

# NATURAL FEATURES

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Loudon is still considered a rural community by many residents. While growth has certainly slowed since the 1980's, it's important to note that Loudon's population has had the second largest overall increase in population from 2000-2016, behind Concord. (See Chapter 1, Loudon Today for more detail.) The Town issued 118 residential building permits from 2012-2016, second only to Concord in the Central NH Region, which issued 307 permits during the same period. While the Town's population continues to grow at a slightly higher pace than Merrimack County and the state, it is the aging population trend that it shares with the rest of the Region and the state that is of particular note. The median age has increased nearly 14% from 2000-2010, with its median age .6 years older than the state's 41.3 years. Loudon's proximity to Concord, the seacoast and the mountains, along with its rural character, continue to make it a desirable place to live and work. Large tracts of land that have been in single-family ownership for decades are becoming increasingly harder to hold on to due to escalating land values; often, only developers can afford these large parcels due to the quick economic return of the development. In addition, the economic pressures facing agriculture have made it necessary and lucrative for farms to be sold for residential development.

On a positive note, the residents of Loudon have voiced their opinion about the future of their Town, overwhelmingly stating that they wish to see Loudon keep its rural character, retaining the agricultural and open space land uses. The residents of Loudon have a great deal of respect for the land and an interest in conserving the community's current mix of development and rural land uses.

The data presented in this Chapter was collected from a number of sources including local, county, regional, state and federal agencies, local residents, existing reports, maps and aerial photographs.

The physical limitations of the land, the Town's location in the Central NH Region, its traditional ownership patterns, and the concern and commitment of the residents place Loudon in a unique situation for conserving its valued resources and preserving the rural character of the Town. Large parcels of forest, farmlands, and wetlands still exist and much of the shoreline of the Soucook River remains undeveloped. The extensive network of streams and small ponds and the mixture of forest and fields provide wildlife habitats for a great diversity of plant and animal species. From the top of Oak Hill to the river valley of the Soucook River, from forested wetlands like Hunting Swamp to the farmlands on the Ridge, and from the natural landscape to the developed areas, the Town provides a multitude of scenic and recreational opportunities.

## VISION STATEMENT

To promote good stewardship of our natural resources, continuing to work towards preserving Loudon's high quality of life and rural character by working to support open space, agriculture, wildlife, recreation and clean water.

Change, however, is inevitable. Therefore, it is important that the Town recognizes and protects its outstanding natural, historic, agricultural and scenic resources. As prime development lands become more limited and technology changes, it is becoming more feasible to develop marginal lands. The impact of an aging population will also impact housing patterns and transportation needs as concerns with access to services close by becomes an important aspect in rural living.

Based upon the Community Survey results, the Conservation Commission proceeded to develop measurable recommendations that can be found at the end of this Chapter. The objectives and recommendations established for the Chapter can be used to develop a workable plan of action to protect these resources.

#### **ACCOMPLISHMENTS SINCE LAST MASTER PLAN**

Much work has been done by the Conservation Commission, residents, and local officials to protect the natural features of the community while making opportunities for the public to explore and enjoy new conservation lands. While many programs and activities are ongoing with no set completion date, several of the recommendations identified by the Master Plan nearly 15 years ago have been fulfilled.

The following recommendations from the 2001 Master Plan, Natural Features Chapter, have been completed:

- ✓ Established a funding base for land protection, including the land use change tax fund and a capital reserve fund.
- ✓ Protected the shorelines of streams and ponds.

- ✓ Increased protection for wetlands by revising the Land Development Regulations to clarify the ZBA special exception wetlands impact process.
- ✓ Included a minimum 50-foot setback of structures and a natural woodland buffer of 150 feet from open waterbodies, watercourses, and wetlands (as delineated by the Wetland Conservation District) to protect sensitive shoreline areas from erosion caused by increased velocity and volume of runoff from developed areas.
- ✓ Amended the zoning ordinance to prevent development on steep slopes greater than 25%, as well as eliminating steep slopes as part of the buildable lot area when calculating minimum lot size to prevent loss of vegetation, increased erosion and sedimentation.
- ✓ Required plans to be stamped by a qualified professional certified by the State of New Hampshire who is capable of preparing site-specific information, (i.e. Licensed Land Surveyor, Soils Scientist, Wetlands Scientist, and permitted Septic Designer).
- ✓ Required the detail of a site specific soil map (SSSMS) where intense development is proposed.
- ✓ Amended the site plan review regulations to include penalties for violation of the approved erosion and sediment control plan as required in the subdivision regulations to encourage developers to properly install and maintain the erosion control devices.

- ✓ Developed a table of dimensional controls to be included as part of the Zoning Ordinance. The table would outline the requirements of each zoning district in a clear and concise tabular form. The table could serve as a quick reference to the Planning Board, the Conservation Commission, landowners, developers and other interested persons.
- ✓ Involved the Conservation Commission in the site plan review process for proposed developments that may encroach upon important natural resources in the Town of Loudon.
- ✓ Continued the Conservation Commission’s practice to review and comment on Wetlands Board dredge and fill applications in the Town and report the findings of these reviews at the Planning Board meeting.
- ✓ Encouraged the use of open space development as a mechanism for protecting sensitive areas of a development and providing open space, with strict regulations imposed to prevent misuse and misinterpretation of this measure.

## CHAPTER OBJECTIVES

### OBJECTIVE 1

To preserve the scenic character of the Town of Loudon by protecting its natural, historic, scenic, and agricultural resources.

### OBJECTIVE 2

To promote the conservation, protection, and sound management of the Town’s natural resources including water, forests, habitats and open space.

### OBJECTIVE 3

To provide recreational opportunities for all ages and user groups.

### OBJECTIVE 4

To educate the citizens and local officials in Loudon on the importance of protecting the Town’s natural resources and open space.

### OBJECTIVE 5

To respond to new techniques or initiatives, as appropriate, that will enhance the protection of natural resources important to Loudon.

### OBJECTIVE 6

Continue to ensure local compliance with federal and state regulations, including gravel excavation.

### OBJECTIVE 7

To seek opportunities to involve Town boards, and public, private, and state organizations in the protection of Loudon’s resources.

## COMMUNITY SURVEY RESULTS

In preparation for the master plan update, a community survey was available for residents to provide input. Like many communities in the Central NH Region, Loudon has a long history of residents with strong ties and commitment to their community. Completed in 2012, the survey demonstrated residents' appreciation of conserved land and recreation and the importance of protecting Loudon's natural resources. Responders expressed an interest in increased access and information on existing access to the Soucook River, stating that lack of access is one of the main reasons they don't use the River's resources.

**Community Survey Question 27:** Do you feel the Soucook River is important to the character of Loudon?

Q. 27	Total	Percentage
Yes	275	80.2%
No	15	4.4%
No opinion	53	15.5%
Total	343	100.0%

**Community Survey Question 28:** Do you feel the Town should invest in the development and improvement of access points to the Soucook River?

Q. 28	Total	Percentage
Yes	176	53.5%
No	63	19.1%
No opinion	90	27.4%
Total	329	100.0%

**Community Survey Question 29:** Do you support the restoration of the Mill Pond in the Village as part of additional bridge abutment/dam repair efforts in the next few years? Doing so will provide increased recreational opportunities along the Soucook River and improve the general appearance of the area.

Q. 29	Total	Percentage
Yes	244	73.3%
No	42	12.6%
No opinion	47	14.1%
Total	333	100.0%

**Community Survey Question 30:** A greenway is a linear open space established along a natural corridor, usually designed to accommodate both wildlife and low-impact human recreational uses. A greenway can serve as a linkage between existing natural and historic sites. Are you in favor of creating a greenway along the Soucook River?

Q. 30	Total	Percentage
Yes	227	68.4%
No	44	13.3%
No opinion	61	18.4%
Total	332	100.0%

**Community Survey Question 31:** Do you support the continued use of 50% of the Land Use Change tax for conservation purposes? The funding has been used for appraisals that have led to the acquisition of three parcels of land for conservation purposes in town since 2005.

Q. 31	Total	Percentage
Yes	222	67.5%
No	45	13.7%
No opinion	62	18.8%
Total	329	100.0%

**Community Survey Question 24 & 25:** Do you use the Soucook River for any of the following activities? If so how often?

Q. 24 & 25	Yes	No	Weekly	Monthly	Yearly
Natural Observation	42.3%	57.7%	39.8%	35.2%	25.0%
Fishing	39.5%	60.5%	13.8%	40.5%	45.7%
Hiking	29.7%	70.3%	23.9%	42.0%	34.1%
Canoeing/Kayaking/Boating	29.4%	70.6%	10.0%	35.0%	55.0%
Birding	20.8%	79.2%	36.2%	32.8%	31.0%
Swimming	19.5%	80.5%	13.7%	27.5%	58.8%
Total Responses by Category	322		181		

## WATER RESOURCES

The **Water Resources Map** depicts the water resources as noted in this section, including hydric soil locations, floodplains, aquifer transmissivity, dams, registered public water supplies and underground storage tanks.

### WATERSHEDS

Within New Hampshire, there are five major watersheds. Loudon and the rest of the Central New Hampshire Region is within the large Merrimack River watershed which stretches from the White Mountains down to Newburyport Massachusetts, and comprises an estimated 40% of the state.

A watershed is an area where all of the water that is under that area or drains off of the area goes into the same place.<sup>1</sup> This includes precipitation, surface water, groundwater, wastewater discharges, and non-point source pollution from natural and urban areas. Water bodies within a watershed can include streams, rivers, ponds, and lakes.

Loudon is part of two other major watersheds, the Soucook River Watershed and the Suncook River Watershed. More than 75% of the Town’s area is drained into the Soucook River, either directly or through a series of tributaries. The Suncook River watershed drains the far eastern part of Loudon.

### PONDS

Used by residents and tourists, ponds provide scenic beauty and recreation resources, such as boating, fishing, and beach access. Maintaining the health of Loudon’s ponds is critical for future

<sup>1</sup> Definition provided on EPA’s [website](#).

residents and visitors, to allow future generations to continue to use of these resources. Monitoring programs, such as the Department of Environmental Services’ (DES) Volunteer Lake Assessment Program (VLAP) and The New Hampshire Lake Association’s Lake Host Program, monitor water quality levels and protect against invasive weed species.

Table 7.1 summarizes the ponds found in Loudon. Though not the largest in size, Clough Pond is highly used by residents from all over New Hampshire, as it is popular for freshwater fishing. The Pond participates in the VLAP and Lake Host Program, which was instrumental in containment of variable milfoil into the Pond in 2005.

**RIVERS**

With headwaters from Gilmanton, the Soucook River begins with the convergence of several brooks in northwestern Loudon, near the border of Canterbury. Flowing in the southeasterly direction through Loudon, the river grows in size as it joins several more streams before converging into the Merrimack River on the outskirts of Concord. Water quality was tested throughout the length of the river through the New Hampshire Volunteer River Assessment Program operated by the DES. Volunteers collected data including turbidity, pH, and dissolved oxygen levels that was analyzed and summarized by DES in a Water Quality Reports. Two reports were published for the Soucook River in 1998 and 2003.

**BROOKS**

A brook is a small stream, of which there are many located in Loudon. Brooks feed larger water bodies and often contain impoundments. The majority of brooks in Loudon only flow short distances before converging into the Soucook River. These brooks include Academy Brook, Bumfagon Brook, Clarke Brook, Pine Island

WHAT IS THE VOLUNTEER LAKE ASSESSMENT PROGRAM & LAKE HOST PROGRAM?

The Volunteer Lake Assessment (VLAP) Program consists of volunteers who assist the Department of Environmental Services (DES) by taking water samples from over 800 public lakes statewide to monitor lake water quality and lake health. Clough Pond participates in this program and the most recent 2017 information can be found on [DES’s website](#).

The Lake Host Program is administered the New Hampshire Lakes Association and works to prevent the spread of variable milfoil through boaters by educating and performing inspections of boats and trailers at various public launch locations across the state. Clough Pond participates in the Lake Host Program and has had one ‘save’ of variable milfoil in 2005.

Table 7.1: Loudon’s Ponds

Pond Name	Location	Size	Notes
Clough Pond	West	45 acres	VLAP and Lake Host Program participant.
Crooked Pond	South-east	29 acres	
Holt pond	East-central	43 acres	
Hot Hole Pond	South	27 acres	Shared with Concord.
Rocky Pond	North-west	78 acres	Majority located in Gilmanton and Canterbury.
Sanborn Pond	North-east	104 acres	

Sources: Loudon Master Plan 2001

Brook, Bee Hole Brook, Giddis Brook, Gues Meadow Brook, Shaker Brook, and Kimball Brook.

### AQUIFERS

An aquifer is defined as a subsurface area that is water bearing. Depending on the amount and size of voids present in the layers of soil and gravel found under the ground surface depicts how much groundwater is able to pass through. The two main types of aquifers, bedrock and stratified drift, vary in composition and the amount of water accessible. Stratified drift aquifers are typically used for public water supplies in New Hampshire, including industrial, commercial, and domestic uses.

One of the largest in New Hampshire, a large coarse-grained stratified drift aquifer, exists along the Soucook River corridor in Loudon. This aquifer stretches from Rocky Pond at the junction of the Gilmanton, Loudon, and Canterbury border and travels south through Loudon before running between Concord and Pembroke. Transmissivity is a measure of how quickly water travels, measured in feet squared per day. In Loudon, there are large areas of aquifer transmissivity of over 3,000 feet squared per day, clustered on the east side Route 106 and around the Soucook River corridor. The **Water Resources Map** shows the locations of the transmissivity of the aquifer and other water resources.

### WETLANDS

Wetlands can be defined by three characteristics: standing water at or near the ground surface during some portion of growing season; soils with characteristics that show they are saturated for some time; and plants adapted to growing in saturated soils. Wetlands are

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<sup>2</sup> Classification of Wetlands and Deepwater Habitats of the United States. USGS Website, Northern Prairie Wildlife Research Center.

extremely valuable to Loudon’s ecosystem and human population as they provide flood control, natural water filtration, water storage and water recharge, wildlife habitat and aquatic nurseries, and economic increase to property value.

Loudon contains over 2,580 acres in wetlands, which are broken into two different wetland types. Palustrine wetlands are forested areas less than two meters (6.6 feet) in water depth and salinity less than 0.5%. These wetlands are typically referred to as marsh, swamp, or bog and are the majority of the wetlands in Loudon with over 90%.

The second wetland type, lacustrine wetlands, encompass only 9.6% of Loudon’s wetlands. This type is less wooded and has a deep water habitat of over two meters deep. Lacustrine wetlands include flooded lakes and can experience considerable wave action.<sup>2</sup> The location of these wetlands can be seen on the **Water Resources Map**.

**Table 7.2: Wetland Acreages by Type**

Type of Wetland	Acreage
Palustrine	2,332.3
Lacustrine	249.5
Riverine	0.0
Total	2,581.8

Sources: National Wetlands Inventory GIS Database

Loudon’s acreage of wetlands is found through many small and medium sized wetlands throughout Town. One large area, Hoit Road Marsh, is located in the southwestern corner of Loudon between Route 106 and Old Shaker Road. Another large wetland

can be found east of Route 129 in the central area of town. Several medium sized wetlands can be found in the northeastern corner of Loudon, many of which are located on conservation lands.

Wetlands are regulated primarily at the state level by the DES Wetlands Bureau. While permitting is required by the state for construction within a predetermined distance from a wetland, Loudon also has a local ordinance to protect wetlands. Similar to surrounding communities, Loudon’s wetland ordinance requires a 75 foot setback from wetlands larger than 2,000 square feet. Smaller wetlands are applicable if determined to be of exceptional functional value by a certified New Hampshire soil scientist. As wetlands and the surrounding watershed often cover multiple communities, local coordination is critical to not only protect each individual wetland but the entire watershed.

**SWAMPS**

A swamp is a wetland often partially or intermittently covered with water, often dominated by woody vegetation, such as trees and bushes. Similar to marshes, swamps are typically found near rivers and lakes and contain very slow draining soils. There are many different classes of swamps, classified by the type of trees present in the swamp.

Two swamps located within Loudon worth noting include The Hunting Swamp and the Bumfagon Swamp. The Hunting Swamp is located in the tracts of land between Old Shaker, Lovejoy, Flagg, and Lesmerises Roads and has been attracting humans and animals alike for years. The Bumfagon Swamp is located off of Young’s Hill Road and also provides significant wildlife habitat.

**Table 7.3: Wetland Ordinances of Loudon and Abutting Communities**

Municipality	Ordinance Title	Wetlands Buffer Details
Loudon	Article III Overlay Districts – Wetlands Conservation District	75 foot buffer for wetlands ≥ 2,000 square feet or if smaller wetlands determined to be of exceptional functional value by certified NH soil scientist. First 25 feet of upland is to be left undisturbed and remaining 50 feet may be selectively cut with no more than 50% of the basal area is removed.
Chichester	Section 3.16 Wetlands and Wetland Buffer	100 foot buffer from second and higher order streams or ponds; 50 feet from wetlands ≥ 0.25 acre; 25 feet from wetlands < 0.25 acre.
Concord	Development Design Standards	50 foot buffer for wetlands > 3,000 square feet; 250 foot buffer for public waters and great ponds; 75 foot buffer all other non-public waters.
Pembroke	143.72 Wetlands Protection Overlay District	Buffer ranges from 20-50 feet depending on structure; no septic within 75 feet.
Canterbury	No separate ordinance	
Gilmanton	No separate ordinance	
Pittsfield	No separate ordinance	

*Source: Municipal Regulations Review by CNHRPC*



## DAMS

Dams provide a vast array of benefits, which includes their role in sustaining many lakes which provide recreation opportunities for locals and tourists, emergency water supply storage, and stormwater detention.

In New Hampshire, dams are placed into four categories, all based on potential damage downstream if failure of the dam occurs. High hazard dams, of which Loudon has two, are those that if failed would inundate home and other structures downstream and likely cause loss of life. Significant hazard dams, which Loudon has none, are those that would cause major property damage downstream if failed. Low hazard dams are identified based on failure that would cause minor property damage downstream, and non-menacing structures are those that cause no threat to life or property if failed. There are three low hazards and nine non-menacing dams within Loudon.

Dam failure and deficiencies typically occur as a result of general aging and inadequate maintenance, including overtopping, structural failure, and cracking. Dam maintenance and repair is the responsibility of the owner, who often has little knowledge of the condition and inadequate funding for proper repair.

During the realignment of Route 106, Mill Pond experienced siltation and degradation of its water quality. Many residents (as evidenced by the Community Survey results) would like to see Mill Pond restored. Funding is needed in order to carry out its dredging as part of the dam repair effort that will be necessary in the next few years.

Dams located in Loudon can be seen in Table 7.4.

**Table 7.4: Dams Located in Loudon**

Hazard Class	Status	Dam Name	River/Brook	Use
High	Active	Sanborn Pond Grist Mill Dam	Sanborn Brook	Mill
High	Active	Sanborn Sawmill Dam	Sanborn Brook	Mill
Low	Active	Obrien Recreation Dam	Pine Island Brook	Recreation
Low	Active	Holt Meadow Pond Dan	Clark Brook	Recreation
Low	Active	Country Club 12 <sup>th</sup> Hold Pond	N/A	Fire protection
Non-menacing	Active	Clough Pond Dam	Clough Pond Outlet	Conservation /agriculture
Non-menacing	Active	Fish Screen Below Crooked Pond	Crooked Pond Outlet	Recreation
Non-menacing	Active	Speedway Lower Pond Dam	Gues Meadow Brook	Detention
Non-menacing	Active	Farm Pond	Unnamed Stream	Conservation /agriculture
Non-menacing	Active	Recreation Pond	Unnamed Stream	Recreation
Non-menacing	Active	Sedimentation Basin A	Runoff	Detention
Non-menacing	Active	Sedimentation Basin B	Runoff	Detention
Non-menacing	Active	Loudon Country Club Pond	Unnamed Wetland	Recreation
Non-menacing	Active	Pleasant View Gardens Pond Dam	Runoff	Detention
	Ruins	Academy Brook I Dam	Academy Brook	Mill
	Ruins	Academy Brook II Dam	Academy Brook	Mill

**Table 7.4: Dams Located in Loudon Continued**

Hazard Class	Status	Dam Name	River/Brook	Use
	Ruins	Academy Brook III Dam	Academy Brook	Mill
	Ruins	Academy Brook IV Dam	Academy Brook	Mill
	Exempt	Soucook River I Dam	Soucook River	Recreation
	Exempt	Giddis Brook Dam	Giddis Brook	Fire protection
	Ruins	Shaker Brook I Dam	Shaker Brook	Mill
	Ruins	Loverings Mill	Shaker Brook	Mill
	Exempt	Fire Pond	Unnamed Stream	Fire protection
	Exempt	Soucook River II Dam	Soucook River	Recreation
	Exempt	Pineridge Detention Pond Dam	Runoff	Detention
	Exempt	Champagne Recreation Pond	Unnamed Stream	Recreation
	Ruins	Unnamed Stream Dam	Unnamed Stream	Recreation
	Ruins	Yeaton Dam	Unnamed Stream	Recreation
	Exempt	Speedway NE Pond Dam	Gues Meadow Brook	Conservation /agriculture
	Exempt	Mitigation Pond 2 Dam	Gues Meadow Brook	Conservation /agriculture
	Exempt	Speedway Middle Pond Dam	Gues Meadow Brook	Conservation /agriculture

Source: NH Department of Environmental Services OneStop Mapper, 2018

**HYDRIC SOILS**

As defined by the USDA, hydric soils are a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Landscapes that have a high water table, floodplains that are seasonally flooded, and depression areas that collect and store runoff are all likely to have wet and potentially hydric soils. Locations of hydric soils are valuable to be aware of as presence of hydric soils is one third the requirement to a jurisdictional wetland. Also, hydric soils impact agriculture production and limits ability to install off-site waste disposal systems.

The most recent soils data for New Hampshire was collected in the late 2000s, classifying soils based upon drainage class, by the frequency and duration of wet periods under similar conditions similar to those which the soil was formed. There are six soil classes available, which can direct the soils performance for crops, forestry, wildlife, recreation and other uses. Loudon’s soil is classified by the acre in Table 7.5.

**Table 7.5: Soil Acreages by Drainage Class in Loudon**

Soils Type by Drain Class	Acreage
Excessively Drained	1,804.40
Somewhat Excessively Drained	2,011.20
Well Drained	12,914.00
Moderately well drained	6,414.60
Poorly Drained	3,325.70
Very Poorly Drained	3,020.30
Total	29,490.20
Water	406.50
Loudon Total Acreage	29,896.70

Sources: NH GRANIT

There are over 12,900 acres of well drained soils in Loudon, accounting for just over 43% of Loudon’s total land acreage. Well drained soils have the ideal amount of water without having features of wetness. Water is also available to plants for growth, but not to inhibit growth of roots.

**WATER QUALITY**

Preserving water quality is essential for maintaining a healthy ecosystem within the water body and watershed. In addition to the health of the aquatic plant and animal species, good water quality contributes to quality of life through recreation and scenic beauty for permanent and seasonal residents. Preserving high water quality throughout Loudon also contributes to higher property values and supports continued recreational use.

**VOLUNTEER LAKE ASSESSMENT PROGRAM LAKE REPORT**

Clough Pond’s most recent VLAP report was released in 2017 and reports water quality statistics based on current and past data trends. Over the ten year period total phosphorus, chlorophyll-a, and pH levels, were rated “slightly bad” on the waterbody report card for aquatic life. Dissolved oxygen (DO) levels were rated “cautionary”. Chlorophyll-a levels for primary contact recreation

were rated “good”. E. coli levels for the Town beach were rated “good”, as sampling data commonly meet water quality standards.

Water quality statistics for 2017 are presented in Table 7.6. The VLAP report pond quality representative of average conditions. Above average spring and early summer rainfall likely flushed nutrients in from the surrounding watersheds resulting in higher phosphorus levels in early summer. After historic trends of worsening conductivity mostly likely due to winter deicing applications, it was recommended that local road agents and winter maintenance crews obtain a NH Voluntary Salt Applicator License through the UNH Technology Transfer Center’s Green SnowPro Certification to try to reduce chloride loads from winter road salting applications.

**EXOTIC WEED SPECIES**

Invasive aquatic weed species, such as variable milfoil, have made their way into many of New Hampshire’s lakes and ponds, causing damage to the water’s aquatic life and recreational use. Once fully established in the waterbody, it spreads rapidly, killing native plant life and blocking sunshine from the bottom of the lake. It also makes boating, swimming, kayaking, and other recreational

**Table 7.6: 2017 Average Water Quality Data for Clough Pond**

Station Name	Alkalinity (Mg/l)	Chlorophyll-a (ug/l)	Chloride (Mg/l)	Conductivity (uS/cm)	Total Phosphorus (ug/l)	Transparency (m)	Turbidity (ntu)	pH
Epilimnion	7.4	4.58	18	98.0	10	4.42	.74	7.21
Metalimnion	-	-	-	101.9	15	-	4.44	6.63
Hypolimnion	-	-	-	121.9	44	-	4.62	6.29
Inlet	-	-	-	90.3	20	-	3.44	6.66
Outlet	-	-	-	98.5	8	-	0.80	6.84
NH Median	4.9	4.58	4	40.0	12	3.2	-	6.6

*Source: 2017 Clough Pond VLAP Report*

## GET THE LEAD OUT, NH

Beginning in 2014, the Clough Pond Association joined the grassroots campaign that helps protect loons and other waterfowl from lead poisoning. The pond association hosted several events throughout the summer pertaining to the cause, and also trained Lake Hosts on the dangers of lead tackle so they can provide information to boaters.

Additional information can be found on the NHLAKES [website](#).

activities very difficult and is easily spread by clinging to boats and boat trailers.

Clough Pond has participated in the Lake Host Program run through the New Hampshire Lake Association which hires Lake Hosts to check boats entering and leaving the lake at the public boat launch for exotic weed species. Lake Hosts check over the trailer, trailer wheel wells, boat propellers, and other areas that come in contact with the water for any milfoil being potentially transported in or out of the lake. If any plant species is found, it is mailed to DES for identification.

Clough Pond is free of milfoil and other invasive weed species. Since beginning participation, Lake Hosts at Clough Pond have made one “save” of catching milfoil before entering the water. The save involved variable milfoil and occurred in 2005.

### **WATER QUALITY PROTECTION ORDINANCES**

Water resources throughout Loudon are protected and preserved through local ordinances, such as wetlands, and steep slopes, of which the wetland protection ordinance was previously mentioned.

For additional information on ordinances related to protecting natural resources, please refer to the Existing and Future Land Use Chapter.

## WATER USE AND CONSUMPTION

### **WATER SUPPLIES**

Water supply, which is essential for residents, businesses and local agriculture, is typically collected and distributed through two different methods: a public water system or a private water system. Typically public water systems are found in densely populated areas, and provide water via piping for a large area with a high number of homes and businesses. Private water supply systems, also known as individual wells, usually service one area, typically a home or business.

Just over 87% of Loudon’s households and businesses are served by individual wells. These wells typically withdraw groundwater from stratified drift aquifers located underground and treat the water onsite to be at drinking water quality standards. The majority of wells in Loudon source from the large stratified drift aquifer underlying the Soucook River corridor. In the past years between 2008 and 2017, a total of 138 new or replacement wells have been installed in Loudon, shown in Table 7.7 by year.

Just under 13% of Loudon is served by public water systems. Some public water systems may source water from groundwater similar to a well, while others may source water from a larger waterbody capable of providing a large of enough volume of water for the system’s needs.

**Table 7.7: Water Wells Installed 2008–2017**

Year	Number of Wells
2017	11
2016	11
2015	5
2014	10
2013	14
2012	11
2011	18
2010	22
2009	16
2008	20

Sources: NH Department of Environmental Services OneStop, 2018

In Loudon, this includes the large stratified drift aquifer under the Soucook River corridor and other small lakes and ponds. There are 27 public water systems in Loudon, five of which are inactive.

Private systems are susceptible to the same pollutants as public water systems, however, there are no state requirements regulating the quality of the water gathered through private systems.

Common, naturally and un-naturally occurring contaminants may be present in private water supplies through bedrock fractures and surrounding groundwater and should be regularly tested.

**POINT SOURCE POLLUTION**

Point source pollution is defined as any single identifiable source of pollution, such as a pipe or ditch. This includes sources such as industrial factories, sewage treatment plants, pulp and paper mills, and automobile manufacturers.

Point source pollution is a concern to local residents and business owners as much of the pollution can contaminate groundwater and surface water gathered by household wells that is used for daily

**Table 7.8: Registered Active Public Water Systems**

Name	Road	Population Served	Service Connections
Brookside Mall	Route 106 North	300	6
Cascade Campground	Route 106 South	475	231
Cascade Campground/Upper	Route 106 South	185	78
Dunkin Donuts	Route 106 South	500	1
Flintlock Apartments	Route 106	30	12
Fox Pond Plaza	Route 106	60	3
Freedom Hill/Pine Ridge	Pine Ridge Road	370	148
KOS Manufactured Community	Shaker Road	137	55
Loudon Big Apple	Route 106	60	1
Loudon Country Club	Route 106	100	1
Loudon Elementary School	School Street	346	1
Loudon Mart	Route 106 North	150	1
NH Motor Speedway	Route 106	4500	9
NH Motor Speedway Main Office	Route 106	45	4
NH Mtr Spdway/RV Camping	Route 106 North	75	30
Presidential Pines/Lower	North Village Road	51	25
Presidential Pines/Upper	North Village Road	60	30
Quality Inn	Route 106	100	1
Rapid Refill 136	Route 106	200	1
Rapid Refill 138	Route 106	125	2
Villages at Loudon	Iris Lane	108	72
VOA/NNE Senior Housing	South Village Road	50	33

Source: NH Department of Environmental Services OneStop, 2018

activities. Contamination of point source pollution has many different routes of entry. Leaking above and below ground storage tanks, which typically hold heating oil and other petroleum products, can pollute groundwater and surface water by soaking through the ground surface. Floor drains that do not properly treat contents before being released can spread pollutants, such as a

floor drain in an auto body shop that collects oil and other chemicals and is released to soak directly on the ground surface. Dry wells, burying wastes, and inadequate septic systems can also cause contamination. As Loudon is approximately 87% served by private water systems, point source pollution can be a potential threat. To help prevent the contamination of groundwater, New Hampshire has taken many precautionary steps in the form of regulation of potential contaminants.

For example, DES requires that an Underground Injection Control (UIC) permit be obtained for anyone who is discharging anything other than normal household waste to an on-site sanitary disposal system. DES also regulates floor drains, of which sensitive areas are not allowed to discharge to the on-site septic system, dry well or ground surface. Above and below ground storage tanks may also be regulated dependent upon the size, contents, and use of the tanks.

Nationally, point source pollution is controlled through the National Pollutant Discharge Elimination System (NPDES) permit program that provides permits to qualifying applicants allowing discharge directly into surface waters. There are no facilities in Loudon with DES permits, but many other communities in Central New Hampshire have several.

#### UNDERGROUND STORAGE TANKS

The purpose of the Underground Storage Tank Program (UST) at NH DES is to prevent and minimize contamination of the land and waters of the state due to the storage and handling of motor fuels, heating oils, lubricating oils, other petroleum and petroleum contaminated liquids, and hazardous substances. Established rules and regulations apply to all non-residential UST systems having a total regulated substance storage capacity of more than 110 gallons

and non-residential tank systems having an on-site use heating oil storage capacity of more than 1,100 gallons.

In Loudon, there are 20 businesses that have permits for underground storage tanks. Of the 20 businesses, a total of 5 have active tanks and one reported having no tank. The majority of tanks are located along Route 106, with others disbursed throughout Town. The businesses are listed, along with the number of tanks reportedly in place in Table 7.9 below.

**Table 7.9: Underground Storage Tank Facilities**

Permitted Businesses	Location	Active Tanks	Closed Tanks
Ashlands Garage	Village Road	0	4
Capitol Fire	North Village Road	0	1
Crowley Land Clearing	Route 106	0	3
D S Cole Growers	North Village Road	0	1
Fillmore Industries	Route 106	0	2
Gilbert Fueling	Shaker Brook Industrial	0	0
Huckleberry Heating Oils	Chichester Road	0	11
Lot No. 236	Route 106	0	3
Loudon Big Apple	Route 106	5	0
Loudon Elementary School	School Street	0	2
Loudon Fire Department	Route 129	0	1
Loudon Mart	Route 106	4	11
Loudon Village Country Store	South Village Road	0	5
NH Motor Speedway	Route 106	2	4
Penny Press	Route 106	0	2
Pleasant View Gardens	Pleasant Street	0	4
Rapid Refill #136	Route 106	3	0
Rapid Refill #138	Route 106	2	0
R K Moore Construction	Goshen Drive	0	1
Thomas Lasssonde	Lesmerises Road	0	1

*Source: NH Department of Environmental Services Onestop, 2018*

The potential for leakage from the underground storage tanks is always a possibility. DES retains a list of known leaking underground storage tanks (LUST) which have not been inventoried in this chapter.

### **NONPOINT SOURCE POLLUTION**

Another threat to Loudon’s water quality is nonpoint source (NPS) pollution, also known as polluted runoff. Nonpoint source pollution (NPS) is pollution that cannot be traced back to any specific source; it is the accumulated pollution resulting from everyday activities and is caused by heavy rain or large amounts of snow melt moving on or through the ground.

Its effects are magnified by impervious surfaces, such as building roofs and paved surfaces. Water cannot infiltrate these surfaces, causing more water to run off over the land. As water washes over the land, it picks up oil, deicers, pesticides, nutrients, sediment, and other pollutants that have been placed into the environment by everyday activities. The runoff water flows into storm drains or directly into water bodies, carrying the pollutants that have been deposited. As little as 10% impervious surface on a lot can begin to negatively impact a waterway. Thus, the more intensively used a piece of land is, the more nearby waterways can be negatively affected by polluted runoff.

Protection from nonpoint source pollution is often a challenge. Low impact development (LID) is one method used to reduce nonpoint source pollution, and focuses on preserving natural landscapes and treating runoff before contamination. Methods of LID design can include rain barrels, rain gardens, and permeable pavements.

## STORMWATER RUNOFF

Stormwater runoff occurs when water from intense rain and snowmelt flows over land instead of soaking into the ground. As the water flows, it picks up contaminants, including sediment, suspended solids, nutrients, heavy metals, pathogens, toxins, and other floating materials that then pollute the water body or groundwater the runoff enters.

Increases in stormwater can increase flooding in the watershed, creating new flooding patterns, channel erosion, and potentially causing harm to surrounding habitats. Flooding also can cause damage in developed areas where there is not adequate stormwater management.

Stormwater infrastructure consists of a system with pipes and inlets, redirecting stormwater to a nearby stream, river, or main wastewater channel to be treated and released. Even though more urbanized communities are more at risk for stormwater runoff, the increase of projected extreme storms and events could cause current culverts, ditches, and dams to be undersized causing impacts on the infrastructures performance and design life.

## GREEN SNOWPRO CERTIFICATION

The University of New Hampshire offers a half day training course focused on efficient and environmentally friendly winter maintenance practices. The course offers basics of salt reduction and other environmentally conscious practices. Local road agents and winter maintenance crews can earn a NHDES Salt Applicator Certification per RSA 489-C. For more information, see the UNH website at [t2.unh.edu/green-snowpro-certification](http://t2.unh.edu/green-snowpro-certification).

## **WATER TESTING**

Whether water supply is provided through a public system or private well, it should be treated to drinking level standards defined as safe for consumption. While water distributed through a public system is first treated in a drinking water treatment plant that is regulated by state permit, personal household wells are not. With a well system, household water treatment systems are used to treat well water to drinking water standards so to protect from contaminants caused by point source and nonpoint source pollution.

In addition to contaminants mentioned previously, common, naturally occurring contaminants, such as arsenic, radon, and iron, may be present in private water supplies due to New Hampshire's geologic profile. A report published in 2013 on Water Supply Infrastructure and Protection by DES estimated about 55% of private well systems in New Hampshire exceed the state's radon limits and 20% exceed EPA's arsenic contamination levels. Arsenic, which has no odor or color in water, occurs in one in five wells drilled in NH. As well water testing in private household is not required, education and awareness of water quality testing is critical for Loudon residents as over 87% use individual household wells for their water supply.

## **LAND RESOURCES**

The ***Conservation and Public Lands and Scenic Vistas Map*** shows conservation lands, public and quasi-public lands, and scenic vistas identified through public outreach and input from the Conservation Commission.

### **CONSERVATION AND TAX EXEMPT LANDS**

Tracts of land under conservation easement can be permanently

protected from future development as part of the parcel's deed restrictions or they can be under temporary conservation for a limited period of time. The total number of acres under conservation was calculated to be approximately 9.0% of the Town's total land area. This is less than the 11% protected in 2001. Table 7.10, identifies those parcels in Loudon that have been protected from development through fee acquisition, conservation easements, or Town owned land.

### **CURRENT USE**

The Current Use Program is a tool that landowners can use to reduce the amount of property tax that they pay on open space within their property limits as an incentive to keep the land in its traditional use. Open space conservation is beneficial to the region as it preserves the land as well as maintains natural features and habitat. The Current Use value is the assessed valuation per acre of open space land based upon the income-producing capability of the land in its current use – not its real estate market value. This valuation shall be determined by the municipality's assessor in accordance with the range of current use values established by the state's Current Use Board (CUB) and in accordance with the class, type, grade, and location of land. Property owners can file for reduced property taxes through the Current Use.

By allowing open space land to be classified as current use, it acts as an incentive for landowners not to develop property. Owners of parcels of land which are not anticipated to be used for a different type of use in the future can apply at municipal offices, and in accordance with RSA 79-A:2, the definitions of eligible land type are farm land, forest land, open space land, unproductive land and wetlands.

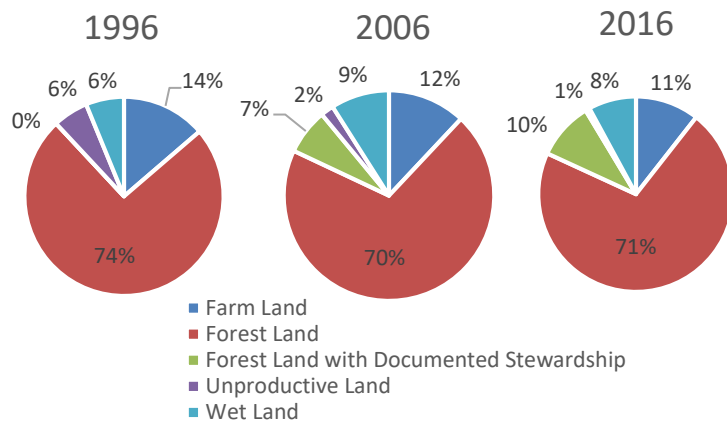


**Table 7.10: Loudon Conservation Commission Protected Properties**

Program Name	Total # of Properties	Total Acreage	% of Protected Properties
Land Conservation Investment Program (LCIP) Easements	8	1,242.70	46.9%
Farm and Ranch Lands Protection Program (FRPP Easements)	3	224.63	8.5%
Five Rivers Trust Conservation Easements (FRTE)	4	313.00	11.8%
NH Motor Speedway/ NH Fish & Game Conservation Easements (NHMS NHFG)	1	53.49	2.0%
Town of Loudon Conservation Easements (TOLE)	2	128.98	4.9%
Town of Loudon Owned Land	34	686.40	25.9%
<b>Total protected Property Acreage</b>			<b>2,649.20</b>
<b>Percent of Protected Property</b>			<b>9.0%</b>

Source: Loudon’s Conservation Commission, data as of February 2016

**Figure 7.1: Current Use figures for 1996, 2006, and 2016**



Source: NH Department of Revenue Current Use Reports

Further noted in RSA 79-A:7, when land is removed from Current Use, ten percent of the full and true value of the land, not the Current Use assessed value, must be paid as a Current Use Land Change Tax. It is important to understand that the Current Use classification can be placed on, or removed from, land at the landowner’s discretion which is why these lands vary from conservation lands.

Of the 29,896.7 acres in Loudon, over 18,179 acres (61.0%) was in current use in 2016. Figure 7.1 shows the percentage of each land type in current use in 1996, 2006, and 2016. Over the thirty years, the percent of unproductive land in current use has decreased to less than one percent in 2016. The amount of farmland has also decreased while a new category of ‘Forest Land with Documented Stewardship’ was introduced between the 1996 and 2006 reports. This new category caused the amount of forest land to decrease, though additional forest land was added in this new category in both 2006 and 2016.

For more information on Current Use, visit NH Department of Revenue Administration’s website at [www.revenue.nh.gov/current-use/index.htm](http://www.revenue.nh.gov/current-use/index.htm).

**AGRICULTURAL RESOURCES**

Agriculture plays a significant role in stewardship of Loudon’s rural landscape and its economic and cultural history. Working farms and fields are valued by residents for providing access to local foods and contributing to farmers markets, as well as for the scenic vistas of the agricultural landscape. As population and development continue to steadily grow, albeit more slowly, prime farmlands will remain under development pressure.

**Table 7.11: Farms located in Loudon**

Farm	Location	Products
Aznive Farm	Pleasant Street	Hay, beef
B&B Syrup	Flagg Road	Maple Syrup
D.S. Cole Growers	North Village Road	Propagators of quality products from world-wide sources
Hill Top Feeds	Storrs Drive	Livestock feed, shavings, hay, dog and cat food. Farm equipment/supplies
Ledgeview Farm	275 Clough Hill Road	Annuals, perennials, cut flowers
Lēf Farms	662, Route 106	Greenhouses, salad greens
Liliana Flower Farm	Beck Road	Perennials, pesticides-free vegetable plants
Lucky Star Farm	Lovejoy Road	Scottish Highland cattle, Heritage piglets, laying hens; tractor services, stump grinding
Lyon Berry Farm	Route 129	Blueberries
Maple Ridge Sugar House	Loudon Ridge Road	Fresh vegetables, maple syrup
Meadow Ledge Farm	Route 129	Peaches, corn, apples, country store
Miles Smith Farm	Whitehouse Road	Hormone and antibiotic free beef, individual cuts, sides
Mudget Hill Mumbling Maplers	Mudgett Hill Road	Maple products: syrup, candy
Our Place Farm	Route 129	Goat milk, eggs, naturally-raised pork, grass-fed beef etc.
Pearl and Sons	Loudon Ridge Road	Maple syrup products
Pleasant View Gardens	Pleasant Street	Horticultural products
Potpourri Acres	Pleasant Street	Organic producer – vegetables
Ramsay’s Farm Stand	Loudon Ridge Road	Vegetables and cult flowers, fruits
Red Manse Farm	Route 129 & Pittsfield Road	Certified organic produce, CSA and Farm Patron Program
Ridgeland Farm	763 Loudon Ridge Road	Maple syrup, pigs
Sanborn Mills Farm	Sanborn Road	Traditional working farm providing workshops
Songaway Farm	Old Shaker Road	Eggs, rabbit meat
Stoneboat Farm	Batchelder Road	Sustainable farming
Windswept Maples	Loudon Ridge Road	Vegetables, beef, maple syrup, eggs

*Source: Farm Map created by Loudon’s Agriculture Commission, CNHRPC research and Planning Board input*

According to the U.S. Department of Agriculture’s National Agricultural Statistics Service, Merrimack County has the highest agricultural sales in the state. Merrimack County is also the top County in New Hampshire for nursery, greenhouse, floriculture and sod. Statewide, nursery or greenhouse-grown products for sale in 2012, including flowering and ornamental plants, were valued at nearly \$29.3 million. This category includes two of the nation’s top greenhouse plant-propagators, Pleasant view Gardens and D.S. Cole, of which one is located in Loudon and the other in Concord.

Local farmers' markets continue to gain popularity through both the summer and winter seasons. In the Central NH Region, there are currently seven farmers markets during the growing season and there were three winter farmers markets in 2017. Loudon currently does not have a farmers market. Farmers markets bring produce directly to consumers, increasing access to healthy locally produced foods and other products, stimulating the local economy and enhancing the social and cultural life of the community. Many cities and towns have found that farmers’ markets can help revitalize downtowns or municipal centers.

Table 7.11 shows some of the farms located in Loudon. These farms can also be found on the [Farm Map](#) created by Loudon’s Agriculture Commission.

Prime farmland soils in Town are shown using the 2009 Soil Surveys by the Natural Resources Conservation Service (NRCS) digital information on the **Prime Agricultural Soils Map**.

Prime farmland soils are described nationally as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and are also available for these uses. By looking at the **Prime Agricultural Soils Map**, several significant concentrations of prime farmland soils are

**Table 7.12: Conserved Forest Acreage in Loudon and Abutting Communities**

Municipality	Municipal Acreage	Forest Acreage	Conserved Forest Acreage	% Conserved
Canterbury	28,696.6	16,277.6	2,778.3	17.1%
Chichester	13,628.1	3,918.0	271.6	6.9%
Concord	42,999.8	14,615.0	4,215.1	28.8%
Gilmananton	38,127.3	8,435.9	3,421.5	40.6%
<b>Loudon</b>	<b>29,896.7</b>	<b>11,840.2</b>	<b>908.9</b>	<b>7.7%</b>
Pembroke	14,597.2	5,127.2	184.2	3.6%
Pittsfield	15,558.7	1,454.7	159.2	10.9%

*Source: NH Granit, NH Fish & Game Department, Department of Resources and Economic Development*

present in Loudon. Generally speaking, soils that are suitable for growing crops are suitable for growing trees as well. Key locations of these soils are located in northern half of Loudon, where Gilmananton fine sandy loam is the predominant soil type present. What is important about prime farmland soils is that they can be farmed continuously or nearly continuously without degradation of the environment. Other benefits include open space and scenic vistas, groundwater recharge areas, wildlife habitat and production of food for local and regional markets.

**FOREST RESOURCES**

New Hampshire is considered the second most forested state in the country, behind Maine, with 84% forested land. Protection of natural, forested lands is valued across Central New Hampshire for its benefits – clean water, preserved wildlife habitats, forest products and recreation. Finding ways to maintain working forests is also a critical partnership with private landowners to maintain forested land in the years to come.

Loudon has 11,840.2 acres of forest, which is about 40% of Loudon's total acreage. Maps created by NH Fish and Game in 2010 as part of the NH Wildlife Action Plan show Loudon's forest to be mainly comprised of hemlock-hardwood pine with spots of forested floodplain, grasslands, and pine barren. These species of trees are home to a wide range of wildlife, ranging from small game, such as the silver-haired bat and eastern box turtle, to larger game such as black bear and moose.

Much of the forest in Loudon and throughout Central and Southern New Hampshire is facing threats to human development, introduced invasive species, and altered natural disturbances. While development is necessary for the state and town, maintaining large tracts of forested land is key for protecting habitat for wide-ranging game, such as moose and bear. According to DRED's Assessment of New Hampshire Statewide Forest Resources, Merrimack County is estimated to lose 3% of forested land between 2001 and 2025.

The growing presence of invasive species is threatening New Hampshire's forests with species of hemlock woolly adelgid, emerald ash borer, elongate hemlock scale, and asian longhorned beetle. While these species have been confirmed in the Central New Hampshire Region, Loudon has yet to have any confirmed cases. Two firewood quarantines were held at the NH Motor Speedway in July and September of 2013. Visitors to the track from out of state were asked if they had untreated firewood, and were directed for inspection. Firewood in violation was confiscated and burned so to prevent the spread of invasive species and harmful diseases. Restricting the movement of firewood from out of state helps to

limit the spread of invasive species. Overall, 195 notices were written with two summons.

The **Forestry Soils Map** depicts the location of the best soils for forestry in Loudon. Similar to the prime farmland soils, forestry soils are classified into categories based on productivity of the soil. Additional information on forestry soil, please refer to UNH Cooperative Extension's publication on forest soils at [extension.unh.edu/goodforestry/html/app-soils.htm](http://extension.unh.edu/goodforestry/html/app-soils.htm)

#### **FOREST MANAGEMENT**

Forestry-based manufacturing and forest-based recreation and tourism in the state not only supplements New Hampshire's economy but also provides a significant number of jobs for residents. In New Hampshire, the economic value of forest-based components of the economy was estimated at \$2.259 billion annually, which is nearly 4% of the gross state product.<sup>3</sup>

Owners of forested areas in New Hampshire are taxed under the real estate tax, since privately owned forested parcels are considered real estate. However, timber is only taxed at the time it is cut and at a rate, so to encourage the growth of forested area. The timber tax collected in Loudon between 2007 and 2016 is shown in Table 7.13. Forestry is also a renewable resource used by many and a source of income for many families in New Hampshire and Loudon.

In New Hampshire, a notice of intent to cut must be submitted so to notify assessing officials and the related state departments. The intent to cut must include a volume estimated, and must be signed

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<sup>3</sup> The economic Importance of New Hampshire's Forest-Based Economy. Published by New Hampshire Division of Forests and Lands, 2011.

and assigned a number by the town within thirty days of submission.

**Table 7.13: Timber Tax Collections, 2005-2016**

Year	Timber Tax Collected
2016	\$18,370.00
2015	\$23,420.00
2014	\$14,014.00
2013	\$29,461.00
2012	\$29,874.00
2011	\$19,657.00
2010	\$15,100.00
2009	\$10,137.00
2008	\$21,527.00
2007	\$13,371.00

*Sources: Loudon Annual Reports*

**TREE FARMS**

The American Tree Farm System (ATFS) is a national program that encourages private forest owners to actively manage their forests in a sustainable manner for many values such as wildlife habitat, recreation, and water quality. Launched in 1942, its mission is to promote the growing and harvesting of renewable forest resources while protecting the environment and increasing public understanding of all benefits of productive forestry. As of 2018, there are over 14,300 tree farms in New Hampshire covering over 484,000 acres of land. In Loudon there are 8 tree farms covering 2,010 acres.

**ECOLOGICAL RESOURCES**

**CORRIDORS**

Corridors and greenways are typically used not only by people for recreation or transportation, but also by wildlife to travel from one

habitat to another. Maintaining viable and undeveloped corridors ultimately measures the biological success of the animals, particularly larger mammals, within an area. The following is an example of a corridor identified in Loudon.

A large riparian corridor is located along the Soucook River which forms in northern Loudon and flows in a southerly direction and eventually forms the border between Concord and Pembroke. The wild and undeveloped nature of the Soucook offers prime habitat and migration opportunities.

A designated corridor along the Soucook River and its tributaries could be an asset to Loudon. The Conservation Commission envisions a mosaic of protected private and public lands linked to the Soucook River Corridor. Protection of this land network will safeguard important wildlife habitat and travel routes, surface water, groundwater, aquifers, wetlands and scenic resources and recreational opportunities. The establishment of a Soucook Corridor would ensure that the region’s most important natural features continue to be available for future generations. As mentioned earlier in this Chapter, residents who participated in the community survey overwhelmingly expressed support for a greenway along the Soucook and feel that it is a key resource contributing to the rural character of Loudon.

One way to establish a Soucook Regional Corridor could be done through a land trust established by resident volunteers who are concerned about the loss of open space lands. Accomplishing this goal would be through landowner outreach, land protection, community assistance and partnerships with neighboring towns. A success story is that of the Bear-Paw-Regional Greenway. Two conservation-minded citizens of Candia started the project back in the 1980s. By 1997 it had become a non-profit tax-exempt land

trust, and it now has full-time staff, a conservation plan and has completed Regional Natural Resource Inventory Maps. The Soucook River Corridor has the potential to be a success story like this.

#### NH NATURAL HERITAGE INVENTORY

Several outstanding plant and animal species have been located in Loudon since the 1930s and recorded in the Natural Heritage Inventory (NHI) program’s database. Species included on the list include Canada mountain-rice grass, spotted turtle, and the American eel. The complete list can be found in the Natural Heritage publication at [www.nhdfi.org/DRED/media/Documents/Natural Heritage/TownLists.pdf](http://www.nhdfi.org/DRED/media/Documents/Natural%20Heritage/TownLists.pdf)

#### IMPORTANT NATURAL COMMUNITIES

Other special undisturbed lands are essential for the biological diversity of plants and animals. The more bio-diversity found within an area, the more valuable and self-sustaining the community becomes from both ecological and economic perspectives. Two natural communities have been identified in Loudon. The first is a large, mostly continuous area of conservation land, including the Merrill, Batchelder and Sanborn Farm properties, located in the northeastern corner of Loudon. This unfragmented area contains a pond, several wetlands and streams and limited roads.

The second is a bog that can be found off of Fox Pond Road and NH 129 North. A bog (sometimes called a kettle hole) is an artifact from the last glacial age 10,000 years ago. Bogs lack drainage; precipitation is the only source of water. Bog water is acidic and lacks oxygen. Sphagnum mosses are the dominant plant forming thick layers of peat. Loudon is fortunate to have one of these unique features in Town and should work to protect and preserve the bog and clean up any accumulated debris.

## GEOLOGIC RESOURCES

### MOUNTAINS AND HILLS

There is no distinct height that categorizes the difference between a mountain and a hill. A mountain is presumed to be higher, historically defined by the British Ordinance Survey as over 304.8 meters (1,000 feet). There are four hills in Loudon, which are summarized below. They can also be seen on the plan’s **Conservation and Public Lands and Scenic Vistas Map**.

**Table 7.14: Highest Elevations**

Mountains and Hills	Elevation
Sabbattus Heights	1040'
Oak Hill	920'
Clough Hill	800'
Bear Hill	740'

*Source: CNHRPC Open Space Plan, 1980*

### SURFICIAL AND BEDROCK GEOLOGY

Glacial drift is material that was been transported and deposited by a glacier or glacier runoff. Material found in glacial drift include gravel, sand, and clay. The majority of Loudon is underlined by glacial drift from the Pleistocene Period. Stratified drift outwash plains can be found beside the Soucook River and are accompanied by sand pits scattered in kames and kame terraces. Additionally, organic deposits are found in various wetland areas throughout town.

Bedrock is the hard, solid rock found underlying vegetation, soil, and loose rock. Loudon contains three types of bedrock, including undifferentiated schists and gneisses, binary granite, and grey gneiss. Undifferentiated schists and gneisses is Loudon’s predominate type of bedrock, underlying approximately 80% of the town.

As previously mentioned, a stratified drift aquifer is located along the Soucook River corridor, stretching from the Canterbury border to the Concord and Pembroke border. Several excavation sites are located within Town, mostly along this aquifer. The location of the aquifer and the excavation areas are indicated on the ***Aquifer and Excavations Map***, and the excavation sites are discussed in more detail in the Existing and Future Land Use Chapter.

#### **RECREATIONAL RESOURCES**

Access to outdoor recreation is critical to the health and quality of life for Loudon's Residents. Protecting open space and ensuring public access, as well as providing information on recreation opportunities can be important for connecting people to the outdoors and promoting a healthy lifestyle.

Loudon contains numerous year-round recreation opportunities through its lakes, rivers, and forested land. Popular activities include hunting, fishing, hiking, and snowmobiling. Easy, safe, and maintained access to Loudon's natural resources is important to accommodate a growing active senior population choosing to stay in place once retired.

Multi-use trails are one popular recreation resource, which can host numerous different activities year round, including walking, hiking, biking, cross-country skiing and snowmobiling. Currently Loudon has some public hiking trails, as seen on the ***Recreation Sites Map***.

A recent collaborative effort between the Conservation Commission and CNHRPC has spurred the development of a loop trail in Batchelder Town Forest off Young's Hill Road. A Trails Subcommittee has been formed which regularly meets every fourth Monday. The group has been working with members of regional organizations such as Trailwrights and the Belknap Range Trail Tenders (BRATTS) to ensure proper trail construction and

maintenance techniques.

Snowmobiling also occurs along the Soucook River, and other locations shown on snowmobiling maps created by the Sno-Shakers snowmobile club. Connecting with other shared-use trails in surrounding communities and creating more shared-use trails within Loudon can create an opportunity for more recreational opportunities for residents. Additionally, working with neighboring municipalities provides an opportunity to organize priorities, develop connected trails and build stronger support for future funding.

Created in 2001, the Open Space Trail System Plan provides recommendations for preserving and protecting open space in Loudon and lays the groundwork for establishing a functional and comprehensive open space and trails network.

The Open Space Trail System Plan, complementing the findings of the 2001 Master Plan, promotes conservation in the Town and provides an option for the expansion of recreational opportunities. Previous versions of the Loudon Master Plan, as well as this one, focuses on protecting Loudon's natural resources and rural character. The establishment of a comprehensive Open Space Trail System would further emphasize the Town's natural resources and promote stewardship of the lands through recruitment of volunteers in trail creation and maintenance.

One of Loudon's most underutilized resources is the Soucook River. Feedback gained from the community survey and comments from Conservation Commission meetings agree that access to the river is difficult and little known to many residents. As a resource for fishing, swimming, hiking, boating, birding and nature observation, the community survey showed the majority of people do not use the river for these activities, and most responders stated that it is

lack of access or knowledge of access preventing them from utilizing the River for these activities.

## STRATEGIES FOR LAND USE CONSERVATION

There are numerous mechanisms available for protecting and conserving a community's natural, scenic, historic and agricultural resources. Specific steps can include strategies or techniques such as amendments to ordinances and regulations and/or more voluntary approaches that focus on education, training and actions by landowners. A very effective, but most costly method, is fee simple purchase of the resource. Because of the limited funding presently available, this method is the most challenging for the Conservation Commission, and in the majority of the cases, fee simple ownership is not necessary to achieve effective protection of the resource. In some instances, however, fee simple acquisition of a parcel may be the best alternative for protection if landowners may no longer be willing to own and manage their property but may still want to ensure that it will be protected and maintained for future generations.

### **WATER RESOURCES**

The water resources in the Town of Loudon are very important assets to our community. The streams, rivers, ponds, wetlands and aquifers provide diverse wildlife habitats, numerous recreational opportunities, ground water recharge and water supplies and many scenic views and vistas. Therefore, it should be a priority for Loudon to preserve and protect its water resources, particularly its aquifer that may become a major source of water in the future.

It is important to understand the function of the Soucook River watershed since healthy watersheds are vital for a healthy environment and economy and provide drinking water, irrigation

and industry. Watersheds are also used for various kinds of recreation such as hiking, swimming, boating, fishing and hunting. Wildlife depends on a healthy watershed for their food and shelter. Managing our watershed and other natural resources is an effective and efficient way to sustain the local economy and environmental health.

Water quality should be protected regardless of whether acquisitions of land or easements are possible. Through the adoption of land use regulations to mitigate ground and surface water pollution, erosion, and sedimentation, the integrity of a water body can be protected. Once a water body has been contaminated, the restoration of the ground and surface waters is costly, time consuming, and often a futile endeavor.

In addition to the tributaries that flow into the Soucook River, the Town has many other small ponds and perennial streams. These ponds and streams provide a diverse wildlife habitat and recreational opportunities for fishing, hunting, birdwatching, hiking, cross-country skiing and snowmobiling. Loudon should explore opportunities to acquire easements for public access to these areas and develop a trail system. This process is made less difficult by the small size of most ponds and the limited ownership.

### **CORRIDOR ALONG THE SOUHOOK RIVER**

The Soucook River is the Town's largest and most important surface water resource. The River flows through the Town for approximately 7.8 miles with much of the shoreline currently undeveloped. Creating a corridor for the Soucook River would protect the river and its tributaries and the uplands incorporated with it for multiple recreational uses. This corridor could provide public access to the Soucook, increase active and passive recreational use, provide a protective buffer to the River itself and



generally increase the quality of life in the community as well as provide a protected wildlife corridor. The Town of Loudon could pursue the creation of a corridor that stretches the entire length of the River in Town and work with the neighboring communities of Canterbury, Concord and Pembroke to do the same, with the intent of creating a regional corridor.

Conservation easements could be used to acquire development rights and public access to parcels with river frontage. Easements for a trail network that would allow public access in existing developed areas could be used to complete the trail system. In addition, acquisition of key parcels could also be required to allow for boat/canoe launch areas, picnic areas and public parks linked by the trail system. Acquiring buffer strips along the Soucook River could be one strategy for Loudon.

The Soucook River and its tributaries flow through one of the largest aquifers in the state. By using the current technologies of GIS, maps can be developed to show the direction the Town could take to develop a Watershed Management Plan. This Plan could then be presented to neighboring towns with the intention of developing a regional corridor much like the one created in southeastern New Hampshire called Bear-Paw Regional Greenway.

The development of a corridor within the Soucook Watershed is a process that will take time and considerable effort. Loudon's Open Space Trail System Plan did not recommend the corridor or a greenway specifically, but it did recommend that a 150 foot buffer zone be created around the Soucook River beginning at Currier Road and continuing to the Concord City Line. This buffer zone could be a start to the creation of a corridor of the Soucook River watershed as the River's buffers are already partially protected by the state's Shoreland Water Quality Protection Act.

## **AGRICULTURE**

Historically the primary land use in Town, agriculture is another resource that is extremely important to Loudon. Many of the original agricultural fields have since been idle and reverted back to forests. Except on Loudon Ridge which still harbors some large, contiguous parcels of active farmland, few active farms remain. Many of the existing agricultural conservation programs are concerned primarily with prime farmland soils and the productivity of the land. While these factors should not be ignored, they are not the only measures for evaluating the importance of agricultural areas. Farms provide open space for viewing fields and hillsides, hunting opportunities, and scenic views of the farms themselves. The visual presence of the farm buildings, pastures, croplands and orchards are essential to the character of Loudon. Farms, in general, provide the variety of habitats, fields, forests, streams, wetlands and transitional areas, essential for species diversity. Farmland preservation and support of agriculture provides these multiple benefits. Therefore, maintaining and supporting agriculture in Town should be a priority. The Town could seek to acquire development rights and easements to agricultural lands to ensure the continuation of farming in the community. This could be accomplished through mechanisms such as the Land and Community Heritage Investment Program or through a municipal or regional land trust. Reviewing regulations to be sure that there are no unintended consequences that prevent agricultural activities is another approach.

The Loudon Agricultural Commission reconvened in November 2014 after two years of inactivity and is beginning to work on various initiatives to promote agriculture in Loudon. The first priority was the creation of a map of active farms in Loudon. In many cases, these are farms where you can purchase fresh meats, vegetables,

dairy products, eggs, plants and other products grown right here in the town of Loudon. In 2011, the Commission received funding to prepare a local farm map to highlight and raise awareness of local resources. Refer to the Commission's website at [www.loudonag.org](http://www.loudonag.org) for more information.

#### **HISTORICAL SITES AND AREAS**

The preservation of historic sites and areas should also be a high priority for the Town; once vanished, these resources are lost forever. Loudon is enriched with historical sites and areas including mill sites, stone houses, the Sanborn Mills Farm, the Maxfield Library, the original Loudon Elementary School, and the areas of Sabbattus Heights and Loudon Center. The Town should actively seek to protect its historic resources by maintaining an inventory of the existing resources and then determining the appropriate protection mechanism for the site. Old mill sites along the Soucook River and feeder streams, for example, could be acquired as part of the corridor while an historic district could be developed to protect the Loudon Village area. See Loudon's History and Culture Chapter for detailed information on historic areas in Loudon.

#### **PUBLIC ACCESS**

When considering resource protection measures, it is important to evaluate the need for public access. In some instances, the Town may only need to purchase an easement for public access to or across an area. Development may be limited due to the physical conditions of the site, poorly drained soils or steep slopes, rendering it unnecessary for the Town to purchase the development rights to the area if the chances for future development are remote. However, the Town could purchase an easement for public access at a much lower cost. Another scenario would be an agricultural parcel with river frontage and high recreational and scenic value. In this case, the Town may consider the purchase of public access (fee

simple or easement) to a corridor along the river to provide for public access to and use of the resource.

#### **OBJECTIVES AND RECOMMENDATIONS**

The Conservation Commission recognizes that it would be impossible to preserve all the open spaces and resources in the Town. Yet there are large parcels of forests and farmlands that still exist, many of which are adjacent to land that is currently under some form of conservation easement or restriction. The Soucook River and the land abutting it are of utmost importance, and one of the recommendations is to develop a corridor to conserve this important resource. There are extensive networks of streams, marshlands, small ponds, and mixtures of forest and fields providing wildlife habitats for a great diversity of plant and animal species. Loudon also rests on top of one of the largest aquifers in New England that makes the mission to conserve an even more critical one. The next step is to discuss the most appropriate mechanisms for protecting these areas and educating the public on the importance of doing so.

The pace of growth is slower now and the more compelling trend is the aging population. As the population grows and its demographic profile changes, there are new challenges to be met. Access to transportation and to amenities and services is a growing concern with an aging population, one that needs to be balanced with the high quality of life valued by Loudon residents for its natural resources, open space and overall rural character. It is that very rural character that is a large part of what defines Loudon. Through community awareness, various conservation techniques, and planning and zoning, Loudon can continue to support stewardship of its natural resources.

### OBJECTIVE 1

To preserve the scenic character of the Town of Loudon by protecting its natural, historic, scenic, and agricultural resources.

- Identify the locations of prime farmland soils using GIS mapping so that the resources may be conserved.
- Continue to work with land trusts, conservancies, and other non-profit groups to protect local lands.
- Identify opportunities to acquire land for permanent protection through available funding mechanisms to ensure the long-term protection of resources.
- Promote the preservation of agricultural lands in the community through state, federal and nonprofit grant opportunities.
- Continue to seek conservation and public access easements to parcels located along the Soucook River.

### OBJECTIVE 2

To promote the conservation, protection, and sound management of the Town's natural resources including water, forests, habitats and open space.

- Review the wetlands application process to look for ways to improve current procedures.
- Evaluate current protection of the Town's future water supplies including the large aquifer under the Soucook River.
- Look for opportunities to reduce nonpoint source pollution, including educating farmers, residents, and businesses on the use of fertilizers, biosolids and cleaned soil and create low salt

areas on Town roads where water resources could be impacted.

- Pursue the identification of wildlife habitats and unique natural communities for future protection efforts in high priority areas.
- Identify critical wetlands that could be candidates for Prime Wetland designation (RSA 482-A:15).

### OBJECTIVE 3

To provide recreational opportunities for all ages and user groups.

- Continue to work with the snowmobile club to obtain landowner permission and parking locations for using the existing snowmobile trails as walking trails during warm weather months.
- Continue to acquire conservation easements for recreational use, including hunting, fishing, and hiking.
- Publicize the properties that are available for public recreational use, including parking areas and type of uses allowed on the properties.
- Continue to work towards an updated trails map of the Town that is available to the public.
- Work towards the development of separate maps of each open space and water resource property, indicating the type of public activities allowed, parking restrictions and location of activities permitted.

#### OBJECTIVE 4

To educate the citizens and Town officials in Loudon on the importance of protecting the Town’s natural resources and open space.

- Provide information to the public about the existing recreational, historical, and conservation resources in Town, including providing a map on the Town website, and report on activities of the Conservation Commission to obtain more support.
- Identify grant funding opportunities to develop a Natural Resources Inventory and consider adopting it as a sub-element of the Master Plan.
- Continue to seek community support for local funding of conservation projects through the Capital Reserve Fund and Land Use Change Tax and apply for grant monies.

#### OBJECTIVE 5

To respond to new techniques or initiatives, as appropriate, that will enhance the protection of natural resources important to Loudon.

- Continue to amend land use and zoning regulations that will protect resources such as wetlands or floodplains.
- Review zoning ordinance to ensure it follows the Shoreland Water Quality Protection Act (SWQPA), NH DES specifications and recognized best management practices to protect water quality.
- Continue to enhance subdivision and site plan review as a means to assess the impact of proposed developments and to negotiate design changes with developers that would protect the Town’s natural, scenic, historic and agricultural resources.

#### OBJECTIVE 6

To ensure local compliance with federal and state regulations, including gravel excavation.

- Continue to monitor gravel excavation and reclamation activities to ensure compliance with RSA 155:E.

#### OBJECTIVE 7

To involve Town boards, and public, private, and state organizations in the protection of Loudon’s resources.

- Continue retention of revenues derived from on Town Forests to be dedicated to conservation projects.
- Encourage other communities along the Soucook River watershed to work with the Loudon Conservation Commission on developing a designated corridor to promote the conservation of the shoreline and to provide public access to a valuable local and regional asset.
- Continue to foster a working relationship between the Conservation Commission, the Planning Board, the Zoning Board of Adjustment, and the Board of Selectmen.
- Promote participation in the Conservation Commission using techniques such as the writing of articles for the Loudon Ledger and the placement of information on the Town website to enhance public knowledge of Conservation Commission activities.
- Reinvigorate the Recreation Committee to work proactively on recreation access to trails and promoting their use.
- Support the Agricultural Commission in promoting the protection of the agricultural resources in Town and

developing a seasonal farmer's market to help promote the Village.

- Explore the feasibility of utilizing the Rivers Protection and Management Program (RMPP) of DES to assess the potential of creating a corridor along the Soucook River.