**Natural Resources Section – Tilton, NH**

**
Salmon Run Conservation Area**

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Edited By:

**Natural Resources**

**Introduction**

Tilton’s natural resources have long defined this small community in the Lakes Region. Lake Winnisquam, Silver Lake, and the Winnipesaukee River form the southern boundary of the town, and are instrumental in bringing recreational opportunities and tourism to the area. People who drive through the town are afforded views of the river, while other visitors can experience the river firsthand by kayaking, canoeing, and fishing. Forested lands comprise 55% of the community while 22% of the land is found in agricultural fields and open habitat, providing Tilton with its rural character and quality of life. Even the commercial development at Exit 20 finds itself surrounded by wetlands and wildlife corridors as well as the nearby stratified aquifer which provides drinking water to many of the residents in the community.

The Tilton Conservation Commission has, as part of its mission statement, the responsibility “to identify and establish the proper utilization and protection of the natural resources as well as the protection of watershed resources in our town.” In addition, the town adopted a wetlands ordinance which was updated in 2005 to include a wetland buffer. Working with representatives from Northfield and Belmont in 2006, the Tri-Town Aquifer Project – Protecting Shared Drinking Water Resources – has been adopted to assist the towns in safeguarding their drinking water.

Although Tilton has seen a dramatic rise in commercial development near the I-93 exit, the town continues to be a place for families to enjoy a rural location. There is still an opportunity to continue to plan wisely for a future that balances environmental protection with economic development, tourism, and an increasing population. Preserving natural assets is a key to reaching this goal.

**A. Resource Inventory**

The town of Tilton has a Natural Resources Inventory which was prepared in 2006, by Vanasse Hangen Brustlin in order to “identify important natural resources through description and mapping.” The (NRI) identifies “areas of high ecological value and … examines relationships between land use in the town of Tilton and the natural resources within the vicinity.” Such information can provide a factual basis for any land development regulations that may be enacted to protect natural areas and should be referenced by local boards and commissions.

**B. Water Resources**

 **1. Surface Water Resources**

Surface water resources include lakes, ponds, streams, rivers, and wetlands. They can provide water storage, water supply, wildlife habitat, and aquifer recharge. The town of Tilton is located within the watershed of the Merrimack River, one of five major drainage basins within the State of New Hampshire. The entire land area of the town lies within the Winnipesaukee River sub-basin, which together with the Pemigewasset River comprise the headwaters of the Merrimack. Within Tilton, there are a number of minor surface drainage basins surrounding perennial and seasonal streams that carry runoff from north to south into the Winnipesaukee River or to Lake Winnisquam and Silver Lake. The Legislative Classification of all surface waters in the Winnipesaukee watershed in Tilton is Class B. Class B waters are considered acceptable for swimming and other recreational uses, and, if appropriately treated, may be used for public water supplies.

Ground elevations range from 866 feet on Calef Hill to a low point of approximately 400 feet on the banks of the Winnipesaukee at the Franklin town line.

Lake Winnisquam, the fourth largest water body in the Lakes Region, has a surface area of 4,264 acres. It is fed by an outlet from Lake Winnipesaukee to the north, and empties into the Winnipesaukee River and then travels to the Merrimack River. The lake’s level and outflow are regulated by Lochmere Dam, located in the Lochmere channel of the Winnipesaukee River and operated by the NH Water Resources Bureau. Tilton shares the lake with four other communities. It is currently used for fishing, boating, and swimming.

Silver Lake in the Lochmere section of Tilton is about 216 acres and is described by the NH Department of Environmental Services as “ a classic example of a ‘pond in a river’ as it is a rather wide expanse of water that is actually the Winnipesaukee River.” The level of the lake is regulated by the hydraulic rating of the natural river channel about 1.5 miles downstream. This lake therefore is subject to considerable variation in surface elevation with changes in riverflow. Typical surface levels range between 464 and 467 feet with occasional peaks in excess of 468 feet and lows of approximately 463 feet. Flooding occurs when periods of heavy runoff coincide with increased discharges from Lochmere Dam. Low flow occurs when discharges from the Lochmere Dam are decreased to maintain the level of the lake. It is managed for lake trout and landlocked salmon.

A smaller pond with some historical significance is Ice House Pond which is located close to Exit 20. This water body currently has a conservation restriction placed on it. The Tilton School also has a small pond near School Street. Both Ice House Pond and the Tilton School Pond are a source habitat for wildlife and provide recreation.

The Winnipesaukee River includes both the Lochmere channel, a narrow 0.6 mile reach of the river connecting Winnisquam and Silver Lakes, and approximately 5 miles of river from the Silver Lake outflow to the Franklin/Tilton line. In Lochmere, prior to impoundment, the Winnipesaukee flows dramatically over an extensive reach of rapids, reflecting the 15-foot fall in elevation between the outlet of Lake Winnisquam and the head of Silver Lake. Currently, the Lochmere Dam impoundment fills a large part of the channel and rapids are only visible below the dam.

Downstream of Silver Lake, the river passes through “the Plains”, a flat gradient natural storage reach about two miles in length. From the Route 140 bridge to the Franklin line, the river flows through a winding channel with alternating sections of flatwater and rapids. Through cooperative efforts with abutting towns, a recreational trail follows these waterways for use by the public. The section which flows through downtown Tilton is impounded by the Clement Dam, a hydroelectric dam, located on the west side of the village. From the outflow of Silver Lake to Route 140, the river’s normal elevation falls slightly, from 464 to 454 feet above mean sea level. From Route 140 to the Franklin line, the elevation drops from 454 to about 390 feet above mean sea level.

New Hampshire’s Shoreland Water Quality Protection Act, originally enacted in 1991, and later revised and renamed in 2011, “establishes minimum standards for the subdivision, use, and development of shorelands adjacent to the state’s public water bodies.” The law includes standards for structures, buffers, setbacks, impervious surface limitations, and a permitting process for activities within the shoreland.

Over ninety per cent of water pollution problems in New Hampshire are the result of stormwater runoff from impervious sources. Such runoff can contain pollutants such as fertilizer, oils, trash, and dirt/sediment which will negatively impact lakes, ponds, and rivers. While some existing state and federal regulations address polluted stormwater from large industrial and commercial properties, towns need to look at the impact of stormwater runoff from private homes and businesses in the area.

**2. Groundwater Resources**

Groundwater is a critical natural resource which is used for public drinking water. A stratified aquifer is defined as a layer of water sandwich between layers of rock and sediment. Based on data from the U.S. Geological Survey NH/VT office, there are four stratified aquifers in Tilton identified as high, medium, and low yield, all of which have the potential to serve as a source of municipal water supply. The largest of these stratified aquifers, classified as high-yield, lies just to the east of I-93 along Gulf Brook, broadening to include almost the entire shoreline of Silver Lake. These aquifers are part of a stratified drift aquifer which lies beneath the towns of Northfield and Belmont to the south and serve as a primary drinking water source (29%) for all three towns. In Tilton there is a large area zoned commercial and industrial located directly above the aquifer (the direct recharge area) which follows the major roadways and comprises 29.2 % of the recharge area. The Rural Agricultural District has the highest percentage of aquifer area in a single district at 30.2%.

In 2006, a collaboration between the three communities - with the assistance of the Lakes Region Planning Commission - resulted in a handbook, “Protecting Shared Drinking Water Resources - Best Management Practices”, that is designed for community officials, developers, business owners, other professionals, and homeowners. Other goals of the project include facilitating the exchange of information and ideas across town boundaries and exploring collaborative initiatives to protect shared water resources.

In both the Tri-Town Aquifer project report and the Tilton NRI, concern is expressed that there has already been extensive exposure to harmful contaminants in this sensitive area, and there is a question whether more threats may occur in the future. Of primary concern is the location of many of the major roads in the three towns which are situated directly over the aquifer recharge area. Primary traffic ways exist adjacent to and over the aquifer increasing the threat to this drinking water source. Land use activities which take place in the recharge area have the potential to directly impact groundwater quality and quantity.

Careful planning will be necessary to balance the needs of Tilton together with the varied needs of Northfield and Belmont for growth and economic development against the long-term protection of the aquifer. Once groundwater becomes contaminated, it is very costly to clean, and if recharge is inadequate, quantity can diminish over time.

A review of Tilton’s Zoning, Site Plan review, and Sub-division regulations all provide positive indications that Tilton acknowledges the importance of keeping groundwater free from pollution although no specifics are provided for making this determination. While provisions are found throughout the regulations that collectively mitigate the potential for stratified drift aquifer contamination, a comprehensive aquifer protection district, incorporating the Aquifer Map and more specific regulations would provide a reference for future zoning and development plans as well as the processing of residential, commercial, and industrial permits.

 **3. Wetlands**

The federal definition of wetlands states, in part, that they are areas “inundated or saturated by surface or groundwater at a frequency and duration sufficient to support… a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” Wetlands are valued for their ability to help in maintaining the quality of surface waters and groundwater through the filtering of surface runoff, the provision of wildlife habitat, flood control, erosion and sedimentation control, and aquifer recharge. Because of the importance of wetlands, they are regulated at all levels of government.

Satellite mapping has revealed wetland systems along surface water courses including Hunt, Gulf, Packer, and Bamford Brooks. Some wetlands lie adjacent to Lake Winnisquam, Silver Lake, and the Winnipesaukee River. There are also some various isolated upland wetlands which all together provide complex wildlife habitats. The Natural Resources Inventory which was prepared by Vanesse Hagen Brustlin, Inc. also includes wetland data. \*\*\*See Map

Tilton has adopted a Wetlands Conservation District as part of its Zoning Ordinance. The ordinance was updated in 2005, and now provides for a wetland buffer and restricts uses in and around wetlands. Special Use permits may be granted by the Planning Board in order to get relief from these restrictions. In order to protect our wetlands these permits should be issued after due diligence and under extreme circumstances.

 **4. Floodplains**

Floodplains are those lands adjacent to surface waters that are periodically subjected to inundation by those surface waters at intervals coinciding with precipitation, spring runoff, and freshets. Undeveloped floodplains store and absorb floodwaters. As development encroaches on the floodplain with structures and pavement, runoff is increased and storage and absorptive capacity is lost, and flood waters can spread to other lands and homes that were not previously inundated.

One-hundred-year floodplains were mapped for communities which were then required to adopt regulations as a prerequisite to qualifying for flood insurance. A one-hundred-year floodplain is the area that would be inundated by a storm that would theoretically occur once in a hundred years, or has a one percent chance of occurring in any given year. Tilton has experienced flooding from severe storms over the past five years.

Tilton has adopted floodplain development regulations as part of its zoning ordinance, pursuant to the requirements of the National Flood Insurance Program, which is administered by the Federal Emergency Management Agency (FEMA).

**C. Agricultural Land and Soils**

Approximately 22% of Tilton’s land area consists of agricultural fields and other open habitat. Agricultural soils are an important natural resource which is both highly productive and limited in quantity. Farmland soils are identified by The Natural Resources Conservation Service (NRCS) with degree of importance as prime, statewide, and local. The Natural Resources Inventory lists soil types found in Tilton as fitting all three designations. Prime farmland has the best combination of physical and chemical characteristics for agriculture. Farmland of statewide or local importance is utilized for the production of food, feed, fiber, forage, or oilseed crops.

Since areas with good agricultural soil are often cleared and accessible, they are also easily developed. Once lost, farmland cannot be replaced.

**D. Forested Lands**

The Tilton Natural Resources Inventory states that 55% of the town (4,192 acres) is forested, with mostly mixed forest but with a considerable amount of coniferous forest. Besides adding to the rural aesthetics of the community, these forested lands serve as a critical habitat for wildlife as well as buffers between differing developed areas. Equally important, they provide open space for recreation and outdoor activities. Forests are an important part of renewable resources. It is important to manage these natural resources in a way that will benefit the entire community and as well as using best management practices as prescribed the publications “Guide to New Hampshire Timber Harvesting Laws” and “Good Forestry in the Granite State”, both prepared by UNH Cooperative Extension.

**E. Fish and Wildlife Resources**

The Winnipesaukee River and its tributaries are significantly important to the fish and wildlife resources. The waterways serve as home to a myriad of wildlife and a source of year-round recreation. Shallow, undeveloped areas along the shoreline provide excellent food and cover for fisheries, waterfowl, and numerous species of both large and small animals. New Hampshire Fish and Game, as part of its Wildlife Action Plan, states that shorelines in Tilton fall into the category of highest ranked habitat in New Hampshire. Other areas in town received the highest ranked habitat in the biological region for terrestrial and wetland habitats. (<http://www.wildnh.com/Wildlife/Wildlife_Plan/WAP_town_maps.html>)

A 2006 study by NH DES and NH Fish and Game refers to Silver Lake as having “an abundant warmwater fish population” as well as being a “major migration route for eels”. The NH Natural Heritage Bureau lists rare and endangered species that have been found in Tilton. The bald eagle and osprey have been reported in the Silver Lake and Lochmere areas.

<http://des.nh.gov/organization/divisions/water/wmb/exoticspecies/documents/silver_lake_tilton.pdf>

The Natural Resources Inventory prepared by Vanasse Hagen Brustlin references a “healthy fish community, including trout” in the Buffalo Park Conservation area, which consists of fifty-five acres of forested habitat. Described as a “diverse habitat”, the conservation easement on Buffalo Park allows hunting in the park. The NRI also references surface waters, state routes, and town roads which provide important edge habitats and hunting corridors for many birds of prey and bats.

**F. Steep Slopes**

There are a number of concerns associated with development on steep slopes, hillsides, and ridgelines. Health, safety, and environmental issues arise when planning development on steep slopes, as is the possible adverse effect on water quality as a result of increased erosion and sedimentation.

As slopes increase, the suitability of the land for development decreases. In areas of steep slopes, the velocity of runoff and, therefore, the erosion potential, increases. The ability of the soil to filter septic system leachate is decreased. Overcoming site constraints becomes increasingly costly. Generally slopes ranging between 8 and 15 percent are considered to have moderate capacity for development. Slopes of 15 to 25 percent present significant constraints, but may support low-density residential uses with proper controls. Slopes exceeding 25 percent slope are considered unbuildable. Road construction and maintenance is a problem in these slopes as is the siting of on-site disposal systems. Erosion is always a concern as is snow removal. Accessibility for fire apparatus and emergency equipment is a substantial problem. With the availability of other, more readily developable, land in Tilton, steep slopes should be more carefully evaluated and considered in planning decisions.

**G. Open Spaces**

The preservation of open space is important not only for the enjoyment of the general public but, more importantly, for the protection of our environment and the prevention of pollution. Open spaces may be in the form of wooded forestland, protected shorelines, manicured and un-manicured fields, courts, and parks. Whatever the form, open spaces are an essential element in creating and maintaining a healthy environment for humans, wildlife, drinking water resources, and natural food supplies needed to sustain all life.

Aesthetics and scenic views are often a bonus of open space and provide the community with a sense of character, an improved quality of life, recreational opportunities, as well as an economic boost. It is important, therefore, that open space be given special consideration in any land use planning or approval process.

Tilton has acquired the 55-acre Buffalo Park and has added Riverfront Park next to the Winnipesaukee River to its list of open space parks and properties. The Winnipesaukee River Trail Association in conjunction with the town has developed a walking trail from Route 140 almost to downtown Tilton. It is hoped that the trail will eventually cross the river to connect with Northfield’s portion of the trail.

Between 2009 and 2016, the Tilton Conservation Commission worked collaboratively with town and state officials as well as the Winnipesaukee River Trail Association to purchase and rehabilitate two parcels of degraded land along the Winnipesaukee River. Grants from the State of New Hampshire as well as the Environmental Protection Agency helped turn a blighted area into the Salmon Run Conservation Area.

During 2017, the Tilton Conservation Commission and the Board of Selectmen worked together to respond to the request of citizens to utilize a parcel of town property as a protected wildlife corridor going from the west side of School Street toward Buffalo Park. The Dodge-Wakefield Wildlife Corridor was part of a 2018 warrant article approved at Town meeting.

Currently, there are fifteen easements held by the town of Tilton on properties for open space, agriculture preservation, and recreation. See Table D.

Another open space opportunity is the need for public access to the public waters of the town. Water frontage is a physical and visual link to the resources which give the region its identity. However, Tilton still does not have a public beach for its residents even though the town lies in the Lakes Region and other nearby communities do have town beaches. Tilton also could benefit from one or more canoe and boat launch areas.

According to the Natural Resources Inventory prepared for the town, Tilton has only about 235 acres of public conserved lands or about 3% of the town’s area. This is a rather small percentage in comparison to the state average of about 23%. The Natural Resources Inventory concludes that ““…in future planning, the Town’s high potential for habitat management and protection should be considered.”

Regulatory techniques, such as zoning, sub-division regulations, and site plan review regulations are some means for protecting natural resources when the purpose is to avoid environmental hazards. The main purpose of these regulations is the prevention of a public harm such as water pollution, flood damage, erosion, siltation.

**Summary Recommendations:**

**Surface Water Resources:**

1. Manage invasive species (milfoil) actively
2. Road Salt identify non-point source pollutants
3. Stormwater and Runoff issues need to be addressed at the local level

\*\*\*\*A list of significant surface water sources and impoundments is included in Table B at the end of this document.

**Ground Water Resources:**

1. Continue and improve the monitoring of all aquifers
2. Try to limit further development within and adjacent to all aquifers
3. Explore any potential contamination of ground waters
4. Work on defined collaborative initiatives with the other towns

**Wetlands:**

1. Maintain and protect identified wetlands
2. Educate the town’s boards, commissions and public on the importance of wetlands and their natural purpose/function
3. Request the town consistently enforce the local wetlands ordinance

**Floodplains:**

1. Undeveloped floodplains need to be protected.

**Agricultural Land and Soils:**

1. Support ordinances that sustain farm land and open habitat.
2. Encourage maintenance of “prime farmland” and discourage the subdivision and development of those lands.
3. Establish an “Agricultural Commission”

**Forested Lands:**

1. Good Forestry in the Granite State
To access this publication, go to this link: <http://extension.unh.edu/goodforestry/assets/docs/GoodForestry2010FINALreducedsizeSECURE.pdf>
2. Utilize existing forested parcels to act as a buffer between developed parcels to maintain and preserve wildlife corridors.

**Fish and Wildlife Resources:**

1. Work to reduce the existence of invasive species (milfoil etc.)
2. Continue to foster the habitat for rare and endangered species.

**Steep Slopes:**

1. Create and pass an ordinance to protect steep slopes from development.
2. Develop a steep slopes overlay map for the town.

**Open Spaces:**

1. Educate land owners of the importance of open space and maintaining the rural character of the community
2. Continue to acquire land and easements to preserve open space

**Table A: Natural Resources Inventory**

**A copy of the NRI prepared by VHB can be found at** [**http://www.tiltonnh.org/content/nat-res/NRI\_Complete\_All\_Parts.pdf**](http://www.tiltonnh.org/content/nat-res/NRI_Complete_All_Parts.pdf)

**Table B: Description of Significant Surface Water Sources and Impoundments.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **General location** | **Confluence** | **Comments** |
| Lake Winnisquam  | East Tilton | Winnipesaukee River | Total area: 4,264 acresLevel & outflow is regulated by the Lochmere Dam. Normal elevation: 482 feet.Shared by Sanbornton, Belmont, Laconia & Meredith. |
| Silver Lake | Belmont / Tilton Town line south of Lochmere Dam | Winnipesaukee River | Total area: 177 acres Level is regulated by natural downstream river hydraulic action. Subject to flooding based on Lochmere Dam discharges & heavy runoff events.Normal elevation: 464-467 feet. Shared by Tilton & Belmont.  |
| Winnipesaukee River | Southern border of Tilton | Merrimack River | Distance: 5.6 miles to Franklin town line. Shared by Belmont and Northfield.Impoundments: Lochmere Dam between Winnisquam & Silver Lakes and Clement Dam on west side of Tilton Village.Normal elevation: 464 to 390 feet, a drop of 60 feet origin to Franklin. |
| Ice House Pond | Laconia Road west of I-93 |  | Under 20 acresHistoric connection |
| Bamford Brook | Lancaster Hill to Silver Lake | Silver Lake | Start elevation: 800 feetDistance: 2 milesImpoundments: None |
| Danforth Brook Town Line | Sanbornton town line | Winnipesaukee River | Start elevation: 700 feetDistance: 1 mile, approximately. |
| Gulf Brook | East of I93 to Exit 20 | Winnipesaukee River East of Route 140 | Start elevation: 700 feetDistance: 2.25 milesImpoundments: Three earthen ponds north of Rt. 3 / 11. |
| Hunt Brook | School St. to down town west of I93 | Gulf Brook (East of I-93) | Descent: 160 feetDistance: 1.5 milesImpoundments: two, both inactive, on Sanbornton town line. |
| Packer Brook | Calef Hill to down town | Winnipesaukee River | Start elevation: 800 ft.Ending elevation: 440 ft. Termination point: west of Park Street Bridge.Distance: 2.25 miles Impoundment: behind NH Veterans Home. |
| Wadleigh Brook (a.k.a. Chapman Brook) | Tilton / Sanbornton town line | Lake Winnisquam @ Jay’s Marina | No data available |

Note: All elevations are above mean sea level.

**Table C: Town of Tilton Wetlands Ordinance**[**http://www.tiltonnh.org/content/ords-regs/o-wetland-2005.html**](http://www.tiltonnh.org/content/ords-regs/o-wetland-2005.html)

**Table D: Conservation Easements held by the Town of Tilton:**[**http://www.tiltoncc.org/easements.htm**](http://www.tiltoncc.org/easements.htm)

**1. Buffalo Park – 55 acres - public access with some restrictions
2. Lochmere Golf and Country Club – winter access only with some
 restrictions
3. Country Lakes Estates – 35.34 acres - no public use
4. Salmon Run – 1.74 acres -conservation and recreational use with
 some restrictions
5. Wal-Mart Ice House Pond – 5.182 - no public use
6. Market Basket Conservation Easement – 8.746 acres no public use
7. Miller-Stock – 39.07 - no public access
8. Nickerson – 19 acres – wetlands and conservation land
9. Rogers Development – 13.047 – no public access
10. Tanger Outlet Mall – 23.931 – wetlands mitigation
11. Home Depot – 18.31 acres – some restrictions
12. Wal-Mart detention pond – no public access
13. Winnisquam Regional School District – 11.6 acres – recreational
 and athletic use by school district
14. Welch Agricultural Preservation Restriction – 7.7 acres
15. Dodge- Wakefield Wildlife Corridor – 2.9 acres**