CHAPTER III - NATURAL RESOURCES

Introduction

Hudson's natural resources are among the most valued of the town's assets and the conservation of open space is one of the highest priorities for Hudson residents. When asked to identify issues that concerned them the most in the 2019 Master Plan survey, respondents identified the loss of open space and natural areas as their top concern (76%). The loss of rural character came in a close 3rd at (71%). Though conservation is clearly a high priority, many Hudson residents believe that current efforts are sufficient and only a slight majority (52%), believe that the Town should "do more" about land conservation. The principal goals of the Natural Resources component of the Master Plan as stated in Chapter I – Community Vision and Goals, are as follows:

- Expand Conservation areas and increase open space.
- Build on existing open space assets such as Benson Park and Robinson Pond.
- Expand the existing trail network and facilitate connections between schools, parks, conservation areas, community facilities, residential neighborhoods, and employment centers.

The Natural Resources Chapter is designed to consider various constraints to development in planning for the future growth of the community and to identify priorities for conservation. This chapter is an update of the 2006 Master Plan Natural Resources chapter. Wherever possible, updated maps and data are provided, however in some cases where new data is not available, information presented in the 2006 plan is brought forward. This chapter includes the following sections: 1) upland resources such as topography, soils, and forest land; 2) water resources, and 3) existing and potential conservation lands.

General Conditions

The Town of Hudson lies on the eastern banks of the Lower Merrimack River in south central New Hampshire. The Town shares its southern border with the State of Massachusetts and its western border with the City of Nashua. As a result, Hudson has developed significantly as a rural/suburban residential community for Nashua and Greater Boston as well as a commercial and industrial center. As available developable land becomes scarcer, impacts of growth make it increasingly important to understand, inventory and plan for the protection of the Town's natural resources. A distinct set of development constraints exists on each parcel of land due to the specific topography, soils, water resources, and flora and fauna that could be present. In addition, the abundance and diversity of natural resources in Hudson, including wetlands, ponds, streams, fields, and forests, provides opportunities for a variety of land uses while contributing to the overall quality of life in the community.

TOPOGRAPHY

Topography generally relates to the surface configuration of the land. The topography of an area can be described by two measurable characteristics — Elevation and Slope. A brief description of each of these factors is given below, along with an explanation of their importance in planning for land use and development within the Town.

Elevation

Elevation defines the relative height of a piece of land at a given point. So that measures of elevation are comparable, they are expressed in terms of feet above Mean Sea Level (feet aMSL). Elevations in

Hudson vary from the lowest point at 100 feet aMSL along the Merrimack River, to 510 feet aMSL in between Musquash Swamp and Pond in the southeast part of Town. The eastern half of the Town is dominated by higher elevations and steep slopes. The western half of the Town is slightly flatter, which indicates the former riverbed location during the glacial retreat and forms the watershed boundary for the Merrimack River main-stem. Map III-1 illustrates the topography for the Town of Hudson.

Slope

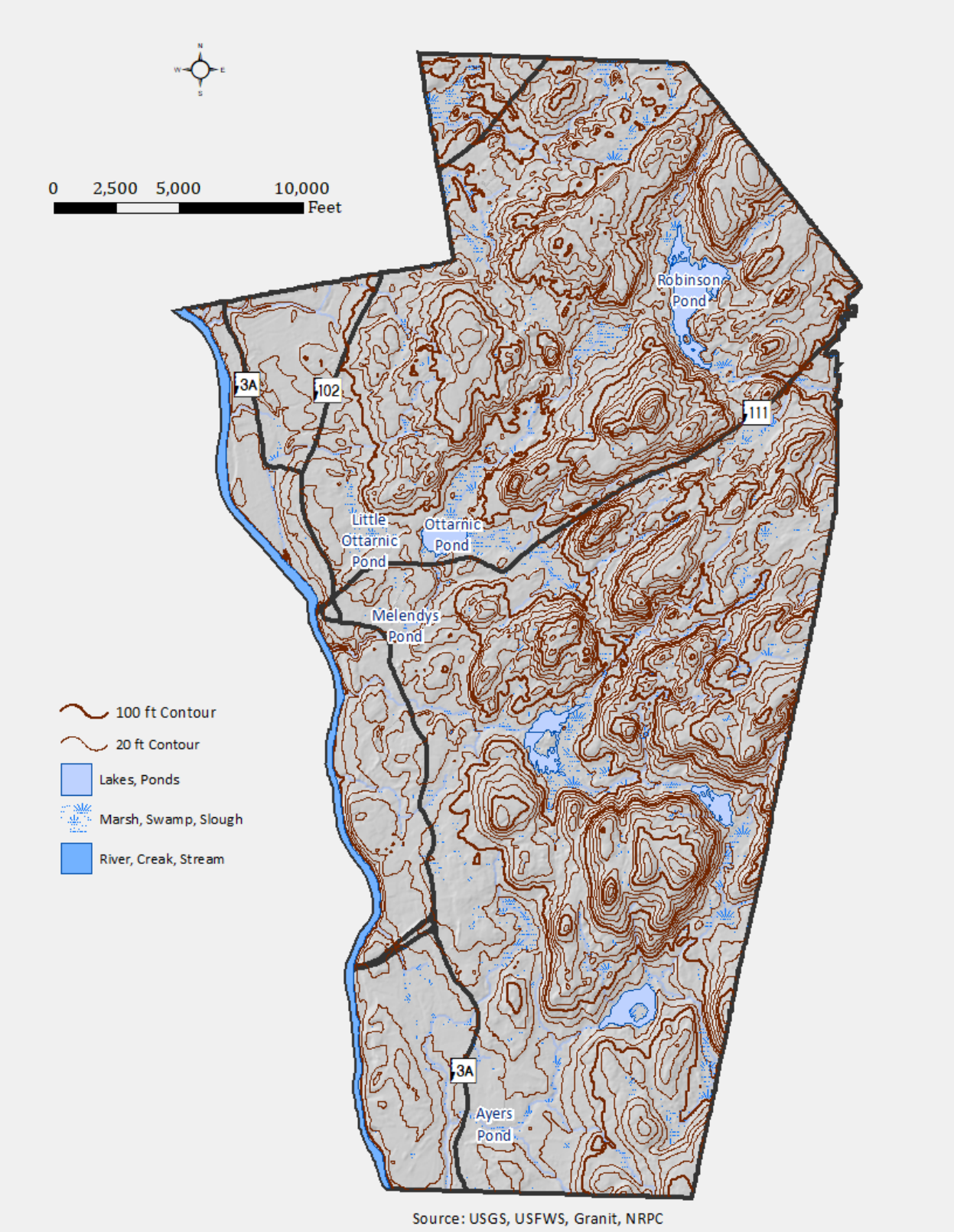
Slope refers to the relative steepness or pitch of a piece of land. Measurements of slope are expressed in percentages and are calculated by dividing the difference in elevation of two points by the distance between the points (i.e., change in elevation/distance = % slope). Thus, land with 0% slope has constant elevation and is perfectly level. Likewise, land with 100% slope has a pitch equivalent to a 45-degree angle. The mapping of slopes is a valuable tool in determining areas where slope conditions may require special design considerations or other precautionary measures. The following slope categories are recommended for consideration in planning for the future land uses in Hudson and are illustrated on Map III-2.

25+% Slope - Land areas in this category are among the most difficult to develop. A 25% slope represents a 25-foot vertical rise in elevation in a 100-foot horizontal distance. The central part of Hudson, near Musquash Swamp contains the few areas in Town where the slopes are 25% or greater. These areas will require extreme care and usually need special engineering and landscaping to be developed properly. The major problem of development on slopes of 25% or more is that in general steep slopes have a very shallow layer of soil covering bedrock. Proper safeguards must be applied to such sites to minimize hazards to downslope areas, and these safeguards usually mean costly and often problematic engineering and landscaping solutions. There are few areas where slopes exceed 25% or greater in the Town of Hudson, see Map III-2.

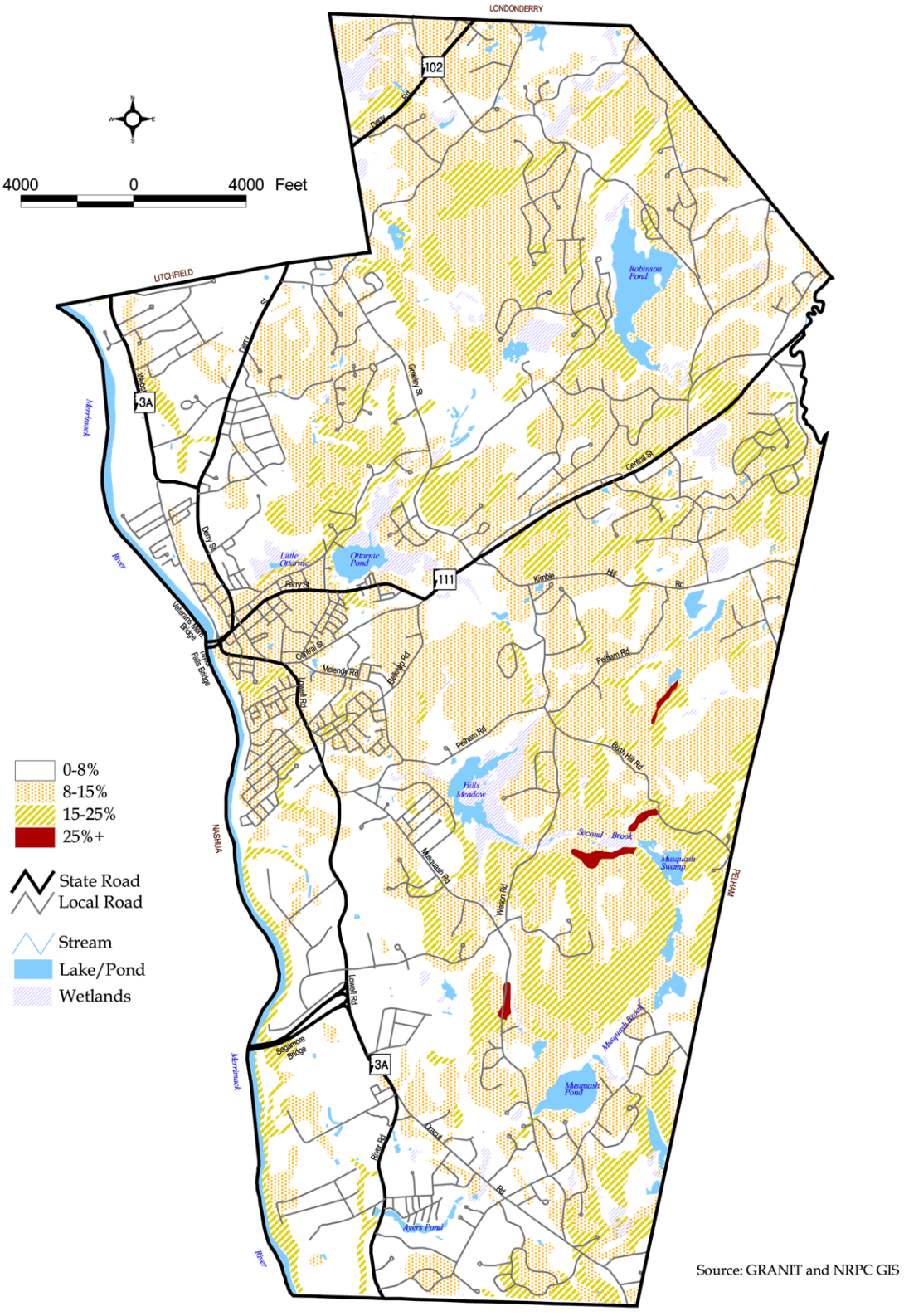
15-25% Slope - Areas in this slope category present similar challenges to areas with slopes greater than 25%. Development of these areas should be undertaken with extreme care, recognizing the sensitivity of the environmental factors involved. In general, the steeper the slope, the shallower the soil layer covering bedrock. In addition, the velocity of surface water run-off can increase with the steepness of the slope, thereby increasing the potential for erosion and decreasing the potential for absorption of surface run-off. Road construction is also more difficult and costly under these slope conditions and will result in increased volume and velocity of run-off to adjacent roadway areas. If proper safeguards are not applied, substantial hazards and potential damage to downslope property could result. For these reasons, active land uses should be avoided or approached with caution. Areas with 15-25% slopes are scattered throughout the Town in both developed and undeveloped areas. These areas are more suitable for open space.

8-15% Slope - Land areas with slopes in this category can present many of the same problems that are associated with the 15%+ category including erosion susceptibility and low absorption potential that can make site development and subsurface sewage disposal difficult. The severity of these conditions, however, is less hazardous than on steeper slopes. Overcoming site conditions can be accomplished with caution and foresight. Approximately one third of the Town is comprised of slopes in this category.

Map III-1. Topography



Map III-2. Slope



0-8% Slope - Land areas in this slope category are generally considered to be well-suited for development. Land in this slope category is concentrated on the western side of Town along the banks of the Merrimack River and straddling some of Hudson's busiest corridors including Lowell Road and Derry Street. These moderately sloping areas are ideal for a wide variety of land uses and not surprisingly, most of Hudson's most heavily developed land is in these areas. Their relative flatness does not pose severe erosion potential, and the velocity of the surface water run-off is sufficiently slow to allow absorption of the water into the soil. In addition, soil layers on slopes of 0-8% are usually of sufficient depth to allow for the absorption and purification of run-off and septic system effluent. One exception to the above comments, however, must be noted. Areas of 0-3% slope at low elevations, or with poorly or very poorly drained soils, have been found to have a high-water table (at or near the surface) throughout most of the year. These areas pose substantial problems to site preparation, construction, and effective subsurface sewage disposal. But generally, flat, well-drained areas are usually quite suitable for active use and development.

Soils

In areas currently without access to Town sewer, soils are the most important determinant of the land's development capability. 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, stormwater management and control systems, buildings, and septic disposal systems. Soils with high limitations for septic systems comprise approximately 40% of Hudson's land area. Concentrations of these soils are located primarily in the northern and southern parts of Town, with scattered concentrations in the central part. Soils with moderate limitations for septic systems comprise approximately 40% of the Town's land area. Concentrations of these soils are located primarily in the central part of Town along the Merrimack River and in the northern area adjacent to the Londonderry Town line, with scattered concentrations throughout the central part. Many of these areas, however, benefit from public sewer. Soils with slight limitations for septic systems comprise approximately 20% of the Town's land area.

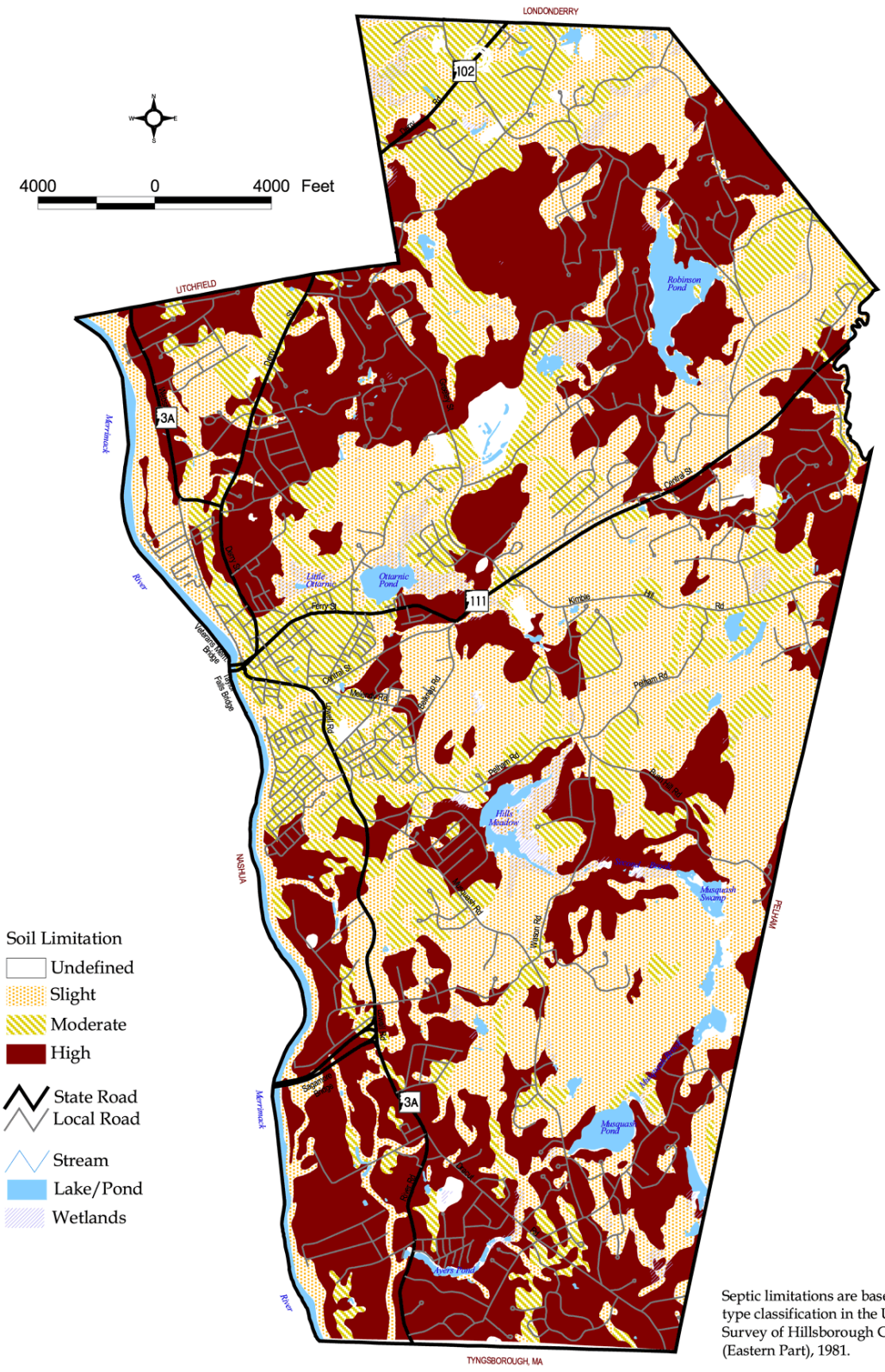
Hudson bases minimum lot sizes for residential development on the presence of both water and sewer service facilities. A single-family residence on Town water and sewer, for example, requires a minimum lot size of 30,000 square feet or 0.70 acres. Without public water and sewer, the residence requires 43,560 square feet for a single family and 60,000 square feet for a duplex. The Town does not permit construction of multi-family houses without Town water and sewer.

Agricultural Soils

Like other Merrimack River Valley communities, Hudson once enjoyed a notable concentration of prime and important farmland, however, most of these areas have been developed for nonagricultural purposes. The USDA has identified soil types that are best suited for crop production based on soil quality, growing season, and moisture supply. The three agricultural soil classifications recognized by USDA in New Hampshire are discussed below. The location of these soils is illustrated on Map III-4, though as noted above, most of these areas are no longer available for farming.

Prime Farmland - These lands are best suited for producing crops. Their soil quality, growing season, and moisture supply make them suitable for producing sustained high yields of crops economically when treated and managed according to modern farming methods. They can be farmed continuously without degrading the environment and usually require little investment and energy for maintaining their productivity. These soils are rated among the best in the country for farming uses. Almost no Prime Farmland remains undeveloped in Hudson.

Map III-3. Soil Limitations



Septic limitations are based on soil type classification in the USDA Soil Survey of Hillsborough County (Eastern Part), 1981.

Farmlands of Statewide Importance - These lands are rated as being of statewide importance for the production of crops. Though not of national importance, they are important to agriculture in New Hampshire and can be farmed satisfactorily and will produce fair to good crop yields when managed properly. The Farmlands of Statewide Importance are scattered throughout Hudson and are commonly found adjacent to wetlands.

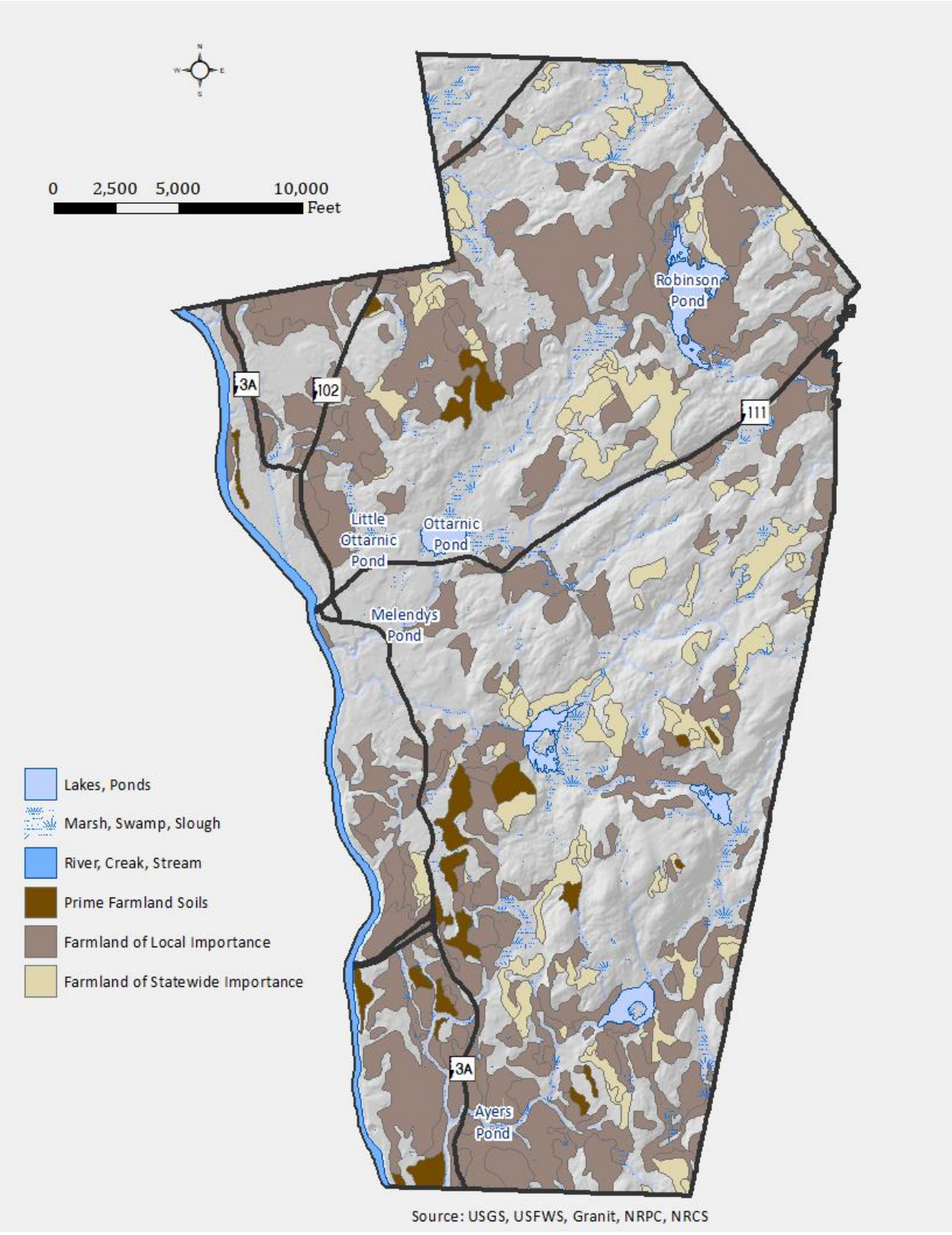
Farmlands of Local Importance - These lands are rated as having local importance because they are already being actively farmed or were farmed in recent years. Aa with Farmlands of Statewide Importance, these areas are scattered throughout Hudson.

Although agriculture is not extensive in Hudson, remaining areas are still an important resource that provides local seasonal produce and planting materials, provides open space, contributes to the rural character of the town, and serves as an educational resource. Significantly, the largest active farm in Hudson is the 100-acre Farm at Alvrine High School. The Farm is a key component of the school's Wilbur H. Palmer Career Technical Center (CTE) program. Alvrine' s facility houses a working dairy farm with several milking cows along with horses and donkeys and a large community garden. Milk from the Farm is used in the making of cheddar cheese under the well-known Cabot brand which can purchased locally and throughout the region. The Alvrine Farm encompasses some of the few remaining undeveloped areas of farmland soils of Statewide and Local significance in Hudson. The Town-owned Hills property across Derry Street also includes undeveloped areas of soils of Statewide and Local significance as well as an area of Prime Farmland soil.

Other undeveloped concentrations of Statewide and Locally Important farmland soils are found to the north, southeast and east of Robinson Pond including on the Robison Pond Park site itself; east of Lowell Road in south Hudson; in east-central Hudson and in the vicinity of Musquash Brook on both Town-owned and privately-owned land.

The Town of Hudson encourages the pursuit of agriculture, promotes agriculture-based economic opportunities, and protects farmlands within the Town by allowing agricultural uses and related activities to function with minimal conflict with abutters. Backyard farming and/or so called "Victory gardens" can provide cost saving nutrition while also providing relief from unexpected events like supply chain disruptions, product recalls, and has potential to combat against 'food deserts." Hudson should adopt policies that allow residents to utilize their properties for such uses. Efforts should be taken to encourage existing farmlands to remain in agricultural production and to protect important agricultural soils on undeveloped land that is not currently in use. This is especially true in the General Districts where agriculture uses are allowed and there is sufficient area for viable farming. The Town's Conservation Fund as well as the Trust for New Hampshire Lands and the Land and Community Heritage Investment Program could provide resources to protect important agricultural lands through the acquisition in fee or through easements. It is also noteworthy that undeveloped land with important farmland soils often also encompasses important wildlife habitat areas.

Map III-4. Important Agricultural Soils



Forests

Forests were the dominant landscape characteristic of New Hampshire after the retreat of the glaciers. Before colonization of New Hampshire, southern New Hampshire was 93% forested with the remaining 7% being marsh or ponds. By 1850, at the height of agricultural development in New Hampshire, only 20% was forest, while the remaining 80% of Hillsborough County was cleared for livestock grazing, growing livestock feed, and raising crops for home consumption. Agriculture began to decline during the 1860's with western migration and industrialization of the northeast. These fields slowly gave way to scrub trees and conifers generally took over the abandoned farmlands and meadows. Currently, the US Forest Service estimates that New Hampshire is approximately 83% forested.

Today, the greatest threats to Hudson's remaining forested areas, aside from development, are from invasive pest species. Most significant of these are the Hemlock Woolly Adelgid, an invasive, aphid-like insect that attacks hemlock trees, and the Emerald Ash Borer, a beetle from Asia. Ash Borer beetle larval feed on the tissue between the bark and sapwood that disrupts transport of nutrients and water in the tree, eventually causing the tree to die. Gypsy moths are also a threat to the health of area forests though the mortality rate from infestations is relatively low.

Hudson's forested land is made up of by two dominant habitat types: Appalachian Oak-Pine and Hemlock-Hardwood Pine. Appalachian Oak-Pine Forest lands include tree species such as black, scarlet, chestnut and white oaks and shagbark and pignut hickories. Also found are black birch, aspen, pitch pine, sassafras, and yellow birch. Sugar maple and white ash may also be present. Blueberry, black huckleberry, sheep laurel, and Pennsylvania sedge are typical understory plants. As noted in *The New Hampshire Wildlife Action Plan Habitat Stewardship Series* produced by the UNH Cooperative Extension, "Appalachian oak-pine forests, with their abundance of nut-bearing oaks and hickories, provide a rich food source for wildlife such as ruffed grouse, turkey, black bear, squirrels, mice, and chipmunks. In turn, raptors such as northern goshawk feed on small mammals and find nesting and perching sites in white pines in the tree canopy. Near water, white pines provide key nest and perch sites for bald eagles, great blue herons, and osprey." Due largely to development pressure, large forest blocks of Appalachian Oak-Pine Forest are becoming increasingly rare in New Hampshire. Wildlife species found in Appalachian oak-pine habitats include the following:

American woodcock, Bald eagle*, Black bear, Black racer*, Blanding's turtle**, Bobcat, Canada warbler, Cerulean warbler, Common nighthawk**, Cooper's hawk, Eastern pipistrelle, Eastern red bat, Hognose snake**, Moose, New England cottontail**, Northern goshawk, Northern myotis, Ribbon snake, Ruffed grouse, Silver-haired bat, Smooth green snake, Timber rattlesnake**, Veery, Whip-poor-will, White-tailed deer, Wild turkey, Wood thrush.

* State-threatened species ** state-endangered species

Blanding's Turtle - *Source: Northeast Blanding's Turtle Working Group*

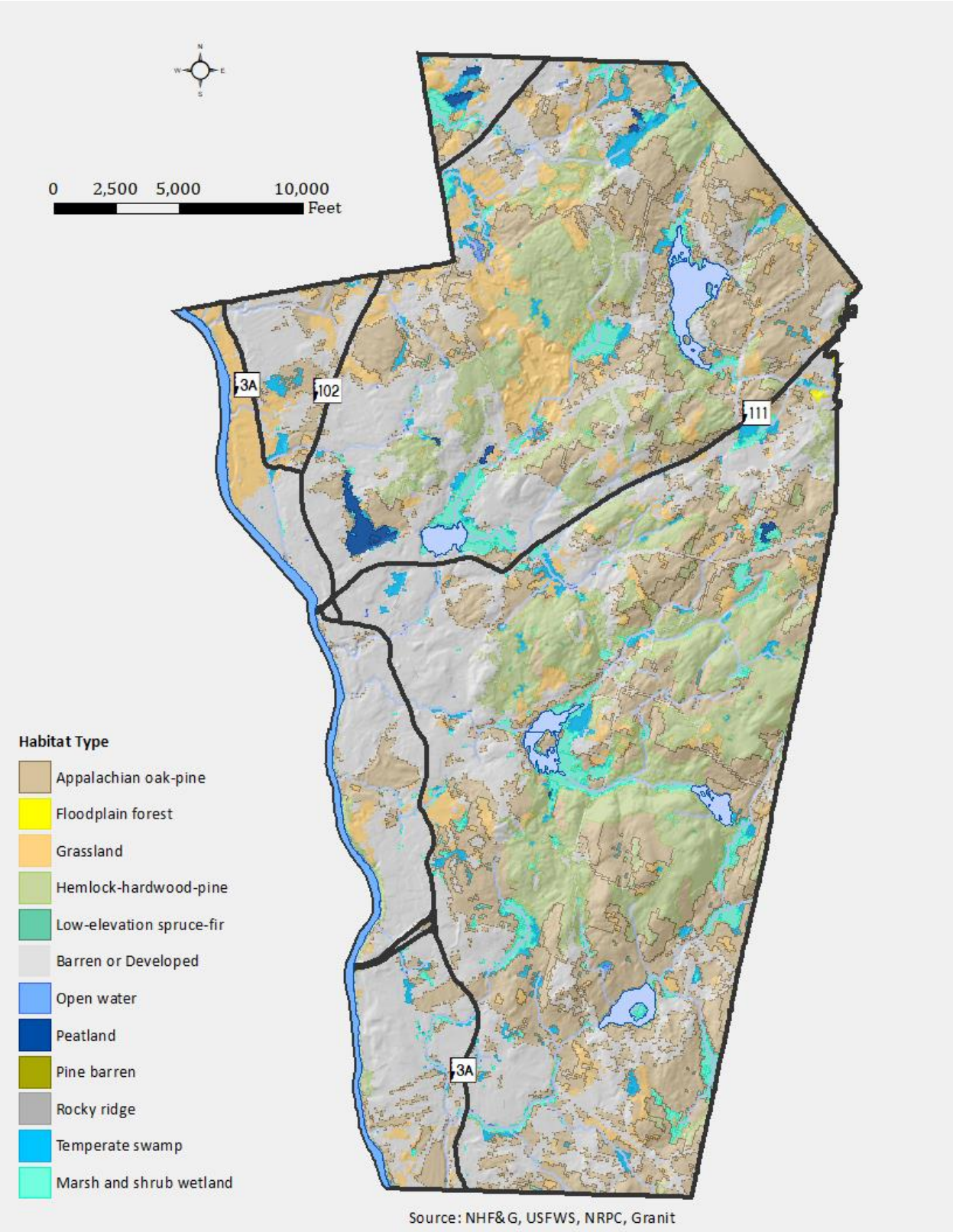
Hemlock-hardwood-pine forest is the most wide-spread habitat in New Hampshire and is heavily represented in Hudson. Dominant trees include white pine and eastern hemlock along with beech, sugar maple, white ash, and red oak. Small trees and shrubs such as witch hazel, maple-leaved viburnum, black birch, black cherry, and ironwood, together with starflower and Canada mayflower found on the forest floor. According to *The New Hampshire Wildlife Action Plan Habitat Stewardship Series*, "Hemlock-hardwood-pine forests are the habitat that surround and support many smaller and unique habitat types in southern New Hampshire. Most wildlife that requires vernal pools, marsh habitat, headwater streams, floodplains, shrublands, grasslands, or peat bogs will also use the surrounding forest to meet their needs for food, cover, or breeding." Wildlife species found in these forests include:

Eastern small-footed bat, Eastern towhee, Flying squirrel, Fisher, Jefferson's salamander, Moose, Northern goshawk, Northern long-eared bat, Pine elfin butterfly, Porcupine, Purple finch, Red-breasted nuthatch, Red-shouldered hawk, Red squirrel, Ribbon snake Cooperative Extension, American toad, American woodcock, Barred owl, Black bear, Black-throated green warbler, Blackburnian warbler, Blanding's turtle**, Blue-spotted salamander, Bobcat, Broad-winged hawk, Canada warbler, Cerulean warbler, Cooper's hawk, Eastern pipistrelle, Eastern red bat, Ruffed grouse, Silver-haired bat, Six-spotted tiger beetle, Smooth green snake, Spotted turtle*, Timber rattlesnake**, Veery , Whip-poor-will, Wood nymph butterfly, White-tailed deer, Wild turkey, Wood thrush, Wood turtle

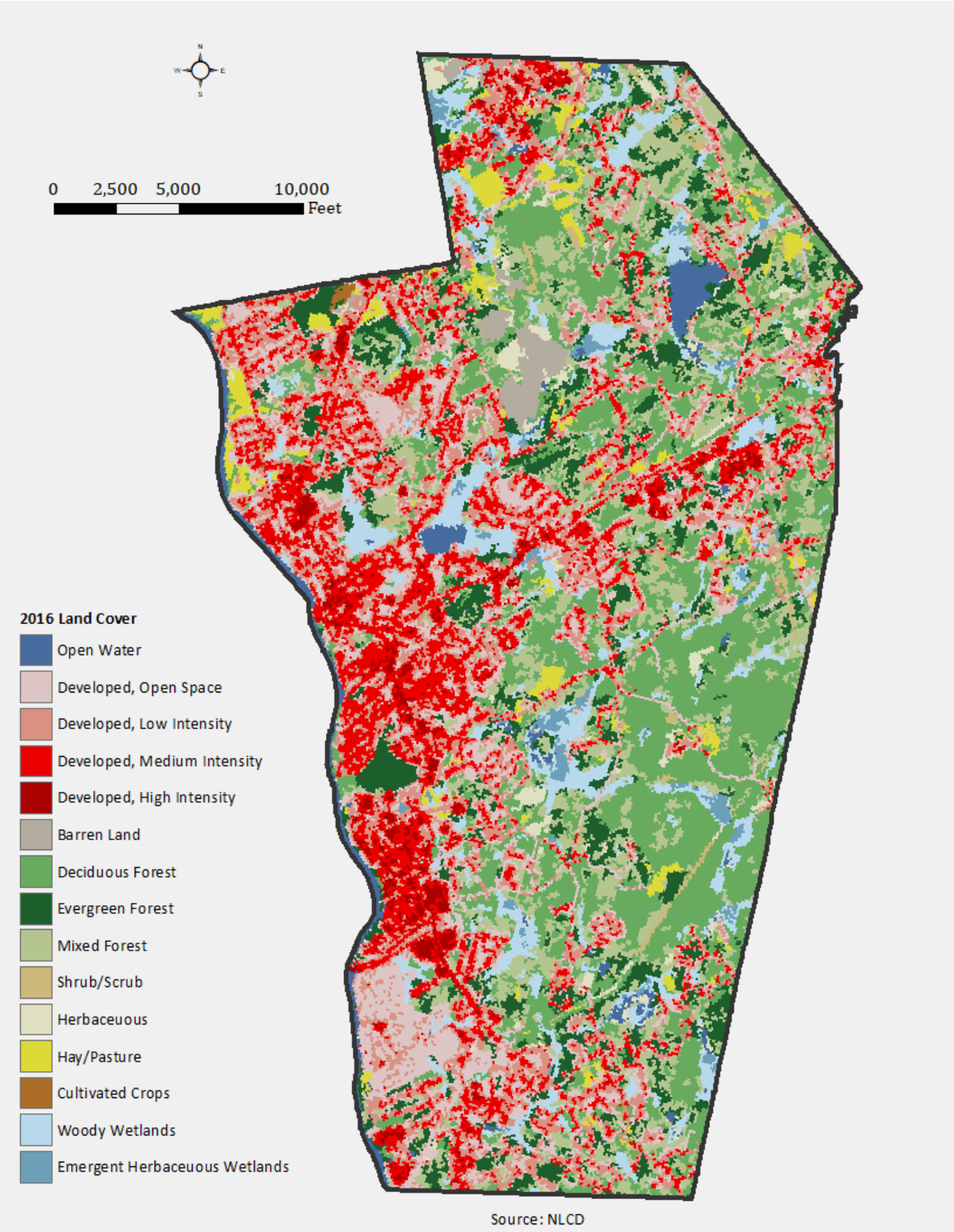
*State-threatened **state-endangered

The dominant forest types in Hudson are illustrated on Maps III-5. Map III-6 depicts land cover in Hudson by type.

Map III-5. Forest Habitats



Map III-6. Land Cover by Type



As can be seen on the preceding maps, the largest remaining forest blocks in Hudson are in the eastern half of the Town, especially in more rural east-central areas. One of the largest of these forest blocks is located on property owned by Brox Industries and is adjacent to an active excavation site. The future of that area is therefore uncertain. Fortunately, however, a significant portion of a large forest block in the southeastern section of Hudson is owned by the Town and is included within the Musquash Pond Conservation area.

The Musquash Conservation Area, pictured to the left, encompasses approximately 416 acres of wetland, open water, and upland areas of mixed forest types. The Town of Pelham also owns almost 25 acres of abutting conservation land in Hudson and additional land in Pelham. Key features include 6.9-miles of trails, a canoe/kayak launch area, and historic sites such as the Deacon Merrill Homestead (see Chapter VII – Historic Resources.) Many species of birds and mammals require large, unbroken tracts of forest to sustain their populations. To maintain healthy and diverse wildlife populations, unfragmented forest blocks of at least 500 acres, ideally with a diversity of habitat areas, are desirable.

Preserving large unfragmented forest blocks is also essential to retaining the Town's scenic beauty and rural character, and to provide sufficient area for hiking trails and other outdoor recreational activities. Adding conservation land to Musquash Pond is Hudson's best opportunity to preserve a large block of forested land capable of sustaining a healthy population of wildlife while providing passive recreational opportunities. Currently, additional undeveloped forestland exists on several adjacent parcels, some of which are vulnerable to development. Most important of these is the adjacent 200+ acre property owned by Nash Family Investments. Acquisition of this property would greatly enhance protection of Hudson's most important block of unfragmented forestland. In recent years, designated Town Forests have been used as a stream of revenues that supports conservation and forest management efforts. Today, Hudson has three dedicated Town Forest areas that are used for this purpose: Colburn Town Forest (52 acres), Hudson Town Forest (78.6 acres) and Rangers Town Forest (56.7 acres). The Conservation Commission is charged with the care of these lands, and the group is actively pursuing the expansion of these forests through abutting land acquisition.

Water Resources

Water is essential to every element of community life. Like air, water is constantly in motion, running above and below the ground's surface across town, state, and national boundaries. The natural system of water in Hudson is also extremely important in planning for growth. Hudson's surface waters are used by residents for fishing, swimming, and boating. Water is drawn from the ground to supply the community with potable drinking water both through on-site wells and from public water supply wells in Litchfield. Conscious and careful planning of the land uses in the Town must be adhered to if hazards to the health and well-being of community residents are to be avoided.

Surface Water Resources

Hudson's surface water resources, including watershed boundaries, are illustrated on Map III-7. Most prominent among these is the Merrimack River. The Merrimack River forms the entire western boundary of the Town and serves as a regional water supply and recreational resource. The Merrimack River also receives discharge from several of the region's wastewater treatment plants including the City of Nashua and the Town of Merrimack and much of the stormwater system. The Merrimack River is one of 12 rivers in the state protected under the Rivers Management and Protection Act. Activities within one quarter of a mile of the river are regulated by the State and reviewed by the Lower Merrimack River Local Advisory Committee (LMRLAC). The Town currently maintains active membership on LMRLAC to review development within the Merrimack River corridor. Currently, access to the Merrimack River in Hudson is extremely limited yet as noted in Chapter I – Community Vision & Goals, improved access is a high priority.

Hudson's largest surface water resource after the Merrimack River pictured below, is Robinson Pond,. Robinson Pond is the largest water body in Hudson. Residents of Hudson and nearby towns use the pond for swimming, boating, nature walks in the Town-owned conservation land, fishing, and bird watching (also see Chapter VIII – Community Facilities). Much of the Robinson Pond watershed is developed which contributes to elevated amounts of nutrients leaching into the pond, resulting in a eutrophic condition. Efforts to improve the condition of the pond include regular water quality monitoring and outreach to residents in the Robinson Pond watershed encouraging them to adopt good stewardship practices and strict enforcement of State regulations. The Conservation Commission is actively monitoring a study that is underway by the Nashua Regional Planning Commission that will evaluate the Robinsons Pond watershed. The study will provide recommendations to the town on ways to improve the overall health of the pond though Best Management Practices and will involve the participation of the Conservation Commission to help inform abutting landowners of the importance of this vital resource. Additionally, the Conservation Commission recently purchased 16 and 25 Robinson Pond Drive – 36 acres for the purpose of protecting the Robinson Pond watershed.

As discussed above, another important water resource in Hudson is Musquash Pond and its associated wetlands and brook. Musquash Brook originates in western Pelham near the Town border and flows into Hudson through a series of ponds and into Limit Brook, which empties into the Merrimack River in Tyngsborough, Massachusetts. Single-family residences comprise nearly half of the land area within the Musquash and Limit Brook watersheds. Despite increased development in recent years, however, this area constitutes one of Hudson's highest quality natural resources because of the diverse wildlife habitat and the numerous recreational opportunities available to area residents.

Merrimack River at Merrill Park

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 also typically contain many sub-watersheds and tributaries. All the perennial streams identified in Table III-1 are tributaries in the larger Merrimack River watershed, with individual watersheds for each stream (see Map III-7).

Table III-1. Perennial Streams in Hudson

Name	Total Length (miles)	Length in Hudson (miles)	Dammed or Free Flowing	Class[i]
Musquash Brook	2.7	2.7	free	B
Limit Brook	2.6	2.6	free	B
Second Brook	2.5	2.5	dammed	B
First Brook	1.5	1.5	dammed	B
Merrill Brook	1.9	1.9	dammed	B
Glover Brook	1.0	1.0	dammed	B
Reeds Brook	2.1	2.1	free	B
Chase Brook	2.3	1.5	dammed	B
Merrimack River	116	6.8	dammed	B

Each of the perennial streams in Hudson has a watershed. The water quality in each of these streams is directly related to the land use and activities that take place within each watershed, which are not always defined by municipal boundaries. Because the drainage area of any given water body may extend beyond a town's borders, inter-municipal coordination of land uses in each watershed is important in ensuring effective management and protection of the water resource. One example is the Musquash Brook Watershed, which is in both Hudson and Pelham, with about one-quarter of its watershed area in Pelham and the remainder in Hudson. Map III-7 illustrates each watershed area in Hudson. Table III-2 provides area statistics for each watershed.

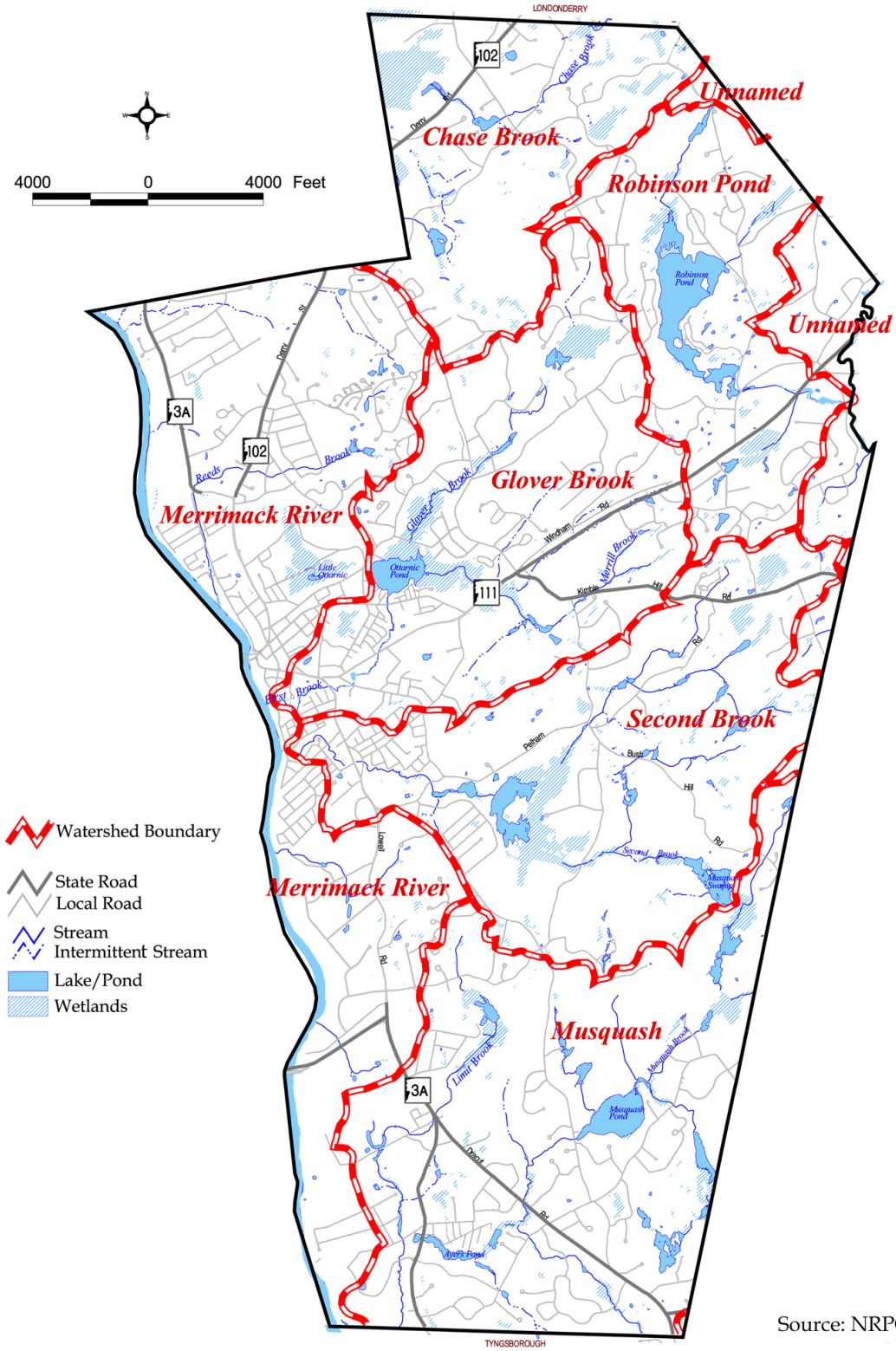
Because all of these systems are connected in the greater Merrimack River watershed, it is important to remember that small disturbances in the perennial streams and their watersheds can alter water quality and quantity in the larger streams and rivers such as the Merrimack River. Erosion, flooding, and contamination can occur in the smaller streams from stormwater. The cumulative impacts of development, from the smallest stream to the largest river, have an impact on both water quality and quantity in a community.

Table III-2. Watersheds in Hudson

Watershed	Acres in Hudson	Percentage of Hudson
Merrimack River primary watershed	3,999	21%
Musquash Brook watershed	3,840	20%
Unnamed watershed	580	3%
Second Brook watershed	3,323	18%
Glover Brook watershed	3,060	16%
Beaver Brook	107	1%
Chase Brook watershed	1,888	10%
Robinson Pond	1,976	11%
Total area	**18,773**	**100%**

Source: NRPC as delineated on USGS quadrangle maps.

Map III-7. Water Resources



Source: NRPC GIS

Lakes and Ponds

Hudson's lakes and ponds are an especially important surface water resource, providing wildlife habitat, water supply, flood control, and outdoor recreational opportunities. An inventory of Hudson's lakes and ponds is found in Table III-3, below.

Table III-3. Lakes and Ponds in Hudson

Name of Water	Area (acres)	Average Depth (feet)	Class	Trophic Class	Type
Ayers Pond	12	5.5	B	Eutrophic	Dammed
Benson's Pond	1.8	~ 6	B	NA	Dammed
Little Ottarnic Pond	2	NA	B	NA	NA
Ottarnic Pond	34	12	B	Eutrophic	Dammed
Melendy's Pond	1.5	NA	B	NA	NA
Musquash Pond	32	NA	B	NA	NA
Robinson Pond	88	29.5	B	Eutrophic	Natural
Unnamed Pond (Musquash Brook)	52.7	9.8	B	Eutrophic	Natural

Source: NH DES, *Survey Lake Data Summary*, November 2000.
Hudson Conservation Plan, November 1990.
Dave Clark, *Benson's Property Water Control Structures,* 2002.

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. Most of the lakes and ponds in Hudson are classified as eutrophic. The natural aging process can be accelerated by excessive nutrient loading which encourages weed and algal growth, and in turn speeds up the deposition of decaying vegetation as organic sediments on the lake's bottom.

Robinson Pond is an example of the acceleration of eutrophication in a pond. The pond, once a popular location for summer camps, has become a popular location to build year-round single-family homes. Due to the intense development, increased amount of nutrients from lawn fertilizers, failing septic tanks and other natural conditions, Robinson Pond is experiencing high levels of phosphorous. Protecting the pond's water quality through sound land use practices, sustainable technologies, natural mitigation processes, public education and land conservation is essential to ensure that it remains a wildlife and recreational.

Shoreland Water Quality Protection Act

The Shoreland Water Quality Protection Act, originally named the Comprehensive Shoreland Protection Act (CSPA), was enacted into law in 1991. Significant amendments were passed in 2008. The Act establishes minimum standards for the development of shoreland areas adjacent to the state's public waters. Protected shoreland includes all-natural freshwater bodies without artificial impoundments,

artificially impounded freshwater bodies, rivers, coastal water, and all land located within 250 feet of the reference line of public waters. Natural woodland buffers must adhere to the following:

1. Where existing, a natural woodland buffer must be maintained within 150 feet of the reference line.
2. Tree cutting is limited to 50% of the basal area of trees, and maximum of 50% of the total number of saplings in a 20-year period.
3. A healthy, well-distributed stand of trees must be maintained.
4. Stumps and their root systems must remain intact in the ground within 50 feet of the reference line.

The Shoreland Protection Act only regulates activities along Ayers Pond, Ottarnic Pond, Robinson Pond, and an unnamed Pond along Musquash Brook and has helped to mitigate adverse impacts to these surface waters resulting from land use and development activities.

Wetlands

Wetlands perform multiple important functions including aquifer recharge, flood control, water purification and wildlife habitat for a wide range of plant and animal species. Several endangered and threatened species are found only in wetlands. As such, Hudson should consider policies and procedures to restrict land uses that endanger these sensitive habitats. Wetlands are defined by three parameters: hydric (saturated) soils; hydrology (water table at or near the surface), and wetland vegetation. Map III-8 illustrates that wetland areas in Hudson are, for the most part, located adjacent to the town's rivers, streams, and ponds. This relationship is the result of a localized high-water table and the source of greater quantities of soil water during periods of high stream flow. There are also some scattered pockets of wetland soils throughout town, usually at the bottom of low-lying areas or depressions.

The significant wetland systems in Hudson include: Musquash Brook-Pond, Second Brook-Mile Swamp, Ottarnic Pond-Glover Brook-Merrill Brook, Robinson Pond, and Chase Brook. Many of these wetlands form contiguous systems, designating them high in ecological value. The value of these connected systems is diminished, however, when land use alteration (such as filling) causes portions of these systems to become fragmented.

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. Hudson's Wetland Conservation District zoning permits only the following uses: forestry and tree farming, agriculture (including grazing, cultivation and harvesting of crops), water supply wells, conservation areas and nature trails, and some uses that are permitted by a Conditional Use permit issued by the Planning Board as long as they do not adversely affect wetlands. With increasing development taking place within the Wetland Conservation District, the Planning Board should carefully evaluate wetland buffer areas during site plan review to ensure minimal disturbance. A biennial review of the Wetland Conservation District may help ensure the Town of Hudson is following all State and Federal Regulations.

New Hampshire Wetland

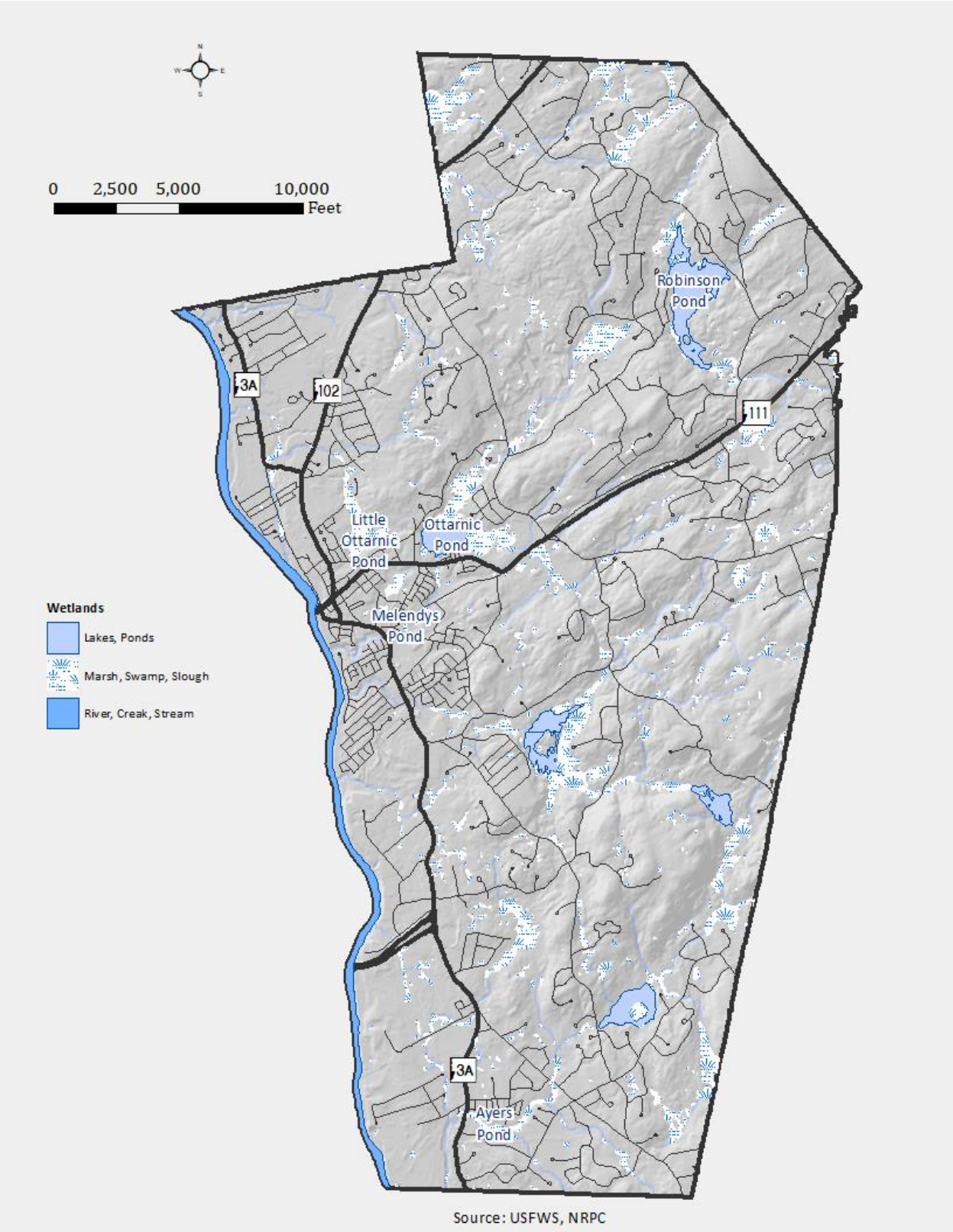
Vernal Pools

Vernal pools are essential for the life cycle of many invertebrates and amphibians. These temporary forested wetlands serve as a home to many of these species which feed on the nutrients from fallen leaves. Vernal pools can range in size from a few square feet to several acres. Vernal pools are generally associated with forested wetlands, but can also be found within larger wetlands, such as oxbows in river floodplains or scrub-shrub wetlands.

Most vernal pool animals do not live their entire lives in the pool but migrate in response to snow melt and early spring rains. The pools generally dry up by mid to late summer. Depending on the groundwater, some pools will be refilled in the autumn. Mole salamanders and wood frogs spend 90% of their lives in the surrounding uplands, perhaps as far as a quarter mile from the pool. Adults migrate to the pool for a few weeks to reproduce and surviving juveniles leave before the water dries.

Other organisms (e.g., snakes, turtles, insects, and birds) migrate from nearby wetlands to breed or feed in the productive pool waters. These animals return to more permanent wetlands. Other animals develop entirely in the pool and most survive the dry season. Fingernail clams and air-breathing snails burrow beneath the leaves that remain to await the return of water. Fairy shrimp deposit eggs in the dry pool that hatch after the pool refills.

Map III-8. Wetlands



Floodplains

Floodplains are areas adjacent to watercourses and water bodies, which are susceptible to the natural phenomenon of flooding during periods of high run-off. The unpredictable nature of flooding requires the application of precautionary measures to avoid substantial damage to life and property in areas susceptible to floods.

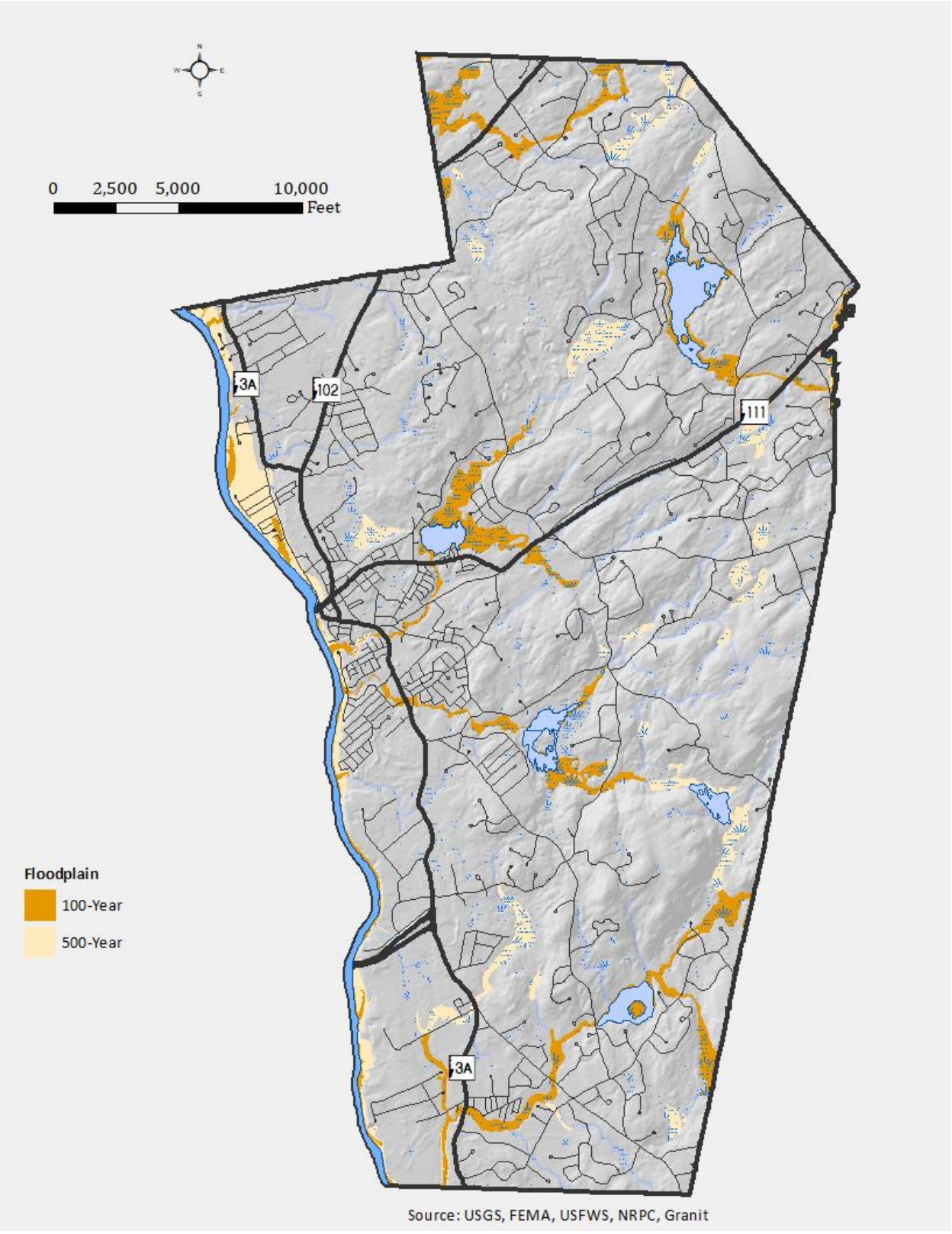
Two methods are available to avoid the problems presented by periodic flooding. Protective measures can be applied to structures already located, or proposed for location, on floodplain areas. Preventive measures can also be used to regulate the types of development permitted in these areas to minimize the potential hazards to life and property of community residents and landowners. Employing either approach requires the identification of affected properties.

Floodplain areas cover over 2,000 acres or approximately 11% of the area in Town. Most of the floodplain area is located along the east bank of the Merrimack River and in the Second Brook and Ottarnic Pond Watersheds as indicated on Map III-9. The only way to change the floodplain boundary is for the owner or the Town to submit a Letter of Map Revision and proof to the Federal Emergency Management Agency (FEMA) stating that the designated area is no longer subject to flooding, although it may have been at one time.

The Town of Hudson requires a floodplain permit for all proposed developments in any special flood hazard areas. The special flood hazard areas are determined by the various zones within the 100-year flood elevation as defined in the Community's Flood Insurance Study, the Federal Insurance Rate Map, and the Flood Hazard Boundary Map. While the Town of Hudson allows development in special flood hazard areas upon approval, the applicant must also obtain permits required by federal or state law. These permits must be provided by the applicant prior to approval by the Town Engineer. In addition, there are certain qualifications that a structure or structures must meet in order to receive a building permit, including the following: 1) all new construction and substantial improvements of residential structures have the lowest floor, including the basement, elevated to or above the one-hundred-year flood level; and 2) proposed structures to be located on slopes in special flood hazard areas…shall include adequate drainage paths to guide floodwaters around and away from the proposed structures.[ii]

Flooding at Central Street - from *Remember Hudson When…Memories of the 1936 Flood*

Map III-9. Floodplains



Hudson's natural areas provide habitat for species such as the Common Nighthawk, pictured above, a state-endangered species.

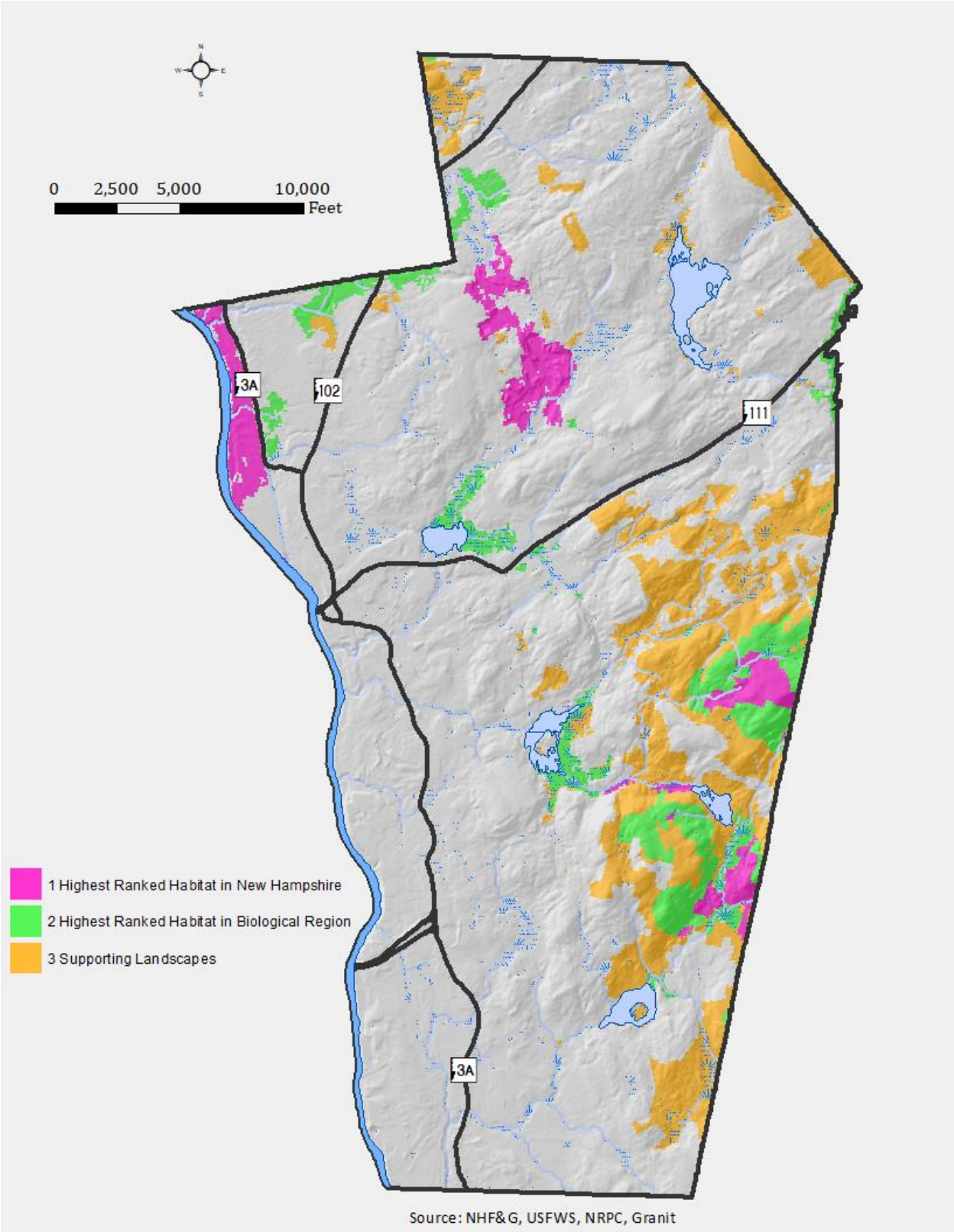
Wildlife Habitat

The suitability of various habitats to support wildlife is affected by the features of a particular place including the size of the area, proximity to other habitat types, proximity to developed areas and other factors. New Hampshire Fish & Game (NHFG) developed a method to assess the relative ecological condition of habitats through the use of statewide GIS data that represents species diversity, landscape context and human impacts. The data was first developed in 2006 and most recently revised in 2015. For 2015, several regional datasets were used.

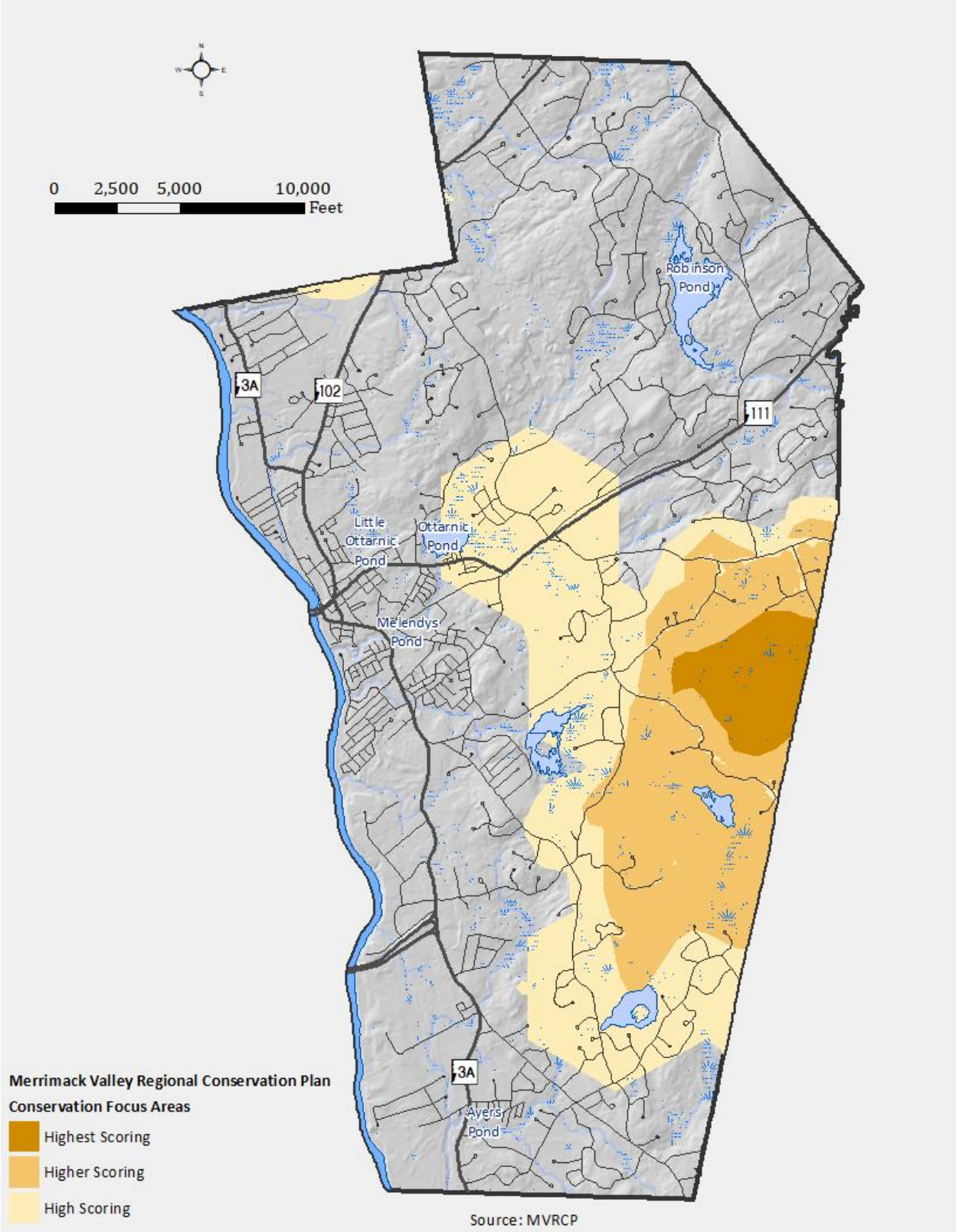
The NHFG rating system is based on three variables: biological diversity, landscape context, and impacts of human activities. Habitats are ranked to identify priority conservation targets across all habitat types. The results of this analysis are shown on Map III-10, on the following page. It should be noted, however, that the highest ranked habitat area shown in the upper left corner of the map adjacent to the Merrimack River has recently undergone development and the large area shown in the north-central portion of town is located on the Brox Industries excavation site.

In 2014, the Merrimack Conservation Partnership, a regional conservation alliance formed to protect the southern portion of the greater Merrimack River watershed in New Hampshire and Massachusetts, developed a conservation plan for the two-state region. This plan also identified priority habitat areas but used a somewhat different analysis based on the "co-occurrences" of four main conservation themes: 1) Wildlife Habitat, 2) Water Resources, 3) Agriculture and Forestry, and 4) Recreation and Trails. The resulting Conservation Focus Area Map for Hudson is shown on Map III-11. Both maps can be used to identify priority areas for land conservation. Since the publication of this map, a large open-space single family development has been built within the "highest scoring" area of the map.

Map III-10. NHFG Habitat Tiers



Map III-11. MVRCP Priority Areas



Groundwater Resources

A substantial portion of water in Hudson is below the ground's surface. Groundwater is water that is stored in the pore or fracture spaces between the individual particles of soil, sand, gravel, bedrock, etc. The ground acts as a sponge (called an aquifer) which filters and stores large amounts of potable water. These supplies are tapped by drilling or digging wells to obtain water for domestic consumption. The amount of water which can be obtained in this manner is determined by the nature of the material holding the water. For example, per unit volume of material, sand and gravel deposits generally have a higher potential for yielding large amounts of water than do deposits of till and bedrock. The three different types of groundwater aquifers include: saturated stratified drift, saturated unconsolidated till, and bedrock. Each source varies as to the quantity of groundwater present and how it moves. Each is described below and illustrated on Map III-12.

Stratified Drift Aquifers - Stratified drift aquifers are made up of sand and gravel materials. The materials were deposited by the melting of glacial ice like rivers that deposit sand or gravel bars today. The deposits may be quite extensive and are layered or "stratified." Their course texture allows for large volumes of water to be stored, and their high porosity allows groundwater to flow through quite readily. For these reasons, stratified drift aquifers are a prime source of water for municipal and other large-volume users.

Till Deposits - Till deposits contain a mixture of clays, sands, and gravels of varying grain sizes. These deposits do not have the capacity to store or transmit large volumes of water; however, they can provide sufficient volumes to supply individual residences or small community wells.

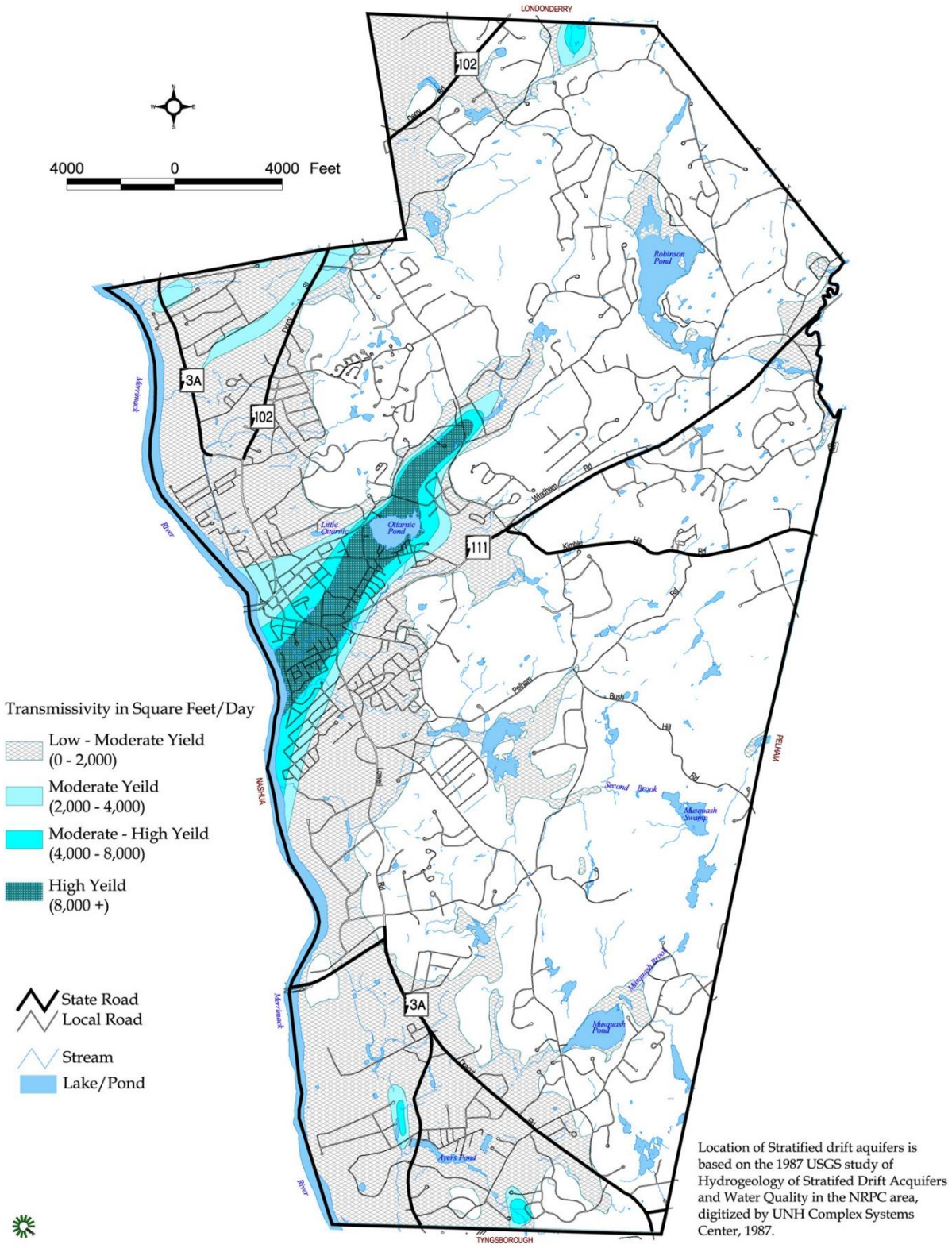
Bedrock Aquifers - Bedrock aquifers are composed of fractured rock or ledge, where groundwater is stored in the fractures. These aquifers are extraordinarily complex because bedrock fractures decrease with depth, “pinch out" over short distances, and do not carry much water. Wells drilled in bedrock that do not "hit" a fractured area will come up dry. If the well encounters an extensive fracture system, then groundwater yields may be high. On average, bedrock aquifers yield smaller volumes of groundwater than wells drilled in stratified drift.

Hudson has a nearly continuous stratified drift aquifer along the Merrimack River that measures approximately 10 square miles or 36% of the total land area in Town (see Map III-12). The most productive aquifer is located around Ottarnic Pond and extends northeast along Glover Brook and southwest to the Merrimack River. This aquifer contains the largest volume of recoverable stored groundwater within Hudson. Several wells, with capacities ranging from 100 to 400 gallons per minute (gal/min), are located in this aquifer near Ottarnic and Melendy Ponds. This area, however, lies under one of the most developed sections of Hudson. The Town should consider absorbing the properties abutting Ottarnic Pond into the Sewer District as this area is currently surrounded by, yet isolated from, the Sewer District.

The area along NH 102 near Alvrine High School in northern Hudson contains a permeable kame delta deposit which supplies water to individual households. According to Map III-8 this area has a moderate transmissivity rate of 2000-4000 square feet per day. Transmissivity is the ability of water to move through the ground. The higher the square footage per day, the more water the ground carries through it. Other permeable stratified drift aquifers, such as the one located adjacent to the border of Londonderry, and another located on the border of Tyngsborough are medium yield but lack the aerial extent and saturated thickness to support large-municipal water systems requiring more than 100 gallons per minute.

As mentioned previously, surface water and groundwater are interconnected. Precipitation falls in areas referred to as watersheds formed by a series of connecting ridges which create a basin. Surface water, flowing through a system of interconnected wetlands, brooks, streams, rivers, is encompassed by the drainage basin or watershed. A watershed can be subdivided into smaller subwatersheds.

Map III-12. Aquifers



In a watershed, groundwater is recharged in stratified drift aquifers in two ways. The area of direct recharge is the land surface directly overlying the stratified drift deposit. Water infiltrating the earth materials within this area has a "direct" route to the groundwater resource. The indirect recharge is the land surface outside the direct recharge area, but within the surrounding watershed, which contributes water to the groundwater system. Watershed management and protection can be used to provide a framework for a comprehensive water resource protection strategy, of which aquifer protection is a part.

Water Supply

All water supplied to Hudson residents and businesses comes from groundwater sources. These sources are tapped by drilling or digging wells to obtain water for consumption. Hudson's public water supply comes from one well located in the Town of Litchfield. Two other wells that are drawn from the Darrah Pond Aquifer in Litchfield were shut down due to PFOA levels. Pennichuck Water Works supplements Hudson's water supply with water from the treatment plant during periods of high demand through the Taylor Falls Pump Station at Ferry Street. Specific information regarding water supply in Hudson is discussed in detail in Chapter VIII: Community Facilities.

The presence and location of major groundwater supplies demand careful consideration in the Town's planning efforts. Map III-8 illustrates areas of groundwater favorability. It should be noted that all groundwater supplies are connected and thus have potential for both depletion and contamination. While water quality issues remain important, water quantity issues have recently become more pressing, especially in the southeastern portion of New Hampshire.

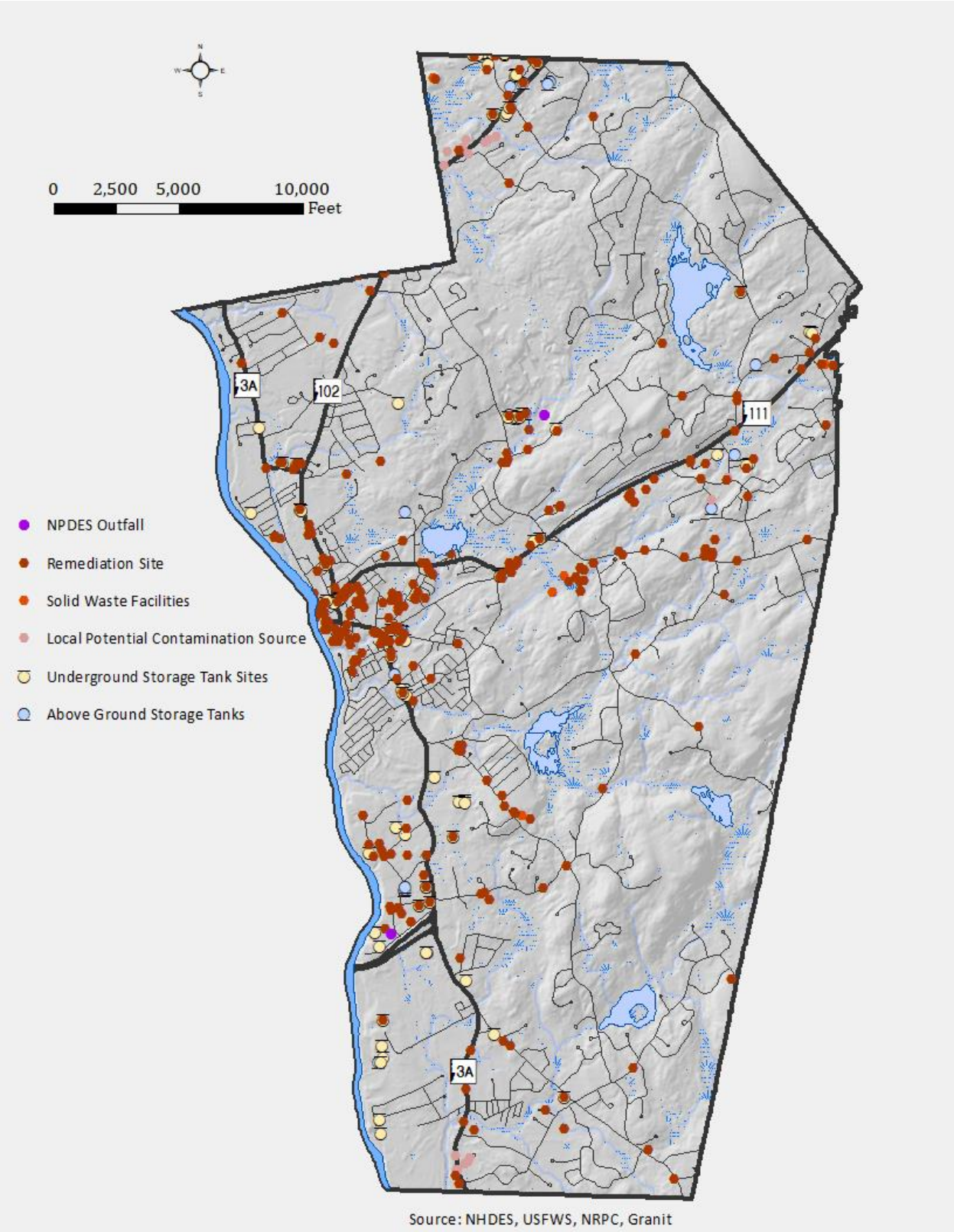
Threats to Surface and Groundwater Resources

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 NHDES, New Hampshire Non-Point 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: 1) danger to public health; 2) magnitude and pervasiveness of the potential threat; 3) potential impacts to receiving waters; 4) professional judgement; 5) ability of existing regulatory programs to control pollution; 6) adequacy of existing education programs to promote pollution control; 7) public perception; and 8) comments of Non-Point Source Management Plan Subcommittee.

The list of non-point source pollution, in order of priority, is: 1) urban (stormwater) runoff; 2) hydrologic and habitat modifications; 3) subsurface waste disposal 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.

A potential contaminant source is defined as a human activity or operation upon the land surface that "poses a reasonable risk that regulated contaminants may be introduced into the environment in such quantities as to degrade the natural groundwater quality." These and other threats to groundwater quality in Hudson are illustrated on Map III-11.

Map III-13. Potential Threats to Groundwater Quality



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, now acknowledged as being the most serious threat facing surface and groundwater resources today. The recommendations that follow this discussion will mention several "best management practices" (BMPs) that address non-point source pollution and stormwater runoff. BMPs are variously defined as technical guidelines for preventing pollution caused by specific activities, and recommended treatment or operational techniques to prevent or reduce pollution. Some of the major sources of surface and groundwater contamination are discussed below.

Stormwater Runoff

The development of land for residential, commercial, or industrial purposes 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 a site and out of a watershed. Increased imperviousness results in direct stormwater discharges into streams and rivers, which results in the 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 non-point contamination source of surface and groundwaters. Potential contaminants found in stormwater runoff include nutrients such as phosphorous, nitrates, heavy metals, floatables and solids, pathogens such as viruses and bacteria, organic compounds including oils, grease, MTBE, and pesticides and herbicides. These materials can lead to the degradation of surface and groundwaters. The U.S. Environmental Protection Agency (US EPA), through a program called the National Pollutant Discharge Elimination System (NPDES),iii aims to prevent and control non-point pollutant sources. The first phase of this program, appropriately referred to as the "Phase I Stormwater Rules," regulated the municipal stormwater systems and discharges of medium and large municipalities (those with populations greater than 100,000).

In May 2003, the EPA expanded the NPDES program to include stormwater systems within the urbanized areas of municipalities with populations less than 100,000.iv These Phase II rules also impact construction activities between 1 and 5 acres, whereas Phase I regulated construction activities of greater than 5 acres. To comply with Phase II requirements, regulated municipalities are required to submit a Notice of Intent (NOI). This NOI includes a stormwater management plan that addresses the six minimum control measures required by the EPA.

The stormwater management plan was designed to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality and to satisfy the water quality requirements of the Clean Water Act. It contains 6 minimum control measures: 1) public education and outreach; 2) public participation and involvement; 3) illicit discharge detection and elimination; 4) construction site runoff control; 5) post-construction runoff control; and 6) pollution prevention and housekeeping.

The Town of Hudson Subdivision of Land Regulations, Section 289-20. Flood, Stagnant and Stormwater require that a Stormwater Management Report be prepared for any site or subdivision plan in Hudson. The report must provide, among other things, a stormwater drainage plan that is certified by a licensed professional engineer and proves that "all drainage shall be designed to achieve a zero increase in run-off for both peak and volume…".v In Hudson, the stormwater drainage plan is seen as the single most important element of the entire site plan.

Road Salt

Excessive salting of roads and improper salt storage create the potential for sodium, calcium, and chloride contamination of the groundwater, which can pose health threats to humans, endanger animals and plants, and corrode metal and concrete.

To avoid contamination of public water supplies, municipalities establish no-salt routes which encompass areas adjacent to public water supplies and areas where on-site wells are located near roadways. Other areas are treated with a mixture of salt and sand. A more expensive method is the use of Calcium Magnesium Acetate (CMA) which is biodegradable and non-toxic to the environment.

Another alternative is to identify critical portions of roads in Town that can be designated for a conversion to "low salt" or "no salt" status on a prioritized basis over a specified time period. The Town can also request that the State use alternative deicers on certain state-maintained roads in priority areas.

Subsurface Sanitary Waste Disposal

Septic system failures from improper design, installation, or maintenance allow nutrients, particularly nitrogen 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 meeting today's heightened standards to be passive and durable systems that can provide acceptable treatment despite a lack of attention by the owner.

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 2020, 73 USTs in Hudson were registered with the NH DES Subsurface Water Bureau.

Existing and Potential Conservation Land

Existing Conservation Land

Since the Master Plan was last updated in 2006, the amount of conservation land in Hudson has almost doubled from approximately 1,100 acres or 5.9% of the town's land area to 2,064 acres or approximately 11% of the total area of the Town. Some of these gains were the result of land set aside for conservation within Open Space developments, however, most were the result of strategic acquisitions by the town. Most significant of these was the purchase of 165.81 acres for Benson Park that includes both conservation and passive recreational areas. More recent acquisitions include the purchase of 40 acres of forestland, including wetlands and existing trails, at 68 Pelham Road in 2019. . Although acquisition of the Pelham Road site predated this Master Plan update, it nevertheless meets the Plan's goals of expanding conservation areas and increasing open space (in general), building on existing open space assets such as Benson Park and Robinson Pond, and expanding the existing trail network to facilitate connections between schools, parks, conservation areas, and other community facilities. The Conservation Commission and Town Staff secured an access easement through dedicated open space on the Oak Ridge Development that is used to connect hiking trails from the Pelham Road site to Benson Park. The connection between Pelham Road and Benson Park through the Oakridge Development demonstrates the value of Open Space developments as part of the town's conservation

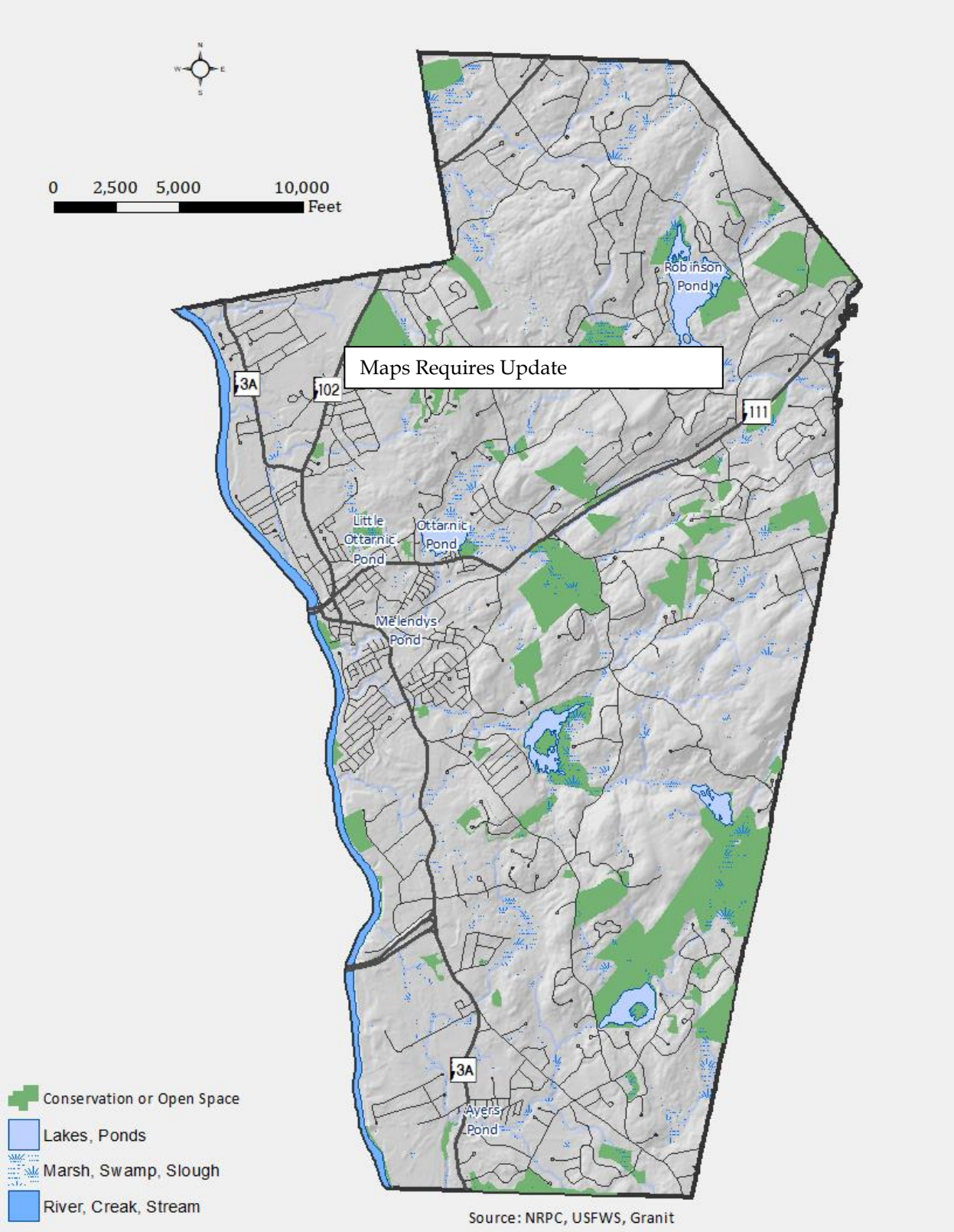
strategy. In 2020, voters approved transferring a vacant 27.48-acre parcel together with a 1.2 acre and 3.3-acre parcel to the Conservation Commission to expand the adjacent 29-acre Rangers Drive Town Forest which was itself dedicated as a Town Forest in 2019. Other significant acquisitions included property adjacent to Robinson Pond (36 acres) and additions to Hudson Town Forest (26.3 acres). At 416 acres, the Musquash Pond conservation area is the largest and perhaps, most important of Hudson's conservation lands. As noted previously in this chapter, the site encompasses important wildlife habitats and historic sites, provides multiple trails totaling 6.9-mile in length and supports outdoor recreational activities such as hiking, mountain biking, walking, bird watching, running, snowshoeing, canoeing, and kayaking.

Though only partially located within Hudson, the Leslie C. Bockes Memorial Forest on Bockes Road is the second largest conservation area available to Hudson residents. The 226-acre site, managed by the Society for the Protection of New Hampshire Forests, includes protected land in Hudson, Londonderry, and Windham. Including abutting land owned by the Town of Windham, the protected forest area encompasses approximately 300 acres. The site provides opportunities for hiking, cross-country skiing, snowshoeing, and horseback riding.

Leslie C. Bockes Memorial Forest – Source: SPNHF

Another important site is the 78.6-acre Hudson Town Forest conservation area located off Kimball Hill Rd. near the Pelham town line. Existing conservation land in Hudson is illustrated in Map III-14. It is important to note that the map depicts both publicly and privately owned protected land including land dedicated to conservation within Opens Space Developments.

Map III-14. Existing Conservation Land & Open Space



Open Space Development

Hudson's Open Space Development (OSD) Ordinance encourages a pattern of development designed to allow residential development while conserving open space. This is achieved by reducing the individual lots in a subdivision by up to 50% of the minimum lot size requirements established in the Zoning Ordinance. The ordinance requires that the remainder "shall be dedicated to permanent open space, conservation land or recreation." OSDs are allowed in any zoning district and may be designed for any use or combination of uses permitted in the district where the OSD is located. Off-site compensatory open space may also be permitted by the Planning Board in lieu of on-site open space if it is deemed ecologically, culturally, historically, and/or recreationally important. The Open Space Development Ordinance has been used very successfully in Hudson and in several locations, land conserved through the ordinance abuts town-owned conservation and recreation land. The Town should continue to encourage developers to consider OSDs as a means of protecting additional open space, especially in areas that abut existing conservation land or encompass important wildlife habitats.

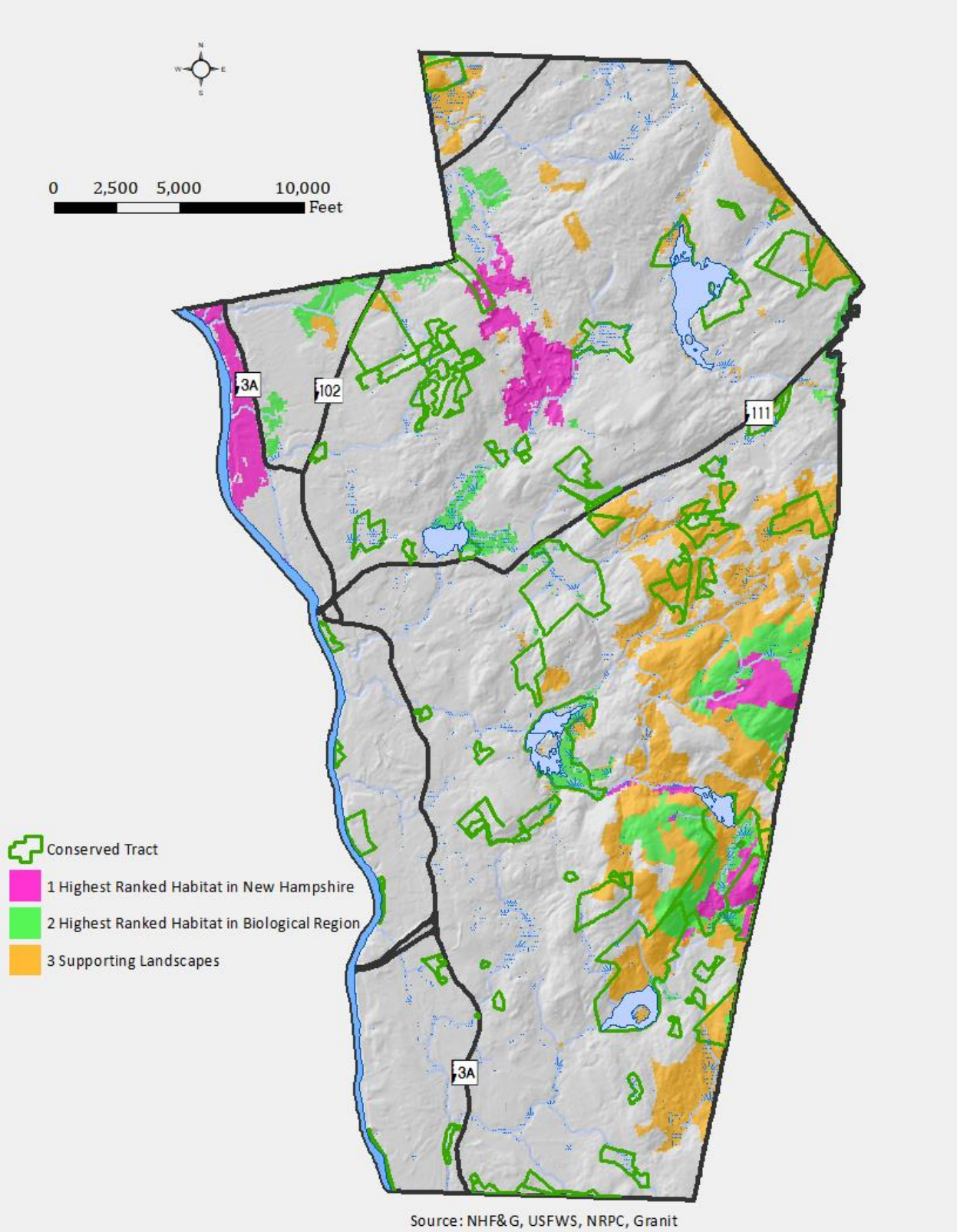
Land in Current Use (NHRSA 79-A)

The current use program provides substantially reduced property tax assessments for land maintained as forests, farmland, or wetlands of 10 acres or greater and for active farms of less than 10 acres with a minimum $2,500 gross value of product. In 2020, a total 3,131.51 acres of land in Hudson was held in Current Use including 1,221.87-acres classified as Farmland, 1,335.45-acres of Forestland (including 115 with documented stewardship), 319.81 acres classified as Unprodctive and 254.38 acres of Wetland. Though an important tool, the Current Use program does not provide permanent protection since land enrolled in the program can easily be converted to other uses. Land coming out of Current Use is subject to a land use change tax of 10% of the fair market value at the time of the change, and in Hudson, 75% of this tax is earmarked for use by the Conservation Commission to purchase land for conservation purposes.

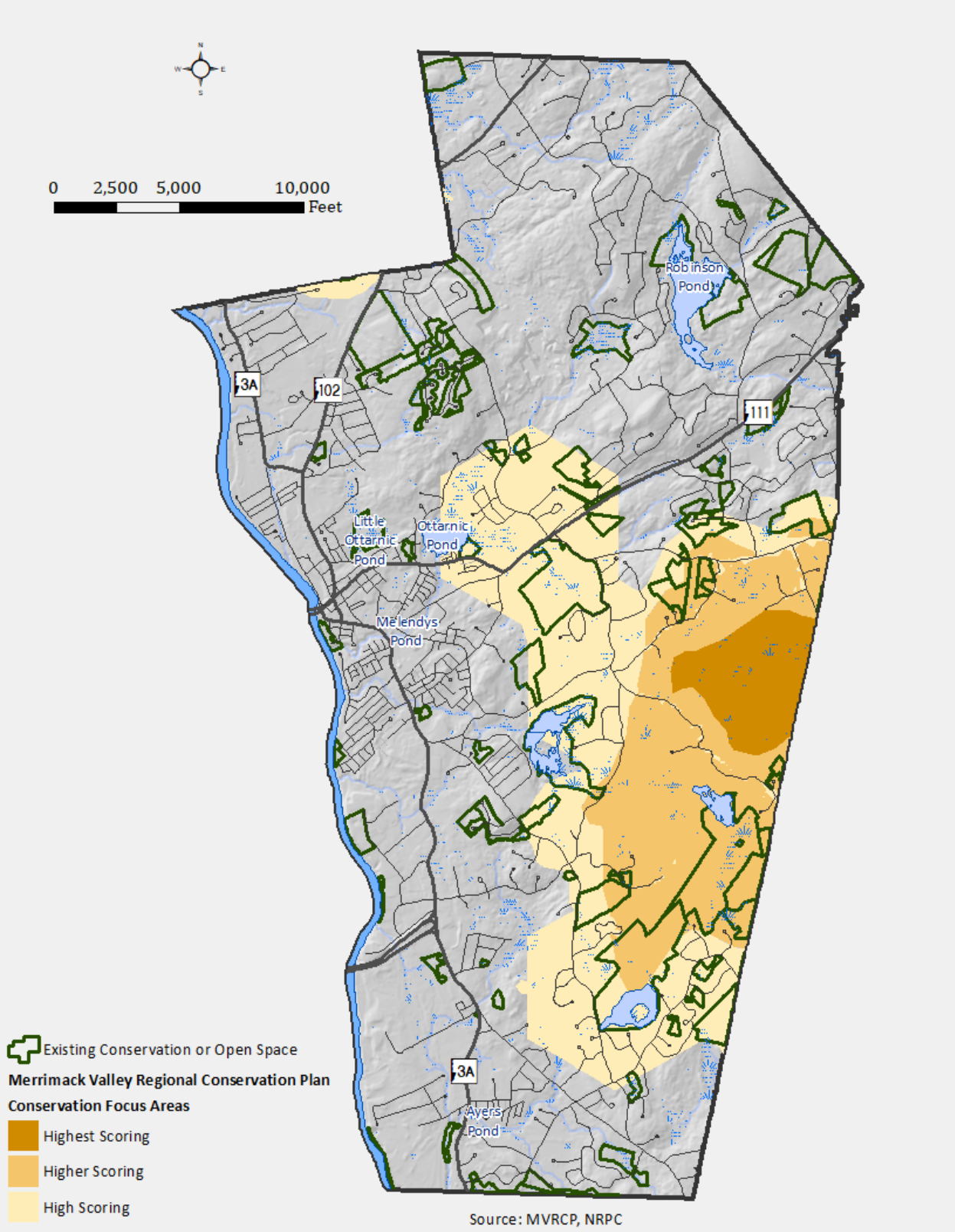
Priorities for Future Conservation Efforts

Protecting open space is one of the highest priorities identified through the Master Plan public input process and this support has also been demonstrated by voter approval of efforts to acquire land for open space and to dedicate existing town-owned land to conservation purposes. Though significant sites have been acquired by the town in recent years, properties important for wildlife habitat, outdoor recreation and the overall quality of life and character of the town remain unprotected. When evaluating potential conservation site acquisitions, priority should be given to sites that meet the Master Plan goals of: Expanding Conservation areas and increasing open space, building on existing open space assets such as Benson Park and Robinson Pond, and expanding the existing trail network and facilitating connections between schools, parks, conservation areas, and other community facilities. In addition, a priority should be placed on preserving the remaining large forest tracks and important wildlife habitats. Map III-15 depicts priority habitat tiers identified by New Hampshire Fish & Game, shown above, together with existing conservation lands. Map III-16 depicts priority habitat area identified by the Merrimack Conservation Partnership, also shown previously, alongside existing conservation lands.

Map III-15. Existing Conservation Land & Open Space with NHFG Habitat Tiers



Map III-16. Existing Conservation Land with MVRCP Priority Areas



As previously noted, the highest ranked habitat areas on the NHFG map in the northwest corner of town along the Merrimack River and in the north-central part of Town on the Brox Industries site do not appear to be available for conservation and the highest ranked area in the east-central part of town (south of Kimball Hill Road and north of Bush Hill Road) is currently planned for development. This latter area also encompasses the highest priority habitat area on the MVRCP map. Fortunately, the most important remaining wildlife habitat area is located within and adjacent to the town's existing Musquash Pond Conservation area. A high priority, therefore, should be given to acquiring additional undeveloped land adjacent to the Musquash Pond Conservation area to protect additional high priority wildlife habitats while creating a protected forest block greater than 500-acres in area. Acquiring additional land in this area would also meet the Master Plan goals of expanding conservation areas and increasing open space, building on existing open space assets, and expanding the existing trail network. Other high priority areas are described below.

Robinson Pond

Robinson Pond is Hudson's largest pond and is the site of Hudson's only public beach. As previously noted, much of the Robinson Pond watershed is developed which contributes an increased amount of nutrients into the pond, resulting in a eutrophic condition. To protect and improve the condition of the pond while expanding recreational opportunities, a priority should be placed on acquiring additional undeveloped land adjacent to the pond for conservation and passive outdoor recreational uses. Hudson should promote natural and technological means to maintain and improve the water quality to ensure continued enjoyment by future generations. It is also noteworthy that the vacant land around Robinson contains some of the few remaining undeveloped concentrations of important farmland soils. Further, building upon existing open space at Robinson Pond is a specific goal of the Master Plan.

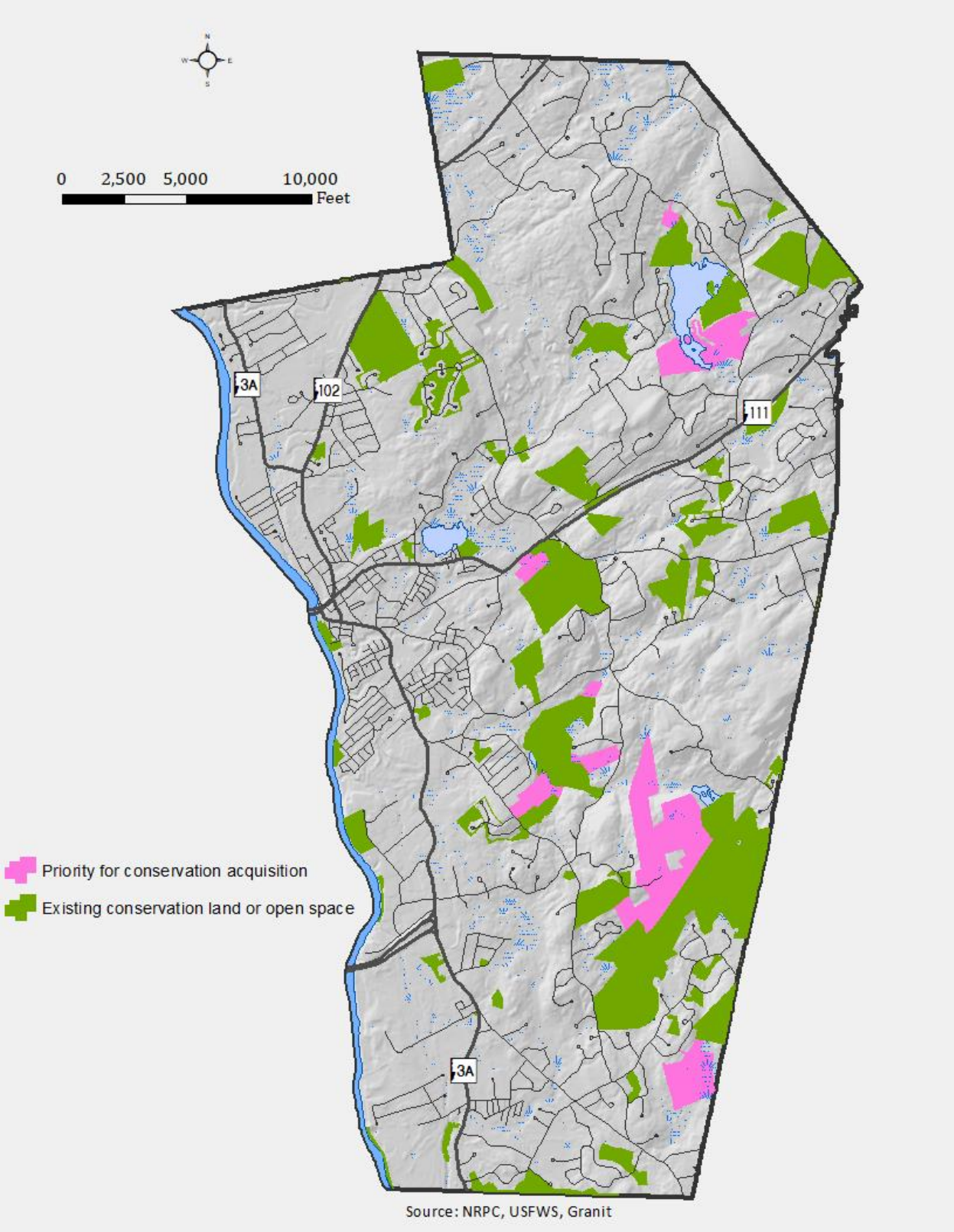
Benson Park

Though opportunities to expand Benson Park are limited, like Robinson Pond, building upon Hudson's most popular park is a specific Master Plan goal. Most significant is a 23-acre parcel located at the park's northwest corner fronting on Central Street. This split-zoned property (Business/General) is poorly suited to development due in large part to the extent of wetlands on the site that are hydrologically connected to Merrill Brook and other surface waters in the park.

Other Conservation Priorities

Other recommended priority conservation areas include undeveloped land adjacent to existing conservation land at Hills Meadow which include significant concentrations of undeveloped Prime and Important Farmland Soils and extensive 100-year and 500-year floodplains, and an undeveloped area adjacent to existing conservation land in the southeast corner of town. Recommended priority conservation lands are shown on Map III-17 alongside existing conservation and open space sites.

Map III-17. Recommended Priority Conservation Areas



Stewardship

The preservation of conservation land and open space through acquisition of property in fee, by easement, through Open Space Developments and by other means is critical, however, ensuring that wildlife habitats thrive and providing for optimal outdoor recreational opportunities while minimizing unwanted impacts requires careful planning and stewardship. There are multiple resources available to assist in developing management plans for conservation land. These include US Fish & Wildlife, UNH Cooperative Extension, The Society for the Protection of New Hampshire Forests and New Hampshire Fish & Game (NHFG). Funded by the US Fish and Wildlife Service, the New Hampshire Fish and Game Department recently published *Trails for People and Wildlife - A Guide to Planning Trails that allow People to Enjoy Nature and Wildlife to Thrive*. As noted on the NHFG website, the guide is:

> "a statewide tool that can be used to assess existing trails and site new trails in the most wildlife-friendly way. This mapping tool highlights areas particularly important for wildlife and areas that would be more suitable for trail development. The guidebook explains in more detail how recreation can impact wildlife, how to use the tool to minimize those impacts, and provides some real-world examples of how conservation organizations are using it to make their trail planning efforts most effective."

The Town, through its Conservation Commission, should consider developing management plans for each of its conservation sites as it has for the Rangers Drive Town Forest and the Hudson Town Forest. To further aide in overseeing our woodland resources, the Conservation Commission should consider forming a Forestry Committee to assist in the decision-making process for these unique parcels. Further, as new trails are planned or improvements to existing trail networks proposed, consideration should be given to using the Trails For People and Wildlife mapping tool to minimize adverse impacts to wildlife while maximizing outdoor recreational opportunities for the people of Hudson.

Duties of the Engineer. http://www.ci.hudson.nh.us/

[iii] www.epa.gov/npdes.

[iv] Comprehensive Environmental Inc., *Phase II Stormwater Rule Summary and How Municipalities Can Prepare for Compliance*; 2000.

[v] *Town of Hudson, New Hampshire, Subdivision and Site Plan Regulations.* Chapter 289-20(C) – Flood, Stagnant Water and Stormwater.