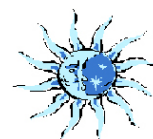


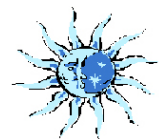


GILFORD, NH

NATURAL RESOURCE INVENTORY



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Gilford, New Hampshire

Natural Resources Inventory

Prepared by:



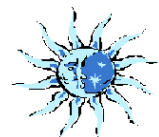
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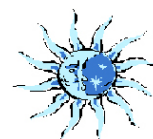


Vanasse Hangen Brustlin, Inc.

November, 2011



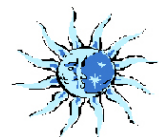
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***“When we see land as a community to which we belong,
we may begin to use it with love and respect.”
Aldo Leopold***



View from summit of Piper Mountain



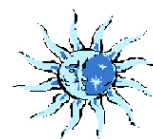
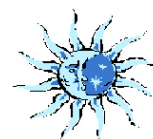


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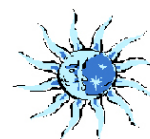
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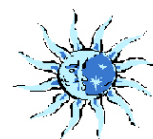


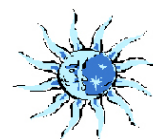
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1.0 INTRODUCTION



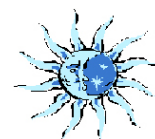
Initially settled in 1777 in the town of Gilmanton, New Hampshire, Gilford was originally known as “Gunstock Parish.” Gunstock Parish separated from Gilmanton and became Guilford in 1812, named after the Battle of Guilford Courthouse. However, a misspelling in the incorporation documents led Guilford to become what it is now known as: Gilford. The town remains the only community in New Hampshire named after a Revolutionary War battle.

Gilford contains approximately 24,793 acres of land and 9,451 acres of inland water (**Figure 1**). When the first census was taken in 1820, there were 1,816 residents; as of 2006, 7,453 people reside in the Town. Gilford has very diverse landscapes, from mountains and forests to wetlands and farms. Located in the popular Lakes Region area, the town is home to many tourist-focused businesses such as Gunstock Recreational Area and Meadowbrook Musical Arts Center. These businesses help further the Town’s revenue, as well as provide employment opportunities to the town’s residents.

This Natural Resource Inventory (NRI) provides data on the existing extent and condition of the natural resources in Gilford. It is intended to be a working and useful document for various town officers and departments who are responsible for overseeing the wise use and stewardship of the natural resources in Gilford. This NRI analyzes in map as well as narrative format Gilford’s natural resources, including surface water resources, farming, forest resources, land conservation, wildlife habitat, unfragmented blocks of land, drinking water resources, wetlands and floodplains. It provides further analysis of those areas where more than one important resource occurs simultaneously on the landscape and presents final analysis maps for critical wildlife habitat, areas of critical co-occurring resources and an overview of lands constrained for development. Where appropriate, recommendations are made to encourage wise use and coordination of management tools with other goals and objectives of the Town so as to promote the long-term stewardship of these important assets.

The goals of completing the Natural Resource Inventory for the Town of Gilford are as follows:

- To fulfill its requirement by the State in RSA 36-A:2 that our Conservation Commission (CC) “conduct researches into its local land and water areas [and]...keep an index of all open space and natural, aesthetic or ecological areas within the city or town;”
- To fulfill its requirement to the residents of Gilford who voted to establish the Gilford Land Conservation Task Force (LCTF) that was charged by the Board of Selectman to inventory and identify areas of the community, which, by preservation, would maintain



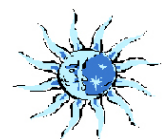
Gilford's rural character and scenic beauty, while simultaneously protecting our natural resources;

- To fulfill the Town's objective under Natural Resources category in the Town's Master Plan (completed in 2004) to properly utilize and preserve the natural resources of the town; and
- 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 inventory was collected from various sources which are listed at the end of the report. In order to maintain the usefulness of this document it is important to understand that the underlying data is constantly changing. The digital GIS data has been developed and packaged in such a way that it can easily be updated as new data or information become available. In March 2009 a Town wide survey was conducted to gather public opinions regarding natural resource values in Gilford. Responses are summarized in **Appendix A**.



View of Lake Winnepesaukee from the Mt. Washington Cruise Ship



2.0 LAND RESOURCES

The Town of Gilford is comprised of 34,244 acres of which land covers about 24,793 acres, or approximately seventy-two (72) percent of the Town. Gilford is one of the larger towns in New Hampshire covering a greater area than 225 of 258 towns.

Elevations range from 504 feet at Lake Winnepesaukee to a high point of 2,382 feet atop Belknap Mountain. The Belknap Mountain Range is a dominant landscape feature within the Town as is scenic Lake Winnepesaukee. The juxtaposition of Gilford between the peaks of the Belknap Mountains and Lake Winnepesaukee creates diverse topography and landscape positions, which in turn give rise to numerous scenic views. The geology of the Lake's Region has been a determining influence on the land resources present in Gilford today.

2.1 GEOLOGY

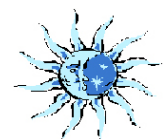
The Town of Gilford has the distinction of having a very complicated geologic history and an unusual variety of rock types. Gilford's geology includes an extinct volcano, rocks formed during the formation of Pangea, and the effects of glaciation. The division between Gilford's dry land and Lake Winnepesaukee is also determined by the boundary of two different rock formations.

The rocks that underlay the lower hills and valleys of Gilford are the metamorphic rocks of the Perry Formation and the Rangely Formation. These rocks are located on the west side the Belknap Mountains and extend to the Laconia border. They comprise about half of Gilford's land area. The Perry and Rangeley Formations were formed 390 - 360 million years ago when the continent of Pangaea was beginning to form. These rocks are mica-rich, rusty weathering schists and metamorphosed sandstones. Bedrock wells that tap these rocks often must be filtered and/or treated for taste and rusty color due to the high iron content in the rock.

The Belknap Mountains are the remnants of an extinct volcano that was active during the Jurassic period approximately 150-160 million years ago. This former volcano makes up the highest and steepest elevations of Gilford. Several rock types make up the Belknap Mountain igneous rocks including basalt, syenite and granite. The most well-known of these is the Conway Granite which is a pink and black biotite granite. Conway Granite was historically mined in the Belknap Mountains for foundations, grave markers, outdoor steps and roadway cobbles in Concord and Laconia.

Lastly, the Winnepesaukee Tonalite underlies Lake Winnepesaukee. The Winnepesaukee Tonalite is made of a gray, sometimes layered diorite and granite that formed 416 to 398 million years ago, making them the oldest rocks in Gilford. Ellacoya State Park and most of Gilford islands in Lake Winnepesaukee are underlain by the Winnepesaukee Tonalite.

New Hampshire has experienced many glacial periods over the last 2.5 million years. The most recent glaciation began about 110,000 years ago and ended around 12,500 years ago. The glaciers removed and redistributed the soil that was in the area 110,000 years ago. As the glaciers melted, the sand, clay, gravel and till that they carried was left behind providing the



basis of Gilford's current soils and sand and gravel pits. The soils of Gilford (and New Hampshire) are fairly young compared to the soils of areas unaffected by glaciers, such as the southeastern United States.

Prior to the last glacial period, Lake Winnepesaukee did not exist. The low lying area was originally an extensive river network that drained to the south. During the last glacial cycle, the glacier that covered the region was a mile or more in thickness and moved slowly to the southeast beyond the current coastline. As the glacier moved across the region for tens of thousands of years, it gouged and deepened the river network creating the basin that now contains Lake Winnepesaukee.

2.2 SCENIC RESOURCES

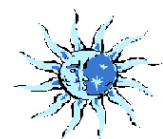
Gilford is blessed with many miles of shoreline frontage along the beautiful Lake Winnepesaukee with views stretching across a broad expanse of open water, dotted with islands framed against a backdrop of the White Mountains.

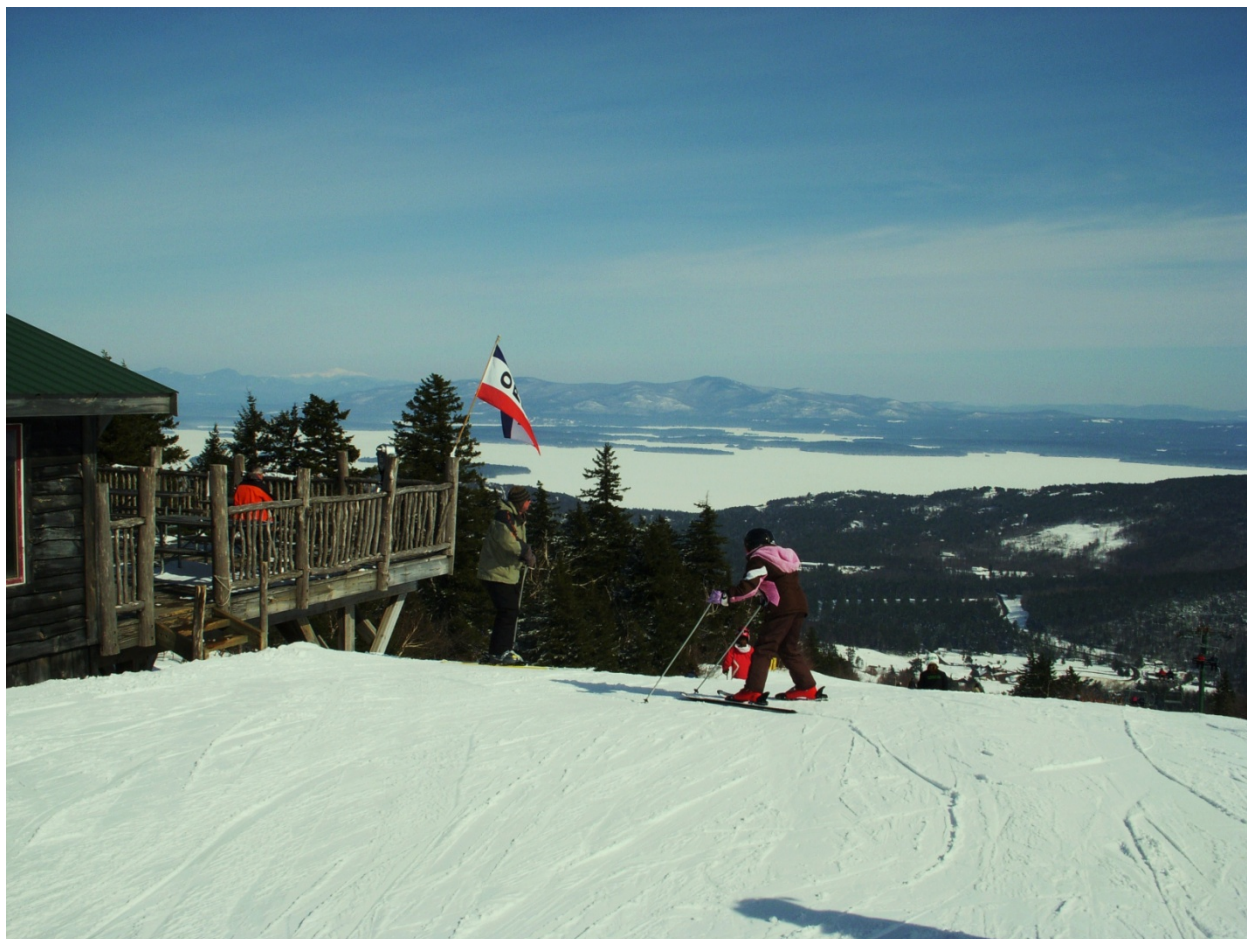
The scenic resources of Gilford are evident at almost every bend in the road, of which there are many. Per NH Statute – RSA 253:17 Section 231:157, any road in a town other than a class I or class II highway, may be designated as a scenic road upon petition and after a vote at any annual or special meeting. Gilford has adopted eight roads as scenic in accordance with the provisions of this statute. The eight scenic roads so designated in Gilford are displayed on **Figure 2** and are listed below:

- Cotton Hill Road
- Curtis Road
- Goodwin Road
- Gunstock Hill Road
- Saltmarsh Pond Road
- Scenic Drive
- Morrill Street
- Weeks Road

Figure 2 also shows a few of the popular scenic vistas in Gilford. These include the views from:

- Belknap Mountain
- Ellacoya State Park
- Gunstock Mountain
- Lincoln Park
- Mt. Rowe
- Piper Mountain
- Saltmarsh Pond
- Scenic Overlook
- Whiteface Mountain





View from summit of Gunstock Mountain at Gunstock Ski Area

2.3 STEEP SLOPES

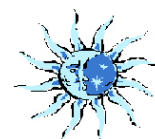
Topography, or the surface configuration of an area, is an important geomorphologic factor that affects local climate, soil development, erosion, vegetative growth, wildlife habitat and other natural processes of the landscape. Usually defined in terms of elevation and slope, topography is important to town planning and zoning because of the potential impacts on human activity and because of the viewsheds and vistas created by marked changes in elevation.

Table 1 lists the higher elevation summits in Gilford. These summits are also called out on **Figure 3**.

Table 1: Summits in Gilford

Summit	Elevation (ft)
Belknap Mountain	2,382
Gunstock Mountain	2,240
Piper Mountain	2,044
Mt. Rowe	1,680
Whiteface Mountain	1,660

Terrain Navigator Pro; December 2009.



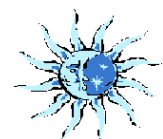
Certain safety and environmental issues are associated with development on steep slopes, hillsides, and/or ridgelines. Foremost among them are the higher potential for increased runoff and erosion and subsequently an increased potential for landslides that are safety hazards that can also create a scar on the landscape that takes many years to fill back in with vegetation. Increased erosion can have an adverse effect on surface water quality as well. Engineering costs to overcome the safety and environmental issues are also much higher for areas of steep slopes.

Steep slopes also play a role when considering the scenic quality of hillsides and ridgelines that can be lost when they are developed. Protecting hillsides and steep slopes from development helps to preserve those unique environmental qualities that people value.

Gilford's Zoning Ordinance defines steep slopes as having a grade of 15 percent or greater; meaning that the elevation increases by 15 feet over a horizontal distance of 100 feet. **Figure 3** features Gilford's topography and shows areas of steep slopes based on the NRCS soil map units and associated slope classifications. Using the NRCS map units as a base, approximately 11,296 acres or 45.6 percent of Gilford's land area has slopes that are 15 percent or greater. The high percentage of the land area in Gilford with slopes greater than 15 percent is primarily due to the influence and dominance of the Belknap Mountain Range and plays an important role in planning for the identification and management of those lands that are best suited to development.

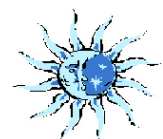
In regulating steep slopes it is important to remember that the NRCS map units are intended for use at a planning level only. Where development is going to be regulated for steep slopes, it is important to have a Site Specific Soil Map prepared by a NH Certified Soil Scientist. The Society of Soil Scientists of Northern New England (SSSNNE), in cooperation with the US Department of Agriculture, through the Natural Resources Conservation Service (NRCS) has developed protocol and requirements for the preparation of Site Specific Soil Maps that also meet the NRCS national mapping standards. The most recent Site Specific Soil Mapping standards may be downloaded from the SSSNNE website: www.sssnne.org

The NH Joint Board regulates the practice of soil mapping and certifies those individuals who are competent to prepare soil maps. A list of NH Certified Soil Scientists may be viewed at the NH Joint Board website for Natural Scientists: <http://www.nh.gov/jtboard/ns.htm> A Site Specific Soil Map should include a written report and the stamp of the NH Certified Soil Scientist that prepared the map. The Site Specific Soil Report should include the methods used to prepare the map, a description of inclusions and the adequacy of the soils within the mapped area for the proposed use. This is valuable information for the Planning Board to have in hand when considering how best to implement the Steep Slopes Ordinance. It will also give more detail about the specific areas that have steep slopes and the type of soil occurring there.





Hillside and ridgetop subdivision as viewed from Intervale Road.



3.0 AGRICULTURAL & FOREST RESOURCES

Soil is an extremely important resource as it is the basis of our ecosystem. Soil performs many vital functions in sustaining plant and animal life. There are many soil types and they have very different physical properties which can seriously affect the value and/or sensitivity of the land to agricultural and forest crop production and management practices. Soil surveys have been developed as a means of classifying soil types and the physical and chemical characteristics of each soil type. Soil surveys can be prepared at differing levels of detail. The most well known soil maps are those prepared through the USDA-NRCS National Cooperative Soil Survey.

3.1 BELKNAP COUNTY SOIL SURVEY

The NRCS Soil Survey program allows soil scientists to study and inventory soil resources across the country. The National Cooperative Soil Survey identifies and maps over 20,000 different kinds of soil in the United States. Soil survey reports include the soil survey maps and the names and descriptions of the soils in a report area. These surveys 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.

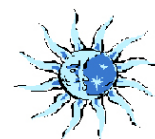
The most recent edition of the Belknap County Soil Survey was updated in 2005, and contains the most detailed information pertaining to soil for the Merrimack and Belknap counties. The updated survey provides a detailed description of the various types of soils found in an area and includes hydric soils, forest soils, and agricultural soils. These data are readily available online at the NRCS Soil Data Mart and/or the NRCS Web Soil Survey.

It is important to note that soil survey maps are designed for general planning rather than site-specific planning purposes. A licensed professional soil scientist should create a site specific soils map whenever there is potential land for development. County-wide soil surveys produced by the USDA Natural Resources Conservation Service have been typically produced at a scale of 1:20,000 or 1:24,000 and should not be altered or "blown-up" to larger scales. The smallest soil area that can be shown on the county-wide soil surveys is 3 to 5 acres in size. These maps are intended for general land use planning purposes only and are accurate for this purpose. They do not display sufficient precision to be used for site-specific applications.

For more information on the Belknap County Soil Survey, visit: <http://www.nh.nrcs.usda.gov>

3.2 IMPORTANT AGRICULTURAL SOILS

The NRCS as part of its mapping of the soil resources on a county by county basis across the country, has developed criteria to rank the many soil types by their suitability for agriculture. The three most commonly encountered rankings for agricultural soils are : Prime Farmland Soils; Soils of Statewide Importance; and Soils of Local Importance.



Each year, the percentage of Prime Farmland in New Hampshire decreases due primarily to human development. This decrease has raised major concerns for the future of Gilford's agriculture. Because of this, it is extremely important to be aware of the Prime Farmland located in the town, which is portrayed on **Figure 4 – Important Agricultural Soils**.

The best soils for agricultural use are loamy mixtures of moderate to well-drained fine and medium textured grains. 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**, soils must have at least one of the following:

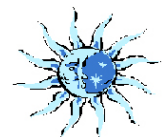
- The ability to grow commonly cultivated crops adapted to New Hampshire in seven or more years out of ten;
- No water table, or a water table that is maintained at a sufficient depth during the cropping season allowing cultivated crops common to New Hampshire to be grown;
- Are not frequently flooded 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;
- A permeability rate of at least 0.06 inches per hour in the upper 20 inches;
- Less than ten percent of the upper six inches consisting of rock fragments larger than 3 inches in diameter;

In order to be considered soils of **Statewide Importance**, soil groups must meet the following:

- 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**:

- Soils that 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 Board.
- Soils that are not prime or unique farmland or soils of statewide importance and meet the following criteria:
 - Have slopes less than 25 percent;
 - Are not extremely stony or boulder;



- Are not poorly or very poorly drained;
- Complexes consisting of less than 40 percent shallow soils and rock outcrop and slopes do not exceed 25 percent.

Only two percent of Gilford's soils classify as Prime Farmland. Soil rankings for farmland are displayed on **Figure 4**. Using the NRCS soil map units and their attribute data (includes NRCS farmland soil ranking) the following estimates of the extent of important agricultural soils in Gilford were derived.

<i>Soil Ranking for Farmland</i>	<i>NRCS Mapped Acreage</i>	<i>Percent of Land in Gilford</i>
Prime Farmland	547 acres	2.2%
Prime Farmland if Protected from Flooding	54 acres	0.2%
Farmland of Statewide Importance	656 acres	2.6%
Farmland of Local Importance	13712 acres	55.3%

There is also a category called Unique Farmland. This farmland 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.

3.3 EXISTING AGRICULTURAL RESOURCES

Agricultural land has been an important resource in towns throughout New Hampshire for hundreds of years. Gilford's roots are deeply embedded in agriculture, and remained the primary pursuit in Gilford throughout the 19th century. In principle, agriculture led to one of Gilford's most important features: tourism. In this respect, agriculture has been a big part of the town's success.

During the 2009 NRI Town survey, 73 percent of respondents believed that fields and agriculture are Gilford's most important natural resource feature. These 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.

Agriculture remains a vital resource today. Gilford's farms are valued for the products they produce, as well as the culture and scenic beauty they provide for the town.

Table 2 lists some of the farms found in Gilford and the products they produce. The locations of these farms are displayed on **Figure 4**.

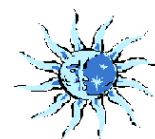


Table 2: Gilford's Farms

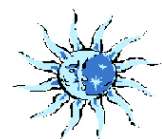
Name	Product
Stone Gate Vineyard	Grapes, Wine
Smith Farm	Strawberries, Raspberries, Blueberries, various vegetables, Maple Syrup
Stoneybrook Farm	Apples, Blueberries
Ramblin' Vewe Farm	Sheep, Wool
Beans & Greens	Vegetables, small fruits, annuals, perennials
Triple Trouble Farm	Blueberries
Muelhke Tree Farm	Christmas Trees
Gary Doucette	Apples, Cider
Robert Watson	Previous Farmland

Belknap County UNH Cooperative Extension; August 2008.

It is important to know that the above list does not inventory all the farms located in Gilford. There are numerous residents that have various livestock as well as vegetables, fruits and herbs for their own consumption.



“Greens & Beans” Corn Field Along Intervale Road in the Meadows



3.4 IMPORTANT FOREST SOILS

The NRCS also classifies soils for their productive value and operability to grow forests as a managed crop. 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. **Table 3** contains descriptions of these Forest Soil Classes as defined by NRCS in the Belknap County Web Soil Survey. **Figure 5** shows the distribution of soils in Gilford by Forest Soil Class.

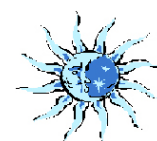
Table 3: NH Forest Soil Classes

Soil Class	Description
IA	Consists of deeper, loamy textured, moderately well, and well-drained soils. Generally, these soils are more fertile and have the most favorable soil moisture relationships.
IB	Generally sandy or loamy over sandy textures and slightly less fertile than those in group IA. 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.
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.
IIA	Includes many of the same soils as in groups IA and IB. However, contains physical limitations which make forest management more difficult and costly, i.e., steep slopes, bedrock outcrops, erosive textures, surface boulders, and extreme rockiness. Usually, productivity of these soils is not greatly affected by their physical limitations; However, management activities such as tree planting, thinning, and harvesting are more difficult and more costly.
IIB	Poorly drained soils.
NC	Several mapping units in the survey are either so variable or have such a limited potential for commercial production of forest products they have not been considered. Often an on-site visit would be required to evaluate the situation.
NR	Not Rated.

GRANIT; July 2008.

3.5 GILFORD'S FOREST RESOURCES

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



Forests are comprised of more than just the trees. Forests are unique ecosystems and are vital in providing key habitats for various wildlife; as well as providing nutrients to the various plant species and food and shelter for insects, birds and animals. Dense softwood/conifer stands are extremely important, especially for deer wintering areas. The majority of the forest in Gilford is a mosaic of Hemlock, Hardwood and Pine. However, the heavily forested areas surrounding the Belknap County Recreation Area and the Belknap Mountain State Forest are a combination of Lowland Spruce-Fir and Northern Hardwood Conifer. **Table 4** provides a brief summary of these forest types.

Table 4: Forest Types

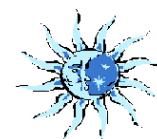
Forest Type	Description	Location
Hemlock-Hardwood-Pine	Transitional forests, occurring between hardwood conifer and oak-pine forests. This common forest type is comprised of dry, sandy soils with red oak and white pine. When these forests have been burned regularly over time, they may be able to support 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.	Areas within/surrounding the Belknap Mountain State Forest
Northern Hardwood Conifer	Typified by beech, sugar maple, and yellow birch. Development pressure is heavy within some parts of this habitat type and trees of varying ages are essential for maintaining the diversity of wildlife, including several listed as endangered/threatened. Normally found between 1,400 and 2,500 feet elevation.	Areas within/surrounding the Belknap Mountain State Forest

NH Wildlife Action Plan; 2010

The only town-owned forest in Gilford is the Wilson-Weeks Forest, which is comprised of 146.8 acres. It is not protected by a conservation easement. Both the Weeks Forest and the Kimball Castle/Lockes Hill property are certified tree farms.



The Wilson-Weeks Forest is shown on **Figure 5** with a cross-hatch pattern. Other forests in Gilford are managed by the NH Department of Resources and Economic Development (DRED). These include: Saltmarsh Pond State Forest and Belknap Mountain State Forest. The Society for Protection of NH Forests has fee ownership of and manages 106.6 acres in Gilford that are called the Weeks Forest.



4.0 WETLANDS

Wetlands provide many valuable functions including sediment trapping, nutrient retention, flood storage, riparian buffers and wildlife habitat. Because of the many important functions that they perform, activities in wetlands are regulated at the State level and at the Federal level. Municipalities in New Hampshire may also regulate activities in or adjacent to wetlands.

The NH Department of Environmental Services (NHDES) Wetlands Bureau has jurisdiction over and regulates activities that involve impacts to wetlands through NH RSA 482-A. The US Army Corps of Engineers, through Section 404 of the Clean Water Act provides federal oversight to the NHDES wetland program and coordinates review and comments on NHDES wetland permit applications and approvals with the EPA and the US Fish & Wildlife Service (USFWS) through a State Programmatic General Permit.

Under the Clean Water Act of 1972, US Environmental Protection Agency (EPA) defines the term wetlands 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."

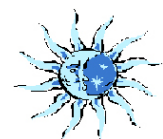
For general planning purposes, municipalities have used different tools to generally locate and map those areas where wetlands are most likely to occur within their town. Some of these methods include using the NRCS hydric soil map units as a wetland map base; using the results of the US Fish & Wildlife Service National Wetland Inventory mapping; using aerial photo interpretation to draw out wet areas; conducting a wetland inventory and/or some combination of the above.

When more detailed information is necessary for development projects that are in close proximity to wetland resources, a field delineation of the wetland resource should be completed. In New Hampshire the practice of field delineation of wetlands and the evaluation of wetland functions, among other wetland related activities is regulated by the NH Joint Board of Natural Scientists through the testing and certification of competent individuals as Certified Wetland Scientists.

4.1 HYDRIC SOILS

Hydric soils are one of the three parameters used to identify jurisdictional wetlands. 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."

By NRCS definition, hydric soils are 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 soils, in an unaltered state, were hydric. 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 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 soils within the Town of Gilford are displayed on **Figure 6**, separated by poorly drained and very poorly drained. Hydric soils as mapped by NRCS cover approximately 1,830 acres or about 7.3% of the land area (24,793 acres) or 5.3% of the total (land & water) area in Gilford. Poorly drained soils (1263.7 acres) are more than twice as common as very poorly drained soils (567 acres) in Gilford.

4.2 NATIONAL WETLANDS INVENTORY

Figure 7 displays those wetland areas within Gilford as identified through the National Wetland Inventory (NWI) mapping completed by the US Fish and Wildlife Service using satellite imagery. The NWI mapping uses the imagery patterns to delineate an approximate boundary for the wetland system and classifies the dominant vegetation and hydrology in the wetland using the US Fish & Wildlife Service methodology “*Classification of Wetlands and Deepwater Habitats of the United States*”, Cowardin, *et al.* (Cowardin Classification Methodology)

Per the NWI mapping, Gilford has 439 acres of Palustrine wetlands, which are further classified below on the basis of the dominant vegetation type within the wetland. These terms come from the Cowardin Classification Methodology and are described briefly below. The Cowardin Classification Methodology and a key to classifying wetland systems using this methodology can be downloaded, free of charge, from the USFWS website: <http://www.fws.gov/wetlands/>

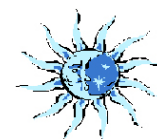
Table 5: Palustrine Wetlands

Wetlands	Total Acreage
Emergent Wetlands	81 Acres
Forested Wetlands	156 Acres
Scrub-Shrub Wetlands	147 Acres
Other Palustrine Wetlands	55 Acres
Total Palustrine Wetlands	439 Acres

GRANIT; July 2008

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 with salinity below a specified amount. 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 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 6 m 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 than 6 m (20 feet) 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.

4.3 WETLAND INVENTORY & EVALUATION

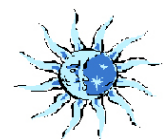
It is generally accepted that the NWI mapping tends to underestimate the extent of wetlands within a municipality or other area of study. The NWI mapping tends to miss poorly drained and forested wetlands. Thus, the actual area of wetlands within Gilford is greater than that reported by the NWI mapping on **Figure 7** and likely much closer to that as indicated by hydric soils in the updated Belknap County Soil Survey, **Figure 6**.

Gilford was one of the first communities in New Hampshire to implement a wetlands ordinance in accordance with the procedures set forth in RSA 31:39. In this first version of the wetland ordinance, wetland areas were defined as poorly drained, very poorly drained and alluvial (floodplain) soils. Approximately 1,790 acres were identified as wetland by this ordinance. In 1979, NH RSA 483-A was amended to allow municipalities to designate some wetlands within their borders as “Prime Wetlands” because of their size, unspoiled character, fragility or uniqueness. The Gilford Conservation Commission (GCC) wanted better information about each of the wetlands within the community to help them make better decisions regarding wetland permit applications and to assist them in planning for the protection of larger and more significant wetlands. Further study of the wetlands in Gilford would also give them the information needed to take advantage of the new “Prime Wetland” legislation.

In 1983, the Gilford Conservation Commission contracted with the Lakes Region Planning Commission to complete a two part study:

- Inventory and classify all wetlands in Gilford
- Evaluate and designate Prime Wetlands

The wetland inventory completed in 1983 located general wetland boundaries in the office using aerial photos, county soil maps and Gilford’s base map. A field inventory was then completed to ascertain wetland existence; to make simple refinements to wetland boundaries on the basis of current vegetation and integrity; to fill out an inventory sheet for each wetland; and to classify each wetland using the Cowardin Classification Methodology. An “Official Wetlands Map” was prepared showing the location of wetland, an identification number and each wetlands classification code. One hundred sixty-three wetlands were inventoried, classified and field checked in the first part of the 1983 & 1984 wetland study. These 163 wetland areas were estimated to cover approximately 1,538 acres. **Appendix B** contains a table and other data that summarizes the methodology and results of the 1983/1984 wetland inventory.



It should be noted that in the 28 years that have passed since the time of the 1983 Wetland Inventory, the methodology and tools for systematically inventorying, classifying and evaluating the wetlands in a municipality have greatly improved. The advent of the use of backpack and handheld global positioning units (GPS) and the continued improvements to Geographic Information System (GIS) data now readily available through GRANIT and other State and Federal agencies, offers an opportunity to municipalities to consider an update to their wetland inventory and eventually, the “Official Wetlands Map” as referred to in the Gilford wetland ordinance.

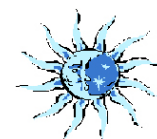
4.4 PRIME WETLANDS

While the Clean Water Act and NH RSA-482-A currently protects New Hampshire wetlands, towns can increase the protection of certain wetlands if their size, fragile condition, character and/or other factors make them significant. These wetlands are designated as “Prime Wetlands” and receive special consideration from the Wetlands Bureau of NHDES. They are recognized as a valued natural resource, and protected against activities that result in loss of the functions and values for which they were designated “Prime Wetland”.

After evaluating these wetlands, only 51 wetlands met the very poorly drained soils criteria, and only 26 wetlands met the RSA 483-A:7 “suggested” criteria list. The Conservation Commission took the evaluation one step further, and determined that out of the 26 potential wetlands only 18 would be put forward for a Town vote to be designated as Prime Wetlands. The Town vote supported the designation of these 18 wetlands as Prime Wetlands. Thus in 1984, Gilford became the first municipality in New Hampshire to designate Prime Wetlands. These 18 Prime Wetlands were estimated to cover approximately 379 acres, or 1.1 percent of Gilford’s total acreage. Descriptions of each of the Prime Wetlands and a table summarizing the Prime Wetland functions and values can be found in **Appendix B**.

Table 6 is taken from and summarizes data from the LRPC Wetland Study relative to the 18 wetlands that were designated as “Prime Wetlands” in accordance with the requirements of RSA 483A-7 in 1984. **Figure 7** shows the locations of each of the 18 Prime Wetlands. They are labeled according to the Prime Wetland number as displayed in the first column of **Table 6**. The “Official Wetland Map” is not contained in this document.

Rules pertaining to the designation and protection of Prime Wetlands have changed since 1979 although the intent to protect wetlands deserving of extra protection due to their size, sensitive nature, integrity and functional values has not changed. Because the Prime Wetland rules seek to protect wetlands from development, there is a constant need for the Town and for the NHDES Wetlands Bureau to stand behind the results of the 1984 LRPC Study and subsequent mapping of Prime Wetland boundaries onto the Gilford Tax Maps. Tools and techniques for placing Prime Wetland boundaries on the tax maps in 1984 was rough at best. Physically surveying by a licensed land surveyor was not economically feasible to the placement of hydric soil polygons from old NRCS soil map units and paper copies of aerial photos onto the Tax Maps resulted in some inaccuracies in the actual placement of the Prime Wetland boundary that are currently addressed on a case by case basis during any permitting and related field delineation procedures.

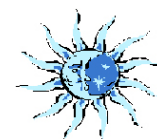


The State rules have changed to allow more of the wetland system to be included as part of the Prime Wetland. When the 1984 LRPC Wetland Study was completed, only the portion of a wetland with very poorly drained soils could be designated as a Prime Wetland. Often this results in the Prime Wetland line going straight through the wetland, creating an artificial boundary, thus weakening the intent of the Prime Wetland legislation to “protect” the wetland, as only part of the wetland could be protected in this way. As discussed at the end of **Section 4.3**, there are significantly improved techniques to more accurately define the edge of the Prime Wetland boundary for placement on the Tax Maps. Other communities (such as Salem, New Hampshire) have put forth a Town vote to adopt the new definition of Prime Wetlands without re-mapping. This would mean that the existing mapping would more closely fit the boundaries as placed on the Tax Maps in 1984, although it would not fix any placement problems due to distortion or transfer/placement issues.

Table 6: Designated Prime Wetlands

Prime Wetland #	Corresponding ID on 1983 Official Wetland Map & Inventory	Location of Prime Wetland
1	Wetland #39	Upper reaches of the Gunstock River.
2	Wetland #136	All wetland area adjacent to and surrounding Lily Pond.
3	Wetland #14 & 15	Along West Alton Brook along eastern edge of Gilford line.
4	Wetland #103 & 104	Along the shores of Saltmarsh Pond.
5	Wetland #9 & 10	Along Poor Farm Brook, close to the headwaters.
6	Wetland #6	N/A
7	Wetland #7	Along south side of Highway 11 and close to Lake Winnepesaukee
8	Wetland #4 & 6	The wetland portion of Round Pond
9	Wetland #161	Behind Harris Farm.
10	Wetland #57	Behind Gilford Elementary School.
11	Wetland #159	At the mouth of a small stream which empties into Lake Winnepesaukee.
12	Wetland #87	Southwest portion of Gilford, headwaters of one of two tributaries to Jewett Brook.
13	Wetland #153	North side of Highway 11, adjacent to east end of Laconia Airport runway.
14	Wetland #101	A mile below the outlet to Saltmarsh Pond.
15	Wetland #90	High in the watershed of Jewett Brook.
16	Wetland #140	In the western “L” of the airport runway (Just north of industrial park).
17	Wetland #141	Northwest of the airport.
18	Wetland #33	Along a small stream which empties into Lake Winnepesaukee at Lakeshore Park.

LRPC Wetland Study; 1984.



4.5 WETLAND BUFFERS AND PROTECTION

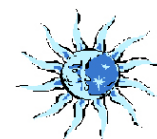
Buffers to surface waters and wetlands have been studied extensively for many years and to date, no one standard has been adopted, although all of the literature agrees that buffers are important to water quality, fisheries habitat and wildlife habitat. There are also many terms used in the literature: upland buffers; riparian buffers; riparian corridors; vegetated buffer strips and more.

Riparian zones are transitional areas between aquatic and upland terrestrial habitats. They can generally be described as long, linear strips of vegetation adjacent to streams, rivers, lakes, wetlands, vernal pools and other aquatic ecosystems. Riparian zones typically comprise less than one percent of the landscape yet they frequently provide habitat to a disproportionately high number of wildlife species and perform a multitude of ecological functions when compared to most upland habitats. Riparian buffers are a band of permanent vegetation around an aquatic ecosystem intended to maintain or improve water quality by trapping and removing various nonpoint source pollutants, including nutrients from fertilizers, sediment, herbicides and pesticides. A buffer strip may also provide habitat for a variety of plants and animals if sufficient land area is contained within the buffer. A riparian corridor (wildlife corridor) is a strip of permanent vegetation that connects two or more larger patches of vegetation and through which fauna will likely move over time.

The management and restoration of riparian corridors and vegetated buffer strips is an important option for improving or maintain water quality and conserving wildlife populations. There is solid evidence that maintaining or restoring riparian buffers of sufficient width protects and improves water quality by intercepting nonpoint source pollutants in surface and/or shallow subsurface flows. Buffer strips also clearly provide habitat for a large variety of animal species, shade aquatic habitats and provide organic matter and large woody debris that is critical for aquatic organisms.

In 1997, the Audubon Society of New Hampshire published a document, *"Buffers for Wetlands and Surface Waters: A Guidebook for Municipalities"*, Chase, V., L. Deming, and F. Latawiec. that was the result of the review of many buffer study research articles and presented guidelines for minimum buffers. This study remains a good review of the literature and provides good recommendations for buffer considerations at the municipal level, with the overall recommendation that 100' is a scientifically defensible buffer to protect water quality in surface waters and wetlands. The Chase et al study is referenced in Chapter 2.6 of *"Innovative Land Use Planning Techniques: October, 2008, NHDES, NHARPC, NHOEP and NHMA"*. A copy of Chapter 2.6 is contained in **Appendix C**.

In 2000, the US Army Corps of Engineers (ACOE) published an article, *"Design Recommendations for Riparian Corridors and Vegetated Buffer Strips, Fisher, R. and J.C. Fischernich, 2000"* that reviews the literature and provides tables of recommended minimum widths of riparian buffer strips and corridors for a number of intended functions. The recommendations in the ACOE study for buffer widths vary depending on the management objective from a bare minimum of 16.5 feet for flat areas to 100 feet on steeper slopes for water quality treatment of surface water runoff into wetlands and surface waters. Wider buffers are



recommended for riparian habitat, flood attenuation and stream stabilization. A copy of the ACOE article is contained in **Appendix C**.

In 2010, the UNH Cooperative Extension, in cooperation with a number of other organizations, published an update to “*Good Forestry in the Granite State*”. Chapter 4.3, Forest Management in Riparian Areas is included in **Appendix C** of this report. The entire report is available for download at: <http://extension.unh.edu/goodforestry/index.htm>. **Table 7** summarizes the recommendations made in the “*Good Forestry in the Granite State*” document. Other chapters in the document make recommendations relative to best management practices (BMP’s) for vernal pools, wetlands and important wildlife habitats but did not make buffer width recommendations.

Table 7: Guidelines for Riparian Management Zones

Function	Riparian Management Zone (Feet)
Intermittent Streams	75’
1 st & 2 nd Order Streams	100’
3 rd Order Streams	300+’
4 th Order Streams	300+’
Pond <10 Acres	100’
Lake or Great Pond	300’

Section 4.3; Good Forestry in the Granite State, 2010 – Appendix C.

Buffers should be wider if adjacent lands have steep slopes, have erodible soils, are intensively used or are in a floodplain. Forested buffers are the most effective for many reasons, including keeping stream temperatures cooler, reducing phosphorous inputs, etc.

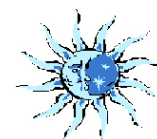
4.6 VERNAL POOLS

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 New Hampshire, a vernal pool is defined as “a surface water or wetland, including an area intentionally created for purposes of compensatory mitigation, which provides breeding habitat for amphibians and invertebrates that have adapted to the unique environments provided by such pools and which:

Is not the result of on-going anthropogenic activities that are not intended to provide compensatory mitigation, including but not limited to:

- (1) Gravel pit operations in a pit that has been mined at least every other year; and
- (2) Logging and agricultural operations conducted in accordance with all applicable New Hampshire statutes and rules; and



Typically have the following characteristics:

- Cycles annually from flooded to dry conditions, although the hydroperiod, size, and shape of the pool may vary from year to year;
- Forms in a shallow depression or basin;
- Has no permanently flowing outlet;
- Holds water for at least 2 continuous months following spring ice-out;
- Lacks a viable fish population; and
- Supports one or more primary vernal pool indicators, or 3 or more secondary vernal pool indicators.”

“The frog does not drink up the pond in which he lives.”

Native American Proverb

Vernal pools also sustain ecosystems by providing an exclusive habitat as well as wildlife corridors in areas with multiple vernal pools; they maintain biological diversity and provide natural flood control; they maintain water supplies and trap excess sediment. Vernal pools can be identified by their indicator species. Indicator species are species that depend on vernal pool habitats for their survival. While other species are found in vernal pools as well, listed below are the species known as “Obligate Vernal Pool Indicators”, ie. if one or more of these species are present then the pool in question is a vernal pool and should be documented as such:

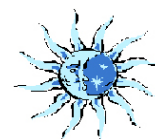
Fairy Shrimp: Usually 0.5 – 1.0 inches in length, with elongated transparent bodies and are generally brown, orange, and red in color. Fairy shrimp appear with the onset of warm weather, and die with the drying of the pool, leaving behind small resistant eggs that will hatch with the next spring’s wet episode.

Adult Caddis Flies: Similar to small brown moths, caddis flies lay their eggs in the dry depressions of vernal pools or overhanging vegetation. The larvae 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.

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

Blue-Spotted Salamander: Usually 4 to 5 inches in length, dark blue or dark grey with blue spots. 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.

Wood Frog: Usually 3.5 to 7.0 cm long, generally tan or dark brown in color with a prominent black mask. Usually found in or near wooded areas. Their early spring calls sound like ducks quacking.



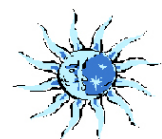
Other species that live in vernal pools but are not obligate indicator species include: Clam shrimps, Isopods, Amphipods, Fingernail clams, Amphibious snails, Four-toed salamander, Jefferson Salamander, Eastern newt, Spring peeper, American toad, Grey treefrog, Green frog, Spotted turtle, and Blanding's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

Because the obligate species that breed in vernal pools and migrate to surrounding uplands for the remainder of the year, it is extremely important that the upland vegetated envelope around vernal pools is maintained. The State of New Hampshire does not regulate upland buffers but the US Army Corps of Engineers (ACOE) through their regulatory authority created by Section 404 of the Clean Water Act, has jurisdiction over the upland buffers of many vernal pools. The ACOE recommended buffer width around a vernal pool depends on the species and quantities of those species (i.e., pool productivity and significance) but ranges from a minimum of 100' to 750'. Applicants for a wetland permit to impact wetlands and/or other jurisdictional waters are required to document the presence/absence of vernal pools on the property in question. As the protective radius for vernal pools may extend off from the property being studied, or may reach to the property to be developed from a vernal pool on an adjacent parcel, it becomes important for a municipality to have a general inventory of where vernal pools are located

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, and is available for purchase from the NH Fish & Game Department or online at the NHFG website: www.wildlife.state.nh.us.



Vernal pool in saddle between Piper Mountain and Swett Mountain.



5.0 SURFACE WATER RESOURCES

Gilford's water resources consist of intricate connection between lakes, ponds, rivers, and brooks. These interconnected systems are vital for a variety of plants and animals, and is extremely important for the residents of the Town. However, too much human interference can negatively impact the water system; for instance, development can cause pollutants that not only affect wildlife and natural communities, but also can affect the quality of drinking water. However, with dedicated planning and conservation, efforts can be taken to protect these valuable and sensitive resources.

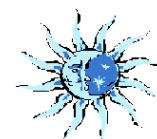
5.1 WATERSHEDS

N.H. Department of Environmental Services defines a watershed as, "an area of land that drains down slope until it reaches a common point." All precipitation that is not used by the surrounding ecosystem runs down into the various streams, brooks, tributaries, and rivers, and will eventually reach a larger body of water within its associated watershed. Watersheds provide Gilford residents with their drinking water supply, as well as recreational opportunities and scenery for all to enjoy.

The headwaters of two major watersheds occur in Gilford. A small portion of the Merrimack River watershed is located in the southernmost area of the Town; and the Winnepesaukee River watershed which covers most of Gilford. Because Gilford lies at the top of two major watersheds, it is important that the Town considers other communities located downstream, as well as its own needs when planning anything which could impact surface waters within the watershed.

Within the two major watersheds are eight subwatersheds. These subwatersheds are shown on **Figure 8** and listed below with the acreage of that watershed within the Town of Gilford. Sanders Bay watershed and The Broads watershed are the two largest subwatersheds within Gilford. Most of Gilford is within the Winnepesaukee River watershed. Only the Crystal Lake subwatershed of which 1,785 acres is located in Gilford flows to the Merrimack River.

<u>Subwatershed</u>	<u>Total Acres</u>	<u>Drains to</u>
Center Harbor	673 acres	Winnepesaukee River
Meredith Bay	371 acres	Winnepesaukee River
Paugus Bay	1601 acres	Winnepesaukee River
Sanders Bay	12784 acres	Winnepesaukee River
The Broads	12585 acres	Winnepesaukee River
Tioga River	825 acres	Winnepesaukee River
Winnisquam Lake	3619 acres	Winnepesaukee River
Crystal Lake	1785 acres	Merrimack River



5.2 SURFACE WATERS

There are 9,451 acres of surface waters in Gilford, which are portrayed on **Figure 8**.¹ Surface water includes lakes, ponds, rivers and streams, which are most commonly recognized as an outlet for recreation and wildlife habitat, also provide flood storage, may be used as water supplies, and provide sedimentation control. Preservation of the quality of Gilford's water resources is a primary concern, as these resources are vital to the Town and should be protected.

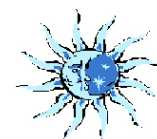


Lake Winnepesaukee and the White Mountains from the Gilford Public Beach

LAKES & PONDS

Gilford is fortunate to be one of the towns surrounding New Hampshire's largest and one of its most popular lakes. Lake Winnepesaukee provides Gilford with beautiful scenic views, offers a habitat for wildlife, as well as offers recreational opportunities for both residents and visitors. During 2009 NRI Town Survey, 87 percent of respondents felt that ponds and lakes were Gilford's most important natural resource. Lake Winnepesaukee is considered an oligotrophic lake, meaning the lake has high water clarity, limited plant growth, and relatively low nutrient inputs.

¹ Note: The spellings of Sanders Bay on all maps in this Natural Resource Inventory are misspelled as Saunders Bay.



Ponds, whether natural or artificial, are also an important resource in providing key nutrients and habitats for a broad array of wildlife. Gilford's surface water resources include four "Great Ponds," which the State of New Hampshire defines as a natural body of water with ten acres or more. Gilford also has one six acre artificial pond located at Gunstock, named Belknap Recreational Area Pond.

Table 8: Gilford's Great Ponds

Name	Size	Max Depth	River System
Lake Winnepesaukee	9,343 Acres	212 ft	Winnepesaukee
Lily Pond	51 Acres	7 ft	Winnepesaukee
Round Pond	18 Acres	9 ft	Merrimack
Saltmarsh Pond	39 Acres	23 ft	Winnepesaukee

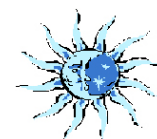
NH DES; July 2008.

Biological Survey of Lakes & Ponds in Sullivan, Merrimack, Belknap and Strafford Counties; 1977.



Saltmarsh Pond

Gilford's "Great Ponds" are protected by the New Hampshire Shoreland Water Quality Protection Act, which regulates activities within 250 feet of the reference line of all Great Ponds (NHDES Fact Sheets regarding the most recent requirements of the N.H. Shoreland Water Quality Protection Act can be found in **Appendix D**). All activities within this land is either restricted or prohibited, unless the NH Department of Environmental Services issues a permit.



Lily Pond, Round Pond, Saltmarsh Pond and Lake Winnepesaukee all fall under the provisions of the Shoreland Water Quality Protection Act.

RIVERS & STREAMS

Streams in Gilford, include perennial, intermittent and ephemeral, all of which may be regulated by the NHDES. A perennial stream flows year-round during most years in a well defined channel. An ephemeral stream receives only surface water inputs and thus only flows for a short period of time after snowmelt or a heavy rainfall and typically does not have hydric soils or a well defined channel. An intermittent stream, flows anywhere in between that of a perennial stream and an ephemeral stream, but usually with hydric soils and a well defined channel.

*“If there is magic on this planet, it
is contained in water”
Loren Eiseley*

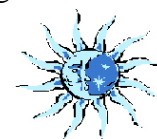
Streams are very important resources for the town, as they provide important habitat and travel corridors for Gilford’s terrestrial wildlife and fish species. During the 2009 NRI Town Survey, 83 percent of respondents felt that rivers and streams were Gilford’s most important natural resource. Listed below are the six named perennial streams in Gilford:

- *Gunstock River*
- *Meadow Brook*
- *Jewett Brook*
- *West Alton Brook*
- *Poorfarm Brook*
- *Black Brook*

The quality of water and habitat these streams provide is dependent on the surrounding land use and upland buffers that protect the streams from developed adjacent uplands. Sediment from erosion and removal of streamside vegetation can easily destroy prime habitats by causing suffocation of invertebrates, harming fish gills, destroying spawning habitat and increasing nonpoint pollutant loading. Removal of streamside habitat not only opens the door for erosion, but also increases water temperature in the rivers and brooks. Because of this, it is important to maintain or improve the riparian habitats along the Town’s rivers and brooks. **Section 4.5** discusses recommended riparian buffer widths, including those for surface water resources. Additional information on the surface water resources in Gilford is provided in the **Section 5.3**.

5.3 FISHERIES

Gilford is extremely fortunate to have its mainland shores and numerous islands on Lake Winnepesaukee, a lake well renowned for its excellent fishing, especially for small mouth bass, landlocked salmon, lake trout and rainbow trout. Largemouth bass, white perch, and cusk are also popular, the latter two of which are most actively sought by anglers during ice fishing season. Many bob houses can be seen during that period across the lake. Fishing derbies are



popular both in winter and spring. Unfortunately unthinking anglers have recently introduced rock bass and northern pike to Lake Winnepesaukee. Anglers catching these species should remove them from the lake.

Poorfarm Brook hosts annual spawning runs of both smelt and rainbow trout in March and April, significantly increasing the importance for protection and/or enhancement of riparian buffers along the Brook.

There are no spawning runs of smelt or rainbow trout in Gunstock River as there are in Poorfarm Brook. However, Gunstock River and Saltmarsh Pond are managed as cold water fisheries and are stocked annually by NH Fish & Game Department with rainbow trout and brook trout. Saltmarsh Pond is a pristine reclaimed trout pond with a motor restriction limited to electric motors of 55 pounds of thrust or less.

Lily Pond is managed as a warm water fishery with largemouth bass, chain pickerel, and yellow perch the dominant species. Round Pond, which is in the Belknap Mountain Range, is only accessible by foot. The fish species there are hornpout and yellow perch.

It should be noted that many of our fish species are contaminated with mercury, and it is best to check recent advisories for safe consumption levels. To view the Fish & Game Stock Maps, see **Appendix E**.

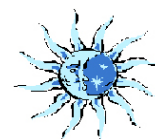
5.4 FLOODPLAINS

A floodplain is any land area that is susceptible to flooding, generally located in low-lying areas adjacent to rivers and lakes.

However, it is easy for any stream or river to overflow their banks & spill onto the adjoining land area, causing a floodplain. It is important to identify floodplains for the safety of the community: Loss of life, property damage and negative environmental impacts can result when people build in designated floodplains.

The Federal Emergency Management Agency (FEMA) has created paper versions of the Flood Insurance Rate Maps (FIRM) for individual communities. Those locations in Gilford that have been designated as floodplains by FEMA are displayed on **Figure 9**. The last documented version for Gilford was in May 1992, although preliminary updated data were used to create Figure 9. As FEMA is currently undergoing map modernization, so it is important to update **Figure 9** once this data becomes available and is no longer considered preliminary for Belknap County.

The most significant area of flooding in Gilford is located along Route 11 at its intersection with Intervale Road. An extensive area has been mapped as Zone AE in this area, due primarily to the Gunstock River at its confluence with Lake Winnepesaukee and Meadow Brook and development within its natural floodplain. Development in the watershed of the Gunstock River and extensive development along the shores of Lake Winnepesaukee have created a situation where there is little room for floodwater to flow without affecting roads, homes and/or



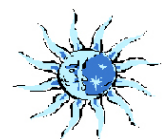
businesses. Many of Gilford's important drinking water resources; aquifers; wetlands and surface water resources are concentrated in this highly developed and congested area. Long term management for this area should include strategies to create storage areas for the Gunstock River within its normal floodplain and improving the quality of the riparian buffers along its length throughout the watershed. Opportunities to create additional flood storage close to Lake Winnepesaukee and Route 11 and Route 11B are limited but there are some areas that would benefit from conversion as structures to natural areas that would help to alleviate some of the localized flooding problems. Any proposed development in this area should also strictly adhere to the new Alteration of Terrain Rules as adopted by NHDES in January 2009.

The following is a list of roads FEMA declares partially or totally within Special Flood Hazard Areas (SFHA):

<i>Alvah Wilson Road</i>	<i>Ames Road</i>	<i>Annis Drive</i>
<i>Area Road</i>	<i>Belknap Mountain Road</i>	<i>Blaisdell Avenue</i>
<i>Broadview Terrace</i>	<i>Brook Road</i>	<i>Casey Road</i>
<i>Coach Road</i>	<i>Country Club Road</i>	<i>Davis Road</i>
<i>Dockham Shore Road</i>	<i>Dow Road</i>	<i>Dump Road</i>
<i>Goodwin Road</i>	<i>Harris Shore Road</i>	<i>Henderson Road</i>
<i>Hoyt Road</i>	<i>Laconia By-Pass</i>	<i>Lazy Brook Road</i>
<i>Liberty Hill Road</i>	<i>Meadowbrook Road</i>	<i>Old Lakeshore Road</i>
<i>Potter Hill Road</i>	<i>Right Hand Road</i>	<i>Scenic Drive</i>
<i>School House Hill Road</i>	<i>Shore Drive</i>	<i>State Road 11</i>
<i>State Road 11A</i>	<i>State Road 11B</i>	<i>Summit Avenue</i>
<i>Swain Road</i>	<i>Wildwood Road</i>	

For more information visit the FEMA's website at: <http://www.fema.gov/>

Gilford implemented a Floodplain Management Ordinance in March 2003. This ordinance is specifically designated for those who wish to propose any form of development on a floodplain. All proposed development in these areas requires a permit, which must be reviewed by a building inspector to determine the safety of the proposed sites and compliance with the Floodplain Management Ordinance. A Floodplain Ordinance is also required by FEMA for those communities that would like to be eligible for financial assistance in times of flooding emergencies within FEMA mapped flood hazard areas.



6.0 GROUNDWATER & DRINKING WATER RESOURCES

Groundwater and associated drinking water resources are extremely important to the health of people everywhere and including Gilford residents. During the 2009 NRI Town Survey, water quality was voted the most important natural feature in Gilford, receiving 92 percent of the votes. Gilford residents and businesses are served by a combination of individual private well sources and public water systems. There is regular monitoring and reporting requirements for all public water systems; however the law does not require monitoring of private sources that serve individual homes, so this responsibility is left to the landowner.

6.1 AQUIFERS & AQUIFER RECHARGE

The US Geological Survey defines an aquifer as, “a formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield significant quantities of water to wells and springs.” For Gilford, the town relies on stratified drift aquifers for the community’s water supply. Stratified drift aquifers are composed of sorted sand and gravel.

Protecting Gilford’s aquifers from potential contamination is vital. Groundwater can become contaminated in a variety of ways, including poorly maintained septic systems, hazardous chemical runoff, vehicular accidents, etc. Controlling land use near an aquifer is recommended to protect water quality.

The ability of an aquifer to supply water is called transmissivity, measured in ft^2/day . Most of Gilford’s aquifers are measured in less than $4000 \text{ ft}^2/\text{day}$, almost half being measured in less than $2000 \text{ ft}^2/\text{day}$. There are only two aquifers that measure above $4000 \text{ ft}^2/\text{day}$. Aquifers with a transmissivity below $1000 \text{ ft}^2/\text{day}$ are considered inadequate for public water supplies.

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. According to NHDES, requiring new development to retain all stormwater and melt water on site will help to maintain pre-development levels of recharge.

Table 9 lists the aquifers located in Gilford. It is important to note that portions of some of these aquifers extend past Town boundaries thus emphasizing a need to coordinate activities that would affect quantity and quality of groundwater resources with the neighboring communities (i.e. Laconia and Belmont). The principal aquifer with the greatest potential to supply water for Gilford lies along the Gunstock River and in the low-lying area along Route 11 that includes the Laconia Airport and the Meadows (See Aquifer ID’s: 89, 90, 91 and 92 in **Table 9**). Refer to **Figure 10** for a map of the Gilford Aquifer Protection District.

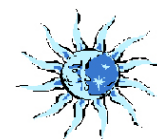


Table 9: Aquifers

Aquifer ID	Trans. Min	Trans. Max	Location
41	0	1000	By Belknap Point
42	0	1000	Including Poor Farm Brook and Ellacoya State Park
43	1000	2000	With Aquifer 42
45	0	1000	Border of Alton, East of Ellacoya State Park
89	0	1000	Biggest aquifer within Gilford. Including Harris Farm, Weeks Forest, Gunstock River
90	1000	2000	With Aquifer 89
91	2000	4000	With Aquifer 89
92	2000	4000	With Aquifer 89
95	0	1000	Including Stone Road Park, West of Saltmarsh Pond
99	1000	2000	East of Saltmarsh Pond
100	2000	4000	With Aquifer 99
101	1000	2000	With Aquifer 95
102	0	1000	Border of Laconia, Southwest of Saltmarsh Pond
104	1000	2000	With Aquifer 102
105	1000	2000	With Aquifer 89
106	0	1000	Including Peverly Lot, border of Belmont.
109	1000	2000	With Aquifer 106

NH DES; June 2009

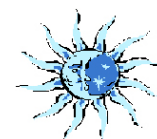
Article 19 in Gilford's Zoning Ordinance relates to the Aquifer Protection District. Its purpose is to protect, preserve, and maintain potential groundwater supplies and related groundwater recharge areas within known aquifers. The boundaries set in this ordinance restricting the district is fifty feet outward from the outermost edge of the surficial extent of all stratified drift aquifer deposits. More information can be found in Gilford's Zoning Ordinances.

6.2 WELLS & WELLHEAD PROTECTION AREAS

Currently, there are 314 records of water wells located in Gilford. Most wells are either drilled or dug, although they could also be driven or pounded. The average bedrock well in New Hampshire is 295 feet deep, has a yield of 6.5 gallons per minute, and generally has a high reliability relative to bacteria. Dug wells are notorious for poor construction leading to frequent bacterial problems. Groundwater from wells is 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 currently active underground storage tanks located in Gilford:

*Gilford Middle-High School
Mountain View Yacht Club
Marine Patrol
Gilford Village Store*

*Gilford Elementary School
Silver Sands Marina
Big Apple Gilford
NH DOT Gilford Warehouse*



*Sky Bright Inc.
Mobil*

Airport Country Store & Deli

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. Gilford has 60 active wellhead protection areas, ranging from a population of 30 to 5,000. All 60 wellhead protection areas, 314 wells, as well as other factors affecting the quality of the drinking water resources, are displayed on **Figure 11**. These data are maintained by NHDES and are updated regularly. Excel files for all records can be downloaded through the OneStop Data site at www.des.nh.gov.

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

*A.G. Dolloff Excavators
PSNH Black Brook Substation*

*Gunstock Ski Area
Fays Boat Yard Inc.*

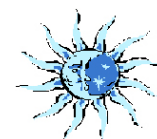
In order to maintain high quality drinking water and to prevent contaminants from reaching drinking water sources, the 1986 Safe Drinking Water Act requires states to develop Wellhead Protection Programs. Through this program, states help communities to:

- 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; and
- Develop a contingency plan to prepare for an emergency well closing and to plan for future water supply needs.

6.3 PUBLIC WATER SUPPLIES

NH Department of Environmental Services defines a Public Water System 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.” There are approximately sixty-six active public water systems in the town of Gilford that get their water from groundwater. These public water systems can be split into three different categories:

- Community water systems. These systems serve at least 25 residents on 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.

Gilford has sixty-six active public water systems, ranging from a population of 25 at Sawyers Dairy Bar to 5,000 at Gunstock Recreational Area. These public water systems are displayed on **Figure 11**.

A Source Water Protection Plan was completed by the Town of Gilford in December 2005. This plan identifies the sixty-six public water systems, as well as pinpoints potential contamination sources to Gilford's drinking water, and provides recommendations to manage such potential threats. Completion of this Natural Resource Inventory and its use for developing a Natural Resource Chapter in the next update of the Gilford Master Plan is one of the recommendations made within the Source Water Protection Plan. There are many other solid water quality recommendations in the Source Water Protection Plan that should become part of the goals, objectives, and regulatory measures of the Gilford Master Plan through its Planning Board and Conservation Commission.

6.4 CONTAMINATIONS SOURCES & IMPERVIOUS SURFACES

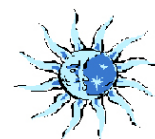
Contamination of Gilford's drinking water can originate from various sources. In Gilford's Source Water Protection Plan, the various sources are explained with recommendations for how to treat and prevent such contamination from occurring in the future. The plan points out the various contamination sources:

- 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) governs the management of these hazardous wastes. The biggest hazardous waste site in Gilford is the former Lily Pond Fire Training hazardous waste site, which was located above Gilford's largest aquifer. In 2006, soil samples were taken and analyzed, and in 2007 the contaminated soil was removed from the site. The following is a list of active RCRA regulated hazardous waste sites:

*Cedarcrest Chiropractic Centre
Eckel, Peter BD MD
Gunstock Area
Gilford Well Co.
Walmart
Pepi Herrman Crystal
Irwin Marine
Silver Sands Marine
NH DOS Marine Patrol*

*Lakes Region Dental Care
Horvath, Mark DR DMD
Gilford Hwy Dept.
Getty Petroleum
Performance Prestige Detailing
Belknap Landscape Co.
Glendale Marine
Fays Boat Yard*

- 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



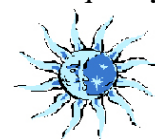
drinking water. Currently, Gilford has reduced their winter salt application, designating certain roads as “no salt” or “low salt” roads.

- 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: Aboveground 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 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 by pumping every 3 – 5 years.
- Transportation Land Uses: Fuel storage and various deicing chemicals from roads, highways, airports, etc., create potential dangers to Gilford’s drinking water. There is one airport located in Gilford, which is managed by the Laconia Airport Authority, and is above Gilford’s largest aquifer. A number of protective measures have been taken in order to reinforce water safety. For instance, the airport uses no deicing agents, but rather manually deice the aircraft. Also, fueling of the aircraft occurs in areas designated by the Gilford Fire Department and Gilford Planning Board.
- Commercial, Industrial, Municipal:
 - There are twenty-one potential sources of contamination that have been identified from commercial, industrial, and municipal land use. Five sites contain aboveground storage tanks, twelve sites contain underground storage tanks, and four sites contain leaking underground storage tanks.
 - There are twenty-nine active Resource Conservation and Recovery Act sites. These sites contain hazardous waste products, which are extremely ignitable, corrosive, or toxic.
 - There are twelve known nonpoint sources of pollution, including three storm drains, two covered sand/salt pile storage facilities, and eight sand and gravel mines.
 - There are six Underground Injection Control Sites that are within 1000 feet of a water source. These sites can easily create a connection between land and groundwater.
- Stormwater Runoff: Because it cannot penetrate impervious surfaces, runoff runs into gutters and storm drains, picking up toxins and suspended solids.

The 2005 Source Water Protection Plan for the Town of Gilford gives recommendations for the various contamination sources, as well as pertinent information dealing with water resources.

POINT & NONPOINT SOURCE POLLUTION

Point and non-point source pollution are very serious threats, 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, such as a leaking oil tank. Non-point source pollution, on the other hand, is pollution that can originate from a number of sources, and is difficult to identify, such as stormwater runoff. 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 the Shoreland Water Quality 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 are required to obtain a groundwater discharge permit. 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 Gilford'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 degrade 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 filtrate pollutants. Wide buffers can significantly reduce impacts from pollutants such as pesticides, nitrates, sediment, phosphorus, pathogens, etc.

Thirteen known and documented nonpoint sources are mapped in Gilford. Their locations are listed below and displayed on **Figure 11**.

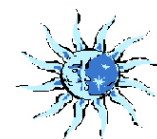


Table 10: Non-Point Source Pollution Sites

Site Name or Address	Site ID(s)
Town Gravel Pit	124-01
Cotton Hill	111-10
Hoyt Road	111-09 111-08
Town Garage	111-07
Town of Gilford	111-06
Town of Gilford Salt Shed	111-04
Off Rt. 140	111-05
Henderson Rd.	111-12
Town Stump Dump	111-11
Catch Basin Varney Pt.	111-18 111-19 111-20

NH DES; June 2009



Although the Belknap Mountains are surrounded by much larger bodies of water, such as Lake Winnepesaukee, Round Pond is the largest permanent body of water within the interior of the Belknap Mountains. It is a scenic, remote pond and is located 1652 ft above sea level, making its size all the more significant.

The pond is considered the main headwaters of the Suncook River and is a designated Prime Wetland.



7.0 RECREATIONAL & HISTORIC RESOURCES

Part of the importance of protecting our natural resources is for the sake of preserving the beauty of our town. By maintaining the health of our environment, we are creating prime locations for residents to enjoy whether it is a recreational area to play in, scenic area to view, or historic location to discover.

7.1 RECREATIONAL FACILITIES, AREAS & TRAILS

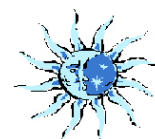
There are various types of recreational facilities, including parks, campgrounds, water related facilities, golfing courses, playing fields, and others. These facilities are open to the public, and provide many opportunities for young and old. These facilities can be found on **Figure 12**.

The following is a list of the various recreational areas Gilford provides, as well as their general purpose.

Table 11: Recreational Facilities

Name	Recreational Purpose
Camp Winsheblo	Campground
Pheasant Ridge Country Club	Golf; Tennis
Saltmarsh Pond	Boat Access; Fishing
Bolduc Park – Piches Ski Touring Center	Par-3 Golf, XC Ski Trail
Middle/High School	Field Sports
Gilford Elementary School	Field Sports
Village Field	Field Sports
Ellacoya State Park	Park, RV Park
Gilford Hills Club	Gymnasium; Tennis
Gilford Yacht Club	Water Sports
Mountain View Yacht Club	Water Sports
Silver Sands Motel and Marina	Water Sports
Arthur A. Tilton Gilford Ice Rink	Outdoor Hockey Rink
Fays Boat Yard	Water Sports
Glendale Docks	Boat Access, Water Sports
Winnepesaukee Yacht Club	Water Sports
Lincoln Park	Park
Gunstock Mountain Resort	Campground, Winter & Summer Sports
Gilford Beach	Swimming
Stonewall Park	Park

NH GRANIT Database; August 2009



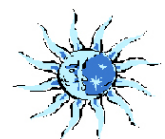


Mountain View Yacht Club

Gilford is notorious for its various recreational areas, especially those venues that bring in revenue. One of the biggest recreational areas the town provides is Gunstock Mountain Resort. A recreational area and a prime tourist attraction, Gunstock offers activities all year long, from horseback riding, skateboarding and camping in the summer, to skiing, snowboarding and tubing in the winter. It also continues to provide various events throughout the year.

Gilford Beach is also a prime location for residents and their guests. Approximately thirteen acres, the beach covers 1,800 feet of shorefront on Lake Winnepesaukee. This is a prime location for residents during the summertime.

Students of the Gilford school systems can enjoy the 28 acre Village Field, equipped with four lighted tennis courts, a lighted basketball court, a regulation soccer field, track, two baseball diamonds with dugouts, playground equipment, picnic facilities and a bandstand. Although this field is shared with the Gilford Middle/High School district, it is also open to the public.



TRAILS

Gilford is fortunate to have numerous trails for residents and non-residents alike. Many trails are used for hiking, snowshoeing, cross-country skiing, snowmobiling, horseback riding, and mountain biking.

The most extensive trail system in Gilford is within the Belknap Mountain Range. The Kimball Castle property, also known as Lockes Hill, is a passive use area with two trails available for public use. The Kimball Castle trail system includes Lakeview and Quarry trails, and these trails are open to hiking, snowshoeing, and cross-country skiing. Weeks Woods and Ramblin' Vewe Farm also have a number of trails for public use. These trails can be found on **Figure 12**.



Note: Due to their complexity and small size, Gunstock Trails have not been mapped on **Figure 12**.

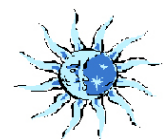
For more information on these trails, visit www.gunstock.org.

A majority of Gilford's residents who responded to the March 2009 NRI Town Survey put on by the Conservation Commission feel that there is a need for development of a trail system in the Town.

7.2 HISTORICAL LOCATIONS

The conservation of Gilford's historic resources is extremely important to the community. The Thompson-Ames Historical Society was independently created to preserve Gilford's heritage, and keep the past alive. There are a few select historical sites in Gilford. An overview of Gilford's history is given below, with a brief summary of prime locations and their importance. To learn more about Gilford's history, contact the Thompson-Ames Historical Society online at: <http://www.gilfordhistoricalsociety.org/tahs/>

The first settlement in Gilford is purported to have taken place around 1777, although at the time, Gilford was still a part of Gilmanton. In 1811 residents of the "upper parish" submitted to the Gilmanton selectmen a request for incorporation into a separate town. This new town was named by Lieutenant Lemuel B. Mason, the town's oldest and most famous resident (as was the custom). He decided to name the town "Guilford" after the battle of Guilford Court House in



North Carolina in the Revolutionary War. However, the name was spelled incorrectly, thus the town was named Gilford.

Agriculture was Gilford's main pursuit; however, industries rapidly grew throughout the years. From cobblers to blacksmiths, from sawmills to cooperages, Gilford certainly had it all. There were a few brick makers in town, although very few brick buildings. The Doe, or Dol, brickyard was located on the Meredith side of the bridge in the area now known as "Brick House Hill," or "Brick Yard Mountain." Also, a brick-making establishment existed at a home on Main Street, now known as the Rowe House on Belknap Mountain Road.

Benjamin Weeks began running the first general store in Gilford in the 1790s, right out of his home. At one point there were four general stores in town, three located in the village. One store remains today.

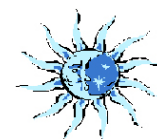
The earliest summer resort was built in the 1790s, known as Mountain View Farm. Now known as Kings Grant Inn, Natt Kimball, the establishment operator, would meet his boarders at the train and would take them on sightseeing expeditions in the White Mountains.

Gilford is extremely proud of its history, establishing the Gilford Village Historic District and the Historic District and Heritage Commission on March 6, 1973. They welcome any and all residents interested in learning more about our community's grand heritage.

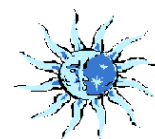
The following is a list of historical locations found on **Figure 12**. For more information behind the history of these locations, contact the Gilford Historical Society or read *Gilford Village Historic District: A Walking Tour*.

Table 12: Historical Locations

Map #	Name	Date
1	Francis Gilman House	c. 1786
2	Sally Blaisdell House	c. 1795
3	Samuel Gilman Jr. House	c. 1796
4	Levi Gilman House	c. 1795
5	Site of First District 8 Schoolhouse	c. 1806 – 1892
6	Morrill Farm	c. 1798
7	Site of First Mill	1789 – c. 1900
8	Easy Street	N/A
9	Rowe Ice House	c. 1860
10	Village Store	1836
11	Old Gilford Library	1926
12	Grange	1857
13	Dr. George Munsey House	c. 1814
14	Albert Chase House	1840
15	Otto Page House	1935
16	Dolly Gilman House	c. 1805
17	Henry Sleeper/Joseph Sanborn House	c. 1810/1820



Map #	Name	Date
18	Village Fields	N/A
19	Thompson-Ames Historical Society	1834
20	Methodist Parsonage	1879
21	Deacon Heman Hunter House	c. 1811
22	Site of Jewett-Folsom House	c. 1828 – 1906
23	Thomas Ayer House	1849
24	Benjamin Jewett Jr. House	1824/1836
25	John P. Davis House	c. 1900
26	Site of Town Hearse “House”	N/A
27	Benjamin Wadley House	1848
28	Saphronia Stevens House	1847
29	Joseph Goss House	1837
30	Site of Rev. Jeremiah Veasey House	c. 1825 – 1870
31	Gilford Elementary School	1939
32	Benjamin Rowe House	1810/1838
33	The Triangle	N/A
34	Henry F. Hunt House	c. 1900
35	District #8 Schoolhouse	1892
36	Nathaniel Davis/George W. Munsey House	c. 1816
37	John G. Weeks House	c. 1835
38	Site of Tannery	c. 1850 – 1900
39	Benjamin F. Weeks House	c. 1840
40	Town Hall	1841
41	Gilford Community Church	1834
42	Parsonage	c. 1825
43	Laura Weeks Hall	1938
44	David Hale Munsey House	c. 1812
45	Site of Jewett/Hatch House	c. 1830 – 1900
46	Site of Fire Station	N/A
47	Benjamin Franklin Hatch House	1867
48	Site of Prohibition-Era Dance Hall	N/A
49	Watson Farm	1798
50	Potter Farm	1785



8.0 OPEN SPACE & LAND PROTECTION

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

8.1 LAND CONSERVATION

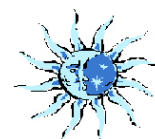
During the past few decades there has been increasing interest and activity throughout New Hampshire in conserving land of which Gilford has been an active participant. A report completed in 2002, "Saving Special Places: Community Funding for Land Conservation" indicated that 12,000 to 15,000 acres of open space were being lost to development in New Hampshire each year. Setting aside parcels for conservation is important for a variety of reasons. They benefit wildlife by providing them with a habitat that is protected from development, most times in perpetuity. These lands also protect water quality and provide beauty and preservation of aesthetic resources throughout the Town of Gilford.

There are many tools for conserving lands. Land conservation measures can be part of a community's land use strategy in its Master Plan or as an Open Space Plan and appropriate zoning measures to support such a plan. Good local planning that provides for economic development, affordable housing and other critical community needs will be complemented by the acquisition of land for open space, parks, aquifer protection and other public benefits.

Gilford has been working diligently to keep open space as an important component of the Town natural resource base primarily through the joint efforts of the Gilford Conservation Commission, the Gilford Land Conservation Task Force, and the Gilford Planning Board, including through partnerships with State, Town, or various organizations dedicated to land protection such as the Society for the Protection of NH Forests (SPNHF), the Lakes Region Conservation Trust (LRCT), and the Belknap Range Conservation Coalition (BRCC). During the 2009 NRI Town Survey, 89 percent of the respondents felt that the conservation of open space was very important and 88 percent supported the acquisition of lands for conservation purposes.

Of the 34,244 acres in Gilford, currently 7423.7 acres or 21.7 percent of the Town, are set aside as conservation lands. Of these lands set aside for conservation, many are also protected by restrictive covenants, conservation easement and/or are owned in fee by a conservation organization such as SPNHF, LRCT, NHFG or others dedicated to the long term stewardship of the conservation parcel. **Figure 13** displays those parcels in Gilford that have been set aside for conservation and the primary type of conservation protection associated with each parcel.

There are two main types of protection for conservation lands: fee-ownership and conservation easement. Fee ownership, or FO, means that the Town, another governmental entity, or a conservation organization owns the conservation parcel, and therefore protects it through their own means. A conservation easement, or CE, means the land is protected through a conservation easement held by the Town, another governmental entity, or a conservation organization, but not necessarily owned by them. In some cases deed restrictions (DR) are put in place to protect



certain resource values of the parcel. Agricultural restrictions or AR means the land is subject to restrictions to keep the land in agricultural use.

Conserved parcels in Gilford are listed in **Table 13**, along with their total size in acres and their protection type. Some of these lands are in public ownership with guaranteed public access; others are protected with conservation easements and are privately owned. A number of parcels are listed as having fee ownership (FO) by the Town of Gilford as the primary protection measure; however no conservation easement protects the long term conservation values of the parcel.

Primary Protection Type – FO 4,934.1 Acres
Primary Protection Type – CE 2,425.1 Acres
Primary Protection Type – AR 64.5 Acres

Table 13: Conservation Lands

Map Number (Figure 13)	Parcel Name	Size	Primary Protection Type	Primary Protection Agency
14	Harris Farm	40.5	AR	TOWN OF GILFORD
36	Sleeper – Agric. Pres. Rest. (3 Lots)	24	AR	NH - DEPT OF AGRIC
2	Bean (2 Lots)	103.2	CE	GILFORD CON COM
15	Hidden Valley BSA	485.3	CE	NH FISH & GAME
23	Mooney	306.5	CE	DRED
33	Roger's	25.3	CE	LRCT
40	Timber Island	127.3	CE	LRCT
27	Persons (3 Lots)	237.8	CE	NEFF
16	Howe #1	22.6	CE	SPNHF
17	Howe #2	27.7	CE	SPNHF
18	Howe #3	35.3	CE	SPNHF
22	Mitchell 2006 Trust	338.1	CE	SPNHF
25	P. Howe III	186.4	CE	SPNHF
26	Parkman D. Howe Jr. 1997 Trust	5.3	CE	SPNHF
31	Pomeroy	10.2	CE	SPNHF
39	Tilton (2 Lots)	56.3	CE	SPNHF
6	Carson	17.1	CE	NH OSP
21	McLaughlin	11.9	CE	GILFORD CON COM
24	Muehlke	169	CE	GILFORD CON COM
45	Westergren	21.9	CE	GILFORD CON COM
47	Philip A. Roux Trust	61.9	CE	GILFORD CON COM
48	Airport	168	CE	GILFORD CON COM
49	Campbell	8	CE	GILFORD CON COM

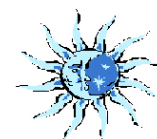
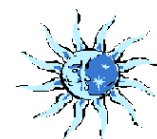


Table 13 (Continued)

Map Number (Figure 13)	Parcel Name	Size	Primary Protection Type	Primary Protection Agency
1	Allen Lot (2 Lots)	17.9	FO	TOWN OF GILFORD
29	Piper Mountain Conservation Area	89.4	FO	LRCT
37	Smart	31.9	FO	LRCT
42	Town of Gilford	5.4	FO	TOWN OF GILFORD
44	Weeks Forest	20.9	FO	SPNHF
46	Weeks Forest	85.7	FO	SPNHF
3	Belknap Country Recreational Area	1707.1	FO	BELKNAP COUNTY
4	Belknap Mt State Forest	1344.5	FO	STATE OF NH - DRED
5	Brookside Crossing Corp.	27.5	FO	TOWN OF GILFORD
7	Devivo	1.2	FO	TOWN OF GILFORD
8	Eastman	0.9	FO	TOWN OF GILFORD
9	Ellacoya State Park	104.6	FO	STATE OF NH - DRED
10	Evvard	7.6	FO	TOWN OF GILFORD
11	Francke	5.3	FO	TOWN OF GILFORD
12	Francke Trustee	26.7	FO	TOWN OF GILFORD
13	Gardner	9.9	FO	TOWN OF GILFORD
19	Kimball Castle	291.2	FO	TOWN OF GILFORD
20	Lincoln Park	0.76	FO	TOWN OF GILFORD
28	Peverly Lot	136.6	FO	TOWN OF GILFORD
30	Piper/Whiteface	144	FO	TOWN OF GILFORD
32	Powell Associates Lot	403.7	FO	TOWN OF GILFORD
34	Saltmarsh Pond Boat Launch	2.2	FO	STATE OF NH - F&G
35	Saltmarsh Pond State Forest	70.9	FO	STATE OF NH - DRED
38	Stone Road Park	8.3	FO	TOWN OF GILFORD
41	Town Beach	16.6	FO	TOWN OF GILFORD
43	Wilson-Weeks	146.8	FO	TOWN OF GILFORD
50	Winsheblo Forest	210.5	FO	SPNHF
Not Labeled	Grant	16	FO	TOWN OF GILFORD

GRANIT & Town of Gilford; March 2011

Some of the parcels that are owned by the Town of Gilford which are not protected by conservation easement include the Powell Lot; the Piper/Whiteface parcel and the Wilson-Weeks Forest. These parcels as well as others are important connecting parcels to other protected lands within important blocks of unfragmented lands and critical resource protection areas. A secondary type of protection such as a conservation easement should be considered for these and other critical parcels.



8.2 STEWARDSHIP, MONITORING & RECORD-KEEPING

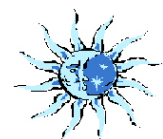
Long-term stewardship measures of parcels protected by the Town of Gilford should include Baseline Documentation of existing conditions and annual monitoring of the parcel. Typically the Conservation Commission is responsible for these tasks and for record-keeping. Or, if funds are available a consultant could be hired to assist in these tasks. If at all possible, lands donated to the Town of Gilford for conservation purposes and/or as part of development conditions or mitigation requirements should include the Baseline Documentation and fees to assist in long term stewardship costs as part of the donation or project. A sample Baseline Documentation Form is included in **Appendix E**. It is intended to be a legal document that certifies the condition of the property as the time the property is transferred and/or at the time the CE or DR is recorded. There is also a checklist of items that should be included with the Baseline Documentation Form/Report. In those cases where the parcel is part of a wetland mitigation requirement of the NHDES Wetlands Bureau, the Baseline Documentation Form and Report is always a condition of the permit and should be easily obtained as part of the permitting process from either the applicant or the Wetlands Bureau Mitigation Coordinator. The Planning Board should consider formalizing the process for accepting CE's on parcels as part of the planning and development process, including the above as well as the requirement that the boundaries of the CE or conservation parcel be marked in the field by a Licensed Land Surveyor.

Another component for long-term success in land conservation is good record-keeping. Parcels set aside for conservation come to the Town in a variety of ways. Sometimes the parcels are donated or a conservation easement (CE) and/or deed restriction (DR) is imposed on the parcel by the Planning Board and/or the Board of Selectmen. In these cases, it is important for the Planning Board liaison to the Conservation Commission to make sure that the GCC is made aware of the conservation easement or deed restriction; that a copy of the final recorded plan and conservation easement language is provided to the GCC (preferably already reviewed and approved by the GCC ahead of time). The GCC or a designated responsible party should make sure that the conservation information for the parcel is recorded at GRANIT using a Track Data Form, a copy of which is included in **Appendix E**. The Planning Board, through its Planning Department should also ensure that the GIS files are maintained, adding the proper designation for protection type and parcel ownership to the GIS data and annual updates to the Conservation Lands data layer and map.

To facilitate the long-term record keeping, the Town should make sure that there is a separate file cabinet for storing documents on each parcel.

8.3 UNFRAGMENTED LAND BLOCKS

Unfragmented land blocks are undeveloped sections of the landscape with few or no roads. Only Class V and Class VI roads are included within the unfragmented blocks of land because these types of roads are not considered to be significant barriers to the movement of wildlife (and many are used as trails by wildlife).



Unfragmented land blocks provide essential forest interior for many species, significant habitats for certain species with large home ranges, and offer recreation opportunities for Gilford's residents. Fragmentation of landscape has serious impacts to many species of wildlife, including loss of habitat area, loss of habitat connectivity, increased potential for incursions of invasive or damaging species, and increased potential for vehicle-wildlife collisions and other undesirable human-wildlife interactions.

There are many unfragmented land blocks located in Gilford, ranging from under 200 acres to >1000 acres in size. These unfragmented land blocks are displayed on **Figure 14**. When considering the significance of unfragmented land blocks it is important to consider the regional context. **Figure 15** shows how the unfragmented land blocks in Gilford are connected to those land blocks in adjacent municipalities. Gilford is a strategic component of a significant block of unfragmented lands in the regional context, sharing over 31,000 acres of unfragmented land with the neighboring communities of Alton, Belmont and Gilmanton. This block of unfragmented land is by far the largest block of unfragmented land in the region represented by the six municipalities on **Figure 15** and is one of the largest unfragmented blocks in the lower third of the State.

The Belknap Range Conservation Coalition (BRCC) is a non-profit organization with participating members from Alton, Belmont, Gilford, Gilmanton, Lakes Region Conservation Trust, UNH Cooperative Extension, Society for Protection of NH Forests, Gilmanton Land Trust, Belknap County Conservation District, Belknap County Sportsman's Association and other dedicated individuals such as Dave Roberts. The mission of the BRCC is to promote the conservation of open space, responsible stewardship and low impact public enjoyment of the scenic, natural, recreation and historical resources of the Belknap Mountain Range. The BRCC focus area is the large unfragmented block displayed on **Figure 15**.

Although any unfragmented block is special, larger blocks of unfragmented land are more likely to support viable populations of species. Larger blocks protect various species of wildlife by providing the essentials of food, cover and successful breeding areas they require to survive, as well as providing a habitat distanced from human activities. Smaller areas can be beneficial for smaller species. However, species such as bobcats, moose and bears require larger home ranges, needing larger unfragmented areas; for instance, the minimum home range for a lynx is between 3,900 – 6,144 acres. Although the smaller blocks are helpful, larger fragments are most likely to support viable populations of 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 14 calls out the largest blocks of unfragmented land of which a part is in Gilford. Keep in mind some blocks exceed town boundaries (as discussed above and as shown on **Figure 15**), and may not be located entirely within the Town of Gilford. The approximate acreage figures shown below also include surface water resources which occur within the unfragmented block of land.

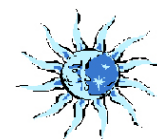


Table 14: Unfragmented Land Blocks, Town Boundaries Considered

Rank	Apx. Size (Acres)	Features Included
1	31, 665	Hidden Valley, Belknap County Recreation Area, Round Pond
2	2049	West Alton Brook, East of Belknap County Recreation Area
3	773	Kimball Castle
4	529	Saltmarsh Pond, Saltmarsh Pond State Forest
5	412	Weeks Forest, Howe Conservation Lands

NH Fish & Game; June 2009

Table 15 lists habitat block size requirements for various species, which should give an idea of the importance of large unfragmented blocks:

Table 15: Habitat Block Size Requirements

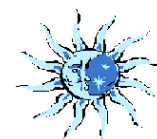
Acres	Species
25	Minimum size for breeding pair of whip-poor-wills.
100	Minimum size for red-shouldered hawk. Area required for viable population of wood thrush.
500	Appropriate maximum dispersal area for wood, spotted or Blanding's turtle.
1200	Minimum home range for northern goshawk.
1320	Maximum home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

Given the diverse habitats, it is no wonder Gilford is a prime location for an abundance of wildlife. However, since an inventory of wildlife has never been completed, the status of various species is unknown. In order to protect both common and rare species in Gilford, unfragmented natural lands and other special habitats need to be conserved.

8.4 CURRENT USE

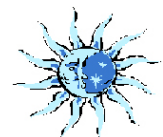
The Current Use Law is a property tax designed to encourage landowners to keep open space undeveloped. Rather than taxing for the highest potential, the land is taxed for its present use. The Declaration of Public Interest stated in NH RSA 79-A states:



“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.”

A high percentage of the parcels in Gilford are listed under current use. More information on the Current Use Law is available from the Department of Revenue Administration.

*“Acts of creation are ordinarily reserved for gods and poets,
but humbler folk may circumvent this restriction
if they know how.
To plant a pine, for example,
one need only own a good shovel.”
Aldo Leopold*



9.0 NATURAL COMMUNITIES AND WILDLIFE RESOURCES

Natural Communities are defined as assemblages of plants, animals, and other organisms together with the natural physical environment in which they are found. The wildlife community is an exceptionally important resource, but it is slowly declining due to habitat loss and fragmentation caused by human development pressures. Some species are in serious jeopardy or are of concern. Both the Federal Government and the State of New Hampshire have their own lists for endangered, threatened, and species of concern. A species may be off the Federal list because numbers nationwide are acceptable, but are extremely rare in New Hampshire and therefore be assigned a higher State classification.

9.1 LAND COVER TYPES

The Wildlife Action Plan (WAP), which was first published by the New Hampshire Fish & Game Department in 2005 and updated in 2010, identifies habitats and species in greatest need of conservation, threats to their existence, and offers strategies to address these threats. The goals of the WAP are to provide readily available maps of the wildlife habitat resources for each municipality in the State to provide decision-makers with important tools for restoring and maintaining critical habitats and populations of the state's species of management and population concerns. One component of the WAP was the creation of a statewide database on existing land use and habitat cover types. Land cover types across the state were classified and standardized.

The Wildlife Action Plan Land Cover Map (**Figure 16**) provides a visual representation of the various habitat types located within Gilford. These habitat types are listed in the table below:

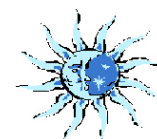
Table 16: Wildlife Habitat Land Cover

Land Cover	Acres	Percent Land Cover	Percent Total Acreage
Grasslands >25 acres	1583	7.40%	4.62%
Hemlock-Hardwood-Pine	16467	77.0%	48.09%
Lowland Spruce-Fir	1307	6.11%	3.82%
Marshes	293	1.37%	0.86%
Northern Hardwood-Conifer	1673	7.82%	4.89%
Peatlands	62	0.29%	0.18%
Open Water	12858	N/A	37.55%
Total Land	21385		
Total Acreage in Gilford	34243		

Belknap County UNH Cooperative Extension, Forest Resources; August 2008.
NH Fish & Game Wildlife Action Plan; 2005.

Listed below are the descriptions of these habitats, as classified within the WAP:

Hemlock-Hardwood-Pine Forests are transitional forests, occurring between hardwood conifer and oak-pine forests. Having the majority of land cover in Gilford, they are comprised of dry, sandy soils with red oak and white pine.



Northern Hardwood Conifer Forests are typically found between 1,400 and 2,500 ft. in elevation, and are typified by American beech, sugar maple, and yellow birch.

Lowland Spruce-Fir Forests are a mosaic of lowland spruce-fir forests and red spruce swamp communities, and supports 101 vertebrate species in the state, including 9 amphibians, 2 reptiles, 53 birds, and 37 mammals.

Grasslands are areas that are greater than 25 acres and are dominated by grasses, wildflowers, and sedges with little shrub or tree cover.

Shrub Swamp Systems have a broad range of flood regimes, often controlled by the presence or departure of beavers. They are 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.

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.

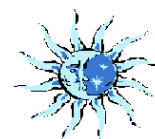
9.2 IMPORTANT HABITAT TYPES

Each species, whether plant or animal, requires a specific type of habitat in order to survive. A species' habitat includes food, water access, shelter type and space, and some species have more stringent requirements than others, such as species found in vernal pools (**Section 4.5**). Because habitat type vary across the state, some species are more common in certain towns than others. That being said, it is understandable why it is important to track natural communities in a town.

Habitat is more important when it:

- Supports a rare species – i.e. the nesting area used by bald eagles in Gilford;
- Represents a small portion of the landscape – i.e. deer yards and vernal pools;
- Provides an abundance of food or cover and other resources – i.e. agricultural lands;
- Provides a buffer against development for important wildlife areas – i.e. land adjacent to rivers and wetlands; and
- Contains unique habitat co-occurrences.

Wetlands and riparian areas contain a multitude of diverse habitats with corresponding edge habitat, are used by a majority of our animal species and contain a majority of the diversity in plants. It has been estimated that wetlands and riparian areas contain 40 percent of the habitat preferred by local species and are used by our 90 percent of the region's wildlife.



NATURAL COMMUNITIES

A natural community is, as defined by the NH Natural Heritage Bureau (NHNHB), “recurring assemblages of plants and animals found in particular physical environments.” If these communities can be preserved, all species within the community will benefit; if they cannot, the species they contain may be in danger.

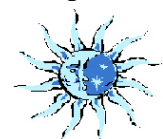
Natural communities are distinguished from one another using three primary characteristics. Each has a definite plant species composition, a consistent physical structure, and a specific set of physical conditions. It is important to classify the landscape into discrete natural communities, allowing us to:

- Compare one area to another and say something about how they are similar or different;
- Determine whether an area is unique or common;
- Know if it is a big or small example of its type;
- Identify the combination of circumstances that likely affect the organisms present;
- Infer how management and stewardship may influence the mix; and
- Ensure the conservation of ecological processes and species that occur in a community, whether they are presently known or not.

The NHNHB tracks “exemplary” natural communities in each town. A natural community qualifies as exemplary if it is of a rare type or a very old occurrence of a common community in good condition. Although NHNHB found no exemplary natural communities in Gilford, it is still important to protect Gilford’s natural communities in order to preserve the biodiversity of the Town. **Figure 17** portrays the NHNHB data for Gilford.

While most species can survive in a habitat containing their basic necessities, there are some habitats that are more important than others. These habitats are considered “significant habitats.” A significant habitat supports rare species as well as provides an abundance of resources and a buffer against the effects of development. The following describes the types of significant habitats located in New Hampshire:

- **Habitat of Rare Wildlife Species:** These habitats contain areas for rare species to live and breed;
- **Unfragmented Lands:** Large areas of contiguous habitat that includes a mixture of forests, wetlands, and other habitats that support wide-ranging animals;
- **Riparian Areas and Large Wetlands:** Riparian areas along water courses, especially those connecting with river corridors, wetlands, and unfragmented lands. Also, large wetlands or wetland complexes that support a wide array of wildlife;
- **Agricultural and Other Open Land:** Areas with large fields and shrub lands, providing the necessities for species dependant on this type of habitat;
- **Wildlife Travel Corridors:** Undeveloped lands which serve as connections between large undeveloped tracts of land; and
- **Other Unique or Critical Habitats:** This category is divided into the following: habitats that are rare statewide, or in a particular geographic area; uncommon land features which provide



unique conditions for various species; habitats critical to certain species in a particular phase of their life cycle or during a particular time in the year.

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 for wildlife, lessening the amount of open habitat and increasing the stress on these animals.

9.3 RARE & IMPERILED SPECIES

The NHNHB tracks all rare and imperiled species in New Hampshire. Currently, the NHNHB maintains records on 386 plants judged to be rare or imperiled in the state. Plant species tracked or under consideration by NHNHB are divided into four categories:

1. Plants Listed as Endangered or Threatened. This category includes 288 species currently listed as endangered or threatened under the Native Plant Protection Act.

Endangered is defined by law as: Native plants with three or fewer natural occurrences in the state observed within the last 50 years, or plants with more than three occurrences which are, in the judgment of experts, especially vulnerable to extirpation.

Threatened is defined by law as: Native plants documented as having 10 or fewer natural occurrences within the last 20 years or that are otherwise threatened by extirpation due to habitat loss or other factors.

2. Candidates for Listing as Endangered or Threatened. This category contains 187 plants identified by a committee of experts as being apparently rare. **Table 17** lists those rare species with records of occurrence in Gilford according to the NHNHB.

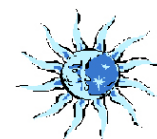
Table 17: NHNHB Rare Species in Gilford

Scientific Name	Common Name	Remaining	Status
<i>Stuckenia pectinata</i>	Sago Pondweed	7	Endangered
<i>Triphora trianthophora</i>	Three-birds Orchid	21	Threatened

NH Heritage Bureau; July 2008.

3. Plants in Need of Additional Expert Review. This category consists of 252 New Hampshire plants whose rarity status is less certain than those in the other two categories.

4. Plants Listed as Special Concern. In addition to recognizing "endangered" and "threatened" plant species, the NH Native Plant Protection Act identifies 11 plants as "special concern." These species are not rare in New Hampshire, but their showy nature makes them vulnerable to over-collection. These species are:



Scientific Name	Common Name
<i>Calopogon tuberosus</i>	Grass pink
<i>Cornus florida</i>	Flowering dogwood
<i>Cypripedium acaule</i>	Pink lady's-slipper
<i>Dicentra cucullaria</i>	Dutchman's breeches
<i>Epigaea repens</i>	Trailing arbutus
<i>Kalmia latifolia</i>	Mountain laurel
<i>Platanthera blephariglottis</i>	White fringed orchis
<i>Platanthera grandifolia</i>	Large purple fringed orchid
<i>Pogonia ophioglossoides</i>	Rose pogonia
<i>Rhododendron lapponicum</i>	Lapland rosebay
<i>Sarracenia purpurea</i>	Pitcher plant

9.4 SPECIES OF CONCERN

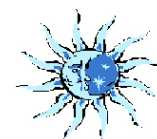
The NHNHB database has only one species listed as “endangered” for the Town of Gilford; *Haliaeetus leucocephalus*, more commonly known as the Bald Eagle. One pair of bald eagles have nested successfully in Gilford for the last four years (2006-2009), producing 7 young. In 2009 there were only 19 territorial pairs in New Hampshire, and 16 young were fledged.

Bald Eagles were first added to the Federal list of threatened and Endangered Species in 1963, when, primarily due to DDT, only 400 pairs of eagles survived across the entire country. As of August 9, 2007, Bald Eagles were officially removed from the Federal list, thanks to the ban on DDT usage and habitat protection efforts to conserve nesting and feeding sites throughout the country. There are now 10,000 pairs nationwide.

9.5 HIGHEST RANKED HABITAT BY ECOLOGICAL CONDITION

The Wildlife Action Plan (WAP) also has produced maps that rank wildlife habitat by ecological condition. The WAP Ecological Condition Habitat Rankings Map (**Figure 18**) assesses the ecological condition of the habitats identified in the development of the WAP Land Cover maps discussed in Section 9.1. These habitats were analyzed by ranking the biological, landscape and human impact factors most affecting each habitat type. Biological factors include rare plant and animal species and overall biodiversity. Landscape factors include size of habitat and how close it is to other patches of that habitat. Human impact factors include density of roads around that habitat, dams, recreational use and pollution. These are just a few of the many factors that were analyzed in developing the ranking of ecological condition.

NHF&G biologists then developed condition filters to provide data and maps that show which habitats are in the best biological condition in the state. There is a different filter for each habitat but all filters include an assessment of biological, landscape and human impact factors. After assigning condition scores to each habitat, the habitats were then ranked to show the habitats that were the highest rankings in the state. This was done so that the top 15% by area of the forest types and the top 10% by area of the other habitat types were considered highest ranking. Those



habitats receiving the highest ranking in the state for ecological condition are shown in pink on Figure 18.

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 percent by area of forests and the top 50 percent 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 percent of wetland habitats, all floodplain forests and 30 percent of surface waters were ranked highest in the biological region. Because the WAP was done on a large scale and focused on 123 species and 27 habitat types in greatest need for conservation, all areas within Gilford may not have been identified.

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.

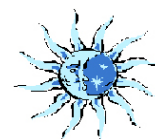
For Gilford, acreage of the Ecological Condition Habitat Rankings Map (**Figure 18**) is as follows:

Highest Ranked in Ecological Condition	10,240 Acres (includes Lake Winnepesaukee)
Highest Ranked in Biological Condition	3,792 Acres
Supporting Landscapes	6,805 Acres

The WAP Ecological Condition Habitat Rankings Map is another important natural resource to consider managing at the regional context. **Figure 19** displays the WAP Ecological Condition Habitat Rankings for Gilford as well as the neighboring municipalities of Alton, Belmont, Gilmanton, Laconia and Meredith. It is important to note that on a regional level, if Lake Winnepesaukee is excluded from the acreage count, that has very little Tier I Habitat. Most of the islands in Gilford are ranked as Tier I habitats, only one of which is currently protected. The rest of the Tier I habitat in Gilford occurs in the headwaters of the Merrimack River watershed. While some of the Tier I habitat in this area is protected as conservation land, there is a large area of Tier I habitat that occurs also within the BRCC Focus Area of unfragmented lands that is *not* protected.

9.6 INVASIVE SPECIES

Invasive species as defined in RSA 430:52 VII is an “alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.” An invasive species is a plant, animal, insect, or fungus that is found in a region not native to its species, and thrives due to the limited amount of natural predators that usually keep them under control in their



native habitat. Because they are exempt from typical dangers, these species spread aggressively and can alter other habitats and threaten the species living in them.

Invasive species can perform a startling amount of damage to an environment. These species can directly harm both native species and the environment around them. Invasive species can harm other species by displacing native plant communities; radically changing the nature of the habitats they invade, competing for the same natural resources and life requirements as the native species, degrading local ecologies by disrupting the food chain, and decreasing the quality and amount of range for wildlife. They can even cause the extinction of the native species. Invasive species can harm the environment by increasing soil erosion and fire hazard, decreasing the quality of understory habitat in forests, degrading aquatic habitats, clogging waterways, reducing the ability of streams to make historic water deliveries, and facilitating the spread of other invasive species. Variable leaf milfoil has invaded Lake Winnepesaukee and expansive efforts are underway to control this extremely invasive plant. Oriental bittersweet, purple loosestrife, multiflora rose and autumn olive are some of the invasive species within Gilford.

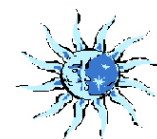
In 2000, House Bill 1258-FN was created requiring the Commissioner of Agriculture, Markets, and Food to, “conduct research and educational activities which address the effects of invasive plant, insect, and fungal species upon the state,” and to “publish annually lists of invasive species that present potential or immediate danger to the environmental and economic interests of the state.” The following lists have been included in hopes of providing awareness to the dangers of these invasive species, and providing Gilford residents with a list of those that qualify as such.

1. N.H. Prohibited List

The State of New Hampshire requires that 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.

Prohibited Plants: Land

Scientific Name	Common Name
<i>Ailanthus altissima</i>	tree of heaven
<i>Alliaria petiolata</i>	garlic mustard
<i>Berberis vulgaris</i>	European barberry
<i>Celastrus orbiculatus</i>	Oriental bittersweet
<i>Cynanchum nigrum</i>	black swallow-wort
<i>Cynanchum rossicum</i>	pale swallow-wort
<i>Elaeagnus umbellata</i>	autumn olive
<i>Heracleum mantegazzianum</i>	giant hogweed
<i>Iris pseudacorus</i>	water-flag
<i>Ligustrum obtusifolium</i>	blunt-leaved privet
<i>Lonicera bella</i>	showy bush honeysuckle
<i>Lonicera japonica</i>	Japanese honeysuckle
<i>Lonicera morrowii</i>	Morrow's honeysuckle
<i>Lonicera tatarica</i>	Tatarian honeysuckle
<i>Polygonum cuspidatum</i>	Japanese knotweed



<i>Rhamnus cathartica</i>	common buckthorn
<i>Rhamnus frangula</i>	glossy buckthorn
<i>Rosa multiflora</i>	multiflora rose
<i>Acer platanoides</i>	Norway maple
<i>Berberis thunbergii</i>	Japanese barberry
<i>Euonymus alatus</i>	Burning bush
<i>Lythrum salicaria</i>	Purple loovestripe

Prohibited Plants: Aquatic

Scientific Name	Common Name
<i>Cabomba caroliniana</i>	Fanwort
<i>Myriophyllum heterophyllum</i>	Variable milfoil
<i>Lythrum salicaria</i>	Purple loosestrife
<i>Phragmites australis</i>	Common reed

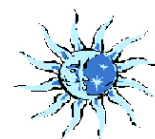
Prohibited Insect Species

Scientific Name	Common Name
<i>Acarapis woodi</i>	honeybee tracheal mite
<i>Adelges tsugae</i>	hemlock woolly adelgid
<i>Aeolesthes sarta</i>	city longhorn beetle
<i>Anoplophora glabripennis</i>	Asian longhorned beetle
<i>Callidiellum rufipenne</i>	cedar longhorned beetle
<i>Dendrolimus sibiricus</i>	Siberian silk moth
<i>Hylurgus ligniperda</i>	redhaired bark beetle
<i>Ips typographus</i>	European spruce bark beetle
<i>Lymantria dispar</i>	Asian gypsy moth
<i>Popillia japonica</i>	Japanese beetle
<i>Pyrrhalta viburni</i>	viburnum leaf beetle
<i>Rhizotrogus majalis</i>	European chafer
<i>Symantia monacha</i>	nun moth
<i>Tetropium fuscum</i>	brown spruce longhorned beetle
<i>Varroa destructor</i>	varroa mite

2. N.H. Restricted List

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

Scientific Name	Common Name
<i>Ampelopsis brevipedunculata</i>	Porcelain Berry
<i>Centaurea maculosa</i>	Spotted Knapweed
<i>Cirsium arvens</i>	Canada Thistle
<i>Coronilla varia</i>	Crown Vetch
<i>Elaeagnus angustifolia</i>	Russian Olive
<i>Euonymus fortunei</i>	Wintercreeper
<i>Glyceria maxima</i>	Sweet Reedgrass
<i>Ligustrum vulgare</i>	Common Privet
<i>Lonicera maakii</i>	Amur Honeysuckle
<i>Lysmachia nummularia</i>	Moneywort



Microstegium vimineum
Phalaris arundinacea
Populus alba
Pueraria lobata
Robinia pseudoacacia
Ulmus pumila

Japanese Stilt Grass
 Reed Canary Grass
 White Poplar
 Kudzu
 Black Locust
 Siberian Elm

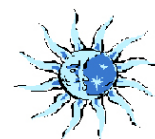
9.7 BENEFICIAL SPECIES

Unlike the invasive species, beneficial insects are important to Gilford's environment because they are a natural plant protector. Natural plant protectors are both healthier and safer for the environment than commonly used chemical protectors, such as broad-spectrum insecticides. There are two categories of beneficial insects: predators and parasites. Predators are the bigger of the two, and they will kill and feed on their prey outright. Parasites, on the other hand, will lay eggs in a host insect, and the larvae will feed on the host. **Table 18** lists some of the beneficial insects recommended by the UNH Cooperative Extension Service:

Table 18: Beneficial Insects

Beneficial Insect	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, mealybugs, 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 mealybugs.
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.
Spiders	Almost anything.

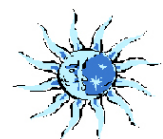
UNH Cooperative Extension; January 2001.



By providing these insects with their essentials for living (water, food, and shelter), you can welcome these insects into your gardens or in some cases they can be purchased online. Abstaining from spraying broad-spectrum insecticides of any kind will ensure the life of these insects.



View toward Mt. Klem from summit of Piper Mountain.



10.0 ASSESSMENT OF CRITICAL RESOURCES

One of the purposes of this Natural Resource Inventory is to provide information to the Town in such a way that important and critical resources are highlighted to assist the GCC and the Planning Board in developing a strategy for the long-term management and protection of these resources. While each of the resources assessed in earlier sections of this NRI can stand alone as an important resource to be managed another way to help prioritize limited funds when considering purchase of conservation lands and/or conservation easements in order to protect those areas most deserving of protection is to conduct a co-occurring resource analysis.

For this NRI, the co-occurring resource analysis was completed in two phases. The first phase of the analysis was to develop a GIS-based model for assessing co-occurring wildlife habitat resources, i.e., where is the greatest number of wildlife habitat resources co-occurring in the same general location. The second phase of the co-occurring resource analysis was to use the results from the wildlife co-occurrence model and build on that to develop a GIS-based model to assess the co-occurrence of those most critical resources in Gilford.

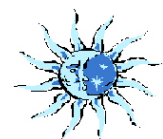
In both phases of the co-occurring resources analysis, the factors to be considered and the weighting to be assigned to each factor or variable was presented to the GCC for their review and approval prior to creating the final analysis maps.

10.1 CO-OCCURRING WILDLIFE ANALYSIS

The first step in the Co-Occurring Wildlife Analysis was to determine the resource data from the NRI that should be included in the model. After a review of several other models from around the New England area the following resource factors and weights were selected for this analysis:

- | | |
|---|----------|
| ➤ Tier 1 – NHFG Highest Ranked Habitats by Ecological Condition | 3 points |
| ➤ Tier 2 – NHFG Highest Ranked Habitat by Biological Condition | 2 points |
| ➤ Tier 3 – NHFG Supporting Landscapes for Highest Ranked Habitats | 1 point |
| ➤ Grassland Habitats | 1 point |
| ➤ Lowland Spruce-Fir Habitats | 1 point |
| ➤ Northern Hardwood-Conifer Habitats | 1 point |
| ➤ Peatland Habitats | 1 point |
| ➤ Marsh Habitats | 1 point |
| ➤ Within 1000' of Lands already in Conservation | 2 points |
| ➤ Within 1000' – 2000' of Lands already in Conservation | 1 point |
| ➤ Steep Slopes >25% | 1 point |

The model inputs and weights were approved by the Gilford Conservation Commission early in 2011 after a review of a draft analysis map. The final rankings as displayed on **Figure 20** were prepared using GIS software to run the Wildlife Co-occurrence Analysis model and were subsequently reviewed by the GCC for final approval in March, 2011.



The model assigns value based on the density and importance of the resources at any one place. It does this by identifying areas where multiple resources coincide and overlap, signaling priority areas for resource protection of important co-occurring wildlife habitat resources. Model output rankings ranged from 0 points (shown in white on **Figure 20**) to 6 points, indicating areas of high value wildlife habitat resources which are shown in red on **Figure 20**. Much of the final rankings included scores of 3 or less indicating relatively low values for wildlife resources. The highest incidence of co-occurring resources occurred in four generalized locations and surprisingly almost all of the highest ranked areas are not currently protected as conservation land. The largest concentration of highest ranked co-occurring wildlife resources is in the heart of the Belknap Mountain Range where there are five unprotected parcels right in the middle of the BRCC focus area and in the middle of the large unfragmented block discussed in **Section 8.3**.

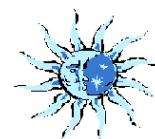
Another large area with a high concentration of important wildlife habitats is on the parcel just to the north of the Wilson-Weeks Forest in an area that falls within the same large unfragmented block discussed in **Section 8.3**. A third cluster of important wildlife habitats is in the southeast corner of Gilford just to the east of lands protected by the Hidden Valley Scout Reservation and NHFG Conservation Easement. This third cluster is also within the BRCC Focus Area. Other smaller concentrations of highest ranked co-occurring wildlife resources occurred in the vicinity of the Meadows, the Gilford Town Beach and Adder Hole and along Lakeshore Drive just east of where Poorfarm Brook flows into Lake Winnepesaukee.

These high priority clusters of highest ranked co-occurring wildlife resources involve approximately 20 parcels with scores ranging from 5 to 6 out of a maximum of 7 points in the model analysis. All of these 20 parcels are notable and should be considered in a long-term protection strategy relative to the ecological and biological integrity of important wildlife habitat. Protection priorities could be further analyzed from here, or simply selected for protection based on availability, land-owner willingness to sell or donate a conservation easement and cost to protect versus funds available.

The excel data table that is part of the GIS attribute data for **Figure 20** could be used as a starting place to track priorities, keeping in mind that the data used to generate the figures and analysis is still based on planning level data and may not be accurate on a site specific basis. Thus, some assurances should be made via field inspection of subject parcels to confirm the results of the model analysis prior to proceeding with plans for protection. In the case of those parcels located in the heart of the Belknap Mountain Range and for which high rankings were achieved in the wildlife habitat co-occurrence model, there is significant rationale and strong justification for proceeding with conservation of these parcels whenever circumstances would make this possible.

10.2 CRITICAL CO-OCCURRING RESOURCE ANALYSIS

The Critical Co-Occurring Resource Analysis is a powerful model that builds on the work of the WAP, the Wildlife Co-Occurrence Analysis and the resource investigations completed as part of this NRI and goes on to analyze where there are high concentrations of co-occurrences of natural resources considered to be critical for protection.



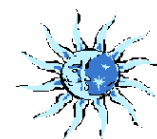
The following model inputs and weights were selected for the Critical Co-Occurring Resource Analysis:

- | | |
|--|--------------|
| ➤ Results of the Wildlife Co-Occurrence Analysis | 1 – 6 points |
| ➤ Overlies an Aquifer Protection Area | 1 point |
| ➤ Within 100' of a Prime Wetland | 1 point |
| ➤ Overlies an NRCS Prime Farmland Soil Map Unit | 2 points |
| ➤ Overlies an NRCS Farmland of Statewide Importance Soil Map Unit | 1 point |
| ➤ Within an Unfragmented Block | 1 point |
| ➤ Occurs within a FEMA Designated Flood Hazard Area – Zone A or AE | 1 point |
| ➤ Within 100' of Surface Waters | 1 point |
| ➤ Within 50' of a Perennial Stream | 1 point |
| ➤ Within 50' of an NWI Wetland | 1 point |

The model inputs and weights were approved by the Gilford Conservation Commission early in 2011 after a review of a draft analysis map. The final rankings as displayed on **Figure 21** were prepared using GIS software to run the Critical Resources Co-occurrence Model and were subsequently reviewed by the GCC for final approval in March, 2011.

This model assesses those locations where multiple critical resources coincide and/or overlap. Areas of the map that are purple to red in color contain the highest concentration of co-occurring critical resources in Gilford, and call out those areas most deserving of protection. The distribution of purple to red areas represents a very small percentage of the total area of Gilford and the parcels on which the highest concentrations of co-occurrence are more dispersed and less clustered than was the case with the Wildlife Co-Occurrence Analysis, with a few notable exceptions as noted below:

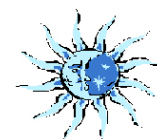
- With the exception of the Gilford Town Beach area, all of the highest ranking co-occurring critical resources are found on parcels that are not currently protected or set aside for conservation.
- There are overlaps with parcels that scored high in the Wildlife Co-Occurrence Analysis but with a different distribution and concentration of critical co-occurring resources.
- The most significant concentration of critical co-occurring resources occurs on one of the Meadows parcels and the adjacent parcel owned by the Carye's.
- At least three of the largest areas of highest ranked critical co-occurring resources are located along the floodplain of the Gunstock River
- Other areas of purple to red on Figure 21 include locations within the Laconia Airport parcels where Gilford Prime Wetlands have been designated and the Airport overlies one of Gilford's most productive aquifers.
- A circle that would connect eastern end of the Airport property, the more easterly parcel of the Meadows property and the Adder Hole/Town Beach property would encompass most of the highest ranked Critical Co-Occurring Resource areas in



Gilford. Thus, this area where Meadow Brook, Gunstock River and Lake Winnepesaukee convene, located over the aquifer in an area dotted with Prime Wetlands, Drinking Water Resources and FEMA designated floodplains is one of the most critical resource areas in Gilford, and thus deserving of the highest degree of management to protect these resources for the long-term.

- There is a large parcel just to the south of Hoyt Road with a wide diversity of co-occurring critical resource areas. The Gunstock River flows through this parcel and joins another stream within the parcel. This parcel has high critical co-occurring resource values.
- The parcel just to the west of the Wilson-Weeks Forest has a high diversity of high concentrations of critical co-occurring resources. The Gunstock River flows through the parcel and it is strategically located at the edge of the BRCC Focus Area and large unfragmented block discussed in **Section 8.3**.
- A parcel along Swain Road in the southwest corner of Gilford has a relatively higher concentration of co-occurring critical resources and protection of this parcel and others to the east towards Liberty Hill Road would provide for the completion of an extension of the BRCC Focus Area to include possible wildlife travel corridors between Swain Road and Belknap Mountain Road.
- Two parcels in the Merrimack River Watershed that scored the highest in the Wildlife Co-Occurrence Analysis exhibit some of the highest degree of interspersions of rankings within Gilford. These two parcels are considerably important to the integrity of the large unfragmented block in the Belknap Mountain Range, the BRCC Focus Area and in the very highest elevations of both the Merrimack River Watershed and the Winnepesaukee River Watershed. Aside from the critical co-occurring resources close to the Meadows and the Laconia Airport, these two parcels are critical to the long-term protection of the integrity of the Belknap Mountain Range and associated unfragmented block.
- The large parcel to the north of the Wilson-Weeks Forest has a high interspersions of differing concentrations of critical co-occurring resources and should be kept high on the list of priorities for protection due to its large size and quality of wildlife habitat.
- Each of the parcels called out by this critical co-occurring resources analysis represents areas that have significant value for long-term protection. This NRI provides the background and documentation for these recommendations.

As mentioned in the wildlife co-occurrence analysis section, smaller parcels in particular must be assessed on a site specific basis to make sure that the model inputs actually occur on the parcel. Due to the planning nature of the GIS data inputs, some model inputs require field verification, especially where the concentration of co-occurring resources falls close to parcel boundaries or on small parcels.



10.3 LANDS CONSTRAINED FOR DEVELOPMENT

Figure 22 provides the results of an additional analysis that should be a useful planning tool to the Gilford Planning Board as well as to the GCC when collaborating to develop a sound plan for the long-term management and protection of Gilford's most important and sensitive natural resources. The analysis completed to create **Figure 22** uses GIS data layers to show those areas in Gilford which either have existing development and/or for which there existing natural resource constraints that could preclude additional development.

Those factors considered in this analysis are listed below:

- Steep Slopes per Gilford Zoning Ordinance (>15%)
- Prime Wetlands per Gilford Ordinance (No Buffer)
- NWI Wetlands (Underestimates the actual distribution of Gilford wetlands)
- Aquifer Protection Overlay District
- Existing Lands Set Aside for Conservation (Includes Town-owned lands without CE)
- Existing Development (Includes all parcels <5 acres with an existing building footprint. Also includes larger parcels consisting of schools, multifamily housing and commercial/industrial developments. Open areas such as golf course and other outdoor recreation areas were not included, as these areas could be sold and re-developed in the future.

Those areas on **Figure 22** that are shown in yellow indicate areas where this analysis shows there are none of the above-listed constraints known to occur there and thus may indicate areas that are more suitable for development.. However, this analysis must be used with caution. Contiguous yellow areas adjacent to existing development and away from large unfragmented blocks of land should be encouraged for development. Those parcels where there are patches of yellow that are disconnected from other areas of development should be discouraged from consideration for development. In fact, there are several parcels in this analysis which show some yellow areas on them that are actually some of the highest ranked parcels for protection based on the co-occurring resource analyses in **Section 10.1** and **Section 10.2**. Because the Lands Constrained for Development analysis did not include buffer zones along wetlands or surface waters and did not include many of the important wildlife parameters, some lands which are most deserving of protection showed up also as lands not constrained for development. Seeking to protect these parcels first, might be another way to interpret these data as they may be most at risk of future development.

This analysis also shows the importance of an up-to-date wetland base map. Use of the NWI wetland layer rather underestimates the actual extent and distribution of wetland constraints within the Town. If the a hard copy of the "Official Wetlands Map" is available in the Town Planning Office, it should be digitized and made a part of the official GIS data layers and as an update to the NRI. The wetland ID numbers and classification codes for all 163 wetlands should be digitized as well and be included on a digitized "Official Wetlands Map", until such time as the GCC considers a more formal update to the wetland inventory and/or an update to the Prime Wetland mapping.

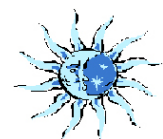
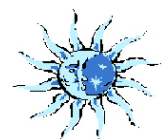


Figure 23 is included here as a companion tool for further consideration of the results of the co-occurring resource analysis and the lands constrained for development analysis. Questions for the GCC to discuss with the Planning Board are:

- What is the current zoning for parcels that are high priorities for protection due to highest ranking wildlife co-occurrence and/or critical co-occurring resources scores?
- Does the current zoning support or conflict with the long-term goals of protection for those parcels with the highest ranking wildlife and/or critical co-occurring resource scores?
- How can zoning help to accomplish some of the long-term goals of protecting these sensitive natural resource areas?
- Are there areas shown as being without constraints for development that are in fact high priorities for long-term conservation? If so, does the current zoning for these parcels put them at risk for development? If so, how can the GCC and the Planning Board work together to develop revisions to the Zoning District to resolve this situation?
- Is the current zoning in the areas shown as being without constraints to development conducive to encouraging development to occur there? How can zoning be adjusted to encourage development in these areas?

*“What’s the use of a house, if you haven’t
got a tolerable planet to put it on?”*

Henry David Thoreau



11.0 PUTTING THE NRI TO WORK

This NRI was prepared with certain goals in mind as discussed in the Introduction. The completion of this document accomplishes the initial tasks of inventorying and documenting important natural resources within the Town. The task remains to put these data to work to fulfill the other goals, that of planning for the long-term protection and management of Gilford's most critical and significant natural resources.

Gilford has a good start in many ways toward long-term protection of its natural resources. An Aquifer Protection District ordinance has been passed, Prime Wetlands have been identified and designated, a Floodplain Management Ordinance has been implemented and some buffer protection measures have been implemented. There is a Land Conservation Task Force and dedicated members of the Gilford Conservation Commission who have established good working connections with land conservation organizations such as BRCC, LRCT, SPNHF and the Belknap County Sportsman's Association. Land conservation in the Belknap Mountain area is off to a good start with some important key parcels remaining to be protected in perpetuity that were identified in Section 10.1 and Section 10.2.

There are several important considerations to keep in mind as the implementation begins:

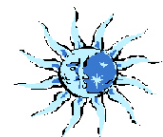
- The GCC and the Gilford Planning Board must work together to update the Master Plan using the data and recommendations of this NRI.
- The NRI is a working document. Resources within the community are changing all the time and new information or tools to identify resources may become available. Therefore, changes to the NRI mapping and database are good and are encouraged. The GIS data files were set up in such a way that the data base can continually be updated as new information becomes available.
- Even the best intentions and ordinances can go awry if there is not a commitment to enforcing those ordinances that are critical to protection of natural resources and in particular water quality.

11.1 RECOMMENDATIONS

Many recommendations have been inserted into and throughout this document during the discussion of a particular resource. Other recommendations are included in the following section.

Soil Recommendations:

- Protect important farmland soils that are necessary for economically viable agricultural activities;
- The steep slopes map (**Figure 3**) should be used as a planning tool but not as a site specific management tool. In order to improve management of lot size and buildable area based on



slope, the steep slope ordinance should be amended to require that a Site Specific Soil Map (SSSM) be completed by a NH Certified Soil Scientist using the standards within the Society of Soil Scientists of Northern New England (SSSNNE) Special Publication #3 – Version 4.0, February 2011 – “Site Specific Soil Mapping Standards for New Hampshire & Vermont”.

Use of these standards would result in the collection of soil and slope data that is specific to the lot that is proposed for development (rather than the planning scale map attached) and the SSSM standards determine the size of the map units and the slope designations for those map units. The SSSM is intended to be an extension of the USDA – NRCS soil mapping standards and was developed in cooperation with NRCS in order to ensure that the SSSM standards were developed to be consistent with the NRCS soil mapping standards. NRCS map units are prepared at too broad of a scale to be applied to site specific land use regulations. Lot size by soil type regulations should all require a soil map by the Certified Soil Scientist.

Agricultural Recommendations:

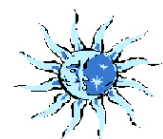
- Consider measures to encourage and support continued agricultural practices on Prime Farmland soils and on parcels adjacent to existing and active agricultural operations.
- Encourage residents to buy locally and to support sustainable agriculture in their homes and purchases.
- Educate farmers about the benefits of conservation easements on their property, and encourage them to follow “Best Management Practices” in the management of their farm particularly in floodplains, along streams and lakes and in the Aquifer Protection District.

Forestry Recommendations:

- Consider expanding the Wilson-Weeks Town Forest and establishing a Conservation Easement on it that reflects the long-term goals of continued forest management on the Forest.
- Encourage all woodlot owners to develop a forest management plan for sustainable forestry using best management practices and consultation with a licensed forester.
- The Gilford Timber Monitor should monitor clear cutting of forests and ensure that timber harvesting is in accordance with “Good Forestry in the Granite State” and State forestry laws.

Wetland & Vernal Pool Recommendations:

- Revise the Prime Wetland mapping and/or accept the more recent definition of Prime Wetlands by Town vote and update the GIS files in the NRI.
- Establish a minimum 100’ buffer around the entire wetland that is associated with a Prime Wetland, which includes both poorly and very poorly drained soils. Legislative initiatives threaten the existing buffer protection afforded to Prime Wetlands at the State level.
- Amend the Zoning Ordinance for the Wetland District to include a minimum buffer of 25’ or greater around all wetlands on the Official Wetlands Map and/or additional wetlands identified during delineation by certified professionals.
- Amend the Zoning Ordinance for the Wetland District to use the NHDES definition of a wetland and to require that the wetlands are delineated by a NH Certified Wetland Scientist.



- Amend the Subdivision regulations to require that wetlands be mapped by a Certified Wetland Scientist for all subdivision and site plan applications.
- Consider conducting an inventory of wetland areas in Gilford to identify those in need of restoration and use this study to apply for funding through the NHDES Aquatic Resource Mitigation Fund. ARM Fund applications should include funding requests for the purchase and/or permanent protection of upland riparian buffer zones around restoration areas with a minimum width of 100'.
- Consider implementing a Habitat Sensitive Building Site Ordinance (**Appendix G**).
- Amend subdivision or site plan regulations to require vernal pool documentation for all projects and establish a minimum 100' buffer zone around all productive vernal 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.
- Require that forest management operations maintain a minimum no-cut buffer around vernal pools to provide shade and keep it from drying up too quickly and/or to maintain water temperatures.
- Ensure that slash is kept out of vernal pools during forestry operations and development.

Surface Water Recommendations:

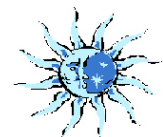
- Ensure that Riparian Buffers are protected in existing zoning ordinance to maintain water quality and wildlife habitat.
- Protect any undeveloped areas of lake and pond frontage, such as the remaining unprotected shoreline at Saltmarsh Pond.
- Consider increasing protection methods of shorelines and continue to enforce the Shoreland Water Quality Protection Act, RSA 483-B.
- Inventory and identify areas where riparian buffers can be restored along the Gunstock River and other perennial streams to protect water quality and stabilize stream channels.
- Implement a stormwater management ordinance (**Appendix F**).
- Consider implementing an Erosion and Sediment Control Ordinance (**Appendix H**).

Groundwater Recommendations:

- Enforce provisions of the Aquifer Protection Overlay District.
- Continue to implement the recommendations from the 2005 Source Water Protection Plan.
- Prohibit or restrict new potential contamination sources from locating in a wellhead protection area.
- Consider filter strips and vegetated retention areas as requirements in site plan design for all paved areas, which moderates temperature of storm water runoff.
- Establish a testing program for septic systems along shorelines of lakes, ponds and streams.
- Continue efforts to require the removal of all coal tar from Liberty Hill site. If this is not achieved, hazardous waste monitoring must be in place for residents as well as protecting Jewett Brook and the outflow to Winnepesaukee River.

Recreational Recommendations:

- Develop and maintain a connected trail network.
- Maintain and enhance the community's existing public and private recreational programs.



- 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.
- Encourage volunteer efforts.

Historical Recommendations:

- Continue to preserve and protect Gilford's historical sites.
- Promote the education of local history.
- Encourage volunteer efforts.

Wildlife Recommendations:

- Develop a long-term protection strategy for highest ranked co-occurring wildlife resources.
- Consider implementing a Habitat Sensitive Building Site Ordinance (**Appendix G**).
- Maintain the integrity of significant unfragmented parcels by encouraging development in areas where fragmentation has already occurred.
- Create buffers around wetlands and riparian areas to protect fragile areas from further development.
- Share new findings with NH Fish & Game – i.e. vernal pool locales, rare species found, etc.

Open Space/Land Conservation Recommendations:

- Implement the recommendations in **Section 10.2**.
- Work with the LRCT to protect additional islands in Lake Winnepesaukee that are unprotected and which are mostly undeveloped. There is a cluster of them that all received scores of 4 in the critical co-occurring resource analysis. These islands are thought to be important to threatened species of wildlife.
- Continue to encourage cooperation among the Town, GCC, landowners, independent land protection agencies, BRCC, and others to protect identified parcels through purchase, conservation easements, donations and other mechanisms.
- Apply for grants to assist with land protection projects, including that of the Aquatic Resource Mitigation Fund for lands called out in this document as having significance for protection. Successful projects should include the upland buffer protection of aquatic resources where the buffer is at least 100' around the aquatic resource. Those projects in unfragmented areas that create linkages between other protected parcels are highly desirable.
- Continue to promote the voluntary protection of lands via conservation easement.
- Develop monitoring strategies for lands that are already protected by the Town.
- Conservation easements must come with adequate documentation in order to keep better track of the easements.
- In order to simplify the tracking of conservation parcels, one person should be in charge of updating files of conservation lands.
- Encourage new development along already developed corridors, reducing the need for new roads and further fragmentation.

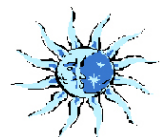


11.2 LOOKING AHEAD & WORKING TOGETHER

As a result of GALA (Gilford: A Look Ahead), a public hearing forum that took place April 2002, a natural resource committee was formed. This committee recommended conducting this NRI, and it is their hope that this Natural Resource Inventory be a valuable resource for the future. It is vital for residents of Gilford to preserve and protect the natural resources while we still can. Think twice before throwing that plastic bottle into the garbage: could it be recycled? Before covering your driveway with de-icing chemicals, keep in mind the potential damage your actions may have on the drinking water resources. By keeping the environment in mind, your actions, combined with the actions of others, could help protect our town's natural resource heritage.

“Never doubt that a small group of thoughtful citizens can change the world. Indeed, it’s the only thing that ever has.”

Margaret Mead





*“The oldest task in human history –
to live on a piece of land without spoiling it.”*

Aldo Leopold



REFERENCES

ORGANIZATIONS

Cartographics Associates, Inc.

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

Gilford Library

31 Potter Hill Road
Gilford, NH 03249
(603) 524-6042
www.gilfordlibrary.org

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

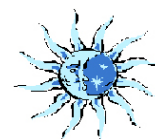
2 Hazen Drive
Concord, NH 03301
(603) 271-3421
www.wildlife.state.nh.us

NH Natural Heritage Inventory

172 Pembroke Road
PO Box 1965
Concord, NH 03302
(603) 271-3623
<http://www.nhdfi.org/natural-heritage-and-habitats/>

Town of Gilford Conservation Commission

47 Cherry Valley Road
Gilford, NH 03249
(603) 527 – 4727



<http://www.gilfordnh.org/>

NH Audubon Society

84 Silk Farm Rd.

Concord, NH 03301

(603) 224-9909

<http://www.nhaudubon.org/>

UNH Cooperative Extension: Belknap County Complex

36 County Drive

Laconia, NH 03246

(603) 527-5475

<http://extension.unh.edu/>

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Buffers for Wetlands and Surface Waters; A Guidebook for New Hampshire Municipalities.
November 1995.

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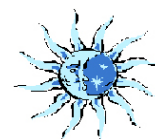
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New Hampshire Office of State Planning; <http://www.nh.gov/oep/>

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/>

