Wolfeboro, New Hampshire

Natural Resources Chapter of the Master Plan

Adopted July 19, 2011
Planning Board

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"THOSE WHO NEVER

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ELEANOR ROOSEVELT

1.0 INTRODUCTION

Known as America's oldest summer resort, the Town of Wolfeboro is a popular tourist location in New Hampshire due to its close proximity to Lake Winnipesaukee, its scenic beauty, and its small town New England character. Settled in 1768, the Town began as a small farming community, not fully flourishing in tourism until 1872. In 2011 Wolfeboro continues to flourish, with a seasonal population that is more than double year-round population.

However, tourism is not the only distinguishing feature of the Town. Wolfeboro has a vast landscape comprised of lakes and ponds, hills and mountains, and natural resources abound, including important land resources, aquifers, surface waters, wetlands, wildlife, and others. These natural resources are highly important to the quality of life in Wolfeboro and provide many other benefits for its residents.

This Natural Resources Inventory (NRI) is information intended to be a resource for town officers, landowners and citizens who are interested in the management and protection of Wolfeboro's natural resources. This NRI covers land resources, soils, water resources, forest and agricultural resources, land conservation, wildlife, and recreational resources. The NRI goes on to analyze current mechanisms for protection that Wolfeboro has for these resources, analyzes this protection, and makes recommendations where necessary to improve protection of specific natural resources. This NRI will be used to update the Natural Resource Chapter of the Wolfeboro Master Plan.

The project goals for the Planning Board update of the Natural Resources Chapter are as follows:

- To fulfill the Town's objective under the Future Land Use category in the Town's 2007 Master Plan to properly utilize and preserve the natural resources of the Town.
- To fulfill the needs of the Planning Board for scientifically based data to enable them to make important decisions for future natural resource and smart growth planning.
- Information provided in this NRI was collected from a variety of sources, which are listed at the end of the report. Citizen input was gathered at a series of public meetings sponsored by the Wolfeboro Planning Board in 2009, the 2006 Wolfeboro Planning Survey, 2009 GRANIT GIS data and other 2009 data relative to regulations and ordinances in Wolfeboro.
- As these data upon which the NRI was completed are constantly changing, it is important to update the NRI and Natural Resource Chapter as new data and new mapping capabilities become available.

2.0 LAND RESOURCES

The Town of Wolfeboro is 37,405 acres in size with land covering approximately 30,693 acres, or 82 percent of the Town. Surface water covers the remaining 18 percent of the Town. When compared to other towns in New Hampshire, Wolfeboro is one of the largest, smaller than only twenty seven towns out of the 258 New Hampshire towns.

Topography, or the surface configuration of the land, is a major factor in the soil development process. Topography modifies the soil-profile development in three ways: (1) by influencing the quantity of precipitation absorbed and retained in the soil, thus affecting soil moisture; (2) by influencing the rate of removal of the soil by erosion; and (3) by directing movement of materials in suspension or solution from one area to another. Topography indirectly plays another role in soil development by influencing the supply of moisture available for plant growth. It also has an effect on the agricultural value of the land because it is related not only to drainage conditions but also to the ease of performing tillage operations.

Usually defined in terms of elevation (height above mean sea level) and slope (expressed as the percent of the change in the vertical distance over a horizontal distance), topography plays a role in the effects of human activity on other natural resources. As a result it is necessary for local zoning to consider topographical characteristics, particularly the slope of the land, when planning for land use within the Town.

Elevation affects the temperature and climate of the land surface, thus affecting the soil building processes. Elevation changes give rise to views and scenic vistas. Elevations within Wolfeboro range from a low of 504 feet at Lake Winnipesaukee to a high of 1,420 feet in the Clark, et al, conservation easement, located near the Ossipee border.

Figure 2 displays the topographic relief of Wolfeboro using 20' contour intervals. High points of elevation that are named on the US Geological Survey (USGS) 7.5 minute topographic quadrangles are labeled on **Figure 2** as well as eighteen scenic vistas. Scenic vistas are discussed further in Section 2.2.. The Town of Wolfeboro has designated scenic roads in accordance with the provisions of RSA 253 Sections 17 and 18. The designated scenic roads are also displayed on **Figure 2** and are further discussed in Section 2.2

2.1 STEEP SLOPES

The NH Department of Environmental Services (NHDES) website suggests that most communities define steep slope as having a grade of 15% or greater; meaning that the vertical elevation increases by 15 feet over a horizontal distance of 100 feet. Steep slopes are important to consider in land use planning because they can have severe and unexpected impacts to natural

resources as a result of development. Any change in equilibrium, whether caused by natural phenomena or human activity, can cause erosion and landslides. Also, road access can be difficult where slopes are steep.

In the Soil Survey of Carroll County published in 1977, the Natural Resources Conservation Service (NRCS) uses the following slope categories:

A: 0 – 3%
B: 3 – 8%
C: 8 – 15
D: 15 – 25%
E: >25%

Figure 3 shows steep slopes with a severe potential for development within Wolfeboro.

Using data from GIS analysis of NRCS soil map unit slope classes as shown on **Figure 3**, the following is a breakdown of steep slopes with severe development limitations in Wolfeboro:

Table 1: Steep Slopes

Steep Slope	Limitation	Acres
15 – 25% (D)	Severe	4,642 Acres
>25% (E)	Severe	1,975 Acres

Natural Resources Conservation Service; August 2009

Although steep slopes can present severe constraints to development, the slopes also provide Wolfeboro with various levels of higher elevation, including the various mountains and summits.

Table 2 lists summits found within Wolfeboro, along with their elevation. These summits are displayed on **Figure 2**.

Table 2: Wolfeboro Summits & Elevations

Summit	Elevation	Summit	Elevation
Whiteface Mountain	1339 ft.	Tibbett's Hill	1278 ft.
Trask Hill	1320 ft.	Unnamed	1229 ft.
Batson Hill	1300 ft.	Mt. Long Stack	1223. ft.
Moody Mountain	1280 ft.	Cotton Mountain	1040 ft.
Clow's Hill	960 ft.	Poor Farm Hill	856 ft.
Center Square Hill	959 ft.	Brown's Ridge	840 ft.
Bennett Hill	940 ft.	Outlook Hill	760 ft.
Mt. Delight	893 ft.	Pine Hill	730 ft.
Furber Hill	869 ft.		

2.2 SCENIC RESOURCES

Wolfeboro takes great pride in maintaining the various scenic resources located within the Town. This includes scenic vistas, viewsheds, designated roads, and other various scenic locations. **Table 3** lists the scenic vistas located in Wolfeboro, along with their corresponding viewing locations. These locations are displayed on **Figure 2**.

Table 3 Scenic Vistas & Direction of View

Scenic Vista	Direction	Scenic Vista	Direction
Abenaki Ski Trail	NNE	Goodwin's Basin	E
Beach Pond Road	W	Hidden Valley	360 Degrees
Brewster Academy	W	Kingswood Golf Club	360 Degrees
Brewster Beach	W	Kingswood School	E/NE
Carry Beach	NW/SE	Libby Museum	SW
College Rd.	SE	Pleasant/Sewall Street	SW/E
Cotton Mountain	W	Pork Hill Rd.	SW
Dockside	SW	Wentworth State Park	S
Fernald's Basin	E	White Face Summit	NW/NE

As mentioned in the 2007 Master Plan, RSA 253 Sections 17 and 18 allows towns to designate by town meeting vote any road (other than Class I or Class II state highways) as a scenic road. The main purpose of a scenic road designation is to help protect the scenic qualities of that road. The designation of a road as "scenic" is a declaration by the Town that the road has important visual qualities which must be recognized and treated with care.

The following are the roads currently designated as "scenic" in Wolfeboro.

Avery Rd.	*Dallas Rd.*
Cotton Mountain Rd.	*Chick Rd.*
Pleasant Valley Rd.	*Haines Hill Rd.*
Trask Mountain Rd.	*Sewall Rd.*
Bickford Rd.	*Cowper Rd.*
Cotton Valley Rd.	*North Wolfeboro Rd.*
Pork Hill Rd.	*Stoneham Rd.*

3.0 SOIL RESOURCES

Soil is an exceptionally important resource that affects how land should and should not be used. Because of this, it is important to understand the properties of soil, which are essential in managing and preserving natural resources. The Natural Resources Conservation Service (NRCS) evaluates and inventories soil throughout the United States using its Soil Survey Program, to identify what soils are located where and to make recommendations as to how they can be used. These surveys provide information that is intended to help sustain soil resources for food production, forest products, land use planning, water quality, and wildlife habitat.

Many people use soil surveys, including farmers, foresters, community officials, engineers, builders, developers, conservationists, teachers, students, and planners from towns, regions and states. Soil surveys contain important information for all types of land users, and include soil maps and detailed data tables.

The soil survey for Carroll County is out-of date. The survey, which was publicized in 1977, can be found on the NRCS website at http://www.nh.nrcs.usda.gov. However, a maintenance project was performed and SSURGO certified in 2006, available in digital format, CD and update pending.

3.1 IMPORTANT AGRICULTURAL SOILS

Important agricultural soil is a diminishing resource in New Hampshire. Once developed, these soil resources are gone forever. Because of this, it is important to identify and protect important agricultural soil resources. **Figure 4** portrays important agricultural soils found in Wolfeboro.

According to NRCS, the Farmland Protection Policy Act of 1981 was established to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses, and to assure that Federal programs are administered in a manner that, to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland. The following criteria define farmland in New Hampshire for the purpose of carrying out the provisions of the Farmland Protection Policy Act of 1981, P.L. 97-98, December 22, 1981.

In order to be considered **Prime Farmland**, soil must have the following characteristics:

- Have the ability to grow commonly cultivated crops adapted to New Hampshire in seven or more years out of ten;
- Have no water table, or a water table that is maintained at a sufficient depth during the cropping season allowing cultivated crops common to New Hampshire to be grown;
- Are not frequently flooded during the growing season (less than a 50 percent chance in any year or the soil floods less than 50 years out of 100);

- The product of the erodibility factor times the percent slope is less than 2.0, and the product of soil erodibility and the climate factor does not exceed 60;
- Have a permeability rate of at least 0.06 inches per hour in the upper 20 inches;
- Have less than ten percent of the upper six inches consisting of rock fragments larger than 3 inches in diameter;

In order to be considered soil of **Statewide Importance**, soils have the following characteristics:

- Are not prime;
- Have slopes of less than 15 percent;
- Are not stony, very stony, or bouldery;
- Are not somewhat poorly, poorly or very poorly drained;
- Includes soil complexes comprised of less than 30 percent shallow soils and rock outcrop and slopes do not exceed 8 percent;
- Are not excessively drained soils developed in stratified glacial drift, generally having low available water holding capacity.

The following characteristics distinguish soils of **Local Importance**:

- Are poorly drained, have artificial drainage established and are being farmed;
- Specific soil map units identified from the NRCS county soil survey legend as determined by the Conservation District.

There is also a category called Unique Farmland. This is farmland that is used for the production of specific high-value food and fiber crops in New Hampshire, but is not considered prime farmland. Sites represent a special combination of soil quality, location, growing season and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. In order to qualify as unique farmland, a high-value food or fiber crop must be actively grown. In New Hampshire, unique farmland crops include, but are not necessarily limited to apples, peaches, pears, plums, strawberries, raspberries, cranberries, blueberries, pumpkins, squash, and tomatoes.

Areas of unique farmland are site specific and cannot be related to soil map units. Because of this, they are not identified in the NASIS database. Data on existing farms in Wolfeboro was not available during the preparation of this inventory.

The areal extents of important agricultural soils in Wolfeboro as displayed on **Figure 4** are listed below:

Prime Farmland	2,171 Acres
Local Importance	15,022 Acres
Statewide Importance	5,336 Acres

3.2 IMPORTANT FOREST SOILS

Forests provide many vital resources, including clean air and water, biodiversity, habitat for wildlife, etc. Because of this, it is important that the foundation of these forests – the soil – is classified and monitored.

In New Hampshire, forest soils have been classified for their productive value and operability. The IA, IB, and IC soils are the most valuable for ecologically sensitive and economically viable forest management. The description of these soils varies for each soil survey area.

Figure 5 portrays the various forest soils in Wolfeboro, as well as their soil classifications.

Table 4 contains the descriptions of these soil classes for the Carroll County Soil Survey as well as the areal extent of soils for each classification.

Table 4: Forest Soil Capability Classifications

Soil Class	Description	Acreage in Wolfeboro
IA	Deeper, loamy textured moderately well to well-drained soils. Generally are more fertile and have the most favorable soil moisture relationships.	11,225 Acres
IB	Generally sandy or loamy textures and slightly less fertile than those in group IA. These soils are moderately well and well-drained. Soil moisture is adequate for good tree growth, but may not be quite as abundant as in group IA soils.	9,905 Acres
IC	Outwash sands and gravels. Soil drainage is somewhat excessively to excessively drained and moderately well drained. Soil moisture is adequate for good softwood growth, but is limited for hardwoods. Ideally suited for forest management.	902 Acres

Soil Class	Description	Acreage in Wolfeboro
IIA	This diverse group includes many of the same soils as in groups IA and IB. However, they are separated due to physical limitations which make forest management more difficult and costly. (i.e. steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness).	3,794 Acres
IIB	Poorly drained soils. The seasonal high water table is generally within 12 inches of the surface. Productivity of this soil is generally less than soils in other groups.	3,499 Acres

Carroll County Soil Survey; 1977.

3.3 SOILS WITH LIMITATIONS FOR DEVELOPMENT

Potential for successful development varies depending on soil characteristics. Soils with high development potential include soils with level or moderate slopes, are free of boulders and ledges, and are not subject to flooding, high seasonal water table, or low permeability.

There are some soils which limit development. Soils which limit development include thin, highly erodible soils, such as soil types ending in "D" and "E." These soils are considered to be steep slopes and severely limit development. (**Figure 3**) and soils with high water tables or hydric soils which are described in Section 3.4

It is important to keep in mind that many soils which have potential for successful development purposes may have positive effects on natural resources if remained undeveloped. These soils include prime agricultural land, which may be better used for farming purposes; also, outwash soils, which often overlie stratified drift aquifers.

3.4 HYDRIC SOILS

NRCS defines hydric soil as, "soil that is formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part." As a result of soil saturation and reducing conditions, hydric soils undergo chemical reactions and physical processes that differ from those found in upland soils.

Hydric soils are soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation; soils that are sufficiently wet because of artificial measures; and soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some series that are designated as hydric have phases that are not hydric depending on water table, flooding, and ponding characteristics.

Hydric soils are one of three parameters used to identify jurisdictional wetlands. Hydric soils are commonly further differentiated by the terms poorly drained and very poorly drained. Some state and local ordinances have different provisions to regulate use of and/or provide varying buffers between poorly drained and very poorly drained soils.

Hydric soil acreage as mapped by the NRCS in Wolfeboro is as follows:

Poorly Drained Hydric Soils	3,499 Acres
Very Poorly Drained Hydric Soils	1,131 Acres

Hydric soils within the Town of Wolfeboro (as mapped by NRCS) are displayed on **Figure 6**,

4.0 AGRICULTURE & FORESTRY

There are a number of challenges when planning for a town's future land use. Various resources must be considered, including agriculture and forestry. These two natural resources are among the most important when considering future land use; once developed, these resources are nearly impossible to get back. In order to keep these valuable resources from diminishing, the existing lands must be identified and protected.

4.1 EXISTING AGRICULTURAL LAND USE

Before 1872, Wolfeboro relied largely on agriculture. Since then, however, the town's economy has thrived on its tourist-based businesses, placing less emphasis on town farms. Yet interestingly enough, use of land for agriculture seems to be on the rise in Carroll County. The 2007 census showed 274 farms in the county in comparison with 224 farms in 2006 Master Plan.

It seems many residents understand the value of agricultural lands. In the 2006 Wolfeboro Planning Survey, 59 percent of residents said they favor the protection of agricultural lands.

4.2 EXISTING FOREST LANDS

Wolfeboro's forests provide a variety of valuable resources, for both the natural community as well as residents of the Town. Forests provide high-quality habitat for certain plant and animal species, absorb rainwater, increase ground infiltration, and provide a buffer for waters from sedimentation and contamination. They also provide a break from high winds, filter dust and pollutants from the air, decrease global warming, provide shade and act as a cooling system during the summer months. Forests also provide recreational opportunities, from various hiking trails to campgrounds and parks. Tourists are attracted to the beauty forests provide, especially during the fall foliage season. Also, well-managed forests provide maple syrup, firewood, and commercial wood products.

Forests are comprised of more than just trees. Forests are unique ecosystems and are vital in providing key habitats for various wildlife, providing nutrients to the various plant species, and in providing food and shelter for insects, birds and animals. The majority of Wolfeboro's woods are a mosaic of Hemlock, Hardwood and Pine.

The following table provides detailed information on these forest types.

Table 5: Existing Forest Types in Wolfeboro

Forest Type	Description	Location
Hemlock-Hardwood-Pine	Transitional forests, occurring between hardwood conifer and oak-pine forests. This common forest type is comprised of dry, sandy soils with red oak and white pine. When these forests have been burned regularly over time, they may be able to support a pitch-pine sand plains system.	Entire Town
Lowland Spruce-Fir	A mosaic of lowland spruce-fir forest and red spruce swamp communities. Support a wide variety of species, many which are heavily dependent on this forest system.	Small regions near Ossipee and Tuftonboro border
Floodplain Forest	Occur 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. Because their rich soil has been used for agriculture for centuries, many floodplains are no longer forested wildlife habitat.	Small regions near Back Bay and Cresent Lake, as well as western side of Lake Wentworth

N.H. Fish & Wildlife Service: 2005.

Recent data show that loss of forested land in Wolfeboro is on the increase. In 2001, there were 24,146 forested acres in Wolfeboro, or 78.7 percent of the Town, which was a 4.3 percent loss of forested land since 1993. It is predicted by the New Hampshire Fish and Game Department that by 2025, there will be 22,972 forested acres in Wolfeboro, or 74.8 percent of the Town.

Town Forests & Forest Management

Currently, there is only one town-owned forest in Wolfeboro. Located on Allen Road, the Tutt Lot Forest contains approximately five acres, and is permanently conserved by the town.

Although Wolfeboro only owns one town forest, the town has forest management plans for seven lots, including the Tutt Lot Forest. Forest Management Plans are developed by a professional forester with input from the landowner as to their forest management goals and with the overall goals of promoting forest health, protecting sensitive areas such as wetlands and vernal pools, and improving wildlife and recreational opportunities.

Wolfeboro has forest management plans for Tutt Lot, Clow Lot, Trask Mountain Lot, Upper Beech Pond Lot, Brown Lot, Town Gardens Lot, and the Armory. Approximate acres of forest that are harvested using a forest management plan are summarized by Lot in **Table 6**. These lots are displayed on **Figure 5**.

Table 6: Lots Under Forest Management

Lot	Acres
Armory Lot	28
Brown Lot	42
Clow Lot	15
Town Garden Lot	7
Trask Mountain Lot	97
Tutt Lot	5
Upper Beech Pond	350

Wolfeboro Conservation Commission, 2009

5.0 WETLAND RESOURCES

According to the US Army Corps of Engineers (USACE), the term wetland is defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." In other words, wetlands generally include swamps, marshes, bogs and similar areas. Wetlands vary in soils, topography, climate, hydrology, water chemistry, and vegetation, among other factors, and provide valuable contributions to water quality, economy, recreation, environmental health, and other areas.

5.1 NATIONAL WETLANDS INVENTORY

The US Fish & Wildlife Service has completed a National Wetland Inventory (NWI) for the entire country. The NWI classifies all wetlands and deepwater habitats according to "The Methodology for the Classification of Wetlands and Deepwater Habitats", Cowardin et al, 1979. Per the Cowardin methodology, all wetlands belong to one of five major wetland Systems: Lacustrine (lakes and ponds); Riverine (rivers and streams); Marine (deep water saltwater environments); Estuarine (shallow tidal influenced saltwater wetlands) and Palustrine (everything else such as marshes, swamps, shallow ponds, etc). Within each System, Classes and Sub-Classes further subdivide wetlands according to common attributes. Each individual mapped wetland was assigned a code representing its System, Class and Subclass.

Figure 7 shows the distribution of NWI wetlands as mapped by the USFWS within the Town of Wolfeboro. Lacustrine, Riverine and Palustrine wetlands all occur in Wolfeboro. Approximately 1,425 acres of the Town are mapped as Palustrine wetlands. Lacustrine wetlands (lakes and ponds) are described in more detail in Section 5.0. Palustrine wetlands as mapped by the NWI have the following approximate distribution of wetland classes in Wolfeboro:

Table 7 Acres of Palustrine Wetlands by Class

Palustrine Wetland Classes	Acres
Emergent wetlands	125
Forested wetlands	716
Scrub-shrub wetlands	436
Other wetland Classes	148
Total	**1,425 Acres**

The Cowardin system descriptions for the Palustrine System and major wetland Classes in Wolfeboro are included below.

The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.501∞. The Palustrine System was developed to group the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, pond, and prairie, which are found throughout the United States. The definitions (without the water regimen restrictions) for the various classes under this system are as follows:

The Emergent Wetland Class is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most

years, maintaining the same appearance year after year. These wetlands are usually dominated by perennial plants.

The Forested Wetland Class is characterized by woody vegetation that is 6m (20ft) tall or taller. Forested wetlands are most common where moisture is relatively abundant, particularly along rivers and in the mountains.

The Scrub-Shrub Wetland Class includes areas dominated by woody vegetation less that 6m tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. Scrub-shrub wetlands may represent a successional stage leading to forested wetland, or they may be relatively stable communities.

5.2 LOCAL WETLAND STUDIES

Two wetland studies have been performed for the Town of Wolfeboro. In 1980, Ray Lobdell completed the first wetland study, updating it in 1988. The second report was created by Barry Keith in 1996, titled *Wetland Evaluation, Wolfeboro New Hampshire.* These studies evaluated and inventoried Wolfeboro's wetlands, and identified important wetlands which resulted in the designation of a few selected wetlands as "Prime Wetlands" in accordance with state legislation and discussed in more detail in Section 5.3.

Wetland complexes of special significance identified as a result of these studies are described below.

Warren Brook

This wetland and Heath and Ryefield Brooks serves as one of the major tributaries to Lake Wentworth. This large and uniquely rich wetland habitat is located in the eastern side of Lake Wentworth and is bisected by the Wolfeboro-Brookfield town line. The hydrologic value coupled with the unique flora and fauna, food chain production, historic importance and aesthetic and recreational value makes this wetland a particularly important critical resource for Wolfeboro and the Lakes Region.

Batson Pond

Batson Pond Wetland Complex is a relatively small area located in northernmost portion of Wolfeboro. This area is bordered to the east and south by Route 28 to the SW and by Pork Hill Rd., and to the NE and NW by the Ossipee-Wolfeboro town line. The overall remoteness and high aesthetic character of this area makes this wetland-pond complex highly desirable for recreation and education. Also historically this area was a farming community prior to the turn of the century. Food chain production, wildlife habitat, and unique rich vegetation makes this wetland exceptionally important.

Porcupine Brook

The Porcupine Brook drainage is a series of large isolated wetlands located in the northeastern portion of Wolfeboro. This drainage and the Young's Brook drainage are the only two drainages in Wolfeboro serving the Saco River Basin. The remote character, rich flora and fauna, historical past, aesthetics, and recreational opportunities of this wetland complex are key reasons for designating this wetland(s) as prime.

Ryefield Brook

This complex consists of a series of wetland areas which in total compromise one of the richest and most diverse habitats in Wolfeboro. Its location as the major tributary to the north of Lake Wentworth gives this wetland complex an important significance. In total, the hydrologic, flora and fauna, food chain productivity, historic importance and high level of aesthetic, recreational and educational value are key considerations in designating this wetland as prime.

5.3 PRIME WETLANDS

New Hampshire law provides for extra protections to wetlands that are designated by a Town as Prime Wetlands according to the requirements of RSA 482-A: 15 and Chapter Env-Wt 700 of the NHDES administrative rules. Limitations to use within 100 feet of such wetlands are then applicable, including the classification of all such project as major projects, mandatory field inspections by DES, and a public hearing before the DES. Prime wetland designation typically relies on an evaluation of a sub-set of wetlands that receive individual study using the Method for Comparative Evaluation of Non-tidal Wetlands in New Hampshire (1991) or an update of which is currently pending.

The Lobdell and Keith studies mentioned above, resulted in the designation of thirty-seven wetlands as Prime Wetlands in Wolfeboro. **Table 8** summarizes Wolfeboro's Prime Wetlands.

Prime wetlands are shown on **Figure 7**. All areas designated as Prime Wetlands are delineated on file maps in the Town Hall. The numbering system on the maps in this inventory differs from the numbering system from the maps at Town Hall. The numbering system at Town Hall is indicated by the "Wolfeboro PW #" column in **Table 8.**

Table 8: Prime Wetlands

PW #	Wolfeboro PW #	Complex Name	Acres
1	4	Batson Pond	30.9
2	20	Clay Pit Brook	2.3
3	21A	Clows Brook	12.1

PW #	Wolfeboro PW #	Complex Name	Acres
4	21B	Clows Brook	9.2
5	26C	Harvey Brook	22.4
6	26B	Harvey Brook	2.2
7	26C	Harvey Brook	0.5
8	26C	Harvey Brook	5.3
9	28A	Heath Brook	87.4
10	28A	Heath Brook	65.1
11	28B	Heath Brook	8.7
12	27	Hersey Brook	13.6
13	35	Perry Brook	1.48
14	48C	Porcupine Brook	52.8
15	48A	Porcupine Brook	54.2
16	48B	Porcupine Brook	10.8
17	42	Ryefield Brook	73.8
18	46A	Ryefield Brook	6.6
19	46B	Ryefield Brook	3
20	45	Ryefield Brook	1.7
21	41	Ryefield Brook	23.1
22	14	Sargents Pond	0.4
23	14	Sargents Pond	12.2
24	18	Sargents Pond	66.7
25	18	Sargents Pond	1
26	39	Warren Brook	75

PW #	Wolfeboro PW #	Complex Name	Acres
27	11A	Willey Brook	5.6
28	11A	Willey Brook	5.8
29	11A	Willey Brook	0.8
30	11A	Willey Brook	8.5
31	11B	Willey Brook	17.2
32	11E	Willey Brook	0.2
33	11C	Willey Brook	8.5
34	11D	Willey Brook	1.5
35	11D	Willey Brook	1.3
36	2	Willey Brook and Youngs Brook	13
37	2	Willey Brook and Youngs Brook	26

Lobdell & Keith Maps; 1980 & 1996. These maps can be found at the Town Hall.

5.4 WETLAND BUFFERS

The undeveloped uplands surrounding each wetland are also considered critical resources. Maintaining a buffer consisting of natural vegetation is important to the health of the wetland, and provides a natural buffer from the effects of human activity. It also protects the wetland against excess rainfall and snowmelt, as well as provides a habitat for surrounding wildlife. Wetland buffers are an integral part of the functions of wetlands. Many of the wetland functions and values are interdependent on a healthy upland buffer. **Table 9** summarizes the recommendations of the Connecticut River Joint Commission for wetland buffers, based on those wetland functions and values that are desired to be protected.

Table 9: Wetland Buffers for Functional Effectiveness

Function	Buffer Width (Feet)
Stabilize banks	35' to 50.'
Filter Sediment	35' of slopes less than 15%.
Filter dissolved nutrients and pesticides	100' to 500.' 100' removes 60% of pollutants.
Protect fisheries	100' minimum.
Protect wildlife	300' minimum.
Flood control	Varies with size.

Introduction to Riparian Buffers; Connecticut River Joint Commission for NH and VT, September 2000.

Note: 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.

6.0 SURFACE WATER RESOURCES

In the Wolfeboro Planning Survey conducted in 2006, 80 percent of respondents said they view high quality water resources as an important reason for visiting or living in Wolfeboro. Wolfeboro's surface water features include a variety of lakes, rivers, ponds, streams, and wetlands, which are of high importance to Wolfeboro. These waters provide vital habitats for various species, recreational and aesthetic resources for residents and visitors, drinking water for a great deal of the community, and second homes contribute income to Wolfeboro.

6.1 SURFACE WATER

There are 6,712 acres of surface water in Wolfeboro which includes approximately 2,898 acres of Lake Winnipesaukee. Surface water comprises approximately 18% of the area of Wolfeboro and is an extremely important aspect of the Town's tourist economy. **Figure 8** displays surface water features within Wolfeboro. Surface water includes lakes, ponds, streams and rivers. Preservation of water quality is a primary concern for Wolfeboro. The desirability of visiting or living in Wolfeboro is related to the quality of water in the lakes, ponds, streams, and rivers.

Lakes & Ponds

Wolfeboro is extremely fortunate to have such an abundance of lakes and ponds. There are many who can enjoy the benefits of living alongside the water, or the easy public access for visitors.

Wolfeboro is blessed to be one of the towns surrounding Lake Winnipesaukee, an especially well-known and visited lake within the State.

Lake Wentworth also provides similar benefits as Lake Winnipesaukee, and is located solely within the Town of Wolfeboro. The Lake is approximately four miles long and three miles wide, and contains 20 islands, including the well-known Stamp Act Island. There are 11 year-long streams which flow into the lake, Willey Brook the largest. Some of these streams, including Willey Brook, Smith River, and Mink Brook once provided hydropower to Wolfeboro.

The shoreline of the lake varies tremendously. There are several sandy beaches, some which are used for recreational purposes and public use. From Moose Point on the western shore, a natural sandy beach extends for a quarter of a mile. Meadows border several sections of the streams that flow into the lake, and were once used by the earlier settlers of Wolfeboro for furnishing hay. Near the outlet of Warren Brook a large deposit of alluvium lies along the stream banks, and is known as the "sands." Wolfeboro is not rich in minerals, although small quantities of bog-iron can be found on the northeast shore. Coarse granite is common, as are deposits of clay.

Many scenic views can be observed from Lake Wentworth. From the southeast, one can see Mt. Dick in Brookfield and Copple Crown in New Durham. From the south and west one can view the mountains of Alton, Gilmanton, and Gilford including the Belknap range. Visible from the north are the Ossipee and Chocorua mountains.

The Lake Wentworth Association was created in 1930 with a goal to protect and preserve Lake Wentworth. More information on the Lake can be found at their website; www.lwa.org.

In the State of New Hampshire, a “Great Pond” is defined as a natural water body with ten acres or greater. Wolfeboro’s “Great Ponds” are listed in **Table 10**.

Table 10 "Great Ponds" in Wolfeboro

Surface Water	Total Acres
Batson Pond	20
Crescent Lake	147
Front Bay	35
Rust Pond	239
Ryefield Marsh	69
Sargents Pond	62
Trapper Pond	2
Upper Beech Pond	144
Wentworth Lake	3096
Lake Winnipesaukee	2898*

* (Total Size of Lake is 45,652 Acres)

Streams, Rivers & Brooks

There are many different types of streams in Wolfeboro, including both intermittent and perennial streams. A perennial stream contains water at least 90 percent of the time in a well defined channel. An intermittent stream, on the other hand, generally contains water only during the wet season, which can be anywhere from 50 percent of the time or even less. Sometimes there are ephemeral streams, but these only occur after a large storm and/or snowmelt for a very short period of time.

The following is a list of the perennial streams located in Wolfeboro:

Perry Brook	*Beech River*	*Hersey Brook*
Youngs Brook	*Townsend Brook*	*Warren Brook*
Wiley Brook	*Fernald Brook*	*Heath Brook*
Ryefield Brook	*Harvey Brook*	*Nineteenmile Brook*
Clay Pit Brook	*Frost Brook*	*Morrill Brook*
Smith River	*Mink Brook*	

The quality of water and habitat these streams provide is dependent on the surrounding land use. Sediment from erosion and removal of streamside vegetation can easily destroy prime habitats. Because of this, it is important to maintain or improve the town's rivers and brooks, refraining from development alongside stream habitats.

6.2 WATERSHEDS

Watersheds are areas that contribute runoff to a particular water body measured at a designated outlet point. Virtually any body of water has an area of upland surrounding it that drains to it which can be delineated as a watershed. Therefore, almost any watershed can be further divided into subwatersheds, depending on which body of water and which outlet is designated for the watershed. How people use land within a watershed determines the quality of the water in lakes, ponds, rivers, streams, and wetlands.

There are three major watersheds in the Town of Wolfeboro.

Table 11: Major Watersheds in Wolfeboro

Major Watershed	Total Acres
Saco River	728,127
Salmon Falls-Piscataqua Rivers	604,461
Winnipesaukee River	310,911

Table 12 lists the names and the total acreages of the six subwatersheds that are present in Wolfeboro. The acreages listed include areas that extend outside the Town boundary.

Table 12: Subwatersheds in Wolfeboro

Subwatershed	Total Acres	Watershed
Pine River	35,248	Saco River
Beech River	12,042	Saco River
Nineteen Mile Bay	29,778	Winnipesaukee River
Wolfeboro Bay	36,965	Winnipesaukee River
The Broads	38,888	Winnipesaukee River
Upper Branch River-Lovell Lake	18,383	Salmon Falls-Piscataqua Rivers

Wolfeboro Bay, sometimes known as the Lake Wentworth/Crescent Lake watershed, is almost entirely within the Town of Wolfeboro. This watershed is protected by the Lake Wentworth Foundation and the Lake Wentworth Association. Both groups seek to preserve and protect this watershed and the lakes found within it.

For more information on these organizations and their mission to protect the watershed, visit their websites:

The Lake Wentworth Association: http://www.lwa.org/

The Lake Wentworth Foundation: http://www.lakewentworthfoundation.org/

6.3 FLOODPLAINS

A floodplain is any land area that is susceptible to flooding, generally located in low-lying areas adjacent to rivers, lakes. It is easy for any stream or river to overflow their banks & spill onto the adjoining land area, causing a floodplain, which are shown on **Figure 9**. It is important to identify floodplains for the safety of the community: Loss of life & property damage can result when people build in a designated floodplain.

The Federal Emergency Management Agency (FEMA) has created paper versions of the Flood Insurance Rate Maps (FIRM) for individual communities. The last documented version for Wolfeboro, NH was in May 1989. Because of this, the data portrayed on **Figure 9** shows only a general location of floodplain areas. FEMA is currently undergoing map modernization, in which

FEMA and its mapping partners are creating digital, seamless, countrywide products. According to GRANIT, these improved products incorporate updated base maps, letters of map change (LOMCs), and revised studied. It is important to update **Figure 9** once this data becomes available for Carroll County. The following is a list of roads FEMA declares partially or totally within Special Flood Hazard Areas (SFHA):

Beech Pond Road	*College Road*
Cotton Valley Road	*Pleasant Valley Road*
Rocky Shore Road	*Sargents Pond Road*
Springfield Point Road	*State Route 28*
State Routes 28 and 109	*State Route 109*
Walt's Lane	*Whitten Neck Road*

The current FIRM panels display three distinct floodplain categories in Wolfeboro: Zone A, Zone AE, and Zone X. Zone A are floodplains with no base flood elevations determined. Zone AE are floodplains with base flood elevations determined. Zone X areas are determined to be outside the 500-year floodplain. In addition to the floodplains associated with lakes and ponds inWolfeboro, there are also Zone AE floodplains associated with perennial streams. In particular, extensive Zone AE floodplains are shown on Figure 9 for Young's Brook, Ryefield Brook, Wiley Brook and Heath Brook.

7.0 AQUIFERS

In town ordinance §175 article four, Wolfeboro defines an aquifer as, "Geologic formation composed of rock or sand and gravel that contains significant amounts of potentially producible potable water." Protecting Wolfeboro's aquifers from potential contamination is vital. Wolfeboro has adopted a Groundwater Protection Overlay District, which promotes health, safety and general welfare of residents by providing prohibitions and restrictions on town aquifers in the town codes, such as the prohibited disposal of solid wastes, liquid or leachable waste, etc.

The ability of an aquifer to supply water is called transmissivity, which is measured in ft^2/day. Most of Wolfeboro's aquifers have a transmissivity anywhere from 0 to 2000 ft^2/day. It is important to note that aquifers with a transmissivity of 1000 ft^2/day or less are not considered adequate for a public water supply.

7.1 WOLFEBORO'S AQUIFERS

Table 13 lists the aquifers mapped as occurring within Wolfeboro. These areas are also shown on **Figure 10**. It is important to keep in mind that many of these aquifers exceed town

boundaries; because of this, changes to these aquifers affect not only the town of Wolfeboro but surrounding towns as well.

Table 13: Aquifer Transmissivity Characteristics

Aquifer ID	Maximum Transmissivity	Features
35	1000	Border of Brookfield, East corner of Lake Wentworth by Walker Rd.
38	2000	Within Aquifer 38.
39	1000	Northeast corner of Winter Harbor, West of Sewall Woods Conservation Area.
40	1000	Southeast corner of Lake Wentworth, Including Patten Corp. and Pleasant Valley Road.
44	1000	Northwest of Rust Pond.
46	1000	Southeast of Rust Pond, Including Marshfield Easement.
47	1000	Border of New Durham, Southeast of Rust Pond.
79	1000	Border of Tuftonboro, including Abenaki Ski Area.
83	1000	Largest aquifer located completely within town. North/Northwest of Lake Wentworth, Including Wiley Brook Conservation Area, Trask Mountain Road Lot, Center St./Route 28.
85	1000	Including Sargents Pond and Bill Rae Conservation Area.
87	1000	Northeast of Lake Wentworth, Including Wentworth State Park and Ryefield Marsh.
88	2000	Within Aquifer 83.
236	2000	Border of Wakefield, Northeast Railroad.
137	1000	Border of Wakefield, Brown's Ridge & N. Wakefield Rd. Lot.

NHDES; June 2009

Aquifer recharge is the process by which rainwater, snowmelt, and other precipitation runoff seeps into the soil into an underlying aquifer. Non-contaminated water must be allowed to seep into the ground surrounding an aquifer in order to protect the quality and quantity of water in an aquifer.

8.0 DRINKING WATER RESOURCES

Currently, Lake Winnipesaukee and Upper Beech Pond are the main sources of drinking water for the residents and businesses of Wolfeboro. The immediate watershed around Beech Pond is regulated by the Town of Wolfeboro as a municipal watershed district. Much of Wolfeboro is considered a source water protection area to Lake Winnipesaukee (which is used by other communities) and Upper Beech Pond. Protecting source water provides public health protection and economic and environmental benefits.

8.1 WELLS & WELLHEAD PROTECTION AREAS

Although the Town of Wolfeboro mainly relies on surface water for drinking water, groundwater is also a resource found in the town and must be protected. High quality groundwater supplies many residents with drinking water; currently, there are 477 recorded water wells located in the town of Wolfeboro. Most wells are either dug or drilled, although they could also be driven. Wells and other forms of groundwater resources will remain a significant water supply source for many years, and it is important to keep this resource protected.

Groundwater is very susceptible to contamination; most often from leaking underground storage tanks, poorly maintained septic systems, improper disposal of hazardous chemicals, and vehicular accidents. Listed below are the underground storage tanks located in Wolfeboro:

Bell Atlantic

Brewster Academy

Carpenter Elementary School

Christys #32506

Citizens Bank

Clipper Home of Wolfeboro

CPT Petroleum Inc

Crescent Lake School

Diamond Lumber

Lakes Region Airport

Lakeview Service Station

Pierce Camp Birchmont Inc

Pollution Abatement Facility

Public Works Garage

Sugar Hill Retirement Community

The Corner Store

Weston Auto Body

Winnipesaukee Lumber

Dockside Gas Inc	*Wolfeboro Corinthian Yacht Club*
Goodhue & Hawkins	*Wolfeboro Incinerator*
Huggins Hospital	*Wolfeboro Irving*
Kingswood Regional High School	*Wolfeboro Texaco*

Aboveground storage tanks also have a negative impact on drinking and groundwater resources when managed improperly. Listed below are the aboveground storage tanks located in Wolfeboro. It is important to make sure these tanks are maintained properly for the health of the town's residents.

Umbrella Point	*Electric Department*
H C Avery Trust	*Public Works Garage*
Wolfeboro Oil; Center St.	*Wolfeboro WWTF*
Wolfeboro Oil; Railroad Ave	*Wickers Sportswear*

According to the Environmental Protection Agency (EPA), in order to maintain high quality drinking water and to prevent contaminants from reaching drinking water sources, the 1986 Safe Drinking Water Act requires states to develop Wellhead Protection Programs. Through this program, states help communities to:

- Form a local team which will assist with protection of public supply wells in there area;
- Determine the land area which provides water to public supply wells;
- Identify existing and potential sources of contamination;
- Manage potential sources of contamination to minimize their threat to drinking water sources;
- Develop a contingency plan to prepare for an emergency well closing and to plan for future water supply needs.

Wolfeboro has eleven active Wellhead Protection Areas, which serve populations ranging from 50 to 210 individuals. The following lists Wellhead Protection areas in Wolfeboro.

Wentworth Estates	*Sherwood Forest*
Trites Chevrolet Chrysler	*Cornerstone Christian Academy*

Point Breeze Condos	*Birch Hill Estates*
Hidden Valley/Mason	*Carroll County Complex*

8.2 PUBLIC WATER SUPPLIES

A public water system is defined by NHDES as "a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year."

Public water supply areas can be divided into three separate categories:

- Community water systems. These systems serve at least 25 residents a year round basis. Examples include municipal water systems and systems at condominiums and single family housing developments
- Non-community non-transient water systems. These systems serve at last 25 people for at least 6 months a year. Examples include day care facilities and schools.
- Non-community transient water systems. These systems serve at least 25 people for at least 60 days per year. Examples include restaurants and motels.

The following is a complete list of the active public water systems listed in Wolfeboro, according to NHDES:

Sherwood Forest	*Kehonka*	*Point Breeze Condos*
East of Suez Restaurant	*Wentworth Estates*	*Camp Bernadette*
Pierce Camp Birchmont/Kitchen	*Pierce Camp Birchmont/Cabins*	*CTLLO Association*
Birch Hill Estates	*Allen A Resort*	*Wentworth State Park*
495 Center St	*Pop Whalen Ice Arena*	*Trites Chevrolet Chrysler*
Barn Door Tavern & Grill	*Robies RV/Trailer Park*	*Wolfeboro Campground*
Wolfeboro 7 Eleven	*Willey Brook Campground*	*Hidden Valley/Mason*
Northern Human Services	*Wolfeboro Water & Sewer*	

Wolfeboro's water system provides water to approximately 42% of households, primarily in the central downtown area. This system receives water through a treatment plant near Upper Beech Pond supply.

Wolfeboro's Water Treatment Facility

8.3 CONTAMINATIONS SOURCES & IMPERVIOUS SURFACES

Contamination is a very serious problem for any resource, especially groundwater. There are numerous ways Wolfeboro's drinking water can be contaminated, and listed below are a few examples. By listing these contamination sources, the town can take them into consideration when planning for land use near an aquifer or groundwater resource site. The locations of known contamination sources are also displayed on **Figure 10**.

Road Salt Application

Due to New Hampshire's rough winters, the state typically uses road salt (sodium chloride) as the primary chemical deicer. While sodium chloride may be effective and economically efficient, the chemical provides negative influences on the drinking water.

Hazardous Waste Sites

Wastes are considered hazardous when they are known to be harmful to human health and the environment if they are not managed properly. The Resource Conservation and Recovery Act (RCRA) govens the management of these hazardous wastes. The following is a current list of the RCRA appointed hazardous waste sites in Wolfeboro and their status. Those listed as "inactive" have satisfied DES requirements are require no further regulatory action. **Table 14** lists these RCRA Hazardous Waste sites.

Table 14: RCRA Hazardous Waste Sites

Site Name	Status
Brewster Academy	Active
French Auto body Inc	Active
GI Plastek LLC	Active
Governor Wentworth Regional School District	Active
Huggins Hospital	Active
Maguire Robert Dr DDS	Active
Neal Richard J JR DMD	Active
Spectrum 1-Hour Photo	Active
Trites Chevrolet Buick CDJ	Active
Wagenwerk	Active
Weston Auto Body	Active
Wolfeboro Corinthian Yacht Club	Active
Wolfeboro DPW Town Of	Active
Wolfeboro Power Equipment Co Inc	Active
Wolfeboro Solid Waste Town Of	Active
Back Bay Marina	Inactive
Blacksmith Printing & Copy Ctr	Inactive
Bowers & Merena Galleries Inc	Inactive
Browns SVC & Reconditioning	Inactive
Desmarais Paul D DMD	Inactive
Granite State Transmission LLC	Inactive
Lakes Region Airpark	Inactive

Site Name	Status
Norris-Harriman Construct Co	Inactive
Wolfeboro 7 Eleven	Inactive
Fritzs Service Inc	Declassified
Wolfeboro Municipal Light	Declassified
Kingswood Regional High School	Non-Notifier
AT&T	N/A
Bills Auto Service	N/A
Sunoco Service Station	N/A

NHDES; June 2009

Pollution from Boating and Marinas

Although individual boats and marinas release only small amounts of pollutants, the combined effect creates a bigger problem.

Residential Development

- Residential Heating Fuel Storage - above ground fuel tanks generally are located on non-impermeable surfaces, and do not have weather protective structures.
- Household Hazardous Waste - household hazardous waste products, if improperly disposed, can easily find their way into water sources.
- Lawn Care - chemicals are commonly used on lawns and in gardens. These chemicals can be effortlessly washed into our drinking sources by rainwater.
- Septic Systems – a failed system endangers the health of the public. When wastewater disposal systems fail, they can be the source of various bacteria, viruses, and protozoa. It is the homeowner's responsibility for ensuring proper system operation every 3 – 5 years.
- Transportation Land Uses - fuel storage and various deicing chemicals from roads, highways, etc., create potential dangers to drinking water.
- Stormwater Runoff - because it cannot penetrate impervious surfaces, runoff runs into gutters and storm drains, picking up toxins and suspended solids.

Drinking water is a highly important resource and must be protected. Creating a source water protection plan may help to further identify groundwater and drinking water resources, their specific contamination sites, and provide recommendations for the town to use.

Point & Nonpoint Pollution Sources

Point and non-point source pollution is a very serious threat, both to the wildlife community and the residential community. Any human use of land and water resources can impact water quality severely, causing major water pollution. This water pollution can originate from two major sources: point and non-point. Point source pollution is pollution that can be directly linked to a specific pollutant or discharge point, and can be identified and located. Non-point source pollution, on the other hand, is a bit trickier. Non-point source pollution is pollution that can originate from a number of sources, and is difficult to identify. Generally, non-point source pollution has no specific point of discharge.

Pollution can take a harsh toll on a number of natural processes and cause serious damage, such as eutrophication. Eutrophication is the process by which water bodies receive excess nutrients that stimulate plant growth, called algal bloom. This algal bloom reduces dissolved oxygen in the water and can cause other organisms to die. Eutrophication is greatly accelerated by pollution such as fertilizers, erosion, and sewage treatment plant discharge. In order to protect water bodies against accelerated eutrophication and other forms of pollution, the State of New Hampshire passed a Comprehensive Shoreland Protection Act, creating a protected buffer for public waters. The act encourages municipalities to adopt land use control ordinances for shorelands of water bodies other than public waters.

Point Sources

In the State of New Hampshire, industrial and municipal discharges and privately-owned wastewater management and treatment facilities that may have a potential impact on groundwater are regulated by the NH Department of Environmental Services, and must obtain a groundwater discharge permit. Also, most discharges have to be treated prior to discharge, and all discharges require a National Pollution Discharge Elimination System permit. These steps are taken to help identify and significantly reduce dangers to Wolfeboro's water resources.

Potential Nonpoint Sources

Logging, construction, road maintenance, agricultural operations and waste disposal facilities are just a few of the many significant land use practices that can be potential sources of pollution and disturb water quality. Non-point sources are difficult to calculate due to their unidentifiable nature; they can impact water quality through unmonitored, intermittent, or incremental contamination, or only be felt over a long period of time. Because of this, it is extremely critical that buffers are created to help infiltrate pollutants. Wide buffers can significantly reduce impacts from pollutants such as pesticides, nitrates, sediment, phosphorus, pathogens, etc.

In Wolfeboro, there are 18 point/non-point sources. Their locations are listed below, provided by New Hampshire Department of Environmental Services.

Table 15: Point & Non-Point Source Pollution Sites

Site Name or Address	
Warren Sands Rd	*Off Trotting Track Rd*
Town Lot Downtown Drain (Main St)	*Rt 109A*
Front Bay Storm Drains	*Pollini Bros (Rt 109 & Rt 28)*
Front Bay (Rt. 28)	*York Rd (off Beach Rd)*
Town Sewage Treatment Facility (Filter Bed Rd)	*Sargent Pond Development*
Town of Wolfeboro (Rt. 109A)	*Trask Mountain Rd.*
Albee Smith Sand Pit	*Nineteen Mile Brook (off York)*
North Line Rd.	*Cotton Valley Rd.*
TR Track Rd	*Tibbitts Rd*

NHDES; June 2009

9.0 OPEN SPACE & PROTECTED LAND

Undeveloped lands are an important resource benefiting both residents and wildlife. Residents and tourists can enjoy the beauty of the town and participate in various recreational activities. Wildlife and plant life can flourish, and the quality of land and water can remain safeguarded.

The results from the 2006 Wolfeboro Planning Survey indicate strong community support for protection of natural resources and aesthetics. When asked how the town could best manage development, 66 percent said preserving open space is very important.

9.1 LAND IN CONSERVATION

Protecting undeveloped lands has become a vital objective for many towns across the state, including Wolfeboro. Of the 30,693 land acres that make up the town of Wolfeboro, 2,655 acres are conserved, or 8.6 percent. Conserving lands enhances the town's aesthetic resources, benefits wildlife by providing them with an enhanced quality of life, safeguards water quality and protects the land against any type of human development.

There are three different types of land protection in Wolfeboro. Fee-ownership, or FO, establishes the town, another governmental entity, or a conservation organization as owner of the conservation parcel, to protect through their own means. Conservation easement, or CE, allows the land to be owned by anyone, but is protected through an easement (or deed restriction) held by the town, another governmental entity, or a conservation organization. Any other type of protection falls under the category other, or O.

Table 16: Conservation Lands by Protection Type

Protecting Organization – Type	Parcels	**Total Acres**
New Hampshire – FO	**3**	232
Town of Wolfeboro – FO	**21**	1102
Town of Wolfeboro – CE	**16**	206
Town of Wolfeboro – O	**2**	11
Private Organization – FO	**9**	307
Private Organization – CE	**8**	797
Total	59	**2655**

GRANIT; July 2009

Most of Wolfeboro's protected land is a level 1 protection, or a permanent conservation land. This type of land is permanently protected from development through conservation easement, restrictions, or outright ownership.

Listed below are the current conserved lands in Wolfeboro organized by primary protecting agency, along with their calculated size in acres and their protection type. It is important to keep in mind that some conservation lands cross town borders, affecting the total acreage size versus the size within the town.

Table 17: Conservation Lands by Primary Protecting Agency

State of New Hampshire		
Conservation Land	**Calculated Acres**	**Protection Type**
Governor Wentworth Historical Site	90.8	FO
Wentworth State Park	52.4	FO
Wolfeboro Railroad	88.5	FO
State of NH Total	**231.7**	

Town of Wolfeboro		
Conservation Land	**Calculated Acres**	**Protection Type**
Albee Beach	9.9	FO
Abenaki Ski Area	21.8	FO
Back Bay Partnership	11.9	FO
Bill Rae Conservation Area	29.0	FO
Brown's Ridge & N. Wakefield Rd. Lot	70.9	FO
Brown Lot	38.1	FO
Clow Lot	14.7	FO
Deutsch Easement	82.7	CE
Drew Lot	26.3	FO
Fairway View Estates	3.6	O
Fernald Basin	2.1	FO
Furber Point Associates	3.9	CE
Gideon Lot	8.2	FO

Town of Wolfeboro		
Conservation Land	**Calculated Acres**	**Protection Type**
Greenleaf Open Space	7.7	O
Huggins Hospital Easement	4.6	CE
Marshfield Easement	7.3	CE
McBride	23.5	CE
Mink Brook	2.2	CE
Patten Corp.	11.3	CE
Prindall	35.2	CE
Ryefield Marsh	53.8	FO
Slaney	4.2	CE
Town Gardens	6.6	FO
Town House Lot	1.8	FO
Trask Mountain Rd. Lot	97.1	FO
Tutt lot – Wolfeboro Town Forest	4.9	FO
Upper Beech Pond	355.2	FO
Water Treatment Abatement Area	296.7	FO
Webber/Brookside	0.64	FO
Wiley Brook Conservation Area	53.0	FO
Windleblo Construction Co.	2.7	CE
Wolfeboro 99-03247	27.7	CE
Town of Wolfeboro Total	**1,319.24**	

Private Organization			
Conservation Land	**Calculated Acres**	**Agency**	**Protection Type**
Benker	63.3	Society for Protection of NH Forests	CE
Clark C.	53.5	Society for Protection of NH Forests	CE
Clark, et al.	360.8	Society for Protection of NH Forests	CE
Crawford Easement	115.1	Society for Protection of NH Forests	CE
Dimon's Corner	3.1	Lakes Region Conservation Trust	CE
Hopewell Easement	88.1	Lakes Region Conservation Trust	CE
Horne	37.5	Lakes Region Conservation Trust	FO
Mason (A)/Bain	17.6	Society for Protection of NH Forests	CE
Mason (B)/Bennett & Cooper	95.7	Society for Protection of NH Forests	CE
Munroe/LRCT	64.9	Lakes Region Conservation Trust	FO
Sewall Woods	72.9	Lakes Region Conservation Trust	FO
Springfield Point	22.3	Lakes Region Conservation Trust	FO
Stamp Act Island Preserve	105.7	The Nature Conservancy	FO
Worcester Island	3.7	Lakes Region Conservation Trust	FO
Private Organization Total	**1,104.2**		

NH GRANIT; May 2009

9.2 UNFRAGMENTED LAND BLOCKS

Unfragmented open spaces are large blocks of forest, wetlands, and farmland that remain intact and unfragmented by development such as public roads. These spaces are important for a variety of reasons; they provide essential forest interior habitat for species that need to be distanced from human activity in order to survive, they provide habitat for animals with large home ranges (such as moose), they enable owners of large parcels of forestland to conduct timber harvests that are economically viable, they minimize conflicts surrounding managed forests or farms and

development, and they offer recreational opportunities for the town's residents, such as hiking, snowmobiling, snowshoeing, etc.

There are many unfragmented land blocks located in Wolfeboro, ranging in size from less than 200 land acres to 16,636 land acres. **Table 18** lists the five largest unfragmented land blocks in Wolfeboro. Although many of these blocks contain a water resource, they are the top five blocks with the most land acres. Most of the large unfragmented blocks extend outside the Town boundaries, and may not be entirely in the Town of Wolfeboro. This presents an opportunity for Wolfeboro to work cooperatively with neighboring towns to develop plans to maintain the integrity of these large remaining blocks of unfragmented land.

Table 28: Unfragmented Land Blocks

Rank	Land Acres	Total Acres	Features
1	16,636	17,149	Including Rust Pond, Marshfield Easement, Patten Corp. Conservation Land.
2	6,737	6,760	Including Brown's Ridge & N. Wakefield Rd. Lot, Drew Lot, Trask Mountain Road Lot.
3	3,468	3,475	Including Crawford Easement, Benker and Clark Conservation Lands.
4	3,315	3,472	Including Upper Beech Pond.
5	2,854	2,866	Just south of Hopewell Easement.

NH GRANIT; June 2009

Larger areas of unfragmented lands are more likely to support a greater diversity of viable populations of wildlife species. Small fragments may not be able to support breeding populations, not to mention persistent fragmentation can often lead to genetic changes and a loss of genetic diversity as populations subdivide into small breeding populations.

Table 19 lists habitat block size requirements for selected wildlife species, which helps to show the importance of large unfragmented blocks.

Table 19: Habitat Block Size Requirements for Selected Species

Acres	Species
25	Minimum size for breeding pair of whip-poor-wills.
100	Minimum size for red-shouldered hawk. Area required for viable population of wood thrush.
500	Appropriate maximum dispersal area for wood, spotted or Blanding's turtle.
1200	Minimum home range for northern goshawk.
1320	Maximum home range for Cooper's hawk.
3900-6144	Minimum home range for lynx.
9400	Area required for breeding pair of northern goshawks.
23616	Average home range of male bobcat.

NH Fish & Game; January 2004

In the 2006 Wolfeboro Planning Survey, 66% of respondents said preserving open space was very important. In order to preserve Wolfeboro's unique wildlife, these unfragmented land blocks should be taken into consideration during the planning phase of development. Conserving these blocks, along with connections to other significant habitat areas, is extremely important for the wildlife that exists in the Town.

9.3 LAND IN CURRENT USE

According to the Declaration of Public Interest stated in NH RSA 79-A, the Current Use Law is a property tax designed to encourage landowners to keep open space undeveloped. Rather than taxing for the highest potential, the land is taxed for its present use. The Declaration of Public Interest stated in NH RSA 79-A states:

> "It is hereby declared to be in the public interest to encourage the preservation of open space, thus providing a healthful and attractive outdoor environment for work and recreation of the state's citizens, maintaining the character of the state's landscape, and conserving the land, water, forest, agricultural and wildlife resources. It is further declared to be in the public interest to prevent the loss of open space due to property taxation at values incompatible with open space usage. Open space land imposes few if any costs on local government and is therefore an economic benefit to its citizens. The means for encouraging preservation of open space authorized by this chapter is the assessment of land value for property taxation on the basis of current use. It is the intent of this chapter to encourage but not to require management practices on open space lands under current use assessment."

In Wolfeboro, there are over 400 properties that are in Current Use. A map showing the properties in Current Use is on file at the Town Hall.

10.0 WILDLIFE HABITAT

Wolfeboro contains a significant amount of wildlife, including bear, moose, deer, bobcat and many others. The wildlife community is an exceptionally important resource, but it is slowly declining due to human development, which causes habitat loss and fragmentation.

10.1 WILDLIFE ACTION PLAN

The Wildlife Action Plan (WAP), which was completed by the New Hampshire Fish & Game Department (NHF&G) in 2005, identifies habitats and species in greatest need of conservation, threats to their existence, and offers strategies to address these threats. The WAP will be regularly maintained by NHF&G as species data is updated and/or compiled. *Updates to the WAP were made available to the public in mid-2010. Due to the timing of the availability of these data, the 2010 data were not incorporated into the maps developed for this NRI.*

As part of the Wildlife Action Plan, NHF&G has created a series of maps for each town in the entire state that can be viewed online at the NHF&G website. This series of maps includes the following maps: Wildlife Habitat Land Cover & Ecological Condition Habitat Rankings.

Wildlife Habitat Land Cover

The Wildlife Habitat Land Cover Map (**Figure 13**) provides a visual representation of the various habitat types located in Wolfeboro. These habitat types are listed in **Table 20**.

Table 20: Wildlife Action Plan Land Cover Types

Habitat Type	Acres	Acres Conserved	Percent Conserved
Hemlock-Hardwood-Pine	24,940	1,966	7.9 %
Lowland Spruce-Fir	156	69	44.2 %
Grasslands over 25 acres	765	6	0.8 %
Cliffs	4	0	0 %
Rocky ridges and talus slopes	41	0	0 %
Floodplain Forest	105	15	14.5 %
Wet meadow/shrub wetland	808	110	13.6 %
Peatland	339	40	11.9 %

NH GRANIT; June 2009

The New Hampshire Wildlife Action Plan describes the various habitats in Wolfeboro (listed above) as the following:

Cliffs are steep rocky outcrops greater than 65° in slope and 3 meters in height, and have sparse vegetation typically restricted to cracks and crevices where soil accumulates. Cliffs are generally primary breeding sites for several state-endangered species.

Floodplain Forests occur 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. Their rich soils have been used for agriculture for centuries; so many floodplains are no longer forested wildlife habitat.

Grasslands are defined as areas greater than 25 acres that are dominated by grasses, wildflowers, and sedges with little shrub or tree cover. Some examples include hayfields, pastures, and cropland (cornfields and other row crops). Grasslands must be mowed to prevent them from becoming shrublands or forests.

Hemlock-Hardwood-Pine Forests are transitional forests, occurring between hardwood conifer and oak-pine forests. This common forest type is comprised of dry, sandy soils with red oak and white pine. This land cover type is the most common land cover in New Hampshire as well as in Wolfeboro.

Marsh and shrub wetlands have a broad range of flood regimes, often controlled by the presence or departure of beavers. 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 wetlands filter pollutants, preventing them from getting into local streams, and help hold water to reduce flooding.

Peatlands have water with low nutrient content and higher acidity caused by limited groundwater input and surface runoff. Conservation of the 11 different natural communities that comprise peatlands is vital to the continued existence of many rare plant and wildlife species in New Hampshire. The most challenging issues facing peatlands habitat are development; altered hydrology (amount and flow of water); non-point source pollutants such as road salt, lawn fertilizers, and pesticides; and unsustainable forest harvesting.

Rocky ridges and talus slopes are two related but distinct habitats. Talus slopes, comprised of loose or stable boulders and rocks, range from open, lichen covered talus "barrens" to closed-canopy forested talus communities. Rocky ridges generally occur on outcrops and bedrock ridges and summits below the alpine zone. Talus slopes and rocky ridges provide crucial habitat for several rare wildlife species in New Hampshire.

Lowland Spruce Firs is a mosaic of lowland spruce-fir forest and red spruce swamp communities. Though it only covers approximately 10% of New Hampshire, lowland spruce-fir forests support 101 vertebrate species in the state.

It is important to note that the habitats are defined by vegetation type and structure, but are based on the needs of wildlife. Because of this, NH Fish & Game included most forested wetlands as a part of the forest habitats. Also, since many rare grassland bird species have specific nesting habitat needs that include a minimum acreage, the grasslands were mapped at 25 acres and above. Also, grasslands include croplands as they could easily be converted to grasslands.

The WAP Land Cover types were used to run a GIS analysis of co-occurring wildlife resources **(Figure 14**). For this NRI, the Wildlife Co-Occurrence model included the following un-weighted parameters: WAP land cover types; NH Natural Heritage Bureau known species location records **(Figure 15)**; existing conservation lands and a 50' riparian buffer zone around all wetlands, streams and surface waters.

The results of the Wildlife Co-Occurrence model are displayed on **Figure 14**. This model indicates that some of the most important wildlife habitat in Wolfeboro is located along Sargent's Lake and Lake Wentworth. Much of the high value habitat resources are located on parcels that have been reserved for conservation. High value habitats that are not protected are noted at the following locations: the intersection of Bickford Road and Stoddard Road; along Ryefield Brook and most notably, the Warren Brook wetland complex located along the Town boundary with Brookfield. A study completed by the Moose Mountain Regional Greenways in

2004, also identified the Warren Brook wetland complex as a wetland with significant values that should be protected.

Wildlife Habitat by Ecological Condition

The Highest Ranked Ecological Condition Wildlife Rankings Map (**Figure 16**) uses information about habitat condition throughout the state to develop a statewide and regional ranking of habitat quality, and to identify the highest condition habitat relative to all polygons in the State. Tiers were determined by assigning threshold values to each habitat type. Tier 1 rating was given to areas that contain the highest condition rank in the state. Tier 2 areas contain the highest condition rank in the biological region and Tier 3 includes other significant factors such as watersheds containing large unfragmented forest blocks of statewide significance, high quality lakes and streams, or habitat for critically imperiled species as identified by NHNHB.

All sixteen habitat types located in New Hampshire, as well as all surface waters, were assessed for condition. Streams and rivers were assessed in watershed units developed by the US Geological Survey (HUC 12). For each category (biological, landscape, and human impact), a single score was calculated by weighting all factors equally. Then the scores from each category were weighted evenly to come up with a single condition score.

For use in conservation planning, the habitats were then ranked to show the habitats that were Highest Ranking in the State. This was done so that the top 15% by area of each forest type, and top 10% by area of the other habitats were considered highest ranking. A few locations, such as that of critically imperiled species, alpine, and coastal habitats, were added as top ranked so that these critical habitats, even if degraded, were considered as a high priority.

The habitats were then ranked within their ecoregional subsection. The Nature Conservancy had developed ecoregions, geographical areas with similar physical characteristics that influence biology, and these were used in the models. The top 15% by area of forests and the top 50% of other terrestrial habitats in each ecoregion are considered Highest Ranking in the Biological Region. To provide a similar comparison for surface waters and wetlands, The Nature Conservancy also developed watershed groupings, which are geographic areas with similar features that influence aquatic biology (link to watershed groupings map). The top 50% of wetland habitats, all floodplain forests and 30% of surface waters were ranked highest in the biological region.

Habitats will not stay in good condition if the surrounding landscape is destroyed, which is particularly true of surface waters. A third ranking, supporting landscapes, consists of the upland part of the watershed for surface waters, some very intact forest blocks, some known locations of WAP species and some locations of exemplary natural communities.

The results of the NHF&G Ecological Condition Habitat Rankings are displayed on **Figure 16**. Tier 1 Habitat Rankings in Wolfeboro included two streams in the Pine River watershed (Frost

Brook and an unnamed stream); Ryefield Brook; Lake Wentworth; Rust Pond; Upper Beech Pond and Lake Winnipesaukee. The acreages noted on **Figure 16** and in the table below include habitat resources that extend outside of the Town boundaries and thus do not represent actual acreages of each Tier habitat within Wolfeboro.

Highest Ranked in Biological Condition	6,193 acres
Highest Ranked in State	76,957 acres
Supporting Landscapes	64,990 acres

10.2 IMPORTANT HABITAT TYPES & NATURAL PLANT COMMUNITIES

Among the necessities of wildlife, food, shelter, water and space are the most critical. These necessities are also known has habitat, and are everywhere. Some habitats, however, are more important to wildlife than others because they support a rare species, represent a smaller percentage of the landscape, provide an abundance of food or other resources, provide a buffer against the effects of development, and/or support several types of wildlife. Other significant habitats are unfragmented lands, riparian areas and large wetlands, and agricultural and other open lands.

There are also other unique habitats that are of special significance, and can be divided into the following categories: Habitat that is rare statewide, habitat that is rare in a particular geographical area, uncommon land features providing unique conditions for certain species, and habitat critical to certain species during a particular phase of their life cycle.

Unfragmented Blocks

The wildlife community is an exceptionally important resource, but is slowly declining due to human development, which causes habitat loss and fragmentation. As roads, buildings, and other human developments are constructed, habitats are continually broken into fragments causing frequent road crossings, lessening the amount of open habitat and increasing the stress on these animals. Unfragmented blocks in Wolfeboro are displayed on **Figure 12** and are discussed in greater detail in Section 9.2.

Vernal Pools

A vernal pool is a temporary water body that provides vital breeding ground for a variety of species, including amphibians. Ranging in size, shape and location, vernal pools annually cycle from flooded to dry. These pools are essential habitats for the broad variety of wildlife that use them, and are mainly used as a breeding ground for frog, turtle, salamander and fairy shrimp

species. Some of these species are rarely found outside of vernal pools, as these pools are safer than other bodies of water because there are no fish to eat the eggs or larvae.

In order to be documented as a vernal pool in New Hampshire, the following requirements must apply:

- *The pool must cycle annually from flooded to dry conditions;*
- *The pool must be formed in a shallow depression or basin with no permanently flowing outlet;*
- *Have evidence that the pool contains water for at least two months in the spring/summer;*
- *Lack of viable fish population;*
- *Must support one primary vernal pool indicator or 3 secondary vernal pool indicators;*
- *Must be evident of amphibian breeding.*

Vernal pools are difficult to identify in most seasons of the year. One of the most common ways to identify vernal pools is to visit them in the spring during the breeding season and to observe the wildlife species that live in them. If obligate species or "Indicator Species" are observed then the pool would meet the current definition of a viable vernal pool. Indicator species are species that depend on vernal pool habitats for their survival. These "Indicator Species" are described below. One or all of these may be present in a highly productive vernal pool.

Fairy shrimp are the most common indicator. Usually from 0.5 – 1.0 inches in length, fairy shrimp have elongated transparent bodies and are generally brown, orange, and red in color. Fairy shrimp appear with the onset of warm weather, and die with the drying of the pool. Because these shrimp only have one generation per wet episode, they create as many eggs as possible, leaving them resting at the bottom of the pool for the next year.

Adult Caddis flies look like small brown moths, laying their eggs in the dry depressions of vernal pools or overhanging vegetation. When the pool floods, the eggs hatch into larvae. The larvae then create long tube-like cases, which are roughly 0.25 inches long. Empty cases left behind after metamorphosis are generally 0.5 – 1.5 inches long.

The Spotted salamander is usually 6 to 8 inches in length, and is black or grey with yellow spots. Typically the species is most abundant in warmer pools, in areas with deciduous or mixed forests.

The Blue-spotted salamander is usually 4 to 5 inches in length, and is dark blue or dark grey, with blue spots. Typically this species favors pools with overhanging bushes and grass, and leafy bottoms with a depth of less than 15 inches. Usually this species is associated with hardwoods, and seems to favor sandy soils.

The Wood frog is usually 3.5 to 7.0 cm long, and is generally pink, tan, and dark brown in color. Due to predators, this species usually only survives in vernal pools, usually found in or near wooded areas.

Other species that live in vernal pools but are not indicator species are the following: Clam shrimps, Isopods, Amphipods, Fingernail clams, Amphibious snails, Four-toed salamander, Jefferson Salamander, Eastern newt, Spring peeper, American toad, Grey treefrog, Green frog, Spotted turtle, and Blanding's turtle.

It is important not to build near any vernal pools. In New England, various states have vernal pool regulations. In New Hampshire, there is no minimum size limit to projects that require a wetland permit. Vernal pools are regulated only if they are located within regulated wetlands, and have traditionally been assessed as low-value wetlands.

Vernal pool locations have not been formally studied in the Town of Wolfeboro. The NHF&G does keep records of vernal pools and/or the presence of sensitive vernal pool indicator species when reports are made available to them, however, this would represent a small subset of the vernal pool inventory in Wolfeboro.

For more information on identifying vernal pools and the species that reside in them, *Identification and Documentation of Vernal Pools in New Hampshire* is an excellent resource.

Significant Natural Plant Communities

The New Hampshire Natural Heritage Bureau (NHNHB) maintains an inventory of natural communities and uses that data to identify those that are in danger. Table 21 lists the significant natural plant communities known to occur in the Town of Wolfeboro. The general locations of these plant communities are also displayed on **Figure 15**.

Table 21: NHNHB Natural Communities in Wolfeboro

Natural Community	# Reported in State
Natural Communities: Terrestrial	
Appalachian oak – pine rocky ridge	14
Hemlock – beech – oak – pine forest	12
Natural Communities: Palustrine	
Red maple – black ash – swamp saxifrage swamp	12
Sandy pond shore system	12
Twig-rush sandy turf pond shore	2

NHNHB; May 2009

10.3 SPECIES OF CONCERN

The New Hampshire Natural Heritage Bureau (NHNHB), in coordination with the N.H. Fish & Game Wildlife Department, maintains an inventory of each town's species of concern. Species of concern are those species that are listed as endangered, threatened, or species within each municipality.

Table 22 lists the plant and animal species of concern that the NHNHB has records for in the Town of Wolfeboro. Those species that are flagged 'T' are considered threatened; those species flagged 'E' are considered endangered.

Table 22: NHNHB Species of Concern

Species	Flag	# Reported in State
Plants		
American Cancerroot (*Conopholis americana*)	T	24
Butterfly Weed (*Asclepias tuberosa*)	E	7
Climbing Fumitory (*Adlumia fungosa*)	E	17
Dwarf Bulrush (*Lipocarpha micrantha*)	E	3

Species	Flag	# Reported in State
Fringed Gentian (*Gentianopsis crinita*)	T	25
Kidney-leaved Violet (*Viola nephrophylla*)	E	8
Large Yellow Lady's Slipper (*Cypripedium parviflorum var. makasin*)	T	20
Ram's-head Lady's Slipper (*Cypripedium arietinum*)	E	14
Small Whorled Pogonia (*Isotria medeoloides*)	T	49
Water Marigold (*Megalodonta beckii*)	E	11
Yellow Lady's Slipper (*Cypripedium parviflorum var. makasin*)	E	10
Vertebrates – Birds		
Common Loon (*Gavia immer*)	T	236
Great Blue Heron (Rookery) (*Ardea Herodias*)	-	38
Vertebrates – Fish		
Lake Whitefish (*Coregonus clupeaformis*)	-	8
Invertebrates – Insects		
A Noctuid Moth (*Chytonix sensilis*)	-	3

NHNHB; May 2009

Wolfeboro is home to a wide variety of species of concern. The general locations of these species are displayed on **Figure 15** and should be a factor when considering fragile ecosystems to be protected through land conservation measures. Sargent's Pond, Lake Wentworth, Warren Brook, Ryefield Brook and Frost Brook have a particularly notable concentration of species of concern.

10.4 INVASIVE SPECIES

An invasive species can be plant, insect, or fungus that is located in a region not native to its species, and thrives due to the limited amount of natural predators that keep them under control in their native habitat. Exempt from typical dangers, these species spread aggressively and can alter other habitats and threaten the species living in them.

Invasive species can:

- Reduce the ability of streams to make historic water deliveries.
- Displace native plant communities and/or radically change the nature of the habitats they invade.
- Compete for the same natural resources and life requirements (food, water, space, shelter) as native species and degrade local ecologies by disrupting the food chain.
- Cause the extinction of native species.
- Increase soil erosion and fire hazard.
- Decrease the quality of understory habitat in forests and facilitate the spread of other invasive species.
- Decrease the quality and amount of range for wildlife (and range animals).
- Degrade aquatic habitats and clog waterways.

Following habitat loss, invasive species are the number one threat to the integrity of America 's natural areas. In 2000, House Bill 1258-FN was created requiring 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," and to "publish annually lists of invasive species that present potential or immediate danger to the environmental and economic interests of the state." These lists are as follows:

N.H. Prohibited List

RSA 430:52 VII defines invasive species as an "alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health." Therefore, no person shall knowingly collect, transport, sell, distribute, propagate, or transplant any living and viable portion of any plant species listed below, which includes all of their cultivars and varieties. Also, no person shall knowingly collect, transport, sell, distribute, propagate or release any living insect species listed below.[1]

Prohibited Plants: Land

Scientific Name	Common Name
Ailanthus altissima	Tree of heaven
Alliaria petiolata	Garlic mustard

[1] Invasive Species Adopted Rule Part Agr 3801.

Berberis vulgaris	European barberry
Celastrus orbiculatus	Oriental bittersweet
Cynanchum nigrum	Black swallowwort
Cynanchum rossicum	Pale swallowwort
Elaeagnus umbellate	Autumn olive
Heracleum mantegazzianum	Giant hogweed
Iris pseudacorus	Water flag
Ligustrum obtusifolium	Blunt-leaved privet
Lonicera bella	Showy bush honeysuckle
Lonicera japonica	Japanese honeysuckle
Lonicera morrowii	Morrow's honeysuckle
Lonicera tatarica	Tatarian honeysuckle
Polygonum cuspidatum	Japanese knotweed
Rhamnus cathartica	Common buckthorn
Rhamnus frangula	Glossy buckthorn
Rosa multiflora	Multiflora rose
Acer platanoides	Norway maple
Berberis thunbergii	Japanese barberry
Euonymus alatus	Burning bush

Prohibited Plants: Aquatic

Scientific Name	**Common Name**
Cabomba caroliniana	Fanwort
Myriophyllum heterophyllum	Variable milfoil
Lythrum salicaria	Purple loosestrife
Phragmites australis	Common reed

Prohibited Insect Species

Scientific Name	Common Name
Acarapis woodi	Honeybee tracheal mite
Adelges tsugae	Hemlock woolly adelgid
Aeolesthes sarta	City longhorn beetle
Anoplophora glabripennis	Asian longhorned beetle
Callidiellum rufipenne	Cedar longhorned beetle
Dendrolimus sibiricus	Siberian silk moth
Hylurgus lingniperda	Redhaired bark beetle
Ips typographus	European spruce bark beetle
Lymantria dispar	Asian gypsy moth
Popillia japonica	Japanese beetle
Pyrrhalta viburni	Viburnum leaf beetle
Rhizotrogus majalis	European chafer
Symantria monacha	Nun moth
Tetropium fuscum	Brown spruce longhorned beetle
Varroa destructor	Varroa mite

N.H. Restricted List

Some species present potential for endangering the environment, yet do not meet all criteria to be listed as prohibited. These species are placed on the New Hampshire Restricted List, and will be further evaluated when more data is available.

These species include:

Scientific Name	Common Name
Ampelopsis brevipedunculata	Porcelain berry
Centaurea maculosa	Spotted knapweed

Circium ravens	Canada thistle
Coronilla varia	Crown vetch
Elaeagnus angustifolia	Russian olive
Euonymus fortunei	Wintercreeper
Glyceria maxima	Sweet reedgrass
Ligustrum vulgare	Common privet
Lonicera maakii	Amur Honeysuckle
Lysmachia nummularia	Moneywort
Microstegium vimineum	Japanese stilt grass
Phalaris arundinacea	Reed canary grass
Populus alba	White poplar
Pueraria lobata	Kudzu
Robinia pseudoacacia	Black locust
Ulmus pumila	Siberian Elm

10.5 BENEFICIAL INSECTS

Some insects are exceptionally beneficial. As a natural plant protector, they are both healthier and safer for the environment than commonly used chemical protectors, such as broad-spectrum insecticides.

Beneficial insects can be either predators or parasites. While predators kill and feed on their prey outright, parasites will lay eggs in a host insect, and the larvae will feed on the host. Predators tend to be bigger, and will eat more pests than parasites. Beneficial insects can be purchased online; however, they can be easily attracted to gardens by simply providing them with their essentials for living: water, food, and shelter. **Table 23** lists some insects that have beneficial interactions with other insects and plants.

Table 23: Beneficial Insects

Beneficial Insect	Benefit/Pests They Prey On
Ant lions	These insects are more commonly found in the south and southwest, but there are a few species found locally. The larvae hide in burrows in the ground waiting for an ant to stumble into the burrow. Once inside, the ant is quickly consumed.
Brachnoids and other wasps	There are many species of parasitic wasps, most of which are quite small. Like the related Ichneumens, they feed on the inner body fluids of the hosts. The most common ones are parasitic on Sphinx moth larvae like the tobacco and tomato hornworms.
Bumblebees and Honey Bees	Extremely important wild pollinators for a variety of fruit and seed crops.
Dragonflies	Mosquitoes and other flies make up a large part of their diet. Both the adults and the aquatic immature stages are predators.
Fireflies	The larvae feed on various smaller insects and snails.
Ground beetles	This beetle family contains hundreds of species that exhibit differences in size, shape and color. Nearly all are predaceous on other insects and many are beneficial. There are also some that feed on snails.
Lacewings	Lacewings produce larvae which crawl along the leaf surface in search of aphids, scales, mealy bugs, thrips, mites and insect eggs. One lacewing larva can consume more than 100 insects a day.
Lady beetles; Lady bugs	Most species of this family are predaceous both as larvae and adults and feed chiefly on aphids. Other hosts include scale insects and mealy bugs.
Praying mantis	These insects are highly predaceous and feed on a variety of insects, including themselves.
Syrphid flies	The larvae of most species are predaceous, feeding on aphids or the young of other mites, ants or bees.

UNH Cooperative Extension; January 2001

10.6 FISHERIES

The New Hampshire Fish and Game (NHF&G) actively manages four fisheries found in Wolfeboro. These fisheries are listed in **Table 24**. Stocking reports for these fisheries are posted on the NHF&G website: http://www.wildlife.state.nh.us/Fishing/fish_stock_current.htm.

Table 24: Wolfeboro Fishing Resources

Location	Acres	Depth	Species	Access
Crescent Lake	148	10’	Small Mouth Bass, Large Mouth Bass, Chain Pickerel, Yellow Perch, Sunfish, Brown Bullhead, White Perch, Black Crappie	Mast Landing trailered boat launch, N end
Rust Pond	210	24’	Small Mouth Bass, Large Mouth Bass, Rainbow Smelt, Chain Pickerel, Yellow Perch, Sunfish, Brown Bullhead	No public access; rough access roadside Rte 28
Sargents Pond	62	N/A	N/A	No public access
Lake Wentworth	3097	25’	Rainbow Trout, Small Mouth Bass, Large Mouth Bass, Chain Pickerel, Hornpout, White Perch	Limited

NH Fish & Game; May 2009

Although not listed in **Table 24**, Lake Winnipesaukee is an excellent fishing resource for a wide variety of fish species with many public access points. The NHF&G website also posts depth charts for many lake and pond fisheries in New Hampshire. In addition to lake and pond fishing resources, the many perennial streams in Wolfeboro offer fishing opportunities as well. Stocked trout streams are also posted on the NHF&G website.

11.0 RECREATIONAL & HISTORIC RESOURCES

Recreational and scenic resources are slightly different than the other resources mentioned in this inventory. These resources are often overlooked as natural resources, even though many have some form of natural foundation. These resources are utilized often by the general public, and provide a sense of community for the town.

11.1 RECREATIONAL FACILITIES

There are various types of recreational facilities, including parks, campgrounds, water areas, golfing areas, field sports, and others. These facilities are open to the public, and provide many opportunities for the young and old.

Table 25 lists the recreational areas in Wolfeboro provides. The locations of these recreational areas are numbered and displayed on **Figure 17**.

Table 25: Wolfeboro Recreation Areas

Location	Recreational Use
Abenaki Ski Area	Snow Ski Area
Allen Albee Beach – Lake Wentworth	Water Sports Area
Back Bay – Elm Street West	Water Sports Area
Bay Street – East Side	Natural Area
Brewster Academy	Field Sports
Brewster Beach – Lake Winnipesaukee	Water Sports Area
Camp Bernadette	Campground
Carpenter School	Field Sports
Carry Beach – Lake Winnipesaukee	Water Sports Area
Cate Park – South Main Street	Park

Location	Recreational Use
Clark Park – Clark House School House	Park
Foss Field Recreation Area – Lehner	Field Sports
Goodhue and Hawkins Navy Yard	Water Sports Area
Kingswood Golf Course	Golf
Kingswood Reg. High School	Field Sports
Lake Winnipesaukee – Access	Water Sports Area
Libby Museum	Other
Mast Landing	Water Sports Area
McKinney Park	Park
Nicholas J. Pernokas Recreation Park ("The Nick")	Park/Field Sports
Pierce Camp Birchmont	Campground
Pop Whalen Ice Arena	Ice Skating
Robies Camping Area	Campground
Russell C. Chase Bridge Falls Path	Park
South Wolfeboro Park	Park
Town Dock Area	Water Sports Area
Town Gardens	Natural Area
Wolfeboro Campground	Campground
Wolfeboro Camp School	Campground
Wolfeboro Corinthian Yacht Club	Water Sports Area
Wolfeboro Marina	Water Sports Area

NH GRANIT; August 2009

11.2 RECREATIONAL TRAILS

Wolfeboro has numerous trails utilized by walkers, hikers, hunters, horseback riders, cross-country skiers, snowmobilers and others. Many of Wolfeboro's trails are located on Class VI roads. There is also a highly used trail located alongside the Wolfeboro Railroad. Through the permission and cooperation of many landowners, these trails exist for the benefit of all to use and enjoy responsibly.

Currently, the Town is in the process of creating a map of the various walking trails within the town. These trails are displayed on **Figure 17**. It is important for the benefit of the community that these trails be protected from any form of development which would create a obstruction, causing a trail closing.

The Wolfeboro Cross Country Ski Association maintains 30 kilometers of groomed cross country ski and snowshoe trails in Wolfeboro. There is also 15+ kilometers of ungroomed trails that are also available to the public. These trails are located within two distinct trail systems that are connected by a single trail; one system is located in the Abenaki Ski Area, the other is located within Sewall Woods. These trails are also located on **Figure 17**. Passes for these trails can be obtained at Nordic Skier Sports.

11.3 HISTORIC RESOURCES

Similar to other New England towns, Wolfeboro has numerous historical locations that contribute to the unique quality of the Town.

The following are a few historical locations in Wolfeboro. **Figure 17** shows the general location of historic resources but due to size constraints are not labeled. The Town of Wolfeboro has developed a pamphlet entitled "Wolfeboro's Self-Guided Historical Tour" that can be used to find the locations for historic resources of interest. For more information on historical resources in Wolfeboro, visit: http://www.wolfeborohistoricalsociety.org/

The Clark House

The Clark House was built in 1778. It was known as a tavern until Joseph Clark purchased it in 1817; three generations of Clarks lived in this house until it was donated to the Town to be used as a living history museum.

Pleasant Valley Schoolhouse

This one-room schoolhouse was built in 1805, and was known as the District 3 schoolhouse or the Townsend school. The schoolhouse was also used for religious services. In 1959, the schoolhouse was moved to the Clark Museum Complex.

Monitor Engine Company Firehouse

Volunteers from the Wolfeboro Historical Society restored a number of antique fire-fighting pieces and hose carriers dating back to the 1800s, which are now on display at the Firehouse. Also at the museum on loan is a restored Amoskeg horse drawn fire engine, which is only one of seventy-five in existence.

Figure 17 shows the various historical locations in Wolfeboro that are listed in the Self-Guided Tour. These locations are listed below, with a brief description:

1. Clark House Museum Complex: ca. 1780. Home of Joseph Clark, whose grandson, Greenleaf Clark, left the property to the Town in 1926 with the understanding the house and grounds would become a museum.

2. Church of Christ Scientist: Built ca. 1876. The only octagonal building in Wolfeboro. Built originally as a home for Charles Ham, it was converted to the church in 1939.

3. Brewster Administration Building: The first Academy building was built in 1887 and burned in 1903. The present Academy building was built in 1905.

4. Estabrook Hall: Built in 1909, it originally was living quarters for girls attending Brewster.

5. Pickering Corner: Intersection of Center St. and Main St.

6. Soldier Monument: The official name of the Civil War statue is Memorial to Loyal Men of Wolfeboro. As a result of donations from the citizens of Wolfeboro, it was dedicated on October 14, 1914 by Judge Sewall W. Abbott.

7. Scott House: Built in 1836 and housed the Wolfeborough Bank. Sold several times before becoming the Lake Bank in 1854; in 1902, it was sold to Nathaniel H. Scott MD who practiced there for many years.

8. Yellow House: Residence of Mrs. Charles Rollins, formerly the Pickering Tavern.

9. Carpenter School: Build in 1923-24, housed Grades 1-8. It has had three major additions since, and now houses Grades K-3.

10. Brewster Memorial Hall: Originally designed in 1886 by Thomas Silloway, a Boston architect. Not everyone favored the building of a new town hall under the Brewster will and several prominent citizens signed a petition against it. It was finally built in 1889-90, costing nearly $40,000. In 1994 the first floor was devoted to town offices.

11. Town Park/Cate Park: This site is two parks with a common boundary. The upper level is Town Park, laid out in 1967 on a site that had been the Ann Inn and then an Esso service station from the 40's on. The lower level is Cate Park, laid out in 1941.

12. Bridges Hallmark: Used to be Folsom-Parker Building, built in the mid 1880s. Has housed shops which sold millinery, fancy goods, jewelry, hardware and groceries, and was at one time a harness shop.

13. Avery Block: Built in 1889 on land acquired from John L. Peavey from the Winnipesaukee Steamboat Company. The block was subsequently known as the Post Office Block, the Haines Block and now the Avery Block.

14. Bridge: ca. 1790. The bridge was originally built on filled in land along the narrow, shallow shore line where the Smith River ("Back Bay") entered Wolfeboro Bay. Considered the dividing line between North and South Main Streets.

15. Durgin Block: Durgin Hall was the 1910's name for the top floor where basketball etc., games were held. Stephen Durgin built the Victorian style building in the mid 1870s.

16. Durgin Stables: Built in ca. 1876, this was originally a large barn where Durgin housed horses that he hired for tourists and boarders.

17. Post Office: The office began operations in 1820 with Daniel Pickering as the first postmaster. In 1857, the post office was on North Main St. opposite the Lake Hotel, but was later located on Railroad Ave until it was destroyed by fire in 1887. It was then rebuilt in the Peavey Block until 1936.

18. Latchaw Building: Initially known as the Bell Building in the early 20th century as the telephone office was located there beginning in 1896. Has housed a barber shop, fruit store, sporting goods, drug store, confectionary and gift shop, electrical shop and dry goods store.

19. Village Players: The Unitarian Church was founded in the 1880s. In December 1886, the group voted to build a church which was completed in late 1887. The group discontinued services in 1908 and sold the building in 1912 to the Masonic Temple Association. For many years motion pictures were shown. In January 1995, the building was sold to the Village Player Theatrical Group.

20. Shoe Factory: Built by Greenleaf Clark in 1895, the Spaulding & Swett Company leased the building from 1895 to 1901.

21. Russell C. Chase Bridge Falls Path: Constructed in 1992, this path follows the original Wolfeboro Railroad line for ½ mile from the Railroad Station to Center Street.

22. Grist Mill and Dam: ca. 1864. A grist mill was built on this site in 1771 by early proprietors to grind their corn, and up until 1981 it was an excelsior mill. The building burned in 1994. The two remaining buildings are part of the grist mill and piano stool factory.

23. Train Depot: Victorian style structure built in 1872. Originally built for the Eastern Railroad, later taken over by Boston & Maine Railroad. Was the Wolfeboro Youth Center during the 1950's and served as a meeting hall through the 70's. It was stuck by lightening in 1987. Now known as the Wolfeboro Chamber of Commerce.

24. First Christian Church: The church was originally organized in 1812, and the present building was created in 1858 at a cost of $1,500.

25. Wolfeboro Inn: ca. 1812. This Adams style farm house was built for Nathaniel Rogers on 150 acres of land. The "Wolfe's Tavern" occupies the ground floor of the original building.

26. Tuc' Me Inn B&B: Federal Style House built in 1850 by the Reverend Asa Piper. Became a Bed and Breakfast in 1985.

27. Lucas-Nowell House: ca. 1780. One of the first settled farms of the seven original farms in Wolfeboro in 1768. Remained a farm until subdivided in 1882. Currently houses art studio of Doug Blum.

28. The Lakeview Inn: ca. 1790. The second farm of the original seven farms. Remained a farm until subdivided in 1940s. The Lakeview Inn began operations in the early 1920s.

29. Goodwin and Haley Building: Originally built in the 1850s. Rebuilt in 1866.

12.0 CO-OCCURRING CRITICAL RESOURCES

The increased availability and use of GIS data has resulted in new tools for the identification and analysis of important natural resources as is evidenced by the many maps depicting these resources in this NRI. An additional useful tool is the analysis of those areas where the locations of important resources overlap and which may deserve additional consideration and analysis in community planning strategies.

In consultation with the Wolfeboro Planning Board, a "Critical Resources Co-Occurrence Model" was developed for this NRI. The model inputs used for this analysis are listed below:

- Results from the Wildlife Co-Occurrence Model Analysis **(Figure 14)**
- Aquifers **(Figure 10)**
- Prime Wetlands **(Figure 7)**
- Unfragmented Lands **(Figure 12)**
- Prime Farmland **(Figure 4)**
- Riparian Buffers – 50' from all Wetlands, Streams, Lakes & Ponds

All model inputs were unweighted for this analysis, meaning that each single attribute is considered as having equal importance to the analysis. The results of the Critical Resources Co-Occurrence Analysis are displayed on **Figure 18**. Total scores range from 1 (Low Value) to 10 (Highest Value). Scores are displayed via a color scheme that is included in the legend on **Figure 18**. Very few areas in Wolfeboro achieved a score of 9 or 10. Of these, the Warren Brook wetland complex on Lake Wentworth at the Wolfeboro/Brookfield town boundary is the only high scoring area that is not currently protected by conservation easement or fee-ownership of lands dedicated for conservation.

Other high scoring areas are:

- Unnamed tributary to Frost Brook in the Pine River Subwatershed. A portion of this critical resource area is within lands dedicated to conservation but there is an intricate array of important resources in this area that are not currently protected.
- The confluence of Clay Pit Brook and Ryefield Brook at Lake Wentworth is another area of high value for which a portion of the critical resource area is within lands designated as conservation lands.
- Ryefield Brook along its reach is a high value perennial stream system with many instances of critical co-occurring resources, ranging in scores from 6 to 10.
- Wetland system to the north of Sargent's Pond along an unnamed tributary to the Pond. A portion of this critical co-occurring resource is located within lands designated for conservation.
- Heath Brook
- Clay Pit Brook
- Frost Brook

12.1 TOOLS TO PROTECT CRITICAL CO-OCCURRING RESOURCES

The Critical Co-Occurring Resource Analysis quickly points to those areas of significant value to the Town of Wolfeboro, based on the criteria used to develop the model. Any area with a score of greater than 5 should be considered critical resources to receive long-term protection. Measures that can be used to protect these resources are:

- Outright purchase by the Town of Wolfeboro or other Land Protection Agency with conservation restrictions. These critical resources could become priority areas to guide the Conservation Commission in the development of a conservation land protection strategy for the Town of Wolfeboro.

- Purchase of a conservation easement by the Town of Wolfeboro or other Land Protection Agency and development of a management plan with the subject landowners to ensure that the critical resources on the subject parcel are properly managed and/or protected.

- Large lot zoning already is in place within a portion of the Pine River watershed (Agricultural District) and could be expanded to include larger parcels along Ryefield Brook and Clay Pit Brook which are located in the same general area of the Town but which are currently located in the Rural Residential District (**Figure 21** – Wolfeboro Zoning Map).

- Develop a Critical Resources Co-Occurring Zoning Overlay District which would spell out buffers and permitted uses within these special resource areas.

- Riparian buffer zones for critical resources should be a minimum of 100' for the protection of these most sensitive resources.

- Land preservation opportunities along critical aquatic resources may be eligible for funding through the NHDES Aquatic Resource Mitigation Fund. These grant rounds are released once each year in March if the HUC 8 watershed has accumulated enough funds to warrant release. The NHDES website has application forms and selection criteria guidelines that can help with determining if the project is a good fit or not for the ARM Fund program. Projects that include restoration of as well as protection of the aquatic resource will score higher than those that only propose one or the other.

12.2 CONSTRAINTS TO DEVELOPMENT

Another GIS analysis that can be used as a planning tool is to create an overlay of all known constraints to development and to use this analysis to develop a plan for the responsible development of areas not so constrained. **Figures 22 & 23** display the results of such an analysis. On **Figure 22**, each of the following land constraints are displayed with their own

unique symbol for easy identification of the constraint. On **Figure 23**, the constraints are treated equally as one GIS layer with no differentiation between type of constraint.

Constrained lands for the purpose of this analysis were considered to be the following:

- Steep Slopes (greater than 15%)
- Prime Wetlands
- Wetlands
- Shoreland District
- Municipal Watershed District
- 50' Riparian Buffer of all Lakes & Ponds, except Back Bay and Upper Beech Pond
- Conservation Lands
- Lands Already Developed (includes building footprints and roads)
- Aquifer Overlay District

12.3 CONSTRAINED LANDS

The Constrained Lands Analysis Map displayed on **Figure 23** highlights those areas where development should be discouraged. In general this analysis picked up most of the Critical Co-Occurring Resource Areas but in general the largest areas of land without constraints are in the northeast corner of Wolfeboro which is currently designated as the Agricultural District and the Rural Residential District. Due to the presence of large unfragmented land blocks in these areas and the concentration of NHNHB species of concern and the relatively high valued Critical Co-Occurring Resources in these areas, it seems as though the current Zoning will help to protect those areas from intense development provided that the spirit and intent of the zoning districts are upheld.

Wolfeboro zoning measures currently in place are intended to encourage increased density of development close to existing services and to discourage development in those areas farther away from existing services. This strategy is sound but does mean that denser development is encouraged in the watersheds of Lake Winnipesaukee and Lake Wentworth. Most of the Lake Winnipesaukee shoreline is already developed but the Lake Wentworth shoreline and riparian buffer zone within 150' should continue to managed in strict adherence to the measures within the Shoreland Protection District.

13.0 ANALYSIS OF CURRENT LAND USE MEASURES

The 2007 Master Plan states, "Because the Master Plan serves as a policy guide for the Town, any ordinance or land use appeal pertaining to the use of land of the growth and development of the municipality should conform to the goals and policies of the plan." Any tools for the protection of the Town's resources must coincide with the most recent Master Plan; because of this, it is essential that all analysis include data from the Master Plan, along with any additional protection methods.

13.1 ANALYSIS OF TOOLS FOR SCENIC RESOURCES

Wolfeboro provides adequate protection of the Town's scenic resources. According to RSA 253, sections 17 and 18, towns have the right to dedicate special roads as "scenic." Wolfeboro has designated 14 roads as "designated scenic roads." Also, there are numerous ordinances that support the protection of the visual aesthetics of the town.

13.2 ANALYSIS OF TOOLS FOR PROTECTION OF AGRICULTURE & FORESTRY RESOURCES

Article XXA states that the Cotton Mountain Historic-Agricultural District Zone is amended to increase lot size from five to 10 acres, including all contiguous land of the present landowners and continuing the preservation of natural resources of forest, field and open space of the Agricultural District in furthering the Town's rural character.

Wolfeboro has implemented an ordinance encouraging the creation of buffers and streetscapes. This ordinance supports including existing forestry into these buffers, and the protection of existing forestry during any type of construction or other potentially harmful practices. Environmentally, the buffer ordinance:

- Aids in stabilizing the environment's ecological balance by contributing to the processes of air purification, oxygen regeneration, groundwater recharge and stormwater runoff retardation while at the same time aiding in noise, glare and heat abatement;
- Ensures that the local stock of native trees and vegetation is protected and replenished;
- Provide visual buffering and enhance the beautification of the Town;
- Conserves energy by providing shade in the summer and direct sun in the winter;
- Preserves and improves the visual and environmental character of the neighborhood and the Town of Wolfeboro in general.

13.3 ANALYSIS OF TOOLS FOR WETLAND PROTECTION

Activities in wetlands are regulated by the NH Department of Environmental Services (NHDES – Wetlands Bureau) and the US Army Corps of Engineers (USACE). In New Hampshire, towns are allowed to develop more restrictive regulations to manage important resources within their town.

Article II of section §175 of the Wolfeboro Town Zoning Ordinances establishes a Wetlands Conservation Overlay District, which regulates land use surrounding naturally occurring wetlands. The Wetlands Conservation Overlay District:

- Prevents development, destruction, and significant changes to naturally occurring wetlands;
- Protects rare, unique and unusual natural species and their habitats;
- Maintains ecological balances;
- Protects existing and potential water supplies, aquifers, and aquifer recharge areas;
- Protects the wetlands, watercourses and water bodies of the Town from degradation and helps maintain their natural beauty.

For permitted land uses, the Wetlands Conservation Overlay District emphasizes the importance of using best management practices in order to protect wetlands. A list of permitted practices can be found in the Zoning Ordinance. The ordinance regulates these permitted land uses; including:

- For a permitted land use, it is prohibited to alter the natural surface configuration of a prime wetland by the addition of fill or by dredging. For wetlands, the fill or dredging of 1,000 square feet or more is also prohibited.
- For a permitted land use, forestry/tree farming is limited to the removal of less than 50 percent of the basal area of the standing timber in any ten-year period. This guarantees a well-distributed stand of healthy, growing trees.
- For a permitted land use, protection of the wetland from any form of pollution is highly emphasized.

Most land use practices require a special use permit. Practices that require special use permits are also listed in the Zoning Ordinance. Special use permits allow regulated land uses to be practiced near a protected wetland, as described below:

- No building activity is permitted within 50 feet of any poorly drained soil and within 75 feet of any very poorly drained soil, except if provided in a special use permit.

- A failed septic system within 75 feet of any Hydric A soils and 50 feet from Hydric B soils must be replaced on land outside the buffer zone, unless the Health Officer makes a determination that such placement is not physically possible. A special use permit shall be required to place a new or failed system within the Hydric A and Hydric B soils buffer zone.

- With a special use permit, access ways and utilities may be constructed in protected areas as long as there is no alternative location outside the wetland or buffer zone that is feasible, and the construction is not economically based. Construction and maintenance methods must minimize detrimental impact upon the wetland, and will restore the site as nearly as possible to the original condition.

As discussed in Section 4.3, towns in New Hampshire are allowed to further protect special wetlands, by designating these wetlands as "Prime Wetlands." Wolfeboro takes advantage of this opportunity; the Wetland Conservation Overlay District declares thirteen wetland complexes as "Prime Wetlands," Prime wetlands, although designated have not received extra protection via the Wetlands Conservation Overlay District for their upland buffers.

The Overlay District also calls for identification of wetland boundaries by a Certified Soil Scientist. The practice of wetland science in New Hampshire is now under the jurisdiction of the NH Joint Board of Licensure – Board of Natural Scientists. As such, an individual practicing wetland science in New Hampshire MUST be a Certified Wetland Scientist or can be subject to legal prosecution.

13.4 ANALYSIS OF TOOLS FOR PROTECTION OF SURFACE WATERS

A shoreland ordinance has been implemented in order to maintain the integrity of existing shore front residential developments, and protect the shore front from over-development. The ordinance also upholds the standards of the New Hampshire Shoreland Protection Act, RSA 483-B, which recognizes that the protection of these shorelands is essential in maintaining the integrity and exceptional quality of the state's public waters.

The shoreland ordinance encourages the following:

- The protection of a natural woodland buffer, which shall be maintained within 150 feet of the high-water line. The purpose of this buffer shall be to protect the quality of public waters by minimizing erosion, preventing siltation and turbidity, stabilizing soils, preventing excess nutrients and chemical pollution, maintaining natural water temperatures, maintaining a healthy tree canopy and understory, preserving fish, bird and wildlife habitat, and respecting the overall natural condition of the protected shoreland;

- All construction proposed within the protected shoreland will be regulated and designed in accordance to rules located within the ordinance;

- Not more than a maximum of 50% of the basal area of trees, and a maximum of 50% of the total number of saplings shall be removed for any purpose in a twenty-year period;
- Minimum shorefront requirements shall be required in the yard area adjacent to any shorefront.

Wolfeboro has also enacted a floodplain ordinance, which states any proposed development in a floodplain requires a permit. A Code Enforcement Officer must review all permits, ensuring these developments are designed (or modified) to be flood resistant. If a new or replacement water/sewer system is being proposed, the Code Enforcement Officer must ensure these systems are designated to minimize/eliminate infiltration and contamination.

The floodplain ordinance has many development regulations, including the following:

- Along watercourses with a designated regulatory floodway, no development is allowed within the floodway that would result in any increase in flood levels within the community during the base flood discharge
- Along watercourses that have not had a designated regulatory floodway designated, no development shall be permitted unless it is demonstrated that the cumulative effect of the proposed development, when combined with all existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

The Code Enforcement Officer's one-hundred-year-flood elevation determination will be used as criteria for development in Zones A, A1-30, AE, AO and A.

13.5 ANALYSIS OF GROUNDWATER PROTECTION REGULATIONS

Article IV of section §175 of the Town Zoning Ordinances adopts an Aquifer Protection Overlay District, that maintains and protects the aquifers within the Town. Under this Overlay District, the following uses are prohibited:

- Disposal of solid wastes, other than brush and stumps;
- Storage of petroleum or gasoline, and the transmission through pipelines;
- The disposal of liquid or leachable wastes;
- Impervious surface coverage of more than 10% of any lot.

For other uses, a permit is required. When reviewing permit applications, the Planning Board evaluates the immediate and long-range impact of the proposed use on groundwater and the possible effects upon maintenance of safe and healthful conditions. The following is a list of considerations:

- The amount and type of wastes to be generated by the proposed use and the adequacy of the proposed disposal system;
- The capability of the land and water to sustain such use without degradation;
- Topography and drainage of the site and susceptibility to flooding;
- The need of a particular location for the proposed use;
- The compatibility of the proposed use with adjacent land uses.

The Planning Board also has the power to impose reasonable restrictions deemed advisable in order to protect the purity of the groundwater. Because this overlay district imposes a higher standard for the promotion and protection of health, safety and welfare, the provisions of this overlay district shall prevail.

13.6 ANALYSIS OF TOOLS FOR THE PROTECTION OF DRINKING WATER

The Town has a Capital Improvements Program designed to identify deficiencies and recommend upgrades to public utilities such as water and sewer. The CIP is a vital physical and financial planning tool, and is designed to provide priorities for the long-term maintenance and improvement of public utilities, facilities and services which the Town provides for its citizens.

Wolfeboro has a newly upgraded Waste Water Treatment Facility. The previous facility was constructed in the early 1970s, and was occasionally unable to comply with NHDES declared spray rate limits. In order to solve this problems, in 2008 the Town constructed a new Waste Water Treatment Facility. This facility pumps up to 600-thousand gallons of treated wastewater each day, and it will remove more nitrogen from the water before it’s pumped up the hill to the new basins. Trace amount of phosphorus will remain in the water but should be filtered out through the sandy basins.

Wolfeboro protects all wastewater pollution from entering groundwater resources in an ordinance on sewage maintenance. The ordinance also prohibits any waste product from entering natural outlets. A permit is required for any construction of private sewage disposal systems.

No use of any land or structure in the Town of Wolfeboro shall be permitted which generates any waste which has been identified as a "hazardous and toxic waste" by the State of New Hampshire Office of Waste Management or by the United States Environmental Protection Agency until a permit for such use has been obtained from the Planning Board.

For all development ordinances subdivision ordinances and personal wireless facilities, stormwater runoff is required to be contained on-site. Also, no hazardous waste shall be discharged on the site of any personal wireless service facility. If any hazardous materials are to be used on site, there shall be provisions for full containment of such materials. An enclosed

containment area shall be provided with a sealed floor, designed to contain at least 110% of the volume of the hazardous materials stored or used on the site.

Excavation projects require a special permit when the excavation would substantially damage quality of the groundwater and/or reduction in the long-term volume of water of a known aquifer. The applicant must submit evidence prepared by a qualified professional that the excavation will not detrimentally affect the quality of the groundwater.

In order to keep the water pure, the following restrictions apply to Upper Beech Pond:

- No trespassing on the town-owned land around said pond will be allowed. This includes, but is not limited to, hiking, camping, picnicking, horseback riding or use of any off-highway recreational vehicles at any time.
- No boating, fishing, swimming or any other use is allowed on or in the pond.

Wolfeboro also has the authority to regulate public water use in the best interest of the town during a water supply shortage. The town can impose restrictions necessary to conserve and maintain adequate reserves of the public water supply, including any or all of the following:

- Restricting landscape and lawn watering and irrigation to designated days;
- Landscape irrigation shall be prohibited, except for irrigation by low volume devices only, of crops for use as food by residents at a primary residence;
- Use of automated landscape sprinkler systems is prohibited;
- Prohibiting all outdoor water use;
- The filling of swimming pools is prohibited;
- Washing or cleaning streets, driveways, sidewalks or other impervious areas is prohibited;
- Washing of cars and boats at a noncommercial facility shall be restricted;
- Washing of cars or boats at a noncommercial facility shall be prohibited.

13.7 ANALYSIS OF TOOLS FOR PROTECTING UNFRAGMENTED LAND BLOCKS

Article XXIV of Section 175 of the Zoning Ordinances emphasizes open space as, “an alternative to the basic provisions of conventional residential subdivision practices.” This alternative encourages the environmentally sound development of land and provides for the preservation of open space, the protection of natural resources and the creation of attractive living environments.

Specific goals of the article are as follows:

- Allow flexibility and creativity in design.
- Discourage development sprawl and consumption of rural and/or agricultural land.
- Create residential environments which provide adequate open space amenities adjacent to living areas.
- Facilitate the economical, efficient and environmental provision of public services.
- Provide a more efficient use of land in harmony with its natural characteristics.
- Preserve usable contiguous open space, agricultural land, tree cover, recreation areas, scenic vistas, undeveloped lengths of shore front and wildlife habitats.
- This ordinance does not apply to every district. The list of districts to which it applies is listed in the ordinance.
- The ordinance requires the following:
- A minimum of 50% of the total tract area, excluding road rights-of-way or easements, shall be required to be permanently dedicated as open space;
- The Planning Board shall require that all environmentally sensitive areas be dedicated as conservation open space;
- In Shore Front Residential District areas, including buffer areas, a minimum of 50% of the land area shall be required to be permanently dedicated as limited use or conservation open space;
- The applicant shall submit a proposal for the use of the remainder of the required open space.
- The ordinance also requires a buffer space consisting of open and undeveloped land along the perimeter property boundary(s) of the original tract. Use of the buffer area shall be limited to conservation open space or limited use open space.
- Tracts 10 acres or less: Buffer areas must be a minimum of 50 feet in depth.
- Tracts greater than 10 acres: Buffer areas must be a minimum of 100 feet in depth.
- A Shore front buffer area will be created to include land within 100 feet of the mean high-water mark of all lake or pond shore front property.

The subdivision ordinance promotes and provides for open space, and prevents scattered and premature development of land. In this ordinance, due regard shall be shown for natural features, such as large trees, wetlands, watercourses, stone walls, scenic points, ledge and boulder outcrops and similar amenities.

Wolfeboro has also become a member of the Moose Mountains Regional Greenways. This is extremely important and beneficial to the concept of protecting large unfragmented land blocks. **Figure 19** shows the relationship of the unfragmented land blocks in Wolfeboro to those in neighboring towns. Partnerships with the MMRG and in particular with Wakefield, Brookfield and New Durham will help to identify joint opportunities for protection of the large unfragmented land blocks that they share. Two of the largest unfragmented land blocks in the 7 town region are significantly represented in Wolfeboro, including the area to the east of Lake Wentworth which includes the Warren Brook wetland complex, a Prime Wetland and a Critical Co-Occurring Resource in Wolfeboro.

13.8 ANALYSIS OF TOOLS FOR PROTECTING WILDLIFE RESOURCES

Aside from the numerous amounts of State laws, there is only scattered protection for wildlife within the 2007 Master Plan and Town Ordinances. Wildlife protection is an important aspect in preservation of natural resources, but is currently protected only indirectly through development ordinances, and the Wetland Conservation Overlay District.

There has been the creation of a Milfoil Control Committee, which oversees the control of the invasive species milfoil. Whether this committee considers other invasive species is something to consider.

There is no vernal pool protection in the town. The Wetlands Conservation Overlay District protects those unique species and habitats found in wetlands.

Figure 20 displays the Wildlife Action Plan Ecological Conditions Ranking for the 7 town region that includes Wolfeboro and its neighboring communities. Some of the highest value habitat in Wolfeboro was mapped as the shoreland zone of Lake Winnipesaukee. Much of this land has been developed and future updates of the WAP data will filter out areas that have been heavily developed. Other riparian areas along perennial streams (in particular Ryefield Brook, Frost Brook and its tributaries and Claypit Brook are deserving of additional protection for their riparian buffers.

13.9 ANALYSIS OF TOOLS FOR PROTECTING RECREATIONAL RESOURCES

Recreational Resources

One of the main goals in the 2007 Master Plan was to manage the recreational resources so that they equitably serve the permanent/seasonal/transient population and stimulate year-round

economic opportunities. Recreation is considered as a positive factor in the Wolfeboro economy; the combination of historical, cultural, and natural resources and community character make Wolfeboro an attractive destination for tourists. Because of this, it is important to promote and expand activities and sports in the town.

Most of Wolfeboro's recreational programs are private or non-profit; in some cases, they have been assumed by the Parks & Recreation Department. These programs include youth hockey, baseball, basketball, lacrosse, soccer, football, skiing, Summer Theater, and community bandstand.

In the 2007 Master Plan, the town owned 680 acres of open space, parks and recreational facilities which need to be maintained and improved.

Wolfeboro has been working on trail connectivity through various committees, including a Pathways Committee and a Trails Rails Action Committee.

The Wolfeboro Area Recreation Association operates The Nick, a full-service sports recreation park.

Historic Resources

The Historical Districts safeguard the heritage of the Town; preserve a district in the Town which reflects elements of its cultural, social, economic and political history; and promotes the use of an historic district for the education, pleasure and welfare of the citizens of our Town. There is a list of the historic districts in the Historic District Ordinance.

The historic districts protect the following:

- Sites at which events occur or have occurred that contribute to and are identified with or significantly represent or exemplify the broad cultural, political, economic, military, social or sociological history of the Wolfeboro Historic District and the nation, including sites and buildings at which visitors may gain insight or see examples either of particular items or of larger patterns in the North American heritage.
- Structures or sites importantly associated with historic personages.
- Structures or sites importantly associated with historic examples of a great idea or ideal.
- Structures or structural remains and sites embodying examples of architectural types or specimens valuable for study of a period, style or method of building construction, of community organization and living or of landscaping or a single notable structure or a single site representing the work of a master builder, master designer, architect or landscape architect.
- Structures contributing to the visual continuity of the district.

Any personal wireless service facilities located on or within an historic structure or building shall not alter the character-defining features, distinctive construction methods, original historic materials of the building, or visually alter the exterior of the historic structure or building. Any alteration made to an historic structure to accommodate a personal wireless service facility shall be fully reversible.

There has also been a creation of a Self-Guided Tour to the historical locations in Wolfeboro.

14.0 RECOMMENDATIONS

- Continue to use all available tools to protect natural resources, including wetlands, wildlife, agriculture, forests, open space, recreation areas, and view sheds.
- Do not issue building permits for development on Class VI roads.
- Establish land use regulations that require new development be sited in ways that minimize the impact on open space and viewsheds.
- Preserve trees and other scenic features which make Wolfeboro particularly attractive; avoid widening existing Town highways and avoid the construction of new roads.
- Continue to implement the State's scenic road law and the Town's scenic road policy.
- Consider strengthening standards used in the Planning Board review of scenic roads to assist in the preservation of existing rural environment.
- Soil is one of the main components in determining how land should and shouldn't be used. Because of this, it is essential that land use decisions be based on accurate soils information. NRCS mapping is for general planning use only because the scale of the NRCS results in inclusions of other soil types with other characteristics than the dominant and named soil map unit would indicate. In order to have good information for site specific development project, the Town of Wolfeboro Planning Board should require Site Specific Soil mapping (SSSM) or HISS mapping on all development projects.
- Create a database of existing farms in Wolfeboro and update Figure 4 to show the location of existing farms.
- Complete Agriculture Profile for the Town.
- Protect Important Farmland soils that are necessary for economically viable agricultural activities.
- Reduce conflict between agricultural and residential uses by requiring a buffer when land is developed adjacent to a farm.

- Support legislation economically beneficial to small agriculture, provided legislation does not have a negative ecological impact.
- Encourage residents to buy locally.
- Educate farmers about the benefits of conservation easements on their property, and encourage them to follow "Best Management Practices" in the management of their farm.
- Increase the number of town-owned and protected forests.
- Continue to prepare forest management plans by a licensed forester.
- Develop a town forest ordinance and signage informing residents of how town forest should and should not be used.
- The Conservation Commission should encourage all woodlot owners to develop a management plan for sustainable forestry using best management practices and consultation with a licensed forester.
- The Town Timber Monitor should monitor clear cutting of forests and ensure that timber harvesting is in accordance with accepted forest management practice and State forestry laws.
- Require the use of BMP's as described in the 2010 edition of "Good Forestry in the Granite State". These BMP's are voluntary at the State level due to political pressure but should be mandatory especially, when working in riparian buffer zones for Prime Wetlands, Shoreland Zones, and the riparian buffers of Critical Co-Occurring Resources
- Update the Wetlands Conservation Overlay District to include a protective upland buffer of at least 100' around all wetlands designated as "Prime Wetlands". At the writing of this NRI, there are changes proposed to state legislation which will endanger the upland buffer protection of Prime Wetlands at the state level. Local regulations will need to increase local protection of Prime Wetlands in order to lessen the negative effect of these proposed changes.
- Prime Wetlands and their protective buffers should be considered for long-term protection through purchase of conservation easements and/or outright fee purchase.
- Amend the Wolfeboro Subdivision regulations to require that wetlands be mapped by a Certified Wetland Scientist for all subdivision applications.
- Amend the Wolfeboro Site Plan regulations to require that wetlands be mapped by a Certified Wetland Scientist for all site plan applications.

- Incorporate "No-Cut" or "No-Touch" riparian buffers into Wolfeboro's zoning ordinances to protect rivers and streams.
- Strengthen local protection methods for the Shoreland Zone due to the current legislative efforts to weaken the State Comprehensive Shoreland Protection Act, RSA 483-B.
- Strengthen local protection of riparian corridors to maintain water quality and wildlife habitat.
- Protect the few remaining undeveloped areas of lake and pond frontage.
- Consider acquiring land over and adjacent to productive aquifers in order to protect future municipal water supplies.
- Ensure the Aquifer Protection Overlay District is being enforced.
- Prohibit or restrict new potential contamination sources from locating in a source water protection area and/or in a wellhead protection area.
- Purchase in fee or purchase a conservation easement on the remainder of the unprotected lands in the Upper Beech Pond Municipal Watershed District.
- Encourage use of the Open Space Subdivision provisions in the Wolfeboro Zoning Ordinance.
- Develop monitoring strategies for lands that are already protected by the Town.
- Require Baseline Documentation Reports for lands to be placed in conservation as a result of municipal zoning. Use these Baseline Documentation Reports to create a file of conserved properties for use by the Conservation Commission in the exercise of their monitoring duties.
- Vernal Pools provide a unique habitat and crucial breeding grounds for a number of species. Efforts should be made to protect this habitat and species it supports.
- Create and implement a vernal pool ordinance that identifies and maps vernal pools;
- 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;
- Educate the public on the importance behind vernal pools and how to identify and document these pools.
- Keep log landings, roads and trails out of vernal pools and the area adjacent to them as this leads 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 development;
- Maintain the upland habitat where many vernal pool species spend most of their life cycle.
- Protect significant habitats and species; consider creating a Wildlife Protection Ordinance.
- Protect riparian corridors with a buffer.
- Keep unfragmented parcels unfragmented.
- The Conservation Commission, the Planning Board and the Board of Selectmen should establish Wildlife Corridors by means of conservation easements and managed development in order to foster the migration and enhancement of area wildlife.
- Continue to support the Milfoil Control Committee. Consider including other invasive species in the committee as they appear.
- Maintain trail connectivity. This is a mutually beneficial goal with that of wildlife habitat connectivity, wildlife corridors and maintenance of large blocks of unfragmented lands.
- Establish a more walkable community by protecting trails, extending sidewalks, and encouraging the work of the TRAC.
- Improve and protect existing recreational, natural, and cultural resources and develop new facilities and programs to meet the needs of current and future Town residents.
- Promote the education of local history to both year-long and summer residents.

REFERENCES

ORGANIZATIONS

Cartographics Associates, Inc.
11 Pleasant Street
Littleton, NH 03561
(603) 444-6768
http://www.cai-info.com/

Lakes Region Conservation Trust
PO Box 766
Center Harbor, NH 03226
(603) 253-3301
www.lrct.org

NH Department of Environmental Services
29 Hazen Drive
Concord, NH 03301
(603) 271-3503
http://des.nh.gov/

NH Fish & Game Department
2 Hazen Drive
Concord, NH 03301
(603) 271-3421
www.wildlife.state.nh.us

NH Natural Heritage Inventory
172 Pembroke Road
PO Box 1965
Concord, NH 03302
(603) 271-3623
http://www.nhdfl.org/natural-heritage-and-habitats/

Wolfeboro Planning Board
Town Office Annex
9 Union Street
Wolfeboro, NH 03894
(603) 569-5970
http://wolfeboronh.us/

PUBLICATIONS

The Changing Face of Wolfeboro. 2007. Town of Wolfeboro Master Plan Summary.

Identifying and Protecting New Hampshire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups. 2001. NH Fish & Game Department.

Introduction to Riparian Buffers. Sept. 2000. Connecticut River Joint Commission

for NH and VT.

Wolfeboro Planning Survey. June 2006.University of New Hampshire Survey Center.

Gilmanton, New Hampshire Natural Resource Inventory. Sept. 2004. Gilmanton Conservation Commission.

Natural Resource Inventories: A Guide for New Hampshire Communities and Conservation Groups. 2001. Amanda Lindley Stone. University of New Hampshire Cooperative Extension.

Classification of Wetlands & Deep Water Habitats of the United States. U.S. Fish & Wildlife Service.

Identification & Documentation of Vernal Pools in New Hampshire. 1997. NH Fish & Game.

Wolfeboro Cross Country Ski Trail Map. Wolfeboro Cross Country Ski Association. www.WolfeboroXC.org

Wolfeboro Historical Self-Walking Tour. Town of Wolfeboro, NH.

(Lobdell Report)

(Keith Report)

(Town Ordinances)

WEBSITES

New Hampshire GRANIT Database; http://www.granit.unh.edu/

U.S. Fish & Wildlife Service National Wetlands Inventory; http://www.fws.gov/wetlands/

Natural Resources Conservation Service; http://www.nrcs.usda.gov/

U.S. Geological Survey; http://www.usgs.gov/

Society for the Protection of New Hampshire Forests; http://www.spnhf.org/

U.S. Department of Agriculture Soil Data Mart; http://soildatamart.nrcs.usda.gov/

U.S. Environmental Protection Agency; http://www.epa.gov/

New England Wildflower Society; www.newfs.org

UNH Cooperative Extension; http://extension.unh.edu/

New Hampshire General Court; http://www.gencourt.state.nh.us/