentation and the Remaining Large Forest Blocks

The term forest fragmentation refers to the progressive dissection of forested areas by new roads and development, which break up the continuity of the forested landscape. Most of the area's native plant and animal species evolved in and are adapted to a heavily forested environment. Many species require large, contiguous forest blocks to successfully reproduce and maintain their populations. The percentage of land in forest cover statewide decreased from 87 to 84 percent between 1983 and 1997, with development contributing to most of the loss.<sup>6</sup> The percentage of forest cover is expected to decline to 79.1 percent by 2025.<sup>7</sup>

According to the Forest Society's report "New Hampshire's Changing Landscape," forest blocks larger than 500 acres have a greater capacity of supporting a wider range of resource protection values such as economic forest management, wildlife habitat, outdoor recreation, and water supply protection than smaller forest tracts. It is for this reason that 500 acres is used as a threshold indicator of forest health and forest fragmentation. Several species, including squirrels, raccoons, skunks, crows, and blue jays, have been able to adapt to an environment consisting of relatively small "habitat islands." However, many species, including the pileated woodpecker, black bear, and numerous songbird species, require large areas of extensive forest or mixed habitat in order to maintain a stable population. Smaller forest tracts are also difficult to manage economically for sustainable timber harvesting and less desirable for hunting, hiking, camping and other forms of outdoor recreation.

The predicted decline in forest area and increasing forest fragmentation can be expected to adversely impact the habitat of many species of wildlife. In particular, many species of migratory songbirds ("neo-tropical migrants" such as warblers, vireos, orioles, tanagers, flycatchers, and thrushes) are thought to be particularly susceptible to forest fragmentation, and drastic population declines of many species have been noted in recent decades. In general, large forest tracts help to protect biodiversity and maintain healthy wildlife populations. As discussed later in this chapter, decreasing forest area may also adversely impact groundwater recharge and drinking water quality.

Merrimack's remaining large forest blocks were mapped as part of the Biodiversity Conservation Plan and are illustrated on **Figure 5-6**. There are four forest blocks in Merrimack that are 500 acres or larger, including a linear area associated with the Merrimack River corridor. The forestland to the southeast, while still largely undeveloped, may experience development pressure in the near future due to its proximity to major roadways and because it is primarily industrially zoned.

The Biodiversity Conservation Plan recommends five Conservation Focus Areas (CFA) as having the highest priority for protection. Two of these areas are forestland areas of more than 500 acres. The three remaining river corridor CFAs are described in the next section.

<sup>6</sup> The Society for the Protection of NH Forests, *New Hampshire's Vanishing Forests*, 2001, pg. 13.

<sup>7</sup> The Society for the Protection of NH Forests, *New Hampshire's Changing Landscape*, Appendix A, pg. 10, 1999.





The Grater Woods CFA, an area containing approximately 1,300 acres, represents Merrimack's largest unfragmented forested block and includes wetland and significant habitat for species of conservation concern. According to the Biodiversity Conservation Plan, as "one of Merrimack's last remaining relatively large unfragmented forests, it carries great significance for biodiversity protection. Without such large contiguous forested areas, various species would not be able to exist. These include bear, moose, bobcat, fisher, otter, mink, hawks, owls, and even small migrant songbirds such as ovenbird, veery, and scarlet tanager."<sup>8</sup> Of the 1,300 acres in this 1,300-acre area, 500 acres are currently protected.

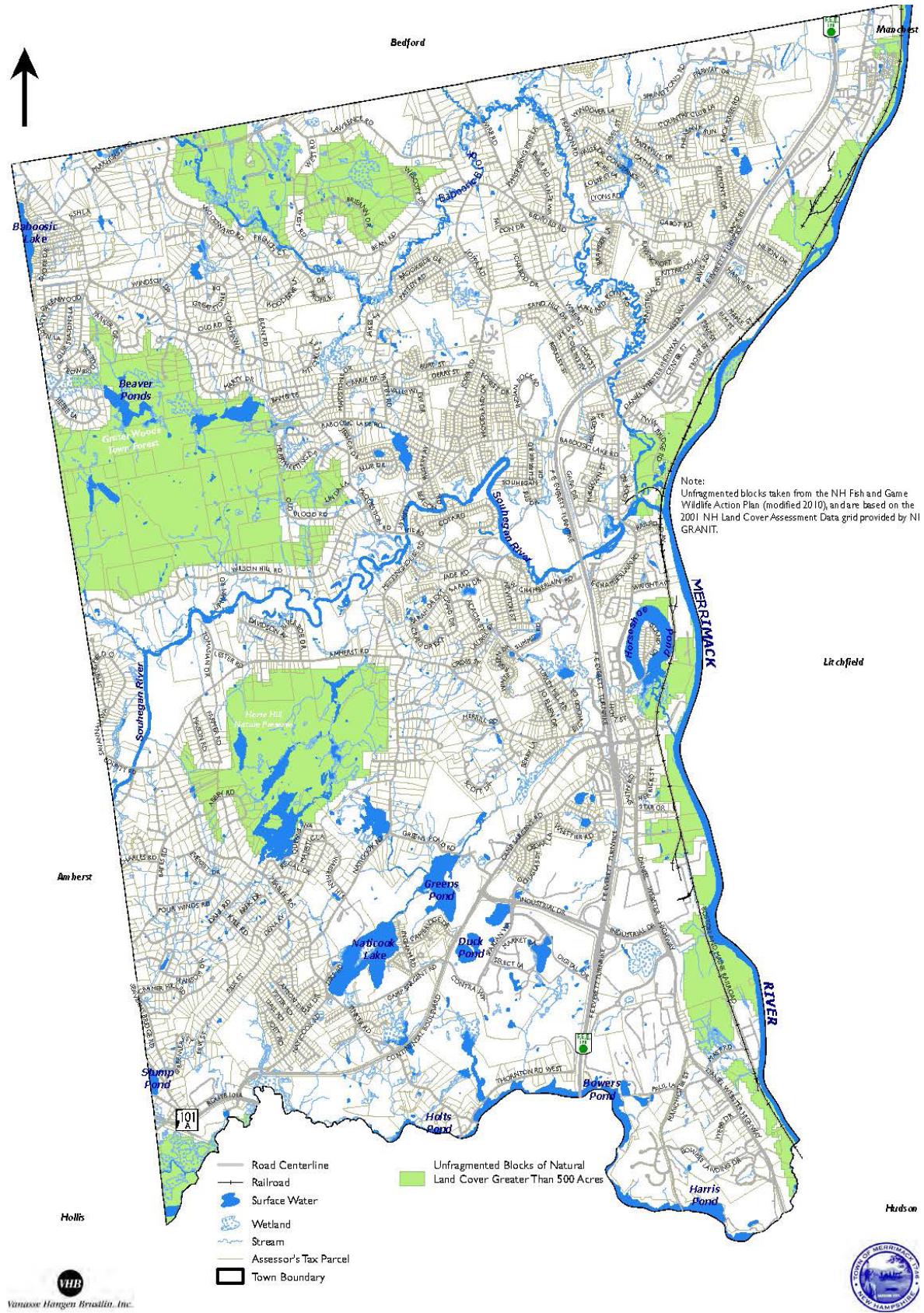
The Horse Hill CFA contains 847 acres and is located just south of the Grater Woods CFA. It is similar to the Grater Woods CFA in that it contains many of the same habitats of forestland and wetland. Currently, there is no protected land within the Horse Hill CFA. One of the benefits of protecting this CFA is that there is potential to provide connectivity to other CFAs.

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8 2010 Biodiversity Conservation Plan, pg. 52



Figure 5-6: Merrimack's Remaining Forest Blocks Greater than 500 Acres



Although Merrimack cannot be expected to remain as forested as more rural towns in other parts of the state, it may be possible to conserve the two remaining large forest tracts described above through targeted land acquisition, private conservation efforts and land use regulation. Since both of these forested areas are mostly located within the new R-1 zoning district adopted in 2000, lower development densities of not less than 100,000 square feet (2.3 acres) per dwelling unit are now required. Additional steps that could be accomplished include encouraging open space residential development that would place larger areas of land into public or private open space without increasing density requirements, and by concentrating land acquisition efforts within these larger forest blocks. Private land owners with larger holdings can also be encouraged to develop forest management plans that include provisions for selective timber harvesting that could enable them to gain a greater economic return from the land while maintaining it in a forested state. Through such measures, the Town could maintain large areas of contiguous open space, provide for enduring passive and outdoor recreational opportunities, conserve wildlife habitats, maintain a local source of timber and other forest products, and also help to retain much of Merrimack's remaining rural character.

### 5.5.5 The Status of Wildlife Habitat in Merrimack

Merrimack provides habitat for a wide diversity of plant and animal species. Many of these species, such as raccoons, skunks, grey squirrels, crows, and blue jays, have become adapted to the human environment, and, as a result, their populations have increased in developed and developing areas. Other species, however, including bobcats, fishers, and many species of forest-dwelling songbirds, require large tracts of unfragmented habitat in order to reproduce successfully. As discussed in the forest resources section, unfragmented blocks of habitat are large pieces of land with few or no roads, houses, or other human-made alterations to the landscape. Unfragmented land provides some of the most valuable wildlife habitat, especially where it provides a range of contiguous habitats of many different types (mature forests, wetlands, open fields, etc.) in close proximity. A primary characteristic of unfragmented habitat is the absence of roads. Roads are a source of mortality and a barrier to wildlife movement. The impact of roads varies with their type and intensity of use. An unmaintained dirt road does not represent the same threat to wildlife as most paved highways for several reasons. Dirt roads tend to be narrower than paved roads, necessitating lower travel speeds and lessening the chances of automobile – wildlife conflicts. Narrow dirt roads in wooded areas also permit the tree canopy to extend over the road, thereby retaining a greater degree of forest cover and habitat for many species of wildlife, especially birds. Careful consideration of road placement and configuration is therefore one of the most important steps that can be taken to safeguard significant blocks of wildlife habitat.

Merrimack is fortunate in that it retains several areas of large, relatively unbroken habitat. While the large forest blocks in the south-central and southern portions of Town are likely to be developed as the Town approaches build-out, the large block of forestland in northwestern Merrimack, by virtue of its remoteness and steep slopes, may be able to be preserved in perpetuity.

As described earlier, the Biodiversity Conservation Plan identifies a number of important ESAs that support a wide range of species. Wildlife corridors, such as the Merrimack River corridor, are important to allow wildlife to travel safely through the landscape. These corridors are not



only important to larger mammals but also to smaller wildlife such as amphibians, reptiles, and migratory birds. As part of the planning effort, the Biodiversity Conservation Plan identifies the primary mammal road crossing to prioritize areas for conservation. In addition to the forest blocks identified as important conservation focus areas above, the Plan identifies the Baboosic Brook Corridor, the Merrimack River Corridor, and the Souhegan River Corridor as important CFAs that offer pristine habitat for common species and species of concern, and allow corridors for wildlife movement by connecting to other critical habitat.

This area contains over 400 acres of contiguous public and privately owned conservation, park and recreational land around Naticook Lake, Naticook Brook and Greens Pond. Large areas of undeveloped, unprotected land are located in this vicinity as well. Other relatively unfragmented wildlife habitat areas are located in the wetlands, floodplains and woodland areas adjacent to portions of the Merrimack River, Souhegan River, Pennichuck Brook and Baboosic Brook. Although the undeveloped land adjacent to these rivers and streams is sometimes narrow, these areas can serve as important wildlife “corridors” that link various types of wildlife habitat together.

### 5.5.6 Invasive Species

One of the greatest threats to Merrimack’s forests aside from forest fragmentation is the presence of invasive species. Conversion of forestland to residential and roadway development leads to colonization of invasive plants that can alter species composition and the natural diversity of trees, shrubs, and plants. Some non-native forest insects that are particularly detrimental to the health of Merrimack’s forests include the hemlock wooly adelgid, the Asian long-horned beetle, and the emerald ash borer. The hemlock wooly adelgid is an invasive insect that destroys Eastern hemlock. According to the Biodiversity Conservation Plan, the hemlock wooly adelgid was reported at Merrimack’s Twin Bridges Park in 2007 and still currently exists there today. The Asian long-horned beetle destroys native hardwood forests, including maple, box elder, birch, poplar, American elm, ash, American horse chestnut, locust, and willow. Unlike native longhorned beetles, the Asian longhorned beetle attacks live trees and has no natural enemies in the United States that would help to keep its population in check. While there have been no sightings of the Asian longhorned beetle in Merrimack or New Hampshire in general, there is evidence that the population is moving northward in New England with an extensive infestation in Worcester, Massachusetts in 2008 and Boston in 2010. There is the potential for this species to be accidentally introduced via firewood from infested trees.<sup>9</sup> The emerald ashborer destroys ash trees and while not currently in New Hampshire, it has also spread rapidly (via infested firewood) from the Midwest and South to Massachusetts in 2012, and had destroyed tens of millions of ash trees.<sup>10</sup>

9 New Hampshire Audubon. Asian Long-Horned Beetle and Emerald Ash Borer. Website: <http://www.nh Audubon.org/asian-long-horned-beetle-emerald-ash-borer>. Accessed January 2012.

10 United States Department of Agriculture Forest Service. Emerald Ash Borer. <http://www.emeraldashborer.info/index.cfm>. Accessed January 2012.

### 5.5.7 Significant Wildlife Species and Human-Wildlife Conflicts

As human habitations encroach into large, contiguous areas of wildlife habitat, conflicts between human interests and wildlife can intensify. These human-wildlife conflicts can take several forms, including:

- Increased incidents of road kills and automobile-wildlife collisions, especially with large mammals such as deer and moose, which can be deadly for both the animals and motorists
- Rabies and other wildlife diseases
- Predatory mammals, such as bear, coyotes and coy dogs, encroach on human habitat with increasing frequency and prey on small livestock and domestic pets
- Deer destruction of shrubbery and vegetable gardens

The Merrimack Animal Control Officer reports that most calls concern loose dogs and domestic animals. She reports that in 2011, she received 645 calls, 31 of which involved dog bites, 11 concerned stray farm animals, and most calls concerned stray dogs. There were no reported cases of rabies in Merrimack in 2011. In addition to domestic animals, there have been 111 sightings of bears and other native wildlife in 2011. Although coyotes are present, she reports that they have presented no real concerns other than nuisance matters.

There are several ways in which human-wildlife conflicts can be minimized. Perhaps the most effective is to preserve as many large blocks of wildlife habitat as possible, on the premise that most species of wildlife would rather forage, breed and travel in areas removed from human activity. Though this may be true for large mammals and many other species, several species, such as raccoons and skunks, have become habituated to suburbia and may prefer an easy meal from a garbage can to a harder earned meal in the wild. In these cases, people can take steps to “wildlife proof” their garbage storage areas, not feed wild animals, and otherwise not encourage wildlife species (with the exception of seed eating birds) to forage in their backyards. With careful planning, there should be room for both wildlife and human habitat in Merrimack’s future.

### 5.5.8 Rare and Endangered Species and Natural Communities

The New Hampshire Natural Heritage Bureau (NH Natural Heritage) is an agency within the Division of Forests and Lands. The NH Natural Heritage finds, tracks, and facilitates the protection of New Hampshire’s rare plants, rare animal species, and exemplary natural communities. To qualify as exemplary, a natural community or system must be rare, or must be a high quality, undisturbed example of a common community.<sup>11</sup>

The Biodiversity Conservation Plan identifies 16 significant wildlife habitats in Merrimack including the forested uplands, wetlands, rivers and brooks, and heron rookeries, among others. These wildlife habitats are home to variety of common species as well as species of concern. For example, the upland forestland is home to birds such the Cooper’s hawk and state threatened common eastern towhee, mammals such as the bobcat, a species of special concern, and reptiles such as the state-endangered Blanding’s turtles.

<sup>11</sup> NH Natural Heritage Bureau. Rare Plants, Rare Animals, and Exemplary Natural Communities in New Hampshire Towns, January 2012.

The karner blue butterfly and the shortnose sturgeon are the only federally threatened species in the region. While the bald eagle is no longer listed as federally endangered, it is still listed as threatened in the state of New Hampshire. The bald eagle makes its home along the Merrimack River corridor in the winter and the Appalachian oak-pine forests. The Audubon Society reports that the Merrimack River corridor is second only to Great Bay, located in southeastern New Hampshire, in winter eagle activity. Although human activity disturbs eagles, they are able to exist in the presence of the noise of cars and trains.

Anadromous fish species such as blue back herring, alewife, American shad and Atlantic salmon are beginning to return to the Merrimack River as a result of the anadromous fish restoration program begun in 1969. The program is a cooperative effort between the Massachusetts and New Hampshire state fisheries agencies, the US Fish and Wildlife Service and the National Marine Fisheries Service. The effort has focused primarily on Atlantic salmon and American shad, both sport fish, with the goal of establishing a self-sustaining salmon population. Fish passages at two locations downstream from Merrimack (Essex dam in Lawrence, MA, 1982 and the Pawtucket dam in Lowell, MA, 1986) have allowed shad to move upstream into New Hampshire waters for the first time in over a century. Along the scenic Souhegan River, the Merrimack Conservation Commission facilitated the removal of the Merrimack Village Dam in 2012, opening up 14-miles of fish breeding habitat in the river that had been blocked for over 100 years.

Water bodies and large wetlands in Merrimack are also known to support a variety of wildlife. Stump Pond in south Merrimack and Amherst is bordered by large swamps to the north and south. Residents have reported that it is a stopover for osprey (threatened in New Hampshire), pied-billed grebe (endangered in New Hampshire), hooded and red-breasted mergansers, ducks, geese and northern goshawks. Many other species of birds are also likely to use this habitat either for nesting or as resting and feeding areas in migration.

The NH Natural Heritage records indicate the presence of 23 plant species in Town that are critically endangered or threatened.

In addition, the NH Natural Heritage identifies seven exemplary natural communities in Merrimack: New England pitch pine heath swamp, high-gradient rocky riverbank system, kettle hole bog system, red maple floodplain forest, sand plain basin marsh system, silver maple—false nettle—sensitive fern floodplain forest, and swamp white oak basin swamp.<sup>12</sup> With the exception of the pitch pine heath swamp, of which there is only a historical record, these natural communities are designated by NH Natural Heritage as extremely to very high importance in terms of the rarity, size, and the health of the community. The Biodiversity Conservation Plan, which included local survey of wildlife habitat during different seasons, notes that 32 natural communities were observed in Merrimack, two of it identified as locally significant and eight as exemplary.

Most of these communities are likely to be associated with the Souhegan River, the Merrimack River, and wetlands within Town. The NH Natural Heritage regards exemplary natural communities as priorities for conservation. Natural communities are “recurring assemblages of species found in particular physical environments.” represent intact examples of New Hampshire’s native flora, fauna and vegetation. While there are many natural communities in

<sup>12</sup> NH Natural Heritage Bureau. Pg. 121.



Merrimack that are common throughout New England, exemplary and those of local significance are of particular importance. The Biodiversity Conservation Plan notes that rare upland forest communities were observed in Merrimack including Appalachian oak rocky woods, which occurs on two Town owned properties, one of which has formal protection. The pitch pine-scrub oak woodland, also rare, is a historical record and may no longer be present in Merrimack.

## 5.6 Existing and Potential Future Conservation Lands

### 5.6.1 Existing Conservation and Publicly Owned Open Space Areas

Merrimack contains a wide variety of conservation and publicly owned open space lands. As seen on **Figure 5-7** these parcels are widely distributed throughout Town. In addition to showing land owned by the Town that is managed for conservation purposes, **Figure 5-7** also shows:

- Land owned by the Merrimack Village District (MVD) for wellhead protection purposes
- Undeveloped land owned by the Merrimack School District
- Significant easement areas managed by the Town of Merrimack or the Conservation Commission
- Town owned land with no management responsibility determined, and
- Privately owned land in current use

As indicated on **Figure 5-7**, many parcels in current use either abut or are in close proximity to conservation and open space land owned by the Town. Given the importance of large forest and habitat blocks for wildlife, groundwater recharge, and the preservation of rural character, it may be worthwhile for the Town to work with the private owners of land in current use to afford them more permanent protection. The Town should work in concert with the MVD to maintain as much open space as possible such that the land could possibly be used as future groundwater wells. The fact that many of these current use parcels are located in northwestern Merrimack, which has development limitations due to poor soils for septic systems, steep slopes, and plentiful wetlands, may provide an opportunity for the Town to work with landowners to achieve this objective. Other land of conservation value in Merrimack includes undeveloped land owned by the School Department. As the Town approaches build-out, these parcels may be needed for additional schools. However, portions of the land, especially areas abutting existing conservation land could still be left in a natural state.