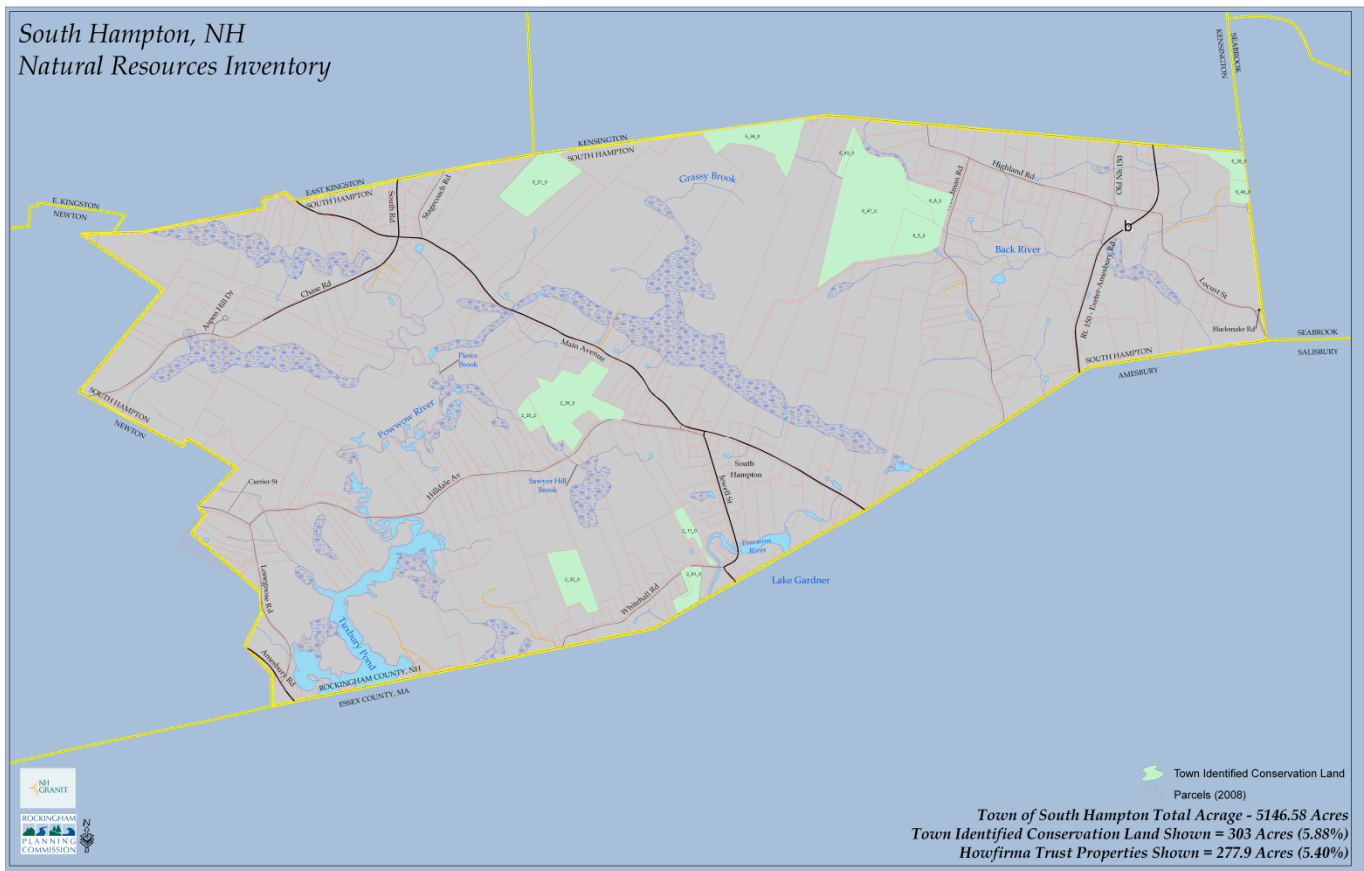


Natural Resources Inventory

South Hampton, New Hampshire December 2011



Conservation Lands in South Hampton, New Hampshire

Prepared by the South Hampton Conservation Commission with support from the
Rockingham Planning Commission

**Town of South Hampton, New Hampshire
Natural Resources Inventory
December 2011**

Table of Contents

	Page
A. Introduction	
I. Purpose of the Natural Resources Inventory.....	4
II. Description of Land Use in the Town of South Hampton.....	5
B. Natural Resource Features	
I. Topography.....	7
II. Soils.....	7
III. Watersheds.....	9
IV. Fresh Water Resources.....	10
V. Vernal Pools.....	13
VI. Groundwater Resources.....	15
VII. Wetlands.....	18
VIII. Potential Threats to Water Resources.....	21
IX. Agricultural and Farmland Resources.....	22
X. Forest Resources.....	24
XI. Natural Communities.....	25
XII. Plant Communities.....	27
XIII. Beneficial Insects.....	30
XIV. Wildlife Habitat.....	33
XV. Fisheries.....	36
XVI. Regional and Statewide Natural Resource Inventories.....	37
XVII. Conservation Land.....	42
XVIII. Current Use.....	43
XIV. Conclusion and Recommendations.....	44

Tables :

- Table 1 – South Hampton Population and Population Projections
- Table 2 – South Hampton Land Use 2005
- Table 3 – Waterbodies in the Town of South Hampton
- Table 4 – Riparian Buffer Requirements
- Table 5 – National Wetlands Inventory for South Hampton
- Table 6 – Agricultural Resources in South Hampton
- Table 7 – Rare Plant and Rare Animal Species in South Hampton
- Table 8 – Prohibited Plant Species in New Hampshire
- Table 9 – Prohibited Insect Species in New Hampshire
- Table 10 - Beneficial Insects

Table 11 – Wildlife Habitat Type and Acres
Table 12 – Bird Species Observed in South Hampton
Table 13 – Mammal Species Observed in South Hampton
Table 14 – Amphibians and Reptile Species Observed in South Hampton
Table 15 – Present and Historic Fish Species
Table 16 – Summary of Wildlife Action Plan Habitat Tiers
Table 17 – Conservation Land in South Hampton

Maps:

Map 1 – 2005 Land Use
Map 2 – Soils, Topography and Watersheds
Map 3 – Surface Water Resources
Map 4 – Aquifers and Groundwater Resources
Map 5 – Farmland Soils
Map 6 – NH Fish and Game Wildlife Action Plan Habitat Tiers
Map 7 – Natural Services Network
Map 8 – Conservation Lands
Map 9 – Natural Heritage Bureau
Map 10 – 2010 Aerial Photo

A. Introduction

I. Purpose of the Natural Resources Inventory

The purpose of this Natural Resources Inventory (NRI) is to:

- Map and describe significant natural resources in South Hampton;
- Identify areas of high ecological value at the local, regional, and state level;
- Recommend options for the protection and management of natural resources in South Hampton;
- Incorporate relevant reports and studies regarding natural resources in South Hampton into one document.

Growth and development are critical issues facing South Hampton. Due to its location in the fringe of the Boston metropolitan area, and proximity to the coast and the White Mountains, South Hampton is an ideal location for access to all these popular areas. The conversion of farm and forestland to residential and commercial use has been a long-term trend. This transformation from a predominantly rural community to a suburban one is taking place across New Hampshire. It is anticipated that the State's population will increase more than 20% between 2000 and 2025, with most of the growth occurring in southeastern New Hampshire. Despite this trend, the US Census Bureau showed South Hampton's population declined from 844 in 2000 to 814 in 2010.

Like all communities, South Hampton is faced with the challenge of finding a balance between growth and the protection of the significant natural resources in the community. The rural and historic character of South Hampton in combination with rivers, ponds, forests, and farms provides a high quality of life for residents and an excellent habitat for native plants and animals.

Many communities, including the residents of South Hampton, have acknowledged the impacts posed by growth and development and the need to conserve land for open space, food supply, recreation, wildlife habitat, and the protection of surface and groundwater quality and quantity. One example of this acknowledgement can be found in the 1990 South Hampton Master Plan, which includes the following recommendation:

"In order to identify important areas on which to focus its preservation efforts, the South Hampton Conservation Commission should undertake a natural resources inventory. Such an inventory would establish areas of critical concern that the Commission should direct its energies toward protecting."

The Master Plan goes on to make several other statements regarding natural resource protection, including:

“The protection and wise use of water resources are of critical concern to the Town of South Hampton. With all but a very few residents of the Town dependent on groundwater, the quantity and quality of this resource must be protected from depletion and/or contamination. Other Town water resources, such as swamps, ponds, rivers, streams, and wetlands, are important not only because they are often hydrologically related to groundwater, but because they provide ecological, scenic and recreational value to the Town as a whole.”

“The South Hampton Conservation Commission should continue to encourage the preservation of land and assist residents with the various methods for preserving their land.”

Given these statements of support for natural resource protection by South Hampton residents, the Conservation Commission has developed this Natural Resource Inventory to guide and support natural resource protection in town.

II. Description of Land Use in the Town of South Hampton

South Hampton was one of the first towns granted by Governor Benning Wentworth after the separation of New Hampshire from Massachusetts in 1741. When the New Hampshire-Massachusetts border was established in 1741, territory that was in Amesbury and Salisbury, Massachusetts, became part of New Hampshire. South Hampton was chartered in 1742 from that territory. Much of the area was already settled when the boundary line was changed, and some residents petitioned to become part of a town closer to them. The east end was annexed to Hampton Falls in 1742 and the west side was separated to form Newton in 1748.

The Town of South Hampton is located in Rockingham County and encompasses 7.9 square miles of land area and 0.1 square miles of inland water area. The US Census Bureau estimates the 2010 population to be 814, the second lowest population in the region after Newington. South Hampton lies in the Powwow River sub-watershed, part of the larger Merrimack River watershed.

South Hampton is a rural community located in one of the fastest growing regions in the State. South Hampton's easy access to Route 150, Route 107A, and Route 108, as well as its close proximity to Routes 95 and 495 suggest that the development pressures will continue. Statistics from the NH Department of Employment Security show that 56% of residents commute out of state to work.

South Hampton's land use pattern is much the same as it was in 1887. Although South Hampton has no one population center, the intersection of Main Avenue, Hilldale Avenue, and

Jewell Street still serves as South Hampton's town center. The cemetery, school, church, Town Hall, and library are all in the same general location. All of the commercial activity in South Hampton is located along Route 150, with the exception of one commercial use in the western part of the Town and numerous home occupations which are dispersed throughout South Hampton.

Table 1
South Hampton Population and Population Projections
1960 – 2030

Sources: 1960-2010, US Census Bureau; 2020-2030, NH Office of Energy and Planning

Year	1960	1970	1980	1990	2000	2010	2020	2030
Population	443	558	660	740	844	814	990	1,060

Table 2 illustrates land use in South Hampton in 2005.

Table 2
South Hampton Land Use 2005

Source: University of New Hampshire, Complex Systems Research Center

Land Use	Acres	% of town
Forest Land	2,878.6	55.9
Wetlands	994.3	19.3
Residential	408.9	7.9
Agricultural	375.2	7.3
Water	143.0	2.7
Brush/transitional woodland	134.1	2.6
Transportation/communications/ROW	103.2	2.0
Outdoor recreation	50.8	.98
Other agricultural land	24.2	.47
Commercial/retail	13.8	.27
Disturbed	6.4	.12
Educational	6.1	.11
Industrial	3.0	.06
Institutional	2.2	.05
Government	1.9	.04
Cemeteries	0.9	.02
TOTAL	5146.6	100%

B. Natural Resource Features

I. Topography

Topography in South Hampton does not vary greatly, with the highest elevation of 320 feet found at Sawyer's Hill. This type of topography is common in southeastern New Hampshire, where the hills are low and their sides generally not steep and the valleys are flat and often wetland. Like the rest of New England, South Hampton was shaped by the movement of glaciers more than 10,000 years ago. The motion of the glacier moved large amounts of rock and soil materials and smoothed the surface giving a more rounded appearance to the surface. However, the glacier also left us with coarse, stony and often infertile soils.

By combining knowledge of the physical environment with what is known of the distribution of plants and animals, the U.S. Forest Service has divided New Hampshire into the following three principal biophysical or ecological regions or sections:

- Southern New England Coastal Plain and Hills Section (southeastern part of NH);
- Vermont-New Hampshire Upland Section (southwestern part of NH);
- White Mountain Section (Northern part of NH).

South Hampton is located in the Southern New England Coastal Plain and Hills Section which can be further divided into three subsections:

- Gulf of Maine Coastal Lowland (immediate coastal region);
- Gulf of Maine Coastal Plain (southern portion)
- Sebago-Ossipee Hills and Plain (northern portion).

South Hampton is in the Gulf of Maine Coastal Lowland, a subsection characterized by broad, hilly plateaus and drumlins leading to the coastal zone. Map 2 highlights South Hampton's topography.

II. Soils

Understanding the nature and properties of soils is critical to managing and conserving our natural resources. Through its Soil Survey Program, the Natural Resources Conservation Service (NRCS) studies and inventories soil resources across the country. Soil scientists make this study in order to determine what soils are present, where they are located and how they can be used. Soil surveys contain information in the form of detailed soils maps, data tables and text narratives that can be used in order to determine appropriate uses for the land. Soil surveys also contain predictions of soil behavior for selected land uses and highlight limitations and hazards inherent in the soil and the impact of selected land uses on the environment. The

latter is especially important in South Hampton because all development relies on on-site wells and septic disposal.

It is important to note that these soil survey maps are designed for general planning purposes and are not at a scale appropriate for site specific use. A site specific soils map should be done by a licensed professional soil scientist wherever there are concerns about the capability of the land for development.

The most recently published edition of the Rockingham County Soil Survey was issued in 1994. This information has been digitized into a GIS (geographic information systems) map by the Rockingham Planning Commission at the end of this report.

- Prime Farmland Soils – These are soils defined by the US Department of Agriculture as having the best combinations of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops, and are also available for these uses (the land could be cropland, pastureland, forest land, or other land, but not urban built up land or water). Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment. According to aerial photos analyzed by the University of New Hampshire Complex Systems Research Center, there are 602.5 acres of prime farmland in South Hampton, 11.7% of the total acreage.
- Soils of Statewide Importance – This is land, in addition to prime farmland that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. Criteria for defining and delineating this land are determined by the NH Department of Agriculture. Generally, these soils are nearly prime farmland that can economically produce high yields of crops when treated and managed according to acceptable farming methods. There are 704.1 acres of soils of statewide importance in South Hampton, 13.6% of the total acreage.
- Wetlands Soils - These soils include Very Poorly (Hydric A) and Poorly Drained (Hydric B) soils. The areas are wet, since water moves through the soil so slowly that the water table remains at or near the surface of the ground for the greater part of the year. The reference to “very poorly” and “poorly” refers in part, but not exclusively to, the amount of time water remains at or near the surface. Very poorly drained soils generally occupy level or depressed sites, are frequently ponded, and commonly have soils with a thick dark colored surface layer and gray subsoil. Poorly drained soils occupy nearly-level to sloping sites, are ponded for short periods, have a dark colored surface layer with grayish, mottled subsoil. There are 655.37 acres, 12.7% of very poorly drained soils (Hydric A) soil, and 988.37 acres, 19.2% of poorly drained (Hydric B) soils in South Hampton. Wetlands are discussed in greater detail in the Water Resources section of the NRI.
- Sand and Gravel Deposits – There are no active sand or gravel pits in South Hampton.

Recommendations for Protecting Soil Resources:

Soils determine how land should and should not be used. It is important that land use decisions be based on accurate soils information.

- Identify and map prime wetland soils to increase protection of highest functioning wetlands in South Hampton.
- Identify and map all prime agricultural soils and soils of statewide importance.

III. Watersheds

A watershed is the geographic area of land that drains surface waters to the lowest point, such as a river or lake. The network of rivers, streams, and other tributaries is collectively known as the drainage system of a watershed.

The Town of South Hampton lies entirely within the Powwow River watershed, which is part of the much larger Merrimack River watershed. This watershed was identified on the "New Hampshire Hydrologic Unit Map" (source: U.S. Department of Agriculture, Soil Conservation Service, May 1982).

The Powwow River Watershed is divided into two sub-watersheds within South Hampton – the Powwow River and the Back River.

- **Powwow River and Watershed:** - The Powwow River rises in the center of Danville, NH and flows southeasterly through Long Pond into Kingston, where it enters Great Pond, a 268-acre water body in the center of the town. Leaving Great Pond, the river enters an extensive network of wetlands and receives a major tributary from the southwest, the outlet of Country Pond situated in Kingston and Newton. Continuing east, the Powwow River enters Powwow Pond and passes into the southwest corner of East Kingston, flowing over Trickling Falls Dam at NH Route 107A. The river turns southeast and enters South Hampton, where it flows into Tuxbury Pond and crosses into Amesbury, MA. Below the outlet of the pond, the river winds easterly along the state line before entering Massachusetts for good at Lake Gardner. The river then flows through the center of Amesbury, where it drops over falls and rapids before reaching the Merrimack River. Within the Town of South Hampton, the Powwow River is fed by Grassy Brook and Pierce Brook. The Powwow River is a dammed river and flows from an elevation of 116 MSL to 96 MSL, and flows through South Hampton for 2.7 miles. The Powwow River Watershed also contains two ponds - Dennett Pond and Tuxbury Pond.

- Back River and Watershed - The Back River watershed is 1,350 acres. The Back River originates in Kensington and flows southeasterly through South Hampton and into Amesbury, MA. The Back River is free flowing and flows through South Hampton for 1.89 miles. The Back River is fed by two unnamed streams.

IV. Fresh Water Resources

South Hampton’s fresh water resources consist of a hydrologically connected system of rivers, streams, brooks, ponds, wetlands, and groundwater. The Town’s surface and groundwaters are intricately interconnected. In some locations and under some conditions, the surface waters recharge the groundwater and in other locations and conditions, the groundwaters feed our rivers, ponds, wetlands and streams and keep surface waters flowing even during droughts. The quality and quantity of one can significantly affect the other.

Buffers, land alongside rivers, streams and ponds, should be left in a naturally vegetated state to protect water quality and wildlife habitat. Vegetation growing along the shore filter pollutants from runoff, promoting groundwater infiltrations, and stabilizing stream banks to control erosion.

Table 3
Waterbodies in the Town of South Hampton
Ponds, Rivers and Streams

Pond	Surface Area (Acres)	Watershed	Impounded or Free flowing
Dennett Pond	1.3	Powwow River	Impounded
Tuxbury Pond	76.5 in South Hampton 117 acres total	Powwow River	Impounded
Rivers and Streams	Length (Miles)	Watershed	Impounded of Free flowing
Powwow River	22.8 (7.6 in So Hampton)	Powwow River	Impounded
Back River	3.01 in So. Hampton	Powwow River	Free flowing
Sawyer Hill Brook		Powwow River	Free flowing
Grassy Brook		Powwow River	Free flowing
Hume Brook		Powwow River	Free flowing
Pierce Brook		Powwow River	Free flowing

Table 4
Riparian Buffer Requirements
as recommended by the Center for Watershed Protection

Function	Minimum Buffer Width
Bank stabilization	50 feet
Sediment control	150 feet
Flood control	200 feet
Wildlife habitat	300 feet

It is important to note that the buffer should be wider if the adjacent land is sloped, if the land use is intensive, if the soils are erodible, if the land is a floodplain and if the stream or river naturally meanders.

The quality of water and habitat in rivers and streams depends upon surrounding land uses and management practices. Sediment from erosion destroys spawning habitat and fills stream beds. Removal of trees and other streamside vegetation raises water temperatures and can destroy habitat for trout and many other species upon which fish depend.

Water quality in the Powwow River has been monitored annually since 2006 by volunteers in conjunction with the NH Department of Environmental Services Volunteer River Assessment Program (VRAP). Annual reports with monitoring results may be found at the DES website, <http://www.des.state.nh.us/organization/divisions/water/wmb/vrap/powwow/index.htm>.

As previously discussed, South Hampton's aquifers which lie only partially within the Town borders are not considered suitable as a municipal water supply source. Hence, this plan does not evaluate potential nonpoint contributions of pollution to the Town's groundwater from surrounding communities.

There are several surface water bodies that flow into South Hampton from abutting communities:

- East Kingston - The Powwow River flows into South Hampton from East Kingston. This water body flows through mostly undeveloped and residentially developed land. The southern part of East Kingston is zoned residential/agricultural, and contains low density residential areas along existing roads, and within both conventional and cluster subdivisions. The Future Land Use map of the East Kingston Master Plan recommends that this area remain residential/agricultural with the exception of 60 acres of land zoned light industry which follows Route 107A at the South Hampton Town Line and is bordered by the Powwow River. East Kingston's Zoning Ordinance allows residential, agricultural and forestry uses.

- Kensington - The Back River drains northeast into Hog Hill Swamp and into Kensington. This water body flows through the residential portion of Kensington. The western part of Kensington is zoned for low density residential development (two acres per dwelling). The proposed Future Land Use map of the Kensington Master Plan (1989) recommends that this area remain as low density residential.
- Newton - Two unidentified streams flow into South Hampton from Newton. Stream A is located in the eastern portion of Town flows through mostly low density residential development, and undeveloped woodlands and fields. Stream B is also located in eastern Newton, but 1 mile south of stream A, and flows through low density residential development, and undeveloped woodlands and fields, with a very small portion flowing near single-family housing. The eastern part of Newton in this area is zoned predominantly low density residential. The proposed future land use map of the Newton Master Plan recommends that this area remain as low density residential.
- Seabrook - There are no rivers or streams which flow into South Hampton from Seabrook or into Seabrook from South Hampton. The western portion of Seabrook abutting South Hampton is referred to as Zone 1 which allows recreational purposes, single and two-family dwellings, professional offices, municipal buildings, churches, schools, and accessory uses. Currently, the western portion of town is relatively undeveloped with single-family homes predominant.
- Salisbury, MA - The Back River eventually flows from South Hampton into Salisbury, MA, via Amesbury, MA, where it becomes the Lucy Brook. Otherwise, only the northwestern corner of Salisbury abuts South Hampton. Currently, the northwestern portion of Salisbury is commercial along major streets and residential along the minor streets. This area is currently zoned commercial (1 acre lots along roads), and low density (2 acre lots) in the backland areas.
- Amesbury, MA - The Powwow River, Back River, and one unnamed stream flow into Amesbury from South Hampton. The Powwow River flows into Tuxbury Pond which then flows east and north and gradually south where it deposits into Lake Gardner. The Back River also flows south into the northeastern corner of Amesbury, where it eventually becomes Clarks Pond. The unnamed stream flows from the south-central part of South Hampton, across Woodman Road, and south into the northeastern portion of Amesbury, and then flows easterly into Lucy Brook in Salisbury.

Amesbury is an important abutting community, as there is a considerable volume of water which is just south of Town. Currently, there is lakeside development along Tuxbury Pond, Lake Attitash and less so along Lake Gardner. Zoning in the area of

Tuxbury Pond and Lake Attitash is low density residential, residential cluster, open space conservants, and wetlands/floodplains.

Recommendations for Protecting Freshwater Resources:

- Protect riparian corridors, especially vegetated buffers, to maintain water quality and wildlife habitat.
- Educate the public about non-point pollution from road salt, pesticides, fertilizers, sediment and other pollutants in water runoff.
- Continue participating in the NH DES Volunteer River Assessment Program (VRAP).
- Protect undeveloped areas of river and stream frontage.
- Partner with land conservation organizations in the region to protect critical areas identified in the Land Conservation Plan for New Hampshire's Coastal Watersheds.
- Prevent the spread of invasive exotic aquatic plants such as milfoil, fanwort, water chestnut and purple loosestrife to uninfected lakes and ponds through education and by monitoring at boat launches. Information on invasive plant species in New Hampshire may be found at the following website:
<http://extension.unh.edu/Forestry/Docs/invasive.pdf>

V. Vernal Pools

Vernal pools are common in South Hampton and all property should be assessed for the presence of vernal pools prior to and development or other land altering activity such as forestry. Although vernal pools may vary in size from a few square feet in area to over a number of acres and may be located in a number of different sites – woods, floodplains or gravel pits—they do have certain features in common. Although they appear in the same place year after year they are defined as a temporary bodies of water because most dry up in hot weather or times of drought. All of them are contained bodies of water without any permanent outflow. They do not support fish and are therefore excellent breeding grounds for species whose eggs would provide an excellent food source were fish present. Some species are so dependent on vernal pools for their survival that their very presence is taken to establish that a particular basin of water is indeed a vernal pool. Not surprisingly, these are known as indicator species.

An essential inhabitant of vernal pools is the fairy shrimp. These are tiny crustaceans that are found throughout the country. They are the earliest creatures to be seen in the spring, often

appearing in March when their early mating leaves eggs on the floor of the pool. These are designed to survive drying out, intense heat, freezing, and even being eaten by birds and, despite everything, will hatch the following spring when the pool is once again filled with water. Should there be a dry spell that prevents this from occurring, the eggs are prepared to wait out the weather.

Some amphibians are also indicator species of vernal pools. Indicator species in New Hampshire are the spotted salamander and the wood frog. Wood frogs are one of the earliest creatures to be seen in the spring, often appearing in March, when their early mating makes it possible for the eggs to develop before the pool dries up. The wood frog call sounds very much like the quacking of ducks and is an early sign of spring. This frog is brown with a black mask, and is often seen in the woods during the summer.

Spotted salamanders lay their eggs in vernal pools as well and migrations of salamanders to breeding areas usually take place after the first heavy rain in early spring. Although both the spotted salamander and the wood frog may be found mating in more permanent waters, eggs laid in vernal pools have the best chance of surviving. The spotted salamander will often lay her eggs in October and, if the pool is still dry, will stay with them keeping guard until Fall rains arrive.

Many other species use vernal pools although they do not have the same dependency upon them. Among the amphibians the species are four-toed salamander, Eastern newt, spring peeper, American toad, the gray tree frog, and the green frog. Among the invertebrates, there are clam shrimp, fingernail clams, and amphibious snails, caddis flies and other aquatic insects. Although no reptile is among the indicator species, the spotted turtle, the earliest turtle to appear in the spring, sometimes moving about in March, often uses such pools as a source of food and a place for courtship and mating. Blanding's turtles have been known to overwinter in vernal pools. Both of these species are endangered in New Hampshire and their appearance is of special interest to the Non-Game and Endangered Species Division of New Hampshire Fish & Game. Information on reporting reptiles and amphibians observed in the wild may be found at the following website:

http://www.wildlife.state.nh.us/Wildlife/Nongame/reptiles_amphibians.htm

Recommendations for Protecting Vernal Pools:

Vernal pools provide a unique type of wildlife habitat and are crucial breeding grounds for a number of amphibians. As such, efforts should be made to protect this habitat and the species that it supports. Some methods to accomplish this goal include:

- Identify and map vernal pools on subdivision plans and site plans in order to provide an opportunity to mitigate the impacts to these sensitive areas;
- Education, including a brochure for residents about South Hampton's land use regulations and conservation policies;

- Keep log landings, roads and trails out of vernal pools and the area adjacent to them. Busy roads near a vernal pool can lead to massive annual mortality and local extinctions;
- Maintain shade around a vernal pool in order to keep it from drying up too quickly and to maintain water temperatures;
- Keep slash out of a vernal pool during forestry operations and during development;
- Maintain the upland (non-wetland) habitat where many vernal pool dependent species spend most of their life cycle.

VI. Groundwater Resources

South Hampton residents receive their drinking water entirely from groundwater sources. Aquifers are concentrations of groundwater and those having medium to high potential to yield groundwater occur in the seacoast area as alluvial deposits of sand and gravel or in bedrock fractures. The sand and gravel deposits are called “stratified drift aquifers” and typically yield more groundwater than bedrock fractures. The major source of recharge to these aquifers is through precipitation filtering directly down into the aquifer. A 1992 study by the U.S. Geological Survey identified four small stratified drift aquifers within South Hampton

- Tuxbury Pond Aquifer – is located in the southwest end of town. The majority of the aquifer lies between Lone Goose Road and Hilldale Avenue. The aquifer extends into East Kingston, NH and Amesbury, Ma. Aquifer recharge is via Tuxbury Pond, wetlands at the surface and precipitation.
- Chase Road Aquifer – is located in the northwest corner of town, on both sides of Chase Road near Aspen Hill Drive. Aquifer recharge is via wetlands at the surface and precipitation.
- Woodman Road Aquifer –is located in the southeast corner of town and underlies South Hampton and Amesbury, MA. Aquifer recharge is via wetlands at the surface and precipitation.

Groundwater quality can be impaired by a variety of materials. Sources of groundwater contamination include landfills, commercial and industrial wastes, agricultural fertilizer, failing septic systems, and road salt. Groundwater quantity can be reduced by contamination of groundwater supplies, over-pumping in the aquifer zone, and increasing impervious surfaces such as roof tops, roads, and parking lots. These surfaces prevent the infiltration of precipitation into the ground.

Impervious Surfaces - When a watershed is increasingly covered with pavement, buildings, and other compacted surfaces that are impervious to water, significant changes in water quality and quantity result. When rain falls on impervious surfaces, it runs off faster into surface waters, carrying with it sediment and pollutants from road surfaces, lawns, construction sites, and parking lots. Flooding, warming water temperatures, and channelization of streams are the result. Infiltration of rainfall into the ground to replenish groundwater is reduced, reducing the quantity of groundwater available for withdrawals for drinking water.

This type of run-off, called “non-point source pollution”, is now the most serious threat to water quality for New Hampshire and for South Hampton. Low impact construction and site designs that promote retention and infiltration of rainwater and runoff, narrower streets and driveways when possible, shrub and tree buffers to waterways, and more compact development patterns can protect South Hampton’s water quality and quantity as the town grows.

Studies conducted in the northeast have documented that by converting as little as 10% of a watershed to impervious surfaces, stream water quality and organisms begin to deteriorate. Above 25% impervious surface, water quality is seriously degraded.

Numerous agencies are currently studying groundwater resources in Southeastern New Hampshire. The New Hampshire Coastal Program, New Hampshire Department of Environmental Services, New Hampshire Geological Survey and the U.S. Geological Survey have researched the availability of groundwater resources in South Hampton and surrounding communities. Population increase and associated development have resulted in an estimated 50% increase in the use of groundwater and surface water resources for drinking water as well as industrial and other uses. To gain a better understanding of how much groundwater is available in the region, researchers quantified water storage and water movement in groundwater and surface water systems. The final report, “Assessment of Ground-Water Resources in the Seacoast Region of New Hampshire”, states:

Climate change in New England is forecast to include more frequent and intense precipitation events, with a slight decrease to little change in total precipitation, and increasing temperatures. The effects of this potential future climate change on the Seacoast hydrologic system would likely include reduced base flows and fresh ground-water discharges to tidal areas and lowered ground-water levels. The effects of these climate changes by 2025 were estimated to be greater than the potential effects of increased water demands. The analyses indicated that there are potential issues of concern for future use of water resources in the Seacoast region. The models developed and demonstrated in this investigation can provide water-resource managers and planners tools with which to assess future water resources in this region. The findings regarding the effects of increasing water demand and potential climate change on ground-water availability may be transferrable to other regions of the Nation with similar hydrogeologic and climatic characteristics.

The full report is available from the following website:

<http://pubs.usgs.gov/sir/2008/5222/>

Stormwater - Stormwater is a term used to describe water that originates during precipitation events. It may also be used to apply to water that originates with snowmelt or rain. Stormwater that does not soak into the ground becomes surface runoff, which either flows into surface waterways or is channeled into storm sewers. The US EPA established the National Pollutant Discharge Elimination System (NPDES) to identify sources of stormwater pollution and other contaminating discharges.

Stormwater is of concern for two reasons, flooding and pollution. The volume and timing of runoff can impact flood storage and control, and stormwater runoff can also flush potential contaminants from roads and parking lots into surface waters.

The treatment and management of stormwater becomes increasingly important with the increasing amounts of impervious surface cover in South Hampton and surrounding communities. Two important resources exist for aiding in stormwater management: the US EPA, and the University of New Hampshire Stormwater Center, which serves as a local resource to communities on stormwater management. The UNH Stormwater Center's website has many resources for Planning Boards, Conservation Commissions, developers and landowners: <http://www.unh.edu/unhsc/>

Recommendations for Protecting Groundwater Resources:

- Require that stormwater and meltwater be retained on site when land is developed.
- Raise public awareness on reducing non-point source pollution from pet waste, fertilizers, pesticides, gasoline, automotive oil, antifreeze, and other hazardous wastes. The public should also understand the importance of aquifer recharge.
- Modify the South Hampton Zoning Ordinance to prohibit or restrict new potential contamination sources from locating in a wellhead protection area.
- Continue to hold but more widely advertise an annual household hazardous waste collection program for residents; add options for convenient disposal at Transfer Station for used oil and mercury products.
- Continue land conservation and protection efforts along rivers and streams, including reviewing land use ordinances, monitoring of storm drain markers, maintenance of signs, updating of stormwater sewer maps, and continue screening outfalls for illicit discharges.

VII. Wetlands

Wetlands, as defined by the Environmental Protection Agency, the NH Department of Environmental Services and the South Hampton Zoning Ordinance are those areas that are inundated or saturated by surface or groundwaters at a frequency and duration sufficient to support and that under normal circumstances do support a prevalence of vegetation adapted for life in saturated soil conditions. Thus a wetland is defined by the presence of all three “H’s”: hydrophytes or wetland vegetation, hydrology and hydric soils.

Wetlands are an integral part of South Hampton’s natural resources. They are important for removing excess nutrients and sediment from the water, slowing and storing floodwaters, promoting groundwater infiltration, and providing habitat for a variety of vegetation and animal life. In addition, wetlands provide recreational, educational and research opportunities. They add to the visual resources of the Town, especially in the fall when the red maples turn scarlet. Wetlands are most often found along streams and adjacent to ponds and lakes. They can be found in clustered complexes that are of great value. Vernal pools are a special type of wetland that dry out completely in the summer and have no fish population.

There is a diversity of wetland types in South Hampton, including areas of open water with emergent vegetation such as cattails, forested wetlands, and scrub-shrub wetlands. The principal types of wetlands with standing water in the spring have been mapped from aerial photos by the National Wetlands Inventory (NWI) of the U.S. Fish and Wildlife Service. The NWI wetlands do not include all wetlands, particularly those that do not typically have standing water in the spring. Therefore, this is an underestimate of the amount of wetlands. The more significant, wetlands, however, are included in the NWI.

The NWI classification codes for South Hampton describe the dominant vegetation type as well as the hydrology of each wetland. For the purposes of this map, these codes were categorized by the dominant vegetation type.

- **Emergent wetlands** are those wetlands with non-woody vegetation that grows above the land and/or water surface. Cattail marshes are one example of emergent wetlands.
- **Forested – deciduous wetlands** are wetlands with deciduous trees as the dominant vegetation type. Red maple swamps are one example of forested – deciduous wetlands.
- **Forested – evergreen wetlands** are wetlands with evergreen trees as the dominant vegetation type. Hemlock, balsam fir and white cedar are examples of evergreen trees that might be dominant in a forested – evergreen wetland.
- **Forested – dead wetlands** are wetlands where a once forested wetland has been flooded (usually by a beaver impoundment) and the standing trees are dead. These wetland types often become nesting areas for great blue herons until the trees fall down and the impounded water becomes densely vegetated.

- **Deciduous – shrub wetlands** are wetlands where the dominant form of vegetation is deciduous shrubs. Highbush blueberry, silky dogwood, sweet gale and winterberry are common deciduous shrubs in South Hampton wetlands.
- **Evergreen – shrub wetlands** are relatively uncommon. These wetland types are dominated by shrubs that do not lose their leaves. Leatherleaf and labrador tea are broadleaf evergreen shrubs. Other evergreen shrubs might be balsam fir, black spruce and other evergreen trees that have not yet reached tree size.
- **Unconsolidated bottom wetlands** are those wetlands with open water over most of the surface area of the wetland. Vegetation may grow in these wetlands below the surface of the water and/or may float on the water but is typically not visible early in the growing season when the aerial photography used to classify wetland types is taken.

The areas and number of each wetland type in South Hampton are shown below in Table 5. The wetlands count does not reflect separate wetlands, but patches of wetlands classified as a particular type. The total area for NWI wetlands in South Hampton is 1,265.6 acres or 24.6 % of the town’s surface area.

Table 5
2001 National Wetland Inventory of Wetlands in South Hampton

Wetland Type	Acres
Forested	855.8
Scrub-Shrub	237.7
Lacustrine (related to a lake or pond)	83.8
Emergent (e.g. cattails)	58.7
Palustrine	29.6
Total NWI Wetlands	1,265.6

Wetland Buffers - In addition to retaining the wetland itself, the undeveloped uplands surrounding the wetland are also essential for a healthy wetland. Maintaining a buffer of a naturally vegetated upland area adjacent to wetlands and surface waters is important to reduce the adverse effects of human activity on these water resources. Vegetation in buffers intercepts rainfall, slows meltwater and promotes infiltration. In addition, a vegetated buffer provides habitat for species dependant on the wetland system and travel corridors for larger mammals. A minimum upland buffer width around wetlands and other shorelines of 100 feet is recommended and 300 feet is desirable to maintain good habitat.

The first step to protecting wetlands and the functions they provide is protecting the land surrounding them. A look at current zoning regulations in South Hampton shows a limited

amount of protection to buffers compared to recommendations from “Buffers for Wetlands and Surface Waters”, A Guidebook for New Hampshire Municipalities published in 1997 by the NH Department of Environmental Services. The guidebook states that “100 feet is recommended as a reasonable minimum buffer width under most circumstances.” It explains that research has shown that 100 feet will generally provide a 60% or higher removal rate of pollutants. Because of the impacts to human health of tainted water supplies, buffers larger than 100 feet may be prescribed around existing or potential water supplies. Buffers of 100 feet protect wildlife species that are aquatic or that stay very close to the wetland edge, but would provide little or no life support for others. Water quality in wetlands and surface waters is important for all wildlife, not just aquatic.

Current South Hampton zoning regulations require a 100 foot buffer between septic systems and wetland soils - both inland and tidal-influenced. Buildings currently have a setback of 50 feet from wetlands or body of water. Septic systems, which generate excess nutrients and pathogens, are not at the minimum recommended setback and are potentially very detrimental to wetland systems. Septic systems have a finite useful life until replacement is needed; unfortunately replacement is seldom done until the system fails. Hydric B wetlands are usually a waterbody’s first defense against pollutants and need just as much buffer as Hydric A soils to provide an acceptable rate (60%) of pollutant removal. Buffering wetlands and surface waters should make up only one piece of a comprehensive natural resource protection plan. As this town faces more development pressures on natural resources, changes in zoning may need to be instituted, coupled with protection through acquisition or easements, to protect a broad spectrum of water resources.

The State of New Hampshire’s Comprehensive Shoreland Protection Act (CSPA) protects surface water resources by regulating buildings, docks, and septic systems along the shoreland, including Great Bay. All primary structures must be set back at least 50 feet from the high water or high tide mark. Natural vegetation must also be maintained along the shoreline. In South Hampton, the Powwow River, Lake Gardner, and Tuxbury Pond are all regulated by the CSPA. For more information on the Comprehensive Shoreland Protection Act, visit the NH DES website, www.des.nh.gov/organization/divisions/water/wetlands/cspa/index.htm

Recommendations for Protecting Wetland Resources:

- Educate the public as to what they can do to protect wetlands and vegetative buffers around wetlands. This should include the importance of reducing non-point source pollution from sedimentation, fertilizers, pesticides, and hazardous wastes.
- Continue to work with the Wetlands Bureau of NHDES to enforce State laws and rules.
- Increase the setback for septic systems to 100’ from wetland soils - Hydric A and Hydric B.

VIII. Potential Threats to Water Resources

There are two general types of pollution threats to surface and groundwater resources: nonpoint and point. Nonpoint pollution sources are diffuse and may discharge pollutants over a broad area. Examples include stormwater runoff from parking lots and roads, erosion and sediment from land development, and leachate from failed septic systems. Point sources of pollution are discernible as the sources can be identified, typically pipes, ditches, and channels.

Potential threats to water resources in South Hampton include:

- Salt Piles – There is one Town-owned salt pile, located at 54 Hilldale Avenue.
- Salted Road – All the paved roads in South Hampton receive some degree of salting during the winter months.
- Underground Fuel Storage Tanks – fire department, Underground Storage Tanks (UST) are a potential threat to water resources in that releases can occur due to spills, defects in tank construction, improper installation, and corrosion of older tanks. New Hampshire requires all tanks with a capacity of 1,100 gallons or more to be registered and the use reported to the NH DES Waste Management Division.
- Active Cemeteries – There are four cemeteries in town - Currierville Cemetary, Locust Street Cemetery, the Old Burial Ground, and Center Cemetery.
- Pesticide Application Sites, Farms, and Agricultural Uses – There are several active farms in South Hampton which may use fertilizers and pesticides as a part of normal agricultural practice. The New Hampshire Department of Agriculture, Markets, and Food promotes the use of Best Management Practices to reduce the threat of pollution from agricultural operations.
- Industrial and Manufacturing Activity – There are several industrial and manufacturing businesses in South Hampton located along the Route 150 Commercial Zone. Activities include a paving company and oil company.
- Septic Systems and Leaching Fields – Generally speaking, septic systems are considered nonpoint source pollution because of their discharge of effluent into the ground. The threat presented by such systems increases when a system fails and the wastewater is not treated sufficiently. All wastewater produced in South Hampton is treated by septic systems.

IX. Agricultural and Farmland Resources

Agricultural land is valued in South Hampton for the food that its farmers produce, some of which is locally available. It is also valued for its scenic beauty and diverse habitat. South Hampton’s farmers and farm families help other residents connect with the town’s rural heritage and promote better land management. In addition, South Hampton’s farmers are stewards of significant natural resources in the community. Table 6 describes some active farms in South Hampton.

Aside from its obvious importance for growing food, agricultural land has value as a scenic resource, as wildlife habitat, and as a groundwater recharge area. Farming also provides economic benefits, especially to the local and regional economy. The loss of farmland has a direct impact on the landscape as well as an indirect impact on the local tax rate. The indirect economic benefit of farming relates to the real estate value of the farmland itself compared to the cost of providing public services to residents once the land is converted to residences. As demonstrated in the Cost of Community Services study conducted by the UNH Cooperative Extension Service in 1995, residential subdivisions cost the town more in terms of providing municipal services than is received in increased property tax revenue, whereas farmland and other open land produce more in revenues than they consume in services, even when enrolled in the Current Use program.

Although most of the farms are smaller in size than in the past, these remaining farms have a very significant impact on the scenic and rural qualities of the community. Farming in South Hampton is defined as any agricultural activity in which land is used for the purpose of producing any cultivated commodity, livestock or poultry.

Table 6
Agricultural Resources in South Hampton
Including farm and forestland

Name and Location	Products	Acres (Approximate)
Far Acres Farm, Hilldale Avenue	Hay, grain, eggs	40
Grassy Brook Farm, Main Avenue	Honey, perennials, shrubs	27
Heron Pond Farm, Main Avenue	Vegetables	30
Jewell Towne Vineyards, Jewell Street	Grape wine	5
Kinney Hill Farm, Woodman Road	Hay, meat	6
New Hampshire Hostas, Exeter Road	Hostas and companion plants	2
Soaring Hawk Farm, Highland Road	Beef, eggs, hay, timber	65
Whippoorwill Farm, Stagecoach Road	Hay, lambs, wood	40

Agricultural Soils - New Hampshire is losing its most productive farmland. Between 1982 and 2000, nearly 18,000 acres of prime farmland became unavailable for production of crops, feed, forage or fiber. Most was lost to urban and rural development. Only 2% of New Hampshire soils classify as prime farmland. Prime Farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is also available for these uses. Cropland, usually the most productive agricultural land, has declined 30% statewide from 1974 to 2000.

An analysis of 2005 landcover data shows that 602.5 acres of land in South Hampton are classified as Prime Farmland, 704.1 acres are classified as farmland of local importance, and 1105.9 acres are classified as farmland of statewide importance. The last two categories are defined as soils that may economically produce high yields of crops when treated and managed according to acceptable farming methods.

Hay is grown on a commercial basis by several farms, as listed in Table 6. There are other South Hampton residents who hay or have their fields hayed but are not commercial operations. There are numerous other residents unknown to us who have horses, sheep, chickens and other livestock. In addition, many people raise vegetables, fruit and herbs for their own consumption and to share with their neighbors.

In order to get a more accurate understanding of the value of agriculture to South Hampton, the Town could complete an Agricultural Profile. A copy of the fact sheet *Developing an Agricultural Profile for Your Town* is available from the UNH Cooperative Extension: http://extension.unh.edu/resources/representation/Resource000023_Rep23.pdf

Recommendations for Protecting Agricultural Resources:

Agriculture is important to South Hampton in many ways. The commercial farms contribute to the town economically and the Town's residents are fortunate to enjoy locally grown produce. The open fields and farm structures comprise the rural and scenic character of town.

Recommendations to help sustain economically viable agriculture in South Hampton are:

- Educate the public that once important farmland soils are developed they are usually lost forever.
- Consider forming an Agricultural Commission.
- Support Eat Local campaigns and encourage residents to buy locally grown food.

- Protect the Important Farmland soils that are necessary for economically viable agricultural activities by working with landowners and land conservation organizations on conservation easements.
- Identify and map prime farmland soils and soils of statewide importance.
- Reduce conflict between agricultural and residential uses by requiring a buffer when land is developed adjacent to a farm.
- Continue to educate farmland owners about the benefits of conservation easements on their property.
- Encourage farmers to follow “Best Management Practices” to protect water quality.

X. Forest Resources

Forests provide South Hampton with a diverse range of benefits. South Hampton’s forests provide valuable habitat for plant and animal populations. The forests absorb rainwater, increase groundwater infiltration, and buffer surface waters from sedimentation and contamination. Near roads and homes, trees cool summer temperatures by 10 degrees or more, break winter winds, and filter dust and pollutants from the air. Forests host scenic recreational trails and hunting grounds. Our tourist industry and seasonal residents are attracted by healthy forests. In addition, well-managed forests provide a sustainable supply of maple syrup, home firewood and commercial wood products and jobs needed by New Hampshire residents.

Forest Cover - A forest is comprised of several forest types. Forest types are distinctive associations or communities of trees, shrubs, and herbaceous plants. They are named for the predominant tree species occurring in the type. Common forest types in South Hampton include White Pine; Northern Hardwood (sugar maple, beech, yellow birch, red maple, white ash and smaller amounts of other species); Spruce-Fir, Red Oak, Hemlock, and Aspen-Birch. A forest type may be dominated by a single tree species or it may be dominated by several species growing together.

South Hampton’s forests provide us with wood and food products, wildlife, scenic beauty, a modified microclimate, stabilization of steep slopes and snowpacks, the control of water flows, the creation and maintenance of stream habitat for aquatic animals, and recreation. In addition, forests constitute a major storage of carbon not only in the trees themselves, but in the forest soils as well.

New Hampshire is the second most forested state in the US trailing Maine. South Hampton is approximately 56% forested; the state average is approximately 85%. Many of South Hampton’s forests have grown from abandoned agricultural land and are now mature.

Recommendations for Protecting Forest Resources:

- Identify forestland abutting rivers and streams for conservation as these forests play an important role in protecting water quality and quantity, and wildlife habitat: http://extension.unh.edu/resources/files/Resource000428_Rep450.pdf
- Encourage planting/transplanting native species.
- Adopt tree clearing regulations to minimize soil erosion, preserve wildlife habitat, and protect water resources.
- Partner with land conservation organizations and surrounding municipalities in the region to protect critical areas identified in the Land Conservation Plan for New Hampshire's Coastal Watersheds.
- Promote sustainable forestry and cooperation among adjacent forest landowners.
- Consider forming a Forestry Commission.

XI. Natural Communities

The July 2010 report from the NH Natural Heritage Bureau entitled, *Rare Plants, Rare Animals, and Exemplary Natural Communities in New Hampshire Towns*, describes natural communities as different types of forests, wetlands, and grasslands. Most of New Hampshire is covered by relatively common natural community types. Scattered throughout the state, however, and usually in predictable areas, are distinctive communities found in few other places. The Natural Heritage Bureau tracks exemplary natural communities. To qualify as exemplary, a natural community must be of a rare type or must be a very old occurrence of common community in good condition.

South Hampton's natural communities serve not only a practical and essential role in keeping our soil, water and air healthy, a concept known as ecological services, but they provide us with diverse physical landscapes and scenic beauty.

Natural communities are defined by three characteristics:

- The plant species present;
- The physical structure of the vegetation (short grasses vs. tall trees);
- The physical environment, which consists of the physical setting (pond shore or hillside), the water and nutrients present and the climate.

Natural communities are made up of living components that are closely interrelated and interact with one another and the environment. Humans are also a part of the living landscape and have a tremendous influence. Human disturbance of the natural environment is occurring at a faster pace than the natural communities can adapt to. It is vital we become aware of the natural communities we have in South Hampton in order to protect them.

The NH Natural Heritage Bureau has identified the following Exemplary Natural Communities in South Hampton:

- Swamp White Oak floodplain forest***
- Temperate minor river floodplain systems

*** = community flagged by Natural Heritage Bureau as “highest importance”

These flags are based on a combination of how rare the species or community is and how large or healthy its examples are in a town.

Table 7
Rare Plant Species and Rare Animal Species in South Hampton
Source: NH Natural Heritage Bureau, July 2010

Latin Plant Name	Common Plant Name	# Observed Last 20 Years in Town	# Observed Last 20 Years in State	State Status
<i>Isoetes engelmannii</i>	Engelmann’s Quillwort	Historical	15	Endangered
<i>Hottonia inflata</i>	Featherfoil**	1	4	Endangered
<i>Carex festucacea</i>	Fescue Sedge	Historical	1	Endangered
<i>Persicaria robustior</i>	Robust Knotweed**	1	6	Endangered
Latin Bird Name	Common Bird Name	# Observed Last 20 Years in Town	# Observed Last 20 Years in State	State Status
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	Historical	4	Special Concern
<i>Pandion haliaetus</i>	Osprey**	1	103	Special Concern
Latin Fish Name	Common Reptile Name	# Observed Last 20 Years in Town	# Observed Last 20 Years in State	State Status
<i>Enneacanthus obesus</i>	Banded Sunfish**	1	30	Special Concern
<i>Notropis bifrenatus</i>	Bridled Shiner***	1	22	Threatened
<i>Esox americanus americanus</i>	Redfin Pickerel**	2	32	Special Concern

*** = community flagged by Natural Heritage Bureau as “extremely high importance”

** = community flagged by Natural Heritage Bureau as “very high importance”

* = community flagged by Natural Heritage Bureau as “high importance”

These flags are based on a combination of how rare the species or community is and how large or healthy its examples are in a town.

Protecting our natural communities is necessary to preserve the biological diversity of our community and of New Hampshire. Biological Diversity, or **biodiversity**, is the variety and variability of all living organisms. This variety includes the diversity of plants, animals, fungi, algae, bacteria, and other microorganisms, their genetic variability, the natural communities in which they live, and the processes and interactions that weave the biological and physical elements of the planet into a complex web.

XII. Plant Communities

Endangered/Threatened Species

In 1987, the New Hampshire state legislature passed the Native Plant Protection Act (NH RSA 217-A) and formally recognized that "for human needs and enjoyment, the interests of science, and the economy of the state, native plants throughout this state should be protected and conserved; and their numbers should be maintained and enhanced to insure their perpetuation as viable components of their ecosystems for the benefit of the people of New Hampshire." Currently, there are 288 species listed as endangered or threatened under the Native Plant Protection Act and that are tracked by the NH Natural Heritage Bureau.

The South Hampton Conservation Commission encourages input from residents should they find an unusual plant species or a unique natural community. The Commission may be reached by calling the Town Office at 603-394-7696.

Endangered and threatened are defined under the NH Native Plant Protection Act as: **Endangered species** are those ceasing to exist locally or in the state; **Threatened species** face the possibility of becoming “endangered”.

Plants Listed as Special Concern - In addition to recognizing Endangered and Threatened plant species, the NH Native Plant Protection Act identifies 11 plants as Special Concern. These species are somewhat uncommon in New Hampshire, and are at risk of decline due to over-collection.

The NH Natural Heritage Bureau does not track these species:

- Narrow-leaf wild leek *Allium tricoccum* var. *burdickii*
- Wild leek *Allium tricoccum* var. *tricoccum*
- Wild ginger *Asarum canadense*
- Giant blue cohosh *Caulophyllum giganteum*
- Blue cohosh *Caulophyllum thalictroides*

- Sea lavender *Limonium carolinianum*
- Ostrich fern *Matteuccia struthiopteris* var. *pensylvanica*
- Canadian burnet *Sanguisorba Canadensis*
- Slippery elm *Ulmus rubra*

These species are not rare in New Hampshire, but their showy nature makes them vulnerable to over-collection. Although the listing does not give the plants any legal protection, it does give the landowner recourse if someone digs it up without the landowner's permission.

Invasive Species - It is important that those of us who reside in South Hampton be informed and aware of invasive species (plants, insects and fungal species) that have the potential to destroy and displace those natural resources that are vital to our biodiversity. According to the New England Wildflower Society, nearly 1/5th of New England's 3,000 plant species are in danger of disappearing from our region. The Nature Conservancy estimates that 42% of all species on the Federal Endangered Species Lists are listed partly due to the effects of invasive species (and for 18%, invasive species are the sole reason for their listing). According to the US Department of Agriculture website, <http://www.invasivespeciesinfo.gov/>, over \$100 million dollars a year is spent in the United States combating invasive plants in wetlands alone. Rich, diverse plant communities can become barren, inhospitable expanses of invasive plants with little value to wildlife. Invasive plants may even deplete groundwater. The public must be educated to buy plants wisely and to control existing invasive plants. Common invasive species observed in South Hampton include Autumn Olive, Oriental Bittersweet, and Japanese Honeysuckle.

What is an Invasive Species? An Invasive Species is a plant, insect, and/or fungal species that is not naturally native to a particular region and has the ability to thrive and spread aggressively outside its natural range. The Invasive Species thrives and spreads in a new habitat due to the fact it has no natural predators (insects, diseases and/or foraging animals) that naturally keep its growth under control as they would in their own native habitat. Invasive plant species commonly found in South Hampton include Phragmites, Purple Loosestrife, Glossy Buckthorn, Barberry, Burning Bush, Multiflora Rose, and Japanese Knotweed. All these plant species are common landscape plants that migrate into open and undeveloped areas.

Why and Where are Invasive Species a problem? Without any natural predators to prevent its spread, the invasive species, particularly in the case of plants, will put extreme pressure on native plants and animals. Ultimately the invasive plant will alter native habitats and reduce biodiversity by choking out native vegetation, threatening rare and endangered species and degrading wildlife habitat. With the loss of native vegetation and wildlife habitat also comes the loss of a number of our native animal, bird and insect species that depend on the native habitats to survive. Invasive species present the worst threat in wetlands, sand dunes, fire prone areas, and serpentine barrens where rare native plants are found. Invasive plants:

- Produce large numbers of new plants each season;
- Tolerate many soil types and weather conditions;

- Spread easily and efficiently, usually by wind, water, or animals;
- Grow rapidly, allowing them to displace slower growing plants;
- Spread rampantly when they are free of the natural checks and balances found in their native range.

In 2000, the State of New Hampshire enacted legislation under House Bill 1258-FN which "requires the Commissioner of Agriculture, Markets, and Food to conduct research and educational activities which address the effects of invasive plant, insect and fungal species upon the state". As a result of this legislation, the New Hampshire Invasive Species Committee was formed

**Table 8
Prohibited Plant Species in New Hampshire**

Tree of Heaven (<i>Ailanthus altissima</i>)	Fanwort (<i>Cabomba caroliniana</i>)
Garlic Mustard (<i>Alliaria petiolata</i>)	Oriental Bittersweet (<i>Celastrus orbiculatus</i>)
European Barberry (<i>Berberis vulgaris</i>)	Black Swallow-wort (<i>Cynanchum nigrum</i>)
Flowering Bush (<i>Butomous umbellate</i>)	Purple Loosestrife (<i>Lythrum salicaria</i>)
Pale Swallow-wort (<i>Cynanchum rossicum</i>)	Parrot Feather (<i>Myriophyllum aquaticum</i>)
Brazilian elodea (<i>Egeria densa</i>)	Variable Milfoil (<i>Myriophyllum heterophyllum</i>)
Autumn Olive (<i>Elaeagnus umbellate</i>)	Europ. Water-Milfoil (<i>Myriophyllum spicatum</i>)
Giant Hogweed (<i>Heracleum mantegazzianum</i>)	European Naiad (<i>Najas minor</i>)
Hydrilla (<i>Hydrilla verticillata</i>)	Yellow Floating Heart (<i>Nymphoides peltata</i>)
European Frogbit (<i>Hydrocharis morus-ranae</i>)	Common Reed (<i>Phragmites australis</i>)
Water-flag (<i>Iris psuedacorus</i>)	Japanese Knotweed (<i>Polygonum cuspidatum</i>)
Blunt-leaved Privet (<i>Ligustrum obtusifolium</i>)	Curly-leaf Pondweed (<i>Potamogeton crispus</i>)
Showy Bush Honeysuckle (<i>Lonicera x bella</i>)	Common Buckthorn (<i>Rhamnus cathartica</i>)
Japanese Honeysuckle (<i>Lonicera japonica</i>)	Glossy Buckthorn (<i>Rhamnus frangula</i>)
Morrow's Honeysuckle (<i>Lonicera morrowii</i>)	Multiflora Rose (<i>Rosa multiflora</i>)
Tartarian Honeysuckle (<i>Lonicera tatarica</i>)	Water Chestnut (<i>Trapa nutans</i>)
Burning Bush (<i>Euonymus alatus</i>)	Japanese Barberry (<i>Berberis thunbergii</i>)
Norway Maple (<i>Acer platanoides</i>)	

More information on prohibited plant species may be found at the following website:

http://www.nh.gov/agric/divisions/plant_industry/

**Table 9
Prohibited Insect Species in New Hampshire**

Honeybee Tracheal Mite (<i>Acarapis woodi</i>)	Asian Longhorned Beetle (<i>Anoplophora glabripennis</i>)
--	---

Hemlock Woolly Adelgid (<i>Adelges tsugae</i>)	Cedar Longhorned Beetle (<i>Callidellum rufipenne</i>)
City Longhorned Beetle (<i>Aeolesthes sarta</i>)	Japanese Beetle (<i>Popillia japonica</i>)
Siberian Silk Moth (<i>Dendrolimus sibiricus</i>)	Viburnum Leaf Beetle (<i>Pyrrhalta viburni</i>)
Elongated Hemlock Scale (<i>Fiorinia externa</i>)	European Chafer (<i>Rhizotrogus majalis</i>)
Redhaired Bark Beetle (<i>Hylurgus ligniperda</i>)	Nun Moth (<i>Symantria monacha</i>)
European Spruce Bark Beetle (<i>Ips typographus</i>)	Brown Spruce Longhorn Beetle (<i>Tetropium fuscum</i>)
Asian Gypsy Moth (<i>Lymantria dispar</i>)	Varroa Mite (<i>Varroa destructor</i>)

XIII. Beneficial Insects

Beneficial insects are a natural way to fight insect pests and protect our environment. When we encourage beneficial insects we are increasing our biodiversity and decreasing our dependency on poisonous chemical controls. Not only are we creating a more beautiful environment, but a safer one as well.

There are two categories of insects considered beneficials, predators and parasites. Predators are organisms that kill and feed on their prey outright. They are generally larger than their prey and must eat lots of prey to complete their development. Parasites are usually smaller and often weaker than their prey. They lay eggs on or within a host insect. The immature larvae use the host for food over time. A parasite will use only one or a few insects for food.

You can entice beneficial insects to your yard and garden by providing them with the three basic necessities: water, food and shelter. In addition, you should avoid using and/or spraying broad-spectrum insecticides. The broad-spectrum insecticides are not selective in that they will kill not only the pest but the beneficial as well. Even the organic pesticides will kill the beneficial insects.

Table 10
Beneficial Insects

Beneficial Insects	Pests They Prey On
Aphid Midge	60 species of aphids (on vegetables, flowers, fruit and shade trees)
Assasin Bug	Many insects including, aphids, Japanese beetles, leaf hoppers, fly larvae, tomato hornworms
Big-eyed Bug	Eggs and small larvae of armyworms, hornworms, loopers, corn earworms, spider mites, aphids, leafhoppers, flea beetles, mealybugs and thrips. One big-eyed bug can eat 12 small caterpillars or leafhoppers per day.
Braconid Wasp	Tomato hornworm, armyworm, cabbageworm, gypsy moth, other caterpillars, beetle larvae, flies, aphids and other insects

Bumblebees, including the Orchard Mason Bee	Extremely important wild pollinators for a variety of fruit and seed crops.
Centipedes	Predators of soil-dwelling pests and insects including slugs, worms and fly pupae. They may also feed on earthworms, but are considered beneficials.
Damsel bugs	Aphids, thrips, leafhoppers, caterpillars, plant bugs and tree hoppers
Damselflies, Darners & Dragonflies	Mosquitoes and small flying insects
Firefly	Many species of pest insects
Ground Beetle	Most species prey on slugs, snails, cutworms and cabbage-root maggots in soil; some pursue prey on plants or trees, such as Colorado potato beetle larvae, gypsy moth and tent caterpillars.
Hoverflies (Flower flies)	Many species of aphids
Honeybee	Extremely important pollinators of fruit, vegetables and agricultural crops. It is estimated that over 80 percent of pollination is done by domestic honeybees. ¹
Ichneumon Wasp	They lay their eggs inside other host insects such as caterpillars, sawfly, beetle larvae and other pests then parasitizes and kills the host.
Lacewing	Soft-bodied insects including aphids, thrips, mealybugs, some scales, moth eggs, small caterpillars and mites.
Lady Beetle (Ladybugs)	Aphids, thrips, mealybugs, mites or soft scales.
Mealybug Destroyer	Mealybugs, scale insects, aphids.
Millipedes	Feed on decaying plant material and are beneficial in breaking down organic matter. May occasionally feed on plant material laying on ground, like strawberries and tomatoes. Also predator of slugs and fly pupae.
Minute Pirate Bug	Will eat anything, but prefer thrips, spider mites, eggs of many insects, small caterpillars, leafhopper nymphs, corn earworms.
Praying Mantis	Almost anything, including other beneficial insects.
Predatory Mite	Spider mites
Predatory Thrip	Eggs and larvae of spider mites, aphids, other thrips, codling moth, Oriental fruit moth, bud moth, peach twig borer, alfalfa weevil, whitefly, leafminer flies and scales.
Rove Beetle	Many are predators of aphids, springtails, nematodes, fly eggs and maggots in the soil; some are parasitic on cabbage-root maggots and larvae of other flies. Many species are scavengers on decaying material.
Spiders	All spiders are predators. Wolf spiders are particularly beneficial to farmers and gardeners because they attack many common garden pests.
Spider Mite Destroyer	Many species of spider mites, especially in unsprayed raspberry patches.
Spined Soldier Bug	Many species of hairless caterpillars and beetle larvae including fall armyworm, sawfly larvae, Colorado potato beetle and Mexican bean beetle larvae.

¹ Rodale's Successful Organic Gardening – Controlling Pests and Diseases, 1994

Tachinid flies	Many species of caterpillars, including cutworms, armyworms, tent caterpillars, cabbage looper, gypsy moth; some attack sawflies, Japanese beetle, May beetle, squash bugs, green stink bugs and sowbugs.
Tiger beetles	Both adults and larvae prey on a wide variety of insects, but are considered mostly beneficial.
Trichogramma Wasps	Eggs of over 200 species of moths, including spruce budworm, tomato hornworm, corn earworm, corn borers and codling moth.
Water Boatmen	Mosquito larvae underwater
Water Strider	Mosquitoes at water's surface
Yellow Jackets	Adults seize large numbers of caterpillars, flies, beetle grubs and other insects to feed their young.

XIV. Wildlife Habitat

South Hampton's forests, grasslands, farmland, and rivers provide rich and diverse habitat for numerous animal species. An on the ground inventory of animals for South Hampton has never been conducted, so the true extent of special habitats, rare species and common species is unknown. However, the 2006 New Hampshire Fish and Game Wildlife Action Plan provides a snapshot of South Hampton's wildlife habitat. These special habitats and unfragmented natural lands need to be conserved in order to prevent common species from becoming rare and rare species from being extirpated from New Hampshire.

The New Hampshire Fish and Game Wildlife Action Plan may be found at the following website: http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm

Unfragmented Open Space - Large blocks of forest, wetlands and farmland that are unfragmented by development or public roads are valuable for many reasons, since they:

- provide essential forest interior habitat for species such as some songbirds that need to be distanced from human activity, pets, and the forest edge in order to survive.
- provide habitat for mammals that have large home ranges and prefer to avoid human contact, such as bobcat, otter, and moose.
- enable owners of large parcels of forestland to conduct timber harvests that are economically viable.
- minimize conflicts that can arise when managed forests and farms are surrounded and interspersed with development.
- offer opportunities for remote recreation, including hunting, hiking, birdwatching, horseback riding, cross country skiing, fishing, and snowmobiling, where landowners allow.

Larger fragments are more likely to support viable populations of species and therefore act as a source of individuals that can then move to another fragment. Small fragments may be unable to support breeding populations. Persistent fragmentation may also lead to genetic changes and a loss of genetic diversity as populations are subdivided into small locally breeding populations.

Table 13 lists the types of habitat found in South Hampton as determined by the NH Fish and Game as part of the 2006 Wildlife Action Plan.

Table 11
Wildlife Habitat Acres, Acres Conserved and Percent Conserved
Source: NH Fish and Game Wildlife Action Plan, 2006

Habitat Type	Acres	Acres Conserved	Percent Conserved
Appalachian Oak-Pine	3915.3	228.2	5.8
Hemlock-Hardwood Pine	582.5	19.7	3.4
Grasslands over 25 acres	760.9	11.7	1.5
Floodplain Forest	1004.0	33.2	3.3
Wet Meadow/Shrub Wetland	303.5	17.5	5.8
Peatland	273.7	7.6	2.8

Conserving these large blocks and connections between other significant habitat areas is important if residents want to retain the species that need larger and diverse home ranges and territories. Some areas should be studied further because the extent of unfragmented lands extends significantly into an adjacent Town making that block more important. Habitat block size requirements for various animals are currently a subject of much study. The following data are from a draft Fish and Game Habitat Manual Analysis dated January 26, 2004.

Grasslands - Grasslands are an ever diminishing and crucial requirement for many birds, including meadowlarks, bobolinks, woodcock, and killdeer which are under increasing pressure from loss of habitat. The 2006 NH Fish and Game Wildlife Action Plan estimates there are 760.9 acres of grasslands in South Hampton, with only 1.5% of these lands protected from development through conservation easements.

Table 12
Bird Species Observed in South Hampton

American Black Duck	Downy Woodpecker	Pileated Woodpecker
American Crow	Eastern Bluebird	Pine Grosbeak
American Goldfinch	Eastern Screech-Owl (red morph)	Pine Siskin
American Robin	Eastern Wood-Pewee	Purple Finch
American Kestrel	European Starling	Red-breasted Merganser
American Tree Sparrow	Evening Grosbeak	Red-breasted Nuthatch
Bald Eagle	Fox Sparrow	Red-eyed Vireo
Baltimore Oriole	Gold-crowned Kinglet	Red-shouldered Hawk
Barn Swallow	Gray Catbird	Red-tailed Hawk
Barred Owl	Great Black-backed Gull	Red-winged Blackbird
Belted Kingfisher	Great Blue Heron	Ring-billed Gull
Black-and-white Warbler	Great Horned Owl	Rose-breasted Grosbeak
Black-capped Chickadee	Great-crested Flycatcher	Ruby-throated Hummingbird
Black-throated Green Warbler	Greater Yellowlegs	Rufous-sided Towhee
Blackburnian Warbler	Hairy Woodpecker	Scarlet Tanager
Blackpoll Warbler	Hermit Thrush	Sharp-shinned Hawk
Blue Jay	Herring Gull	Song Sparrow
Bobolink	Hooded Merganser	Tree Swallow
Broad-winged Hawk	Eastern Kingbird	Tufted Titmouse
Brown Creeper	Eastern Phoebe	Turkey Vulture
Brown Thrasher	House Finch	Veery
Brown-headed Cowbird	House Sparrow	Purple Martin
Bufflehead	House Wren	Red-bellied Woodpecker
Canada Goose	Indigo Bunting	White-breasted Nuthatch
Canada Warbler	Least Flycatcher	White-crowned Sparrow
Cedar Waxwing	Killdeer	White-throated Sparrow
Chestnut-sided Warbler	Lesser Yellowlegs	Wild Turkey
Chipping Sparrow	Loon	Wood Thrush
Common Flicker	Mallard Duck	Wood Duck
Common Goldeneye	Mourning Dove	Yellow-bellied Sapsucker
Common Grackle	Mute Swan	Yellow Warbler
Common Merganser	Northern Cardinal	Woodcock
Common Raven	Northern Harrier	
Common Redpoll	Northern Flicker (yellow-shafted)	
Common Yellowthroat	Northern Mockingbird	
Cooper's Hawk	Osprey	
Dark-eyed Junco (slate-colored)	Olive-sided Flycatcher	
Double-crested Cormorant	Pheasant	

Table 13
Mammal Species Observed in South Hampton

American Beaver	Eastern Cottontail	Red Squirrel
Big Brown Bat	Eastern Gray Squirrel	River Otter
Black Bear	Eastern Pipistrel Bat	Short-tail Weasel
Brown Rat	Fisher	Southern Flying Squirrel
Common Gray Fox	Hairytail Mole	Starnose Mole
Common Muskrat	Little Brown Myotis (Bat)	Striped Skunk
Common Porcupine	Long-tailed Jumping Mouse	Virginia Opossum
Common Raccoon	Meadow Vole	White-footed Mouse
Coyote	Mink	White-tailed Deer
Eastern Chipmunk	Red Fox	Woodchuck

Table 14
Amphibians & Reptile Species Observed in South Hampton

Eastern Newt (Red-spotted)	Gray Tree Frog	Common Snapping Turtle
Eastern Red-backed Salamander	Green Frog	Spotted Turtle
Spotted Salamander	Wood Frog	Wood Turtle
American Toad	Eastern Painted Turtle	Eastern Ribbon Snake
Spring Peeper	Blanding's Turtle	Common Garter Snake
Milk Snake		

Significant Habitats

All wildlife needs food, shelter, water and space to survive. These life requirements are defined as an animal's habitat. Animals use a variety of strategies to find food, water and shelter in the environment and it is these strategies that determine the habitat needs for each species. Habitat is everywhere, yet some habitat is more important to wildlife than others. Habitat is more significant when it supports a rare species, represents a smaller percentage of the landscape, provides an abundance of food or other resources, provides a buffer for wildlife against the effects of development, and supports several types of habitat.

The following habitat types are considered to be significant in New Hampshire:

- **Habitat of Rare Wildlife Species** – examples include bald eagle wintering areas, peregrine nesting cliffs, common loon nesting areas and Great Blue Heron rookeries.
- **Unfragmented Lands** – Large tracts of contiguous habitat that include a mix of forests, wetlands, riparian areas or other habitat which support wide-ranging mammals and forest interior birds.

- **Riparian Areas and Large Wetlands** – Riparian areas along water courses, especially those areas that connect river corridors, wetlands and unfragmented lands. Large wetlands or wetland complexes that support a variety of wetland dependent wildlife.
- **Agricultural and Other Open Land** – Large fields and shrub lands that support species dependent on this open land type. This habitat has been disappearing in South Hampton as farmland is converted to development or reverts back to forest.
- **Other Unique or Critical Habitats** - This habitat type is divided into the following groups:
 - Habitat that is rare statewide, for example pine barrens;
 - Habitat that is rare in a particular geographic area, for example mountains in southern New Hampshire;
 - Uncommon land features which provide unique conditions for certain species, for example denning sites in rock piles;
 - Habitat critical to certain species during a particular phase of their life cycle or a particular time of the year. Examples include vernal pools, waterfowl migration stop-over sites and deer wintering areas, all of which are found in South Hampton. Large wetlands are valuable stop-over sites for migrating waterfowl in the spring and fall. Canada and Brant geese, mergansers, pied-billed grebes, mallards, and many other species rest and feed here. Migrating geese also feed in the stubble of South Hampton cornfields in the late fall. Seeps or seepage wetlands are generally small areas (less than ¼ acre) that occur where groundwater comes to the surface. These sites are the first to green-up in the spring and are frequented by a variety of wildlife for that reason. Dependent species include bear, deer, moose, turkey, salamanders, migrating birds and woodcock.

XV. Fisheries

Fishing is a popular hobby and South Hampton’s fisheries are an important natural resource. It is important to keep in mind that many of our fish have been contaminated by mercury and other pollutants. Before eating any fish, consult with the most recent advisories as to what is a safe consumption level.

Table 15
Freshwater Fish Species
May be present in South Hampton

Brook Trout	Largemouth Bass	Yellow Perch
Rainbow Trout	Pickrel	
Brown Trout	Horned Pout	
Lake Trout	White Perch	
Whitefish	Black Crappie	
Smallmouth Bass	Blue Gill	

Recommendations to Protect Wildlife Habitat:

South Hampton's wildlife, and the habitat that it requires, is an important component of the rural character of the town that is so important to its residents. Because the habitat maps highlight large, unfragmented blocks of land and wetlands, conserving key wildlife habitats will also work towards preserving rural character and water quality.

- Partner with land conservation organizations and surrounding municipalities in the region to protect critical areas identified by the Southeast Land Trust of New Hampshire, NH Fish and Game, Audubon Society of NH, and the Society for the Protection of NH Forests.
- Support the protection of riparian corridors by enforcing wetland buffer protections in the Town's Wetland Ordinance and educating landowners about the important role riparian buffers have in the protection of water quality and wildlife habitat.
- Continue to protect large parcels of unfragmented land from development.
- Minimize impacts to significant habitat during development by continuing to require that a natural resource inventory be completed prior to subdivision or site plan approval.
- Apply principles of conservation design to minimize the impacts of development and preserve natural undeveloped lands.
- Work with surrounding communities to identify and conserve wildlife corridors.
- Identify and conserve wildlife corridors through parcels to facilitate wildlife movement across developed areas.
- Educate the public about the value of wildlife habitat.

XVI. Regional and Statewide Natural Resource Inventories

New Hampshire Fish and Game Wildlife Action Plan (WAP) - The WAP is the most comprehensive wildlife assessment ever completed in New Hampshire, identifying 123 species and 27 habitats in greatest need of conservation. The purpose of the WAP is to provide decision makers with information that encourages sustainable development in sensitive wildlife areas, and considers proactive strategies for land protection. The WAP may be found at the following website:

http://www.wildlife.state.nh.us/Wildlife/wildlife_plan.htm

Wildlife habitat is categorized in the following ways in the WAP:

- Tier 1 – Highest quality habitat in NH
- Tier 2 – Highest quality habitat in a biological region
- Tier 3 – Supporting landscapes

The amount of acres in each of these four categories was calculated for South Hampton, as was the number of acres conserved in these categories. It is important to note that almost 17% of South Hampton is classified by NH Fish and Game as Tier 1 – the highest quality habitat in the state. Table 18 lists this information.

Table 16
Summary of Wildlife Action Plan Habitat Tiers

Tier 1	871 acres 16.9% of land in South Hampton
Tier 1 Acres Conserved	96.8
% of Tier 1 Acres Conserved	11.1%
Tier 2	1078 acres 20.9% of land in South Hampton
Tier 2 Acres Conserved	39.3
% of Tier 2 Acres Conserved	3.6%
Tier 3	13780 acres 26.8% of land in South Hampton
Tier 3 Acres Conserved	90.0
% of Tier 3 Acres Conserved	6.5%

Habitat Types Found in South Hampton

- **Appalachian Oak-Pine Forests** – South Hampton has 3,915 acres of this habitat type, which is characterized as being found mostly below 900 feet elevation in southern New Hampshire and along the Connecticut River in western New Hampshire. The nutrient-poor, dry, sandy soils and warm, dry, climate influences the typical vegetation including oak, hickory, mountain laurel, and sugar maple. Many wildlife species use these forests for part or all of their life cycle including whip-poor-wills, black bears, northern myotis, and state endangered eastern hognose snakes. Traditionally, Appalachian oak-pine forests are influenced by frequent fires, which change the age structure of the forest. The diverse age and structure of the forest help to promote wildlife diversity. Intense

development pressure particularly in the southeast corner of New Hampshire has dramatically reduced naturally occurring fires and increased fragmentation of this forest type. Incorporating habitat conservation into local land use planning, protecting unfragmented blocks, and adopting sustainable forestry are a few examples of conservation strategies for Appalachian oak-pine forests.

- **Hemlock Hardwood-Pine Forests** – South Hampton has 582 acres of this habitat type, which is comprised of mostly hemlock, white pine, beech, and oak trees. Since this is a transitional forest, it can occur at different elevations and over different types of soil and topography, so the composition of vegetation can be variable. This forest type is the most common in New Hampshire and covers nearly 50% of the state and provides habitat for numerous wildlife species such as the cerulean warbler, eastern pipitrelle, and bobcat. Many of the species that use this habitat type require large blocks of unfragmented forest such as the northern goshawk and black bear. Since this forest type is so common, it is sometimes overlooked in conservation efforts. Development and fragmentation is a huge threat to the continued existence of hemlock-hardwood-pine forest. Some conservation strategies for hemlock-hardwood-pine forests are incorporating habitat conservation into local land use planning, protecting unfragmented blocks of land, and educating landowners.
- **Grassland** – South Hampton has 761 acres of this habitat type, which is comprised of grasses, sedges, and wildflowers with little to no shrubs and trees. The most common grassland habitats are airports, capped landfills, wet meadows, and agricultural fields such as hayfields, pastures and fallow fields. Pre-colonial grasslands in New Hampshire were probably only maintained by beaver and fires started by lightning and Native Americans. The numerous agricultural lands maintained by early European settlers provided ideal habitat for some wildlife species that need grassland habitat. As these agricultural lands were abandoned, these populations began to decline and are now on the state endangered list such as the eastern hognose snake, northern harrier, upland sandpiper and on the state threatened list such as the grasshopper sparrow. Other species also benefit from these open grass fields such as wood turtles and numerous species of butterflies. Development and natural forest succession have reduced grassland habitat in the state. Grasslands require maintenance and must be mowed to prevent them from becoming shrublands or forests. Only 8% of NH grasslands are currently under conservation easements. Reclaiming and maintaining grasslands are two important conservation strategies for grassland habitats. Many grassland and potential grassland habitat are on private land and landowners can help restore and conserve them.
- **Floodplain Forest** – South Hampton has 1,004 acres of this habitat type, which occurs in valleys adjacent to river channels and are prone to periodic flooding. Also referred to as

riparian forests, they support diverse natural communities, protect and enhance water quality by filtering and sequestering pollution, and control erosion and sediment. Many wildlife species use these forests at some point in their life cycle. It would not be uncommon to find red-shouldered hawks, veery, or chestnut-sided warblers breeding in floodplain forests. Evidence of beaver, mink, or otter can usually be found along the water's edge. Other wetlands, like swamps and vernal pools, can be found in floodplain forests and these areas are particularly important for Jefferson salamanders, northern leopard frog, wood turtles, and state endangered Blanding's turtles. Since these species, like most wildlife species, use a variety of habitats, not only is a floodplain forest important but the adjacent upland is also crucial for these species. Floodplain forests with their rich soils have been converted to open farmland for centuries, so many floodplains are no longer forested wildlife habitat. Other human activities have threatened these habitats including residential and commercial development along rivers and the installation of dams which have altered the natural flooding regime. Floodplain habitats are particularly vulnerable to invasive plants because the frequent disturbances from flooding give aliens opportunities to establish, and because these species tend to thrive in the nutrient rich soils characteristic of floodplains. Annual flooding can control these invasives, if the natural flood regime is not altered. Some conservation strategies for maintaining this unique habitat type in the state are managing river impoundments to simulate natural water flows, removing dams where possible, and protecting the highest quality sites. Many floodplain forests are on private land and landowners can help restore and conserve them.

- **Marsh and Shrub Wetlands** – South Hampton has 303 acres of this habitat type, which is characterized by a broad range of flood regimes, sometimes controlled by the presence or departure of beavers, but mostly controlled by groundwater. This system, which is an important food source for many species, is often grouped into three broad habitat categories: wet meadows, emergent marshes, and scrub-shrub wetlands. Marsh and shrub wetlands filter pollutants, preventing them from getting into local streams, and help hold water to reduce flooding. Many wildlife species use marsh and shrub wetlands including common species like red-winged blackbirds, beavers, and painted turtles. Marsh and shrub wetlands are also critically important for state endangered Blanding's turtles, New England cottontails, northern harriers, ringed boghaunters, and sedge wrens plus state threatened spotted turtles and pied billed grebes. Development is a threat to these habitats mostly from driveways and roads that fragment wetlands or change the flow of water. The loss of an upland habitat around a marsh or shrub wetland also increases the amount of pollution and sedimentation threatening the habitat. Another constant threat to marsh and shrub wetlands is invasive plants such as purple loosestrife and Japanese knotweed that compete with native vegetation. Some conservation strategies for marsh and shrub wetlands are restoration and protection of these important habitats. Many marsh and shrub wetlands are on private land and landowners can help restore and conserve them.
- **Peatlands** – South Hampton has 274 acres of this habitat type. Peatland habitats are

extremely important for carbon sequestration on a local and global scale. The water in peatlands has low nutrient content and typically high acidity caused by limited groundwater input and surface runoff. These environmental conditions are such that plant and animal material take a very long time to decompose. This organic material contains carbon and other nutrients, storing it away and slowly releasing it into the atmosphere. Drainage and destruction of peatlands releases this carbon into the atmosphere quicker, increasing greenhouse gases today. Conservation of the 11 different natural communities that comprise peatlands is also vital to the continued existence of many rare plant and wildlife species in New Hampshire. The state endangered ringed bog haunter uses peatlands and the surrounding uplands in the southern part of the state. The northern bog lemming inhabits burrows in the sphagnum moss and associated grasses. Typical vegetation in a peatland includes sphagnum moss, leather leaf, northern white cedar, and American larch. Threats to peatland habitats are development, altered hydrology (amount and flow of water), and unsustainable forest harvesting. Non-point source pollutants, such as road salt, lawn fertilizers, and pesticides, also threaten this habitat by altering the acidity and nutrients. Establishing buffers around this habitat is one conservation strategy that will help minimize the threats to peatland habitats.

Profiles of all these habitat types may be found at the following website:

http://www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/habitat_types.htm

Natural Services Network - The natural world provides the foundation for human health and economic vitality. Natural systems store floodwaters, cleanse air and water, maintain productive soils for agriculture and forestry, support wildlife, recycle wastes, moderate temperature extremes, and more. The free benefits provided by nature are called *natural services*.

The New Hampshire Natural Services Network is a GIS-based tool identifying lands that provide important ecological services that are difficult and expensive to replicate. These areas are classified as:

- Water supply lands, including aquifers and gravel well sites identified by the NH Department of Environmental Services;
- important wildlife, as identified by the NH Fish and Game Wildlife Action Plan (WAP);
- productive soils, including prime farmland and farmland of statewide importance identified by the Natural Resource Conservation Service, and;
- flood storage, including the 100-year floodplains identified by FEMA and wetlands identified by the US Fish and Wildlife Service National Wetlands Inventory.

Approximately 3,111 acres in South Hampton are classified as providing natural services as described above. Loss of these services affects human health, safety, quality of life, and economic opportunity.

XVII. Conservation Land

South Hampton has several parcels of land that have been permanently protected from future development due to the actions taken by landowners, land conservation organizations, and the State of New Hampshire. This protection takes the form of easements placed on the land that restrict the type of activity that can take place on the parcel and the sale or donation of the fee simple ownership of a parcel to a land conservation organization or the Town.

**Table 17
Conservation Land in South Hampton**

Parcel Name	Acreage in So. Hampton	Location	Current Owner	Easement Holder	Public Access
Briggs	23	Map 5, Lot 38	Pine Tree Trust	Society for the Protection of NH Forests	Yes, via Rt. 107 in Kensington
Brunet	5.7	Map 2, Lot 35-2	Town of South Hampton	unknown	Yes, via Powwow River State Forest
Burrows-Brookside Sanctuary	11.3	Map 6, Lot 6	Audubon Society of NH	unknown	Yes, via small parking area on Woodman Road
Burrows-Brookside Sanctuary	20	Map 6, Lot 5	Audubon Society of NH	unknown	Yes, via small parking area on Woodman Road
Capp Farm	16.5	Map 2, Lots 11 & 81	Capp Farm Trust	Town of South Hampton	Unknown
Cowden State Forest	18.3	Map 2, Lot 32	State of NH	None	Yes, off Whitehall Road
Crosby	113	Map 5, Lot 43 and Map 6, Lot 47	Henry Crosby	Town of South Hampton	Yes, via parking area on Woodman Road through Burrows-Brookside Sanctuary
Easton Hill	35	Map 5, Lot 21	Whippoorwill Realty Trust	Howfirma Trust	Yes

Powwow River State Forest	52	Map 2, Lot 36	State of NH	None	Yes, via baseball field on Hilldale Avenue
---------------------------	----	---------------	-------------	------	--

In addition to the above conservation efforts, the Howfirma Trust, a private, non-profit organization, works to conserve land in South Hampton. The Trust owns thirteen properties in South Hampton, Kensington, East Kingston, and Newton. The purpose of the Trust, as stated on its website are: “(i) the preservation, protection, or enhancement of land in its natural, scenic, historical, agricultural, forested or open-space condition or use; (ii) the preservation, protection and enhancement of wildlife habitat and/or wildlife; (iii) education of the public on issues relative to the above mentioned purposes of the Trust; and (iv) the purchase of land and easements or development rights in order to facilitate the above.”

Recommendations regarding Conservation Land:

- Maintain communication with large landowners in town about conservation objectives.
- Organize nature walks in town.
- Consider building nature trails on conservation land where permitted.
- Collaborate with other towns along the Powwow River concerning conservation and recreation.
- Explore possibilities for model forestry and wildlife plans on the Powwow River State Forest and the Cowden State Forest.

XVIII. Current Use Assessment – NH RSA 79-Current Use Assessment provides a property tax incentive to all qualifying landowners who agree to maintain their land in an undeveloped condition. This assessment is based on the capacity of the land to produce income in its current use-whether it is managed farm or forest, or unmanaged open space. Current Use is the cornerstone of the state's land conservation efforts, with over half the land in New Hampshire is enrolled in this valuable program.

The minimum requirements for land to be enrolled in the Current Use program are:

- 10 or more acres of land that is undeveloped and with no structures;
- A tract of wetland of any size less than 10 acres; wetlands larger than 10 acres are not eligible because of state regulations;
- A certified Tree Farm of any size;

- A tract of undeveloped land of any size that is actively devoted to the growing of agricultural or horticultural crops have an annual gross income from the sale of crops totaling at least \$2,500.

It is important to note that land enrolled in current use is not deed restricted and may be eligible for development. For more information, visit www.nhspace.org

XIX. Conclusion and Recommendations

South Hampton enjoys generous natural resources which will continue to thrive under proper stewardship. Given its unique setting among communities that have experienced much greater development, residents' actions now will make sure that these resources flourish and endure. This effort will reap everlasting benefits for the town and the entire region.

Recommendations:

1. Provide the public with information and education using the Natural Resources Inventory (NRI) as a tool.
2. Incorporate aspects of the NRI into planning at the town and regional levels.
3. Facilitate open discussions with landowners to promote conservation easements, wildlife habitat, farming, forestry, and recreation.
4. Foster attitudes of long-term land and resource stewardship for public and private lands.
5. Encourage collaboration among adjacent and neighboring landowners for mutual benefits.
6. Promote land protection along the Powwow River, including in neighboring towns.
7. Expand conservation lands in town from the current 6% to 25% by 2025.
8. Consider a town bond for purchasing conservation easements. Such a bond may be appropriate when the school bond has been fully paid.
9. Develop relationships with established conservation partners and funding sources such as land trusts, government agencies and UNH Cooperative Extension.
10. Establish a South Hampton website to allow greater collaboration on these efforts.
11. Enjoy! Help people experience all the natural beauty that the town has to offer.

