Chapter 3: Natural Resources

This chapter inventories Acton's existing natural resources. It includes:

- Relationship of Natural Resources to Planning Goals
- Current information on Acton's
    - geology and topography,
    - soils,
    - surface water resources,
    - major habitats and wildlife resources, and
    - rare species.
- Opportunities and Challenges posed by the Existing Natural Resource Conditions.

Why Acton's Existing Natural Resources are Important to the Comprehensive Plan
Acton's natural resources provide services to the citizens of Acton. Clean water and air are critical for the town's future. Healthy ecosystems and habitats with a diversity of wildlife are indicators that families can live healthy lives and enjoy their surroundings. Measures to protect natural resources will be important strategies for the Comprehensive Plan. One of the primary ways to help preserve the Town's character that was identified in developing a vision for Acton's future was the preservation and additional acquisition of open space.

Relationship to Planning Goals

Goal: Preserve and Enhance Town Character:
Natural resources are major factors contributing to Acton's unique character. The pattern of the town's early development was based on good land for pastures and water resources for power for mills. The topography, forests, surface water features, wetlands, geological features, and agricultural lands, all contribute to town character and are important natural resources.

Goal: Ensure Environmental Sustainability:
Living sustainably is based on living within the limits of our natural resources—water, air, energy, and food—without harming those natural resources for future generations. Increasing sustainability implies protecting natural resources..

Goal: Increase Connections
Protecting natural resources can also help develop connections. Trails through protected natural areas that facilitate the ability to walk or bike between destinations, schools, shopping, and neighborhoods can be developed if a system of inter-connected open spaces are protected. Sharing experiences about wildlife and natural areas can also increase connections and communication.

Goal: Enable Diversity and Inclusion:

Access to natural resources contributes to diversity. We all rely on natural resources and share some attitudes and values about nature. Maintaining and protecting natural areas supports those shared values and also allows diverse relationships with nature.

Goal: Provide Places for Gathering:

Natural areas can provide important places for gathering. Nature can bring people together for enjoyment and learning.

Goal: Maintain and Enhance Town Assets:

Water, wildlife, soils, and natural landscapes are important town assets. Pure drinking water is arguably the town's most important asset and understanding the relationship between existing future development and water quality is critical for protecting it.

Goal: Maintain and Improve the Financial Well-being of the Town

Investment in the protection of Acton's natural resources must be done prudently and with consideration of competing resources, but preserving these resources can save money in the future by helping the town to meet regulatory requirements, quality drinking water, and, in some cases, serve as an alternative to development of specific parcels of land that could require more town services than it contributes in taxes.

Summary of Key Points

Geology and Topography

- The underlying bedrock is Nashoba Formation that dates back between 430 and 500 million years.
- Acton Granite, a younger intrusion into the underlying formation, was a source of foundation stone for many older buildings.
- The topographic character of Acton is due to glacial activity that deposited glacial till, drumlins (Great Hill), kettle-holes (Grassy Pond), eskers (Acton Arboretum), kames (Forest Road west of Hosmer Street), and alluvial and swamp deposits along stream beds.
- The average elevation is about 230 feet, the highest point is 430 feet, and the lowest is 130 feet.

Soils

- In general Acton soil groups are moist, rough and stony in character with many areas of sandy loam. Wet soils are located in stream valleys and certain areas have ledge.
- High ground water, stoniness, and excessively drained soils present challenges for location of underground septic systems in many areas, but 80% of Acton homes use these systems. (See Chapter 7 for further discussion.)

Surface Water Resources

- There are two major watersheds – Nashoba Brook and Fort Pond Brook.
- Acton Stream Teams (http://www.actonstreams.org) has done visual shoreline monitoring and educates the public about the town's 36 streams (more than 32 miles).
- The state has classified Acton's surface waters, with the exception of Nagog Pond, as Class B. This classification indicates the waters are generally suitable for primary and secondary contact recreation, may be used for water supply with appropriate treatment, and will provide good wildlife habitat.
- Nagog Pond (Class A) was assigned to Concord by the General Court in 1884 for its water supply.

- Excess nutrients are a problem in some of Acton's surface water bodies. Much of the excess nutrients come from storm water run-off. Drainage from impervious surfaces, parking lots, streets, and the roofs of structures impacts surface water quality. All of these sources of storm water run-off carry pollutants that end up in the town's wetlands and waterways. In response to these problems the Town has developed a Storm Water Management Plan and a Nonpoint Source Control Program. These efforts identify sources of pollutants and steps to mitigate their impacts.
- Acton watersheds account for 65% of the recharge of its groundwater aquifers – the source of the town's drinking water. The other 35% is contributed by watersheds that are not wholly within Acton.

Major Wildlife Resources

- Over the last 100 years, Acton, like many surrounding communities, has been transformed from a community dominated by fields and orchards, to a one dominated by suburban development and forests.
- Acton includes five "hotspots" for biodiversity identified in the state's BioMap 2 Project
    - NARA/Wills Hole/Kennedy/Marshall Land/Nashoba Sportsman Club (partially town-owned and Zone II Wellhead Protection Area),
    - Grassy Pond (partially town-owned),
    - Assabet River in southeastern corner of town, including portion of Zone II Wellhead Protection Area,
    - Heath Hen Meadow, a wetland area and wetlands along the town boundary with Stow and Maynard, including a portion of a Zone II Wellhead Protection Area, and
    - Reformatory Fields/Weatherbee Conservation Land, including portion of a Zone II Wellhead Protection Area.
- Acton also has state-designated Priority Habitats of Rare Species.
- Acton has approximately 7,000 acres of forest land (more than 50% of its total area). This total includes small private holdings such as back land on residential lots as well as larger forested areas on public open space.
- Wetlands, both forested and non-forested, comprise nearly 13% of the Town's area and are important habitats.
- There are 23 certified vernal pools and 142 potential vernal pools – important habitat for wood frogs, salamanders, etc.
- Acton includes habitats for 9 state-listed rare plant or animal species. These habitats are concentrated along the major brooks.

Geology and Topography[1]

The topography of the town is best described as hilly, with a series of glacial drumlins separated by broad glacial outwash valleys. The general elevation is about 230 feet above mean sea level, with one hill rising to 430 feet above sea level. The lowest elevation of the town, 130 feet above sea level, is located at the Concord town line.

The bedrock underlying Acton is known as the Nashoba Formation (Hansen, 1956; Alvord, 1975). These rocks were originally sandstones and similar sedimentary rocks, but were altered by heat and pressure over geologic time into metamorphic rocks and then reshaped and altered during the continental ice ages. The Formation is largely gneiss, a relatively coarse-grained rock that shows different layers of minerals upon close examination. There is considerable variety in this mineral composition, and numerous subdivisions have been identified. Most of the Formation in Acton is biotite gneiss, in which one can see small flat crystals of the mineral biotite, a black form of mica. The formation is relatively old, dating back to the Ordovician geologic period that occurred between 430 and 500 million years ago.

The Nashoba Formation was subjected to extreme forces over geologic time as at least one mountain range rose and was completely eroded away. As a result, the Formation is very folded and faulted (Goldsmith, 1991). The various subgroups within the Formation are mapped as elongated bands that run from northeast to southwest. Faults separate the Formation from the neighboring rocks to the northwest and southeast. These faults are minor and do not present a significant geologic hazard. Nonetheless, small magnitude earthquakes do occur once every year or two. If residents even notice these earthquakes they often mistake them for a large truck passing, although sometimes they can be accompanied by a sudden loud noise like a cannon shot.

The Nashoba Formation is punctuated in places by younger volcanic rocks, known as Acton Granite. These deposits were formed when molten magma intruded from the subsurface into the Nashoba Formation. The intrusions, which are relatively small features, were mined in the past in several small quarries in Acton. Old quarries were located in North Acton off Quarry Road, Knox Trail, Lexington Drive, and-in the Acorn Park subdivision. Foundation stones seen in colonial houses and barns around Acton are usually Acton Granite.

Acton's current topographic character is largely determined by younger deposits that overlie the bedrock. These varied formations were deposited during the continental ice ages that ended about 14,000 years ago. During the ice ages, sheets of ice, over a mile thick in places, covered Canada, New England, and the north central United States. The glaciers formed, melted away, and reformed although only the effects of the most recent ice age are clearly discernible. During

[1] *References:*

Alvord, D.C., 1975. Preliminary Bedrock Geologic Map of the Westford and Billerica Quadrangles, Massachusetts. Open File Report 75-387. United States Geological Survey, Washington, D.C.

Goldsmith, R., 1991. "Stratigraphy of the Nashoba Zone, Eastern Massachusetts: An Enigmatic Terrain." In: N.L. Hatch, Editor. The Bedrock Geology of Massachusetts. Professional Paper 1366-E-J. United States Geological Survey, Washington, D.C.

Hansen, W.R., 1956. "Geology and Mineral Resources of the Hudson and Maynard Quadrangles, Massachusetts." Geological Survey Bulletin 1038. United States Geological Survey, Washington, D.C.

each ice age, massive sheets of ice moved over the landscape, scraping and re-depositing rocks and sediment. In Acton, the last glacier moved more or less due south. Glacial striations, marks scraped by the moving glacier and the rocks it carried, can still be seen on smooth rock outcrops.

The ice ages left behind numerous and varied geologic deposits, which were altered during the post-glacial period as the melting glacier produced eroding torrents of water. Much of Acton is blanketed by **glacial till**, a compact mixture of sediment. Till is composed of a wide range of particle sizes, from very fine clay to large boulders. These various grain sizes were compressed under the moving glaciers into a poorly sorted mixture that often resists drainage. The high water tables and poor drainage that interfere with on-site wastewater treatment systems in much of Acton are caused by these till deposits. The rocky soils that discourage farming in New England are also a consequence of the glacial till.

One striking manifestation of till are **drumlins**, elongated hills aligned with the direction of movement of the glacier. There are nine drumlins in Acton, ranging in height from 310 to 430 feet above mean sea level. They include Faulkner Hill in South Acton, Wright or Mead's Hills in West Acton, and Great Hill near the intersection of Routes 27 and 111.

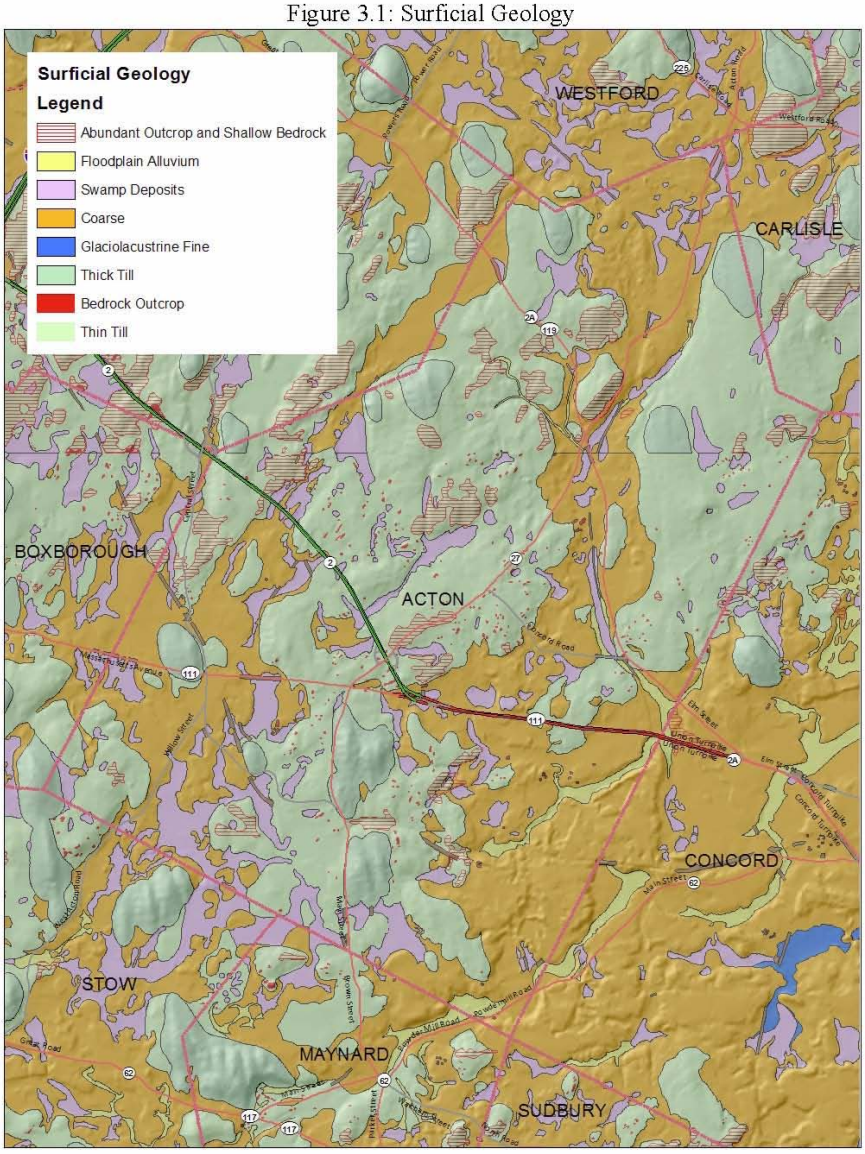
Lower elevations are generally occupied by glacial **outwash** deposits, sand and gravel deposited in water running from the melting glaciers. Fine-grained clay and silt were washed from these deposits by the running water, and therefore these soils are more open and drain more readily than the till soils. All of Acton's public water-supply wells are located in sand and gravel outwash, and these deposits generally require greater protection from pollution than the areas covered by till.

The sand and gravel outwash deposits are punctuated by a variety of intriguing glacial features. Blocks of ice left by the wasting glacier eventually melted to create "**kettle-holes**" in the outwash. Grassy Pond and Will's Hole formed in such glacial kettle holes. Today, these two ponds have evolved into quaking bogs with mats of sphagnum moss floating on the water. With time, the floating mats will slowly close in on the open water and eventually the ponds will disappear and give way to meadows.

Eskers, long sinuous gravel deposits, are also found in Acton. These deposits were made in ice tunnels under the wasting glacier. Today, they stand as narrow causeways, 10 to 30 feet high, winding through the woods. Were it not for their tortuous path, one could mistake them for constructed road or railroad beds. Eskers are found in the Town Forest in North Acton and in the Acton Arboretum.

Other glacial deposits include kames, kame terraces, and kame deltas. **Kames** are relatively flat-topped hills that formed in holes in the ice sheet. **Kame terraces** were formed by glacial melt-water streams along the margin between the wasting ice sheet and higher valley walls. Where these streams flowed off the ice onto ice-free land they formed **kame deltas**. A large kame delta occupies the area south of Fort Pond Brook along the Concord town line and west to Parker Street. A kame terrace lies to the north of the brook along School Street. Forest Road runs on top of a kame west of Hosmer Street.

Figure 3.1: Surficial Geology



Acton's geology continues to change in present times, and there are geologic formations that postdate the ice ages. These include **swamp deposits**, which are forming in wetlands throughout the town, and **alluvium**, which forms in stream beds.

There are few commercial rock or mineral deposits in Acton. Historically, Acton Granite was quarried and deposits of bog iron were used to produce a low quality ore. Several gravel pits were recently active, producing aggregate from esker and glacial outwash deposits.

There are generally no features that pose significant geologic hazards or limitations on development. Perhaps the only exceptions are the recent swamp deposits, which have poor bearing capacity for structures. These deposits generally occur within wetlands, which are precluded from development by town bylaw and the Massachusetts Wetlands Protection Act. The Acton Planning Department also reports that there were some recent relatively small landslides along the Assabet River that started in Concord and ended up in Acton.

Soils[2]

Acton soils are predominantly moist, but rough and stony in character, with many areas of sandy loam. Wet soils are associated with the stream valleys, and certain areas of town have a number of ledge outcroppings.

The Natural Resources Conservation Service has mapped associations of generalized soils for broad areas which have a distinctive pattern of soils, relief, and drainage. Each association on the generalized soil map (Figure 3.2) is a unique natural landscape. Typically, an association consists of broad areas of one or more major types of soils and some additional areas of minor soil types. The association is named for the major soils included in the broad area. The components of one association can occur in another, but in a different pattern. More detailed information on soils is included in the appendix.

The generalized soil map (Figure 3.2 – Generalized Soils Map) can be used to compare large areas for general land uses. Areas of suitable and unsuitable soils for different uses can be inferred from the map. Because of its small scale, the generalized map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. More detailed mapping is available for those purposes. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management. Any particular site can have a variety of soil types.

[2] The soil types identified in this report were compiled by the Natural Resources Conservation Service and reported in "Soil Survey of Middlesex County, Massachusetts", 2009.

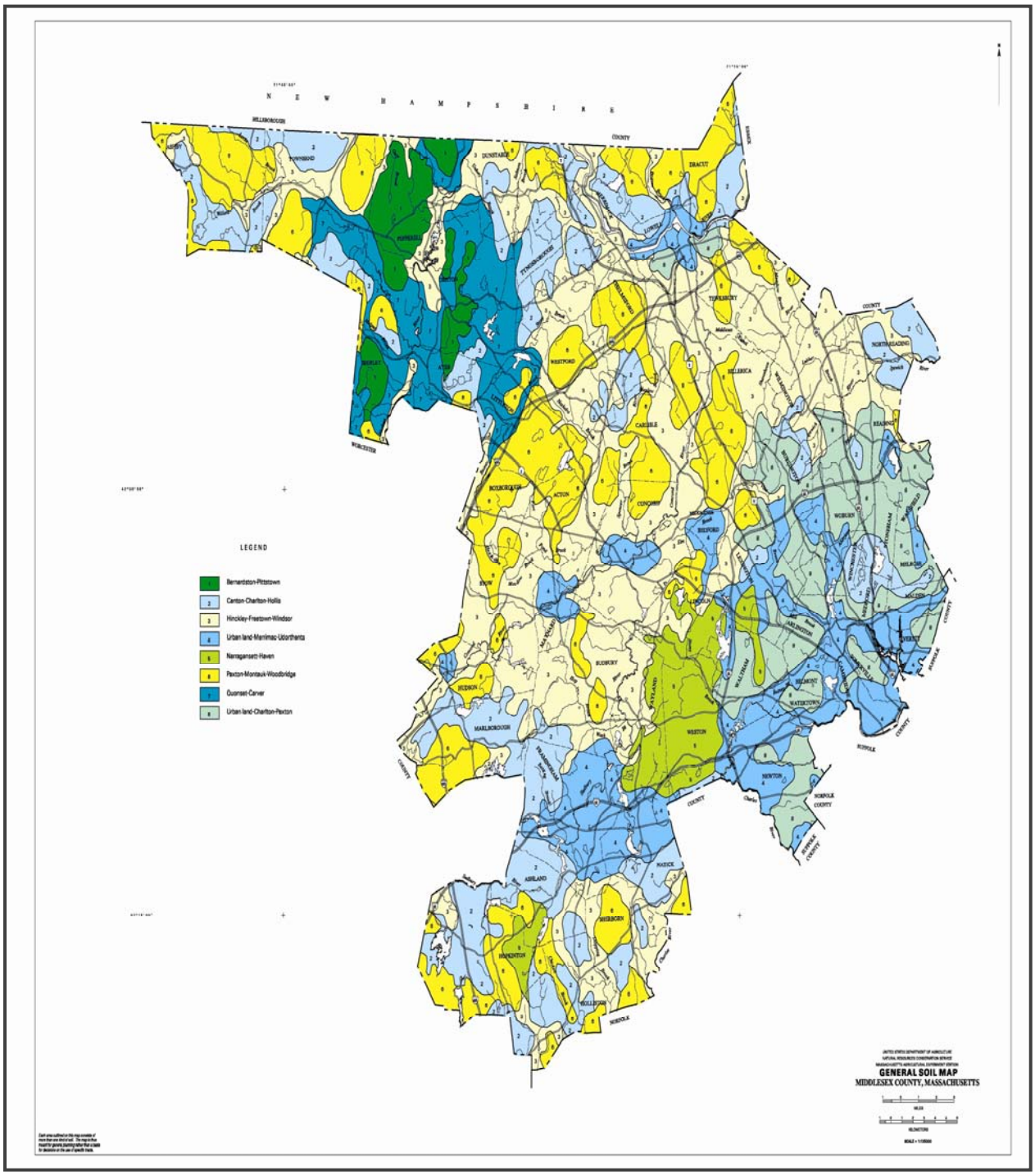


Figure 3.2-Generalized Soils Map

Hinckley-Freetown-Windsor Association (beige, #3 on Figure 3.2)

Nearly level to steep, very deep, excessively drained, sandy soils that formed in glacial outwash, and nearly level, very deep, very poorly drained, organic soils.

Excessively drained Hinckley soils are on glacial outwash plains and terraces. Nearly level, very poorly drained Freetown soils are in large depressions and along streams and typically have layers of muck, mucky peat, and peat to a depth of about 65 inches.

Excessively drained Windsor soils are on glacial outwash plains, and the tops of terraces and deltas. Typically, the soils have an 8 inch surface layer of loamy sand. The 15 inch subsoil consists of loamy sand in the upper part and sand in the lower part. The substratum consists of gravelly sand and sand.

The dominant minor soils in this generalized map unit are the somewhat excessively drained Merrimac soils on smooth-sloping plains, moderately well drained Sudbury and Deerfield soils on low plains and in swales, and poorly drained Wareham and Raynham soils and very poorly drained Scarboro soils in depressions and along drainage-ways.

This association is mostly forested. Some areas are cropland. Many areas are used for home sites. A few isolated areas are used as sources of sand and gravel.

This association has “severe limitations” for onsite sewage disposal, as the Hinckley and Windsor soils readily absorb but may not adequately filter and treat the effluent from septic tanks and may contaminate ground water resources. This association is poorly suited to cultivated crops and pasture as the Hinckley and Windsor soils are droughty and require irrigation for optimum crop production. Freetown soils have severe limitations for urban use because they are wetlands.

Paxton-Montauk-Woodbridge Association (yellow, #6 on Figure 3.2)

Nearly level to steep, very deep, well drained and moderately well drained, loamy soils formed in glacial till; on drumlins and smooth-sloping ground moraines.

Well drained Paxton soils are on top slopes and side slopes of drumlins. Typically, the soils have a 7 inch surface layer of sandy loam. The subsoil has fine sandy loam in the upper part and sandy loam in the lower part. The approximately 43 inch substratum is firm, sandy loam in the upper part and very firm, fine sandy loam in the lower part.

Well drained Montauk soils are on smooth sloping ground moraines and broad, irregularly shaped drumlins. Typically, the soils have a 7 inch surface layer of fine sandy loam. The subsoil is about 22 inches thick and consists of sandy loam. The substratum is firm, gravelly loamy sand.

Moderately well drained Woodbridge soils are in drainage swales and on top slopes, upper side slopes, and toe-slopes of drumlins. Typically, the soils have a 2 inch surface layer of fine sandy loam. The subsoil of fine sandy loam has distinct, brown and yellowish red masses of iron accumulation. The substratum is firm, fine sandy loam with similar red masses of iron accumulation.

The dominant minor soils are moderately well drained Scituate soils on drumlins and moraines and poorly drained Ridgebury and very poorly drained Whitman soils in depressions and

drainage-ways. Many small areas of very poorly drained Freetown and Swansea soils occur in depressions and small narrow valleys.

This association is mostly forest. Some areas are orchards, hay, or pasture. Some areas are used for home sites. It has "severe limitations" for onsite sewage disposal because of restricted permeability and a seasonal high water table. Where slopes do not exceed 15 percent, this map unit is well suited to cultivated crops, orchards, pasture, and has good potential for conifer production. Areas with slopes in excess of 15 percent are suitable for orchards, but are subject to erosion.

Urban land-Merrimac-Udorthents Association (blue, #4 on Figure 3.2)

Nearly level to strongly sloping, very deep, somewhat excessively drained Merrimac soils on broad outwash plains and valleys; areas of Urban land and Udorthents (man-altered land[3]).

Nearly level and gently sloping, somewhat excessively drained Merrimac soils are in areas where less than 85 percent of the land is covered with impervious surfaces, and most areas are in intricate patterns with Urban land. Typically, the soils have a surface layer of fine sandy loam about 9 inches thick. The subsoil is gravelly sandy loam in the upper 9 inches and gravelly loamy coarse sand in the lower 8 inches. The substratum is gravelly coarse sand in the upper part and gravelly coarse sand in the lower part.

Udorthents consist mainly of areas where soil has been removed and of areas that have been filled. Where the surface soil has been removed, loamy or sandy subsoil and substratum layers are exposed. The fill consists of soil, rubble, refuse, and spoil from dredging, and ranges from 2 to 20 feet thick.

The dominant minor soils are well drained Canton, Charlton, and Paxton soils on uplands. Also included are moderately well drained Sudbury soils in swales and depressions and excessively drained Hinckley soils on knolls and low ridges. Freetown, Swansea, and Scarboro soils occur in isolated wetlands.

This association is mostly in residential, commercial, and industrial developments. Because of the Merrimac soils, this association has severe limitations for septic tank absorption fields, but since most of these areas are served by municipal water and sewage disposal systems, there are few limitations for additional development, as far as the major soil components are concerned.

Prime farmland

There are 547 acres of prime agricultural soils and a limited number of active farms in town that total about 167 acres according to the land classification of the Acton Assessors (Chapter 61 – 97 acres, other 70 acres). Much of the prime farmland is no longer in agricultural use.

Soil classes are listed and briefly described in the appendix.

Soils Discussion

Seventy-five percent of Acton's area has soils that are classified by the Natural Resources Conservation Service as having "severe limitations" for on-site septic systems. Still more than 80% of the developed parcels in Acton have such systems. Some of these have been built with "mounded" systems, where additional soil has been brought in to aid filtration and some are on

[3] Urban land consists of areas where 85 percent or more of the land is covered with impervious surfaces such as buildings and pavement.

sites that have sufficient area to find enough good soil to design a functional system. The Acton Health Department approves and monitors (at time of sale – Title V) these private on-site septic systems. The Town's 2004 Comprehensive Water Resources Management/ Environmental Impact Report states that over 90% of these existing systems are adequate and are expected to continue to function for the planning period – 2024. About 3.5% of the remaining 10% are appropriate for on-site, innovative/ alternate (I/A) technology and/or mounded systems. The other 6+% are systems that would require off-site solutions for the wastewater disposal problems and they are dispersed throughout the town. Attempting to service only the dispersed lots with off-site solutions would be technically impractical and cost prohibitive. The lots identified as needing off-site solutions could be joined by adjacent lots to create independent service areas that may be more economically feasible. Alternatives for these sites are being reviewed. See additional discussion in the Chapter 7: Facilities and Services.

The development issues imposed by soils include high ground water, which may limit the installation of septic systems and basements; stones or boulders, which may increase construction costs; or shallow soils over bedrock, which may limit construction and increase costs. Slope is more of a limitation for commercial development than it is for residential development. Excessively drained soils may not provide sufficient filtration for on-site septic systems causing contaminants to reach groundwater resources. All of these factors can be overcome at additional expense, and with high real-estate prices those costs are passed on to the purchaser. Contamination of groundwater is a concern for the Acton Board of Health and they have an aggressive program of inspections and regulations to address the concern.

Surface Water Resources

Among Acton's prize natural resources are two major streams: Fort Pond Brook, fed by flows from Grassy Pond, Guggins Brook, and Heath Hen Meadow Brook, flows through the western and southern portions of town. Nashoba Brook flows across the eastern portion of the town; Butter Brook, Will's Hole Brook and Nagog Brook are its tributaries. Spencer Brook, and its tributaries, drains the extreme northeast corner of town. Since approximately 75% of the watershed areas for Fort Pond and Nashoba Brooks are located in Acton, the quality of these brooks depends on how well they are protected. The streams and associated wetlands mentioned above provide an estimated average of 65% of the recharge of the aquifers, the source of Acton's drinking water.[4]

Acton Stream Teams (www.actonstreams.org) founded in 1998, maintains active public education programs to reduce sources of pollution and excessive nutrients to Acton's waterways and to raise awareness of the wildlife habitat and recreational opportunities provided by Acton's streams. They have done visual shoreline surveys, written descriptions of 36 stream areas along the town's 13 named streams (more than 32 miles), and installed 26 signs identifying the streams in Acton. The Stream Teams also perform annual cleanups.

Other than the small pond at the North Acton Recreation Area, NARA, the town does not have any large ponds or lakes that are used for public swimming as do many surrounding towns. Ice House Pond, located off Concord Road, was used as a source of ice for many years. Grassy Pond, with its bog-like characteristics, is habitat for many rare plants and home to a diverse

[4] Town of Acton Open Space and Recreation Plan 2002 – 2007.

wildlife population. Part of Nagog Pond is located in Acton (the other part is in Littleton) although water supply rights were assigned to Concord by the General Court in 1884.

The state has classified Acton's surface waters, with the exception of Nagog Pond, as Class B. This classification indicates the waters are generally suitable for primary and secondary contact recreation, may be used for water supply with appropriate treatment, and will provide good wildlife habitat. Nagog Pond is classified as Class A water, reflecting its high quality and use by Concord for drinking water.

In addition to the nine acre pond at NARA, Acton has numerous water-related recreational options. Some of the town's waters are popular for fishing, skating, boating, and wildlife observation. Many of the ponds and streams can only be accessed by hiking through town conservation lands, but some, such as Ice House Pond, are adjacent to parking. (See the Open Space and Recreation chapter for more information on water-based recreation.)

Storm Water Management Plan

Excess nutrients are a problem in Acton's surface water bodies. For example, during the summer and early fall a green carpet of aquatic plants, indicating eutrophic conditions that promote a proliferation of plant life, especially algae, which reduces the dissolved oxygen content and often causes the death of other organisms, can be seen on Robbins Mill Pond, an impounded section of Nashoba Brook. Ice House Pond has also had problems in the past with water chestnut, an invasive exotic plant.

Much of the excess nutrients come from storm water run-off. Drainage from impervious surfaces, parking lots, streets, and the roofs of structures impacts surface water quality. All of these sources of storm water run-off carry pollutants that end up in the town's wetlands and waterways. In response to these problems the Town has developed a Storm Water Management Plan (SWMP - http://www.acton-ma.gov/DocumentView.aspx?DID=38) and a Nonpoint Source Control Program (http://www.acton-ma.gov/DocumentView.aspx?DID=46). These efforts identify sources of pollutants and steps to mitigate their impacts.

When the NARA swimming area was built in 2002 an innovative constructed wetland was built to help deal with intercepting nutrients and suspended solids from storm water run-off. Water testing in 2005 showed that the wetland was effective. It is also an attractive teaching tool for the summer camp and has interpretive material for other visitors that illustrate the value of wetlands and their role in maintaining clean water..

Major Habitats and Wildlife Resources of Acton

Over the last 100 years, Acton, like many surrounding communities, has been transformed from a community dominated by fields and orchards, to one dominated by suburban development and forests. As a result of this dramatic change in land use and increased forest cover, Acton has experienced an influx of many wildlife species that were uncommon in eastern New England during the past 150 years, such as coyotes, beavers, turkey, and fisher. While it is true that wildlife can be found in the most densely populated areas of town, the most productive and diverse wildlife habitat corridors follow the two major stream basins, Nashoba Brook and Fort Pond Brook. Together these streams and their associated tributaries represent Acton's contribution to the Assabet River watershed and are home to a rich wildlife community.

Some may look at Acton and perceive its undeveloped land, the few existing and former agricultural areas, forests, water, and wetlands as being relatively unimportant land uses. In fact, this undeveloped land still constitutes about 60% of the town's total land area. Much of this undeveloped land is wetlands, other water bodies, and protected natural areas. In addition to being home to about 22,000 residents, Acton is home to a diversity of wildlife. Biodiversity is a term used to describe habitats and interactions of native species in a particular area, with emphasis on the quality of the natural community. The Massachusetts Natural Heritage and Endangered Species Program has recently issued BioMap 2, a biodiversity conservation plan for the Commonwealth. In addition, the Sudbury, Assabet and Concord (SuAsCo) Biodiversity Protection and Stewardship Plan (http://www.sudburyvalleytrustees.org/files/Biodiversity_Plan/Contents.html) provides more specific biodiversity information within those target watersheds. Together, these two projects have identified several areas of interest within Acton. Acton has five areas identified by the state's BioMap 2 Project as "core habitats" for conserving biodiversity for future generations;

1. NARA/Wills Hole/Kennedy/Marshall Land/Nashoba Sportsman Club (partially town-owned and Zone II Wellhead Protection Area),
2. Grassy Pond (partially town-owned),
3. Assabet River in southeastern corner of town, including portion of Zone II Wellhead Protection Area,
4. Heath Hen Meadow, a wetland area and wetlands along the town boundary with Stow and Maynard, including a portion of a Zone II Wellhead Protection Area, and
5. Reformatory Fields/Weatherbee Conservation Land, including portion of a Zone II Wellhead Protection Area.

The Natural Heritage and Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries and Wildlife has mapped these Core Habitats as the state's "hotspots" for biodiversity. These areas are identified as the most viable natural communities and habitats for rare plants and animals and the most critical sites for biodiversity conservation across the state.

Acton also has NHESP designated "Priority Habitats of Rare Species" along Nashoba Brook (partially protected by public ownership), and wetlands and upland along the Boxborough boundary (mostly protected by town ownership and wetlands regulations). These are rare species (plant and animal) habitat areas that have been identified by the state and have a legal status that triggers a more comprehensive review by the local Conservation Commission and the state when development is proposed.

A diversity of wildlife is an indicator of the health of the environment and is a source of joy for children and grownups alike. The following describes the town's major wildlife habitats, agricultural land, open land, forests, and wetlands, and some of the more common wildlife likely to be found in them.

Agricultural Land

This once common habitat has become scarce with the replacement of farms with houses. One consequence of this suburban development is a return of forest land. This has meant a return of some plants and animals to Acton and the region. For example, beaver, coyote, moose, fisher,

and bear are now becoming common in many areas where they had been extirpated. At the same time species requiring large meadows and grasslands have become more rare.

Acton Assessors classify 167 acres in agricultural use (97 acres in Chapter 61, 70 acres of other farmland). Chapter 61 is a program that reduces the property taxes for land in agricultural use as an incentive to help keep the land in farming use. The program allows the town to an option to buy the land if it is removed from agricultural use and sold. In addition the state-owned agricultural land at the Route 2 gateway includes another 75 acres of agriculture and other small agricultural fields total about 94 acres, for a total of 336 acres (2.6% of the total area). These areas are still important resources for a diversity of wildlife. Most of the remaining agricultural land is located in small fields in several areas of town:

Many bird species nest near these fields and use them as well as other habitats for hunting and feeding on seeds, insects, and small mammals. Many migrant songbirds, those that move between northern and southern latitudes with the seasons, can still be found feeding in farm fields in Acton and other nearby towns during migration. Many hawks and owls, such as American kestrels and northern harriers, rely on grasslands for hunting small mammals, while other hawks and owls, such as red-tailed hawks and great horned owls, hunt in these fields as well as in the town's forested areas. In addition to birds, voles, white-tailed deer, woodchucks, coyotes, eastern cottontail rabbits, and other mammals often use agricultural areas. Several snakes, such as the eastern hognose snake and the northern brown snake can also be found in fields and pastures.

Open Land

Power line corridors and unused open land, like agricultural fields that are no longer being cultivated, are areas used by many of the same species of wildlife that use agricultural land. The 2008 land use map[5] indicates there were about 214 acres of this type of habitat in Acton (1.6% of the total area). Power line and other utility rights-of-way are also often used as movement corridors for wildlife, providing a means of getting from one habitat to another.

Forest Land

Acton has an abundance of forestland. The habitat map (Figure 3.3) shows approximately 7,000 acres of forest, including forested wetlands, in Acton (over 50% of the town's total area). A large forested area (720+ acres), in a largely road-less part of town, is located in the northeast corner, east of Nashoba Brook. Part of this area is protected by Spring Hill, Camp Acton, and Nashoba Brook conservation land. Another large forested area (400+ acres) is located south of Nagog Pond. Part of this area is protected by the Nagog Hill conservation land. Mixed oaks dominate the upland areas sometimes mixed with white pine, American beech, pitch pine, black birch, sassafras, and pignut hickory. Three hundred and four acres of Acton's privately owned forests are in the State's Chapter 61 tax abatement program. The program allows the owner to pay reduced taxes as an incentive to keep the land in forest and gives the town a first right to purchase the land when the owner wishes to sell.

Much of Acton's forest land is in small private holdings including street-side trees and back land of residential lots. Some of these areas are ecologically significant as wildlife habitat and movement corridors, and make important contributions to the town's character.

[5] See Chapter 8: Land Use and Zoning

Common birds include red-tailed hawk, Cooper's hawk, mourning dove, downy woodpecker, great-horned owl, eastern wood pewee, blue jay, American crow, white-breasted nuthatch, brown creeper, scarlet tanager, ovenbird, yellow-rumped warbler, Baltimore oriole, broad winged hawk, ruffed grouse, pileated woodpecker, red-eyed vireo, black-capped chickadee, wood thrush, indigo bunting, and wild turkey. Several species, such as the hawks, are most often found at forest edges, where woodlands abut more open areas such as agricultural fields. A diversity and juxtaposition of habitat types is not only aesthetically pleasing, but often an enhancement to wildlife as well. Some of the common reptiles and amphibians found in Acton's forests include spotted salamander, redback salamander, wood frog, American toad, eastern milk snake, and eastern garter snake. Common mammals include Virginia opossum, eastern chipmunk, woodchuck, gray squirrel, red squirrel, white-footed mouse, red fox, eastern coyote, raccoon, river otter, white-tailed deer, and striped skunk. (Note: Species of birds that are particularly threatened by forest fragmentation are underlined in the lists of forest species. See discussion of forest fragmentation below.)

Forest Fragmentation

Many ecologists agree that one of the biggest threats to natural communities and biodiversity in Massachusetts and much of the rest of New England is the fragmentation of large expanses of uninterrupted forest habitats. Many wildlife species depend on the interior of forests (areas far from an edge) for a significant portion of their life cycle and many biologists agree that the loss of large uninterrupted tracts of forest is contributing to the decline of many species of birds and mammals.

As a result, the remaining uninterrupted forests in Acton, noted above, and surrounding towns are particularly valuable for a broad diversity of wildlife.

Another consequence of forest fragmentation and the cessation of hunting in suburban areas seems to be an explosion in the deer populations that serve as a host for deer ticks that carry Lyme disease. Deer prefer fragmented forests where they have access to relatively small patches of woods in proximity to openings that serve as feeding areas.

Wetlands

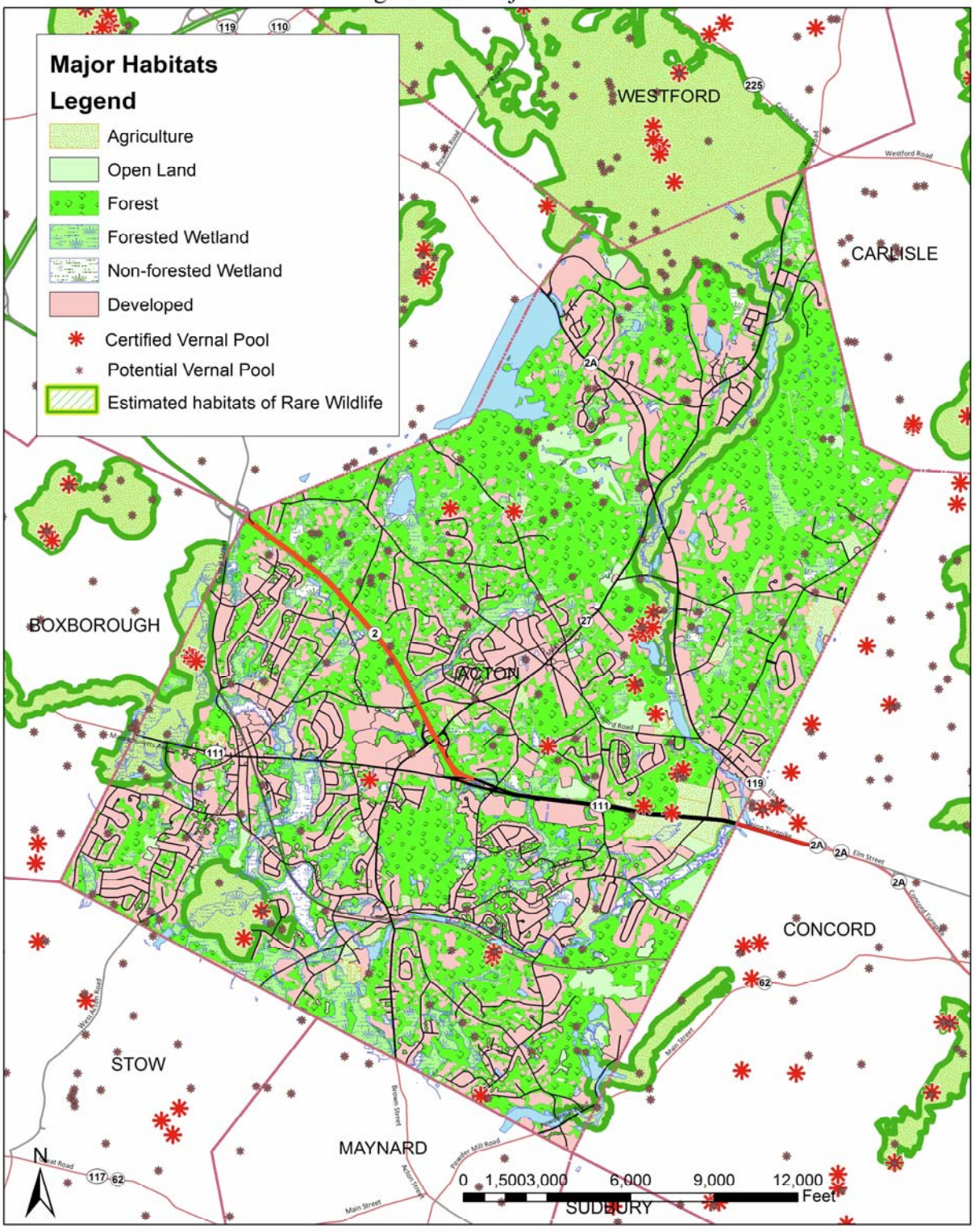
Wetlands, including forested wetlands (1,297 acres - 10% of the town's total area) and non-forested wetlands (373 acres – 2.9% of the town's total area) are an important natural resource in Acton. They play a critical role in flood control and in maintaining water quality. These wetlands provide visual variety, wildlife habitat, and help maintain a healthy environment. Acton has good access to many of its wetlands and some education programs, like the NARA wetland, that increase community awareness of their value and interest as natural habitat.

In 1996, the Massachusetts Rivers Protection Act amended the State's Wetlands Protection Act to establish an additional wetland resource area: Riverfront Area. Streams that are perennial (i.e. those which flow all year except during periods of drought) are designated as "Rivers" and the land within 200 feet of each side of the channel is protected from most incursions under the Massachusetts Wetlands Protection Act regulations as "riverfront." The Acton Conservation Commission administers the state's Wetlands Protection Act regulations including the Rivers Act.

The dominant wetland forest type is red maple swamp[6]. Red maple occurs in either pure stands or as a major component of mixed stands in combination with yellow birch, white pine, eastern hemlock, or white oak. Other less common trees include American ash, cedars, and black gum. Wetland understory shrubs are common, including alder, viburnums, blueberries, and others. Herbs are abundant and include sedges, ferns, false hellebore, and skunk cabbage. These woodlands are an important component of the town's remaining forested lands and wetland laws generally protect them.

[6] Community vegetation terms are standardized and follow either the Massachusetts Natural Heritage and Endangered Species Program "Classification of the Natural Communities of Massachusetts" (http://www.mass.gov/dfwele/dfw/nhesp/natural_communities/natural_community_classification.htm) or the Massachusetts Department of Environmental Protection GIS wetland classification system.

Figure 3.3: Major Habitats



Some of the common animals found in the red maple swamp association include northern spring peeper, gray tree frog, bullfrog, common snapping turtle, painted turtle, northern water snake, and northern ringneck snake. Birds common to this habitat and not so likely encountered in upland forests include red-shouldered hawk, swamp sparrow, barred owl, cedar waxwing, yellow warbler, and common grackle. Many of the same mammals found in the upland forests are also likely to be found in red maple swamps. (Note: Species of birds that are particularly threatened by forest fragmentation are underlined in the lists of forest species. See discussion of forest fragmentation above.)

Non-forested Wetlands

The vegetation map identifies 373 acres of non-forested wetlands in Acton (2.9% of the total area), and 253 acres of water (2.0% of the total area). The majority of the town's non-forested wetlands are found along the town's two major brooks. These rich wildlife resources include shallow marshes, deep marshes, shrub swamps, and ponds. Other non-forested wetlands are located at scattered locations throughout the town.

Bogs are peatlands, generally with evergreen and deciduous shrubs and patches of sphagnum moss. These wetland peatlands are found along the edges of Grassy Pond and Wills Hole. Bogs are known to provide important amphibian breeding habitat and may host populations of spotted turtles.

Emergent vegetation and floating-leafed plants such as water lilies (Nymphaea and Nuphar), and water depths to 6 feet characterize deep marshes. They typically provide preferred habitats for the following species; painted turtle, spotted turtle, and red-spotted newt. Common birds may include wood ducks as well as migrating pied-billed grebe, and American coot. Common mammals include the same species found in shallow marshes.

Shallow marshes are characterized by persistent emergent vegetation such as cattails and water depths to 1.5 feet, and provide preferred habitat for the following wildlife species; northern spring peeper, painted turtle, and northern leopard frog. Common birds may include great blue heron, green heron, Wilson's snipe, Virginia rail, mallard duck, tree swallow, red-winged blackbird, and American goldfinch. Common mammals may include Virginia opossum, little brown bat, muskrat, mink, and raccoon.

Woody shrubs such as buttonbush, alder, silky dogwood, and red maple, and saplings characterize shrub swamps. They typically provide preferred habitat for the following species: American woodcock, yellow warbler, common yellowthroat, common grackle, song sparrow, swamp sparrow, and American goldfinch. Common mammals include Virginia opossum, little brown bat, eastern cottontail, and raccoon.

Ponds are small bodies of water that are characterized by open water and some emergent vegetation such as cattails or floating-leafed plants, or both. Grassy Pond has characteristics of a bog with some associated bog species. Nagog Pond is the other major pond in Acton. Both of these ponds are important habitat areas for wildlife.

Vernal pools are small seasonal ponds that often are not connected to streams or other water bodies. Thus, they depend on groundwater, snowmelt and rainwater and usually become dry by late summer. Twenty-three Certified Vernal Pools and 142 "potential vernal pools" are identified on the Habitat Map for Acton. Vernal pools are critical habitats for some salamander species, wood frogs, and a wide variety of other wildlife. Some species of salamanders and

wood frogs migrate from surrounding forested uplands to these pools in the spring to breed. Without these vernal pools, these animals would be lost. Potential vernal pools are small topographic depressions or small pockets of suspected standing water identified from topographic maps and aerial photographs by NHESP as possible candidates for being vernal pools. A vernal pool is certified by NHESP following submission of documentation that a species of animals that require vernal pool habitat are actually present. Acton's wetland regulations provide a degree of protection for vernal pools regardless of their certification status. Ponds and vernal pools also provide preferred habitat for the following wildlife species; bullfrog, pickerel frog, eastern painted turtles, little brown bat, big brown bat, mink, and beaver.

Rare Species

The 2009 list of rare species published by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) lists nine occurrences of rare or endangered plants and animals in Acton with the date they were last noted. The one listed plant is Dwarf Mistletoe (*Arceuthobium pusillum* 1898):

The eight state-listed animal species include: Threatened –Vesper Sparrow (*Pooecetes gramineus* 2003); and Species of Special Concern – Blue-spotted Salamander (*Ambystoma laterale* 2002); Twelve-spotted Tiger Beetle (*Cidindela doudecimguttata* 1930); Frosted Elfin (*Callophrys irus* 2008); a dragonfly – Zebra Clubtail (*Stylurus scudden* 1996); a mussel – Triange Floater (*Alasmidonta undulate* 1999), a mussel – Eastern Pondmussel (*Ligumia nasuta* 1999); and Wood Turtle (*Glyptems insculpta* 2006); and a moth called the Barrens Buckmoth (*Hemileuca maia* 1986).

Estimated Habitats of Rare Wetlands Wildlife are mapped by the NHESP and are indicated on the Major Habitats Map (Figure 3.3). These areas are known sites for rare or threatened species and receive an extra degree of protection from the Massachusetts Endangered Species Act, administered by NHESP and the Massachusetts Wetlands Protection Act, administered by DEP and the Acton Conservation Commission. It is likely that there are other important wildlife species, habitats and more vernal pools in Acton.

Why should a resident of Acton care about rare species and protecting habitats that support them? Rare species are an indicator of the health of the environment and a healthy environment is important for our continuing health as well. Proximity to nature is also a source of enjoyment and increases livability. It also adds to the value of our homes. Several studies also show that proximity to open space increase the value of nearby homes.

Overall Summary

Acton has a varied topography and large forested and wetland areas supporting biodiversity, potentially including 9 state-listed rare plant or animal species. Surface waters are generally of good quality but are impacted by nutrients from storm water runoff, which the Town's Storm Water Management Plan is designed to reduce.

Opportunities and Challenges Posed by Existing Natural Resource Conditions

- Despite development, Acton has many important natural areas that enrich residents' lives and contribute greatly to the town's character. The challenge will be to continue to protect those areas and resources.
- Acton soils represent a challenge for the operation of septic systems. The Board of Health will need to continue to be diligent in enforcing their regulations in order to protect water resources. (See the discussion of water and wastewater in Chapter 7.)
- Protecting surface water resources from pollutants in storm water will be a continuing challenge.
- Adding to already protected conservation land is an opportunity and a challenge. The opportunity to protect additional wildlife and water resources and create connections between protected areas is contrasted with the increasing costs of acquiring land.
- Existing privately owned forested areas represent an opportunity to increase the size of existing protected forested areas.

In conclusion, Acton has a wealth of natural resources that contribute to the town's character and help to preserve biodiversity and water quality, but which require on-going effort to protect and preserve.

Appendix: Acton Soils

The following descriptions are based on the Natural Resources Conservation Service's descriptions. For more detailed information and maps consult the "Soil Survey of Middlesex County Massachusetts", 2009, by the Natural Resources Conservation Service.

Birdsall mucky silt loam—These soils (0.5% of the town's area) have severe limitation for all types of development because of wetness. Development on such soils is generally prohibited by wetland regulations.

Canton-Charlton-Urban land complex—These soils (2.5% of the town's area) are generally developed with residences and businesses. The Canton and Charlton soils have moderate limitations for use as sites for the construction of dwellings or as sites for local roads, due to slope. The Charlton soil has moderate limitations for septic tank absorption fields, due to slope. Both Canton and Charlton soils have good potential for woodland wildlife habitat.

Canton fine sandy loam—These soils (2.2% of the town's area) have severe limitations for septic tank absorption fields, as it readily absorbs but does not adequately filter sewage effluent. The inadequate treatment capacity may result in the pollution of ground water. Low-density development can help to reduce this impact. Canton fine sandy loam with 3 to 8 percent slopes (80.9 acres) is classified as prime farmland.

Carver loamy coarse sand—These soils (0.2% of the town's area) are very sandy and have severe limitations for septic tank absorption fields, as it readily absorbs but does not adequately filter sewage effluent.

Charlton-Hollis-Rock outcrop complex—This map unit (9.7% of the town's area) consists of well drained Charlton soils on toe-slopes and in low pockets. The somewhat excessively drained Hollis soils are on hilltops and ridges. Stones and boulders cover up to 15 percent of the surface. Exposed bedrock, seepage, slope, shallowness to bedrock, and large stones on the surface severely limit this complex's suitability for most uses.

Charlton-Urban land-Hollis complex—These soils (1.3% of the town's area) are nearly level to rolling. The complex consists of very deep, well drained Charlton soils; areas of developed urban land; and shallow, somewhat excessively drained Hollis soils on uplands. The majority of the area is developed with residences and businesses.

Charlton fine sandy loam—This map unit (1.8% of the town's area) is very deep, gently sloping, well drained soil on toe-slopes of hills and on uplands. With the exception of having moderate limitations for small commercial buildings, this map unit has no major limitations for building site development, local road construction, or the construction of septic tank absorption fields. This map unit has good potential for woodland wildlife habitat. Charlton fine sandy loam with 3 to 8 percent slopes is prime farmland.

Deerfield sandy loam—These soils (1.4% of the town's area) have moderate to severe limitations for development because of high water table.

Freetown mucks—These soils (8.6% of the town's area) have severe limitations for all types of development because of wetness. Development on such soils is generally prohibited by wetland regulations.

Haven silt loam—This map unit (0.4% of the town's area) consists of very deep, well drained soils on glacial outwash plains and terraces. This map unit has slight limitations for use as a site for the construction of dwellings. It has moderate limitations for road construction, due to frost action. This map unit has severe limitations for septic tank absorption fields, as the soil readily absorbs but is a poor filter of sewage effluent. This inadequate filtering capability may result in the pollution of ground water. This map unit has good potential for woodland wildlife habitat. Haven silt loam is prime farmland.

Hinckley loamy sand—This map unit (8.8% of the town's area) consists of very deep, excessively drained soils on glacial stream terraces, outwash plains, kames and eskers. This map unit has slight limitations for the construction of dwellings and of local roads. It has severe limitations for septic tank absorption fields, as it readily absorbs but is a poor filter of sewage effluent. The soil's inadequate filtering capability can result in pollution of ground water. This map unit has poor potential for woodland wildlife habitat.

Hollis-Rock outcrop-Charlton complex—This unit (1.0% of the town's area) consists of rolling, shallow soils, areas of exposed bedrock, and very deep soils on hills and ridges where the relief is affected by the underlying bedrock. The somewhat excessively drained Hollis soils are on the crests of ridges or are near rock outcrops. The well drained Charlton soils are on side slopes or saddles on the landscape. Stones and boulders cover up to 15 percent of the surface. Slope and shallow depth to bedrock are severe limitations for septic tank absorption fields on the Hollis soils. Taking advantage of the moderate limitations of the Charlton soil areas and installing the septic system distribution lines across the slope are necessary for proper operation. However, it may be difficult to locate suitable sites for septic tank absorption fields on building lots of less than 2 acres. The Charlton soils have good potential for woodland wildlife habitat; the Hollis soils have poor potential for this habitat.

Merrimac-Urban land complex— This undulating complex consists of very deep, somewhat excessively drained Merrimac and similar soils, and areas of Urban land on broad plains. The Merrimac soils have only slight limitations for dwelling or local road construction. However, they have severe limitations for septic tank absorption fields.

Merrimac fine sandy loam—This very deep, nearly level, somewhat excessively drained soil (1.5% of the town's area) is on outwash plains and glacial stream terraces that commonly follow major stream valleys. This map unit has only slight limitations for the construction of dwellings or for road construction. However, it has severe limitations for septic tank absorption fields, as the soil readily absorbs, but is a poor filter of effluent. This inadequate filtering capability can result in pollution of ground water. This map unit has fair potential for woodland wildlife habitat. Merrimac fine sandy loam with 3 to 8 percent slopes is prime farmland.

Montauk fine sandy loam—This very deep, gently sloping to steep, well drained soil (2.4% of the town's area) is on the tops and upper side slopes of glaciated hills. This map unit has severe limitations for septic tank absorption fields. There may be a seasonal high water table from February to May. Also, restricted permeability in the substratum prevents the soils from readily absorbing sewage effluent. Installation of a larger-than-average leach field will help to overcome the latter limitation. Placing the distribution lines along the contour is generally needed to overcome the slope limitation in steeper areas. Where suitable outlets are available, curtain drains around the leach field help to remove excess subsurface water. This map unit has good potential for woodland wildlife habitat.

Narragansett-Hollis-Rock outcrop complex— This map unit (0.2% of the town's area) consists of rolling, very deep and shallow soils on uplands where the relief is affected by the surface of the underlying bedrock. The well drained Narragansett soils are in low pockets on toe-slopes. The somewhat excessively drained Hollis soils are on the crests of hills and ridges. Stones and boulders cover up to 3 percent of the surface. The Narragansett soil has moderate limitations as a site for dwellings, with or without basements, due to slope. The Hollis soil has severe limitations for dwellings with basements because bedrock is at a depth of less than 20 inches. Suitable home-sites can be located in this map unit, but the use of larger than customary lot sizes may be necessary. The Narragansett soil has moderate limitations as a site for local streets and roads, due to slope and frost action. The Hollis soil has severe limitations because bedrock is at a depth of less than 20 inches. The Narragansett soil has moderate limitations for septic tank absorption fields due to its slope and poor filtering qualities. Intensive onsite investigations may be necessary to locate areas suitable for the purpose, as the shallow Hollis soils have severe limitations for use as sites for septic systems. The Narragansett soil has good potential for woodland wildlife habitat. The Hollis soil has poor potential for woodland wildlife habitat.

Narragansett silt loam-- This very deep, gently sloping, well drained soil (2.3% of town's area) is on uplands adjacent to plains and stream terraces. This map unit has no major limitations for the construction of dwellings. Frost action moderately limits its use for road construction. This map unit has moderate limitations for septic tank absorption fields, as Narragansett soils readily absorb but are poor filters of sewage effluent. This inadequate treatment capability can cause pollution of ground water. Low density development or large lot sizes may help reduce the impact on ground water. This map unit has good potential for woodland wildlife habitat.

Paxton fine sandy loam— This very deep, gently sloping, well drained soil (10.3% of town's area) is on the smooth, convex side slopes and tops of glaciated hills. Slope and the seasonal perched water table are the main limitations of this soil for community development, especially as a building site and as a site for sanitary landfills. The slow permeability in the substratum of the soil is a limitation for septic tank absorption fields.

Ridgebury fine sandy loam, extremely stony—This soil (1.9% of the town's area) has a seasonal high water table that is the main limitation for community development, especially as a building site or as a site for septic tanks or sanitary landfills. Its slow permeability in the substratum is an additional limitation for septic tanks. It has the additional limitation of stoniness.

Scio very fine sandy loam—This very deep, gently sloping, moderately well drained soil (0.3% of the town's area) is in shallow depressions on plains and on tops of stream terraces. This map unit has severe limitations for septic tank absorption fields. Seepage and a seasonally high water table are the main limitations. Placing leaching facilities in a mound of more suitable fill material will help to overcome these impediments. This map unit has good potential for woodland wildlife habitat. It is prime farmland.

Scarboro mucky fine sandy loam— This very deep, nearly level, very poorly drained soil (1.9% of the town's area) is in low, flat areas and depressions on glacial outwash plains and terraces. This map unit has severe limitations for building sites due to ponded water on its surface. It is severely limited for septic tank absorption fields because of its poor filtering qualities and ponded surface water. Soils that are better suited for these uses should be selected. This map unit has poor potential for woodland wildlife habitat.

Scituate fine sandy loam—This very deep, gently sloping, moderately well drained soil (2.4% of town's area) is on shoulders and toe-slopes of uplands. Because of the seasonal high water table and restricted permeability, this map unit has severe limitations for septic tank absorption fields. Installing a larger-than average distribution system in a mound of more suitable fill material will help to overcome these limitations. This map unit has good potential for woodland wildlife habitat. Scituate fine sandy loam with 3 to 8 percent slopes is prime farmland.

Sudbury fine sandy loam—This very deep, gently sloping, moderately well drained soil (0.3% of the town's area) is in low areas and shallow depressions on glacial outwash plains and terraces. This map unit has severe limitations for septic tank absorption fields, mainly because of the seasonal high water table and inadequate filtering capacity of the soil. This inadequate filtering may result in the pollution of ground water. Placing septic system distribution lines in a mound of more suitable fill material will help to overcome these limitations. This map unit has good potential for woodland wildlife habitat.

Whitman fine sandy loam—The seasonal high water table is the main limitation of this soil (3.7% of town's area) for community development, especially as a building site or as a site for sanitary landfills or septic tank absorption fields. The slow permeability in the substratum is an additional limitation for septic tanks. Stoniness is another difficulty for development.

Windsor loamy fine sand—These soils (2.2% of town's area) have severe limitations for septic systems because of poor filtration and slight limitations for roads, residential or commercial development. Areas with slopes greater than 8% have more limitations for development.

Woodbridge fine sandy loam— This very deep, nearly level, moderately well drained soil (7.1% of the town's area) is on the smooth tops and toe-slopes of glaciated hills. The seasonal perched water table is the main limitation of this soil for community development, especially as a building site and as a site for septic tank absorption fields and sanitary landfills. The slow permeability in the substratum is also a limitation for septic tanks. Installing a larger-than-average distribution system in a mound of more suitable fill material will help to overcome these limitations. This map unit has good potential for woodland wildlife habitat.

Man-altered soils (Udorthents and Urban Land) compose 8.0% of the town's area.

Water covers 1.7% of the town's area. Gravel pits occupy 0.4% of the town's area.

Several other soil types occur in Acton in small, scattered sites. These include: Wareham loamy fine sand (0.6%), Swansea much (2.9%), Saco mucky silt loam (0.7%), Rock outcrop-Hollis complex (0.0%), Rippowam fine sandy loam (0.0%); Raypol silt loam (0.0%), Raynham silt loam (0.1%), and Quonset sandy loam (0.2%.),