

Section III

Natural Resources

Introduction

Natural resources are one of the most fundamental elements of the “quality of life” of a place where people live and visit. Sunapee relies on its natural resources for drinking water, agricultural production, construction materials, wood-based heat, country setting, wildlife, scenic vistas, and recreational opportunities. This Section explores Sunapee’s natural resources and provides guidance for their protection. The Sunapee Natural Resource Inventory (2009) is included as Appendix D.

Goals for Natural Resources

1. Create and maintain a process for natural resource protection.
2. Protect the natural environment.
3. Provide public access to significant natural areas.
4. Provide an opportunity for the use of significant natural resources.

Vision for Natural Resources

The vision for Sunapee includes these community values pertaining to natural resources:

- Maintain and enhance the quality of Lake Sunapee
- Peace and quiet
- Dark night sky
- Maintain scenic views
- Enhance seasonal recreation opportunities
- Improve the quality of Perkins Pond.

Related Goals from Land Use Section

The Land Use Section describes the community’s goals for the types and locations of growth. These land use goals have an influence on natural resources:

- Encourage high-density housing in the village areas served by utilities and lower-density housing in outlying areas.
- Encourage preservation of significant historic, natural, and scenic resources.
- Recognize areas with large undeveloped tracts of land and protect them with zoning controls which will maintain the character of the area.
- Encourage the development of trails, bike paths, and other recreational ways.

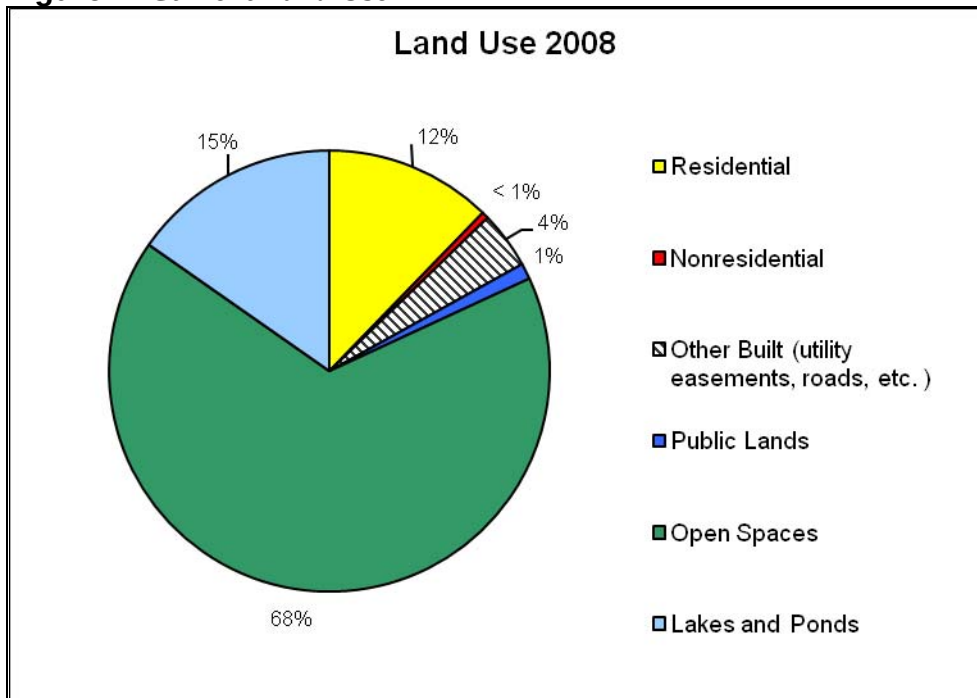
Land-Based Resources

Sunapee is ecologically linked to its neighboring towns by Lake Sunapee and its watershed, as well as to towns downstream along the Sugar River. The town lies within

the Connecticut River Basin, which covers 11,000 square miles in Vermont, New Hampshire, Massachusetts, and Connecticut.

Existing residential development is clustered along the lakeshores. Commercial development is located in Sunapee Harbor, Georges Mills, and along Routes 11 and 103. The western part of town is less developed than the eastern part near Lake Sunapee.

Figure 1: Current Land Use



Source: Town parcel data from Sunapee Master Plan, 2010.

Within the region, there are three large blocks of unfragmented land with some coverage in Sunapee (Map 1):

- A 1,204-acre block in the western end of town, lying north of the Sugar River and south of Perkins Pond and containing significant wetland areas, including the Wendell Marsh Wildlife Management Area.
- A 4,230-acre block in Croydon, Springfield and the northwest corner of town, connecting to the shorelines of Perkins Pond, Ledge Pond, and Lake Coniston.
- A 30,000 acre tract of forested land, the Sunapee-Pillsbury Highlands, which extends into the southeast corner of Sunapee and much of which is protected from development by the Mount Sunapee and Pillsbury State Parks and private conservation.

These large contiguous blocks of unfragmented land provide habitat and movement corridors for wildlife and protection for water resources.

Agricultural Soils

The Sullivan County Soil Survey places Sunapee's agricultural soils in three classes:

- Prime farmland (2.8% of total land area)
- Farmland of statewide importance (3.3%)
- Farmland of local importance. (21.8%)

Forest Soils

Sunapee is heavily forested, with over 80% of its land covered by hemlock-hardwood-pine mixed forest, mixed with significant areas of lowland spruce-fir forest and northern hardwood-conifer forest. (Section 3.2, Land Use and Land Cover, [Appendix D](#)). There is an abundance of soil types that support sufficient tree growth for commercial forestry operations.

Earth and Mineral Resources

Sand and gravel resources represent about 4 percent of the town's total land area. The largest deposit is located in the southwest corner of town in the outwash plains along Wendell Brook. This is likely the only area in town that can support commercial sand and gravel excavation for use in local construction and export to other communities.

There is one active granite quarry in Sunapee, located approximately one mile south of the village, east of Route 103 B. The granite is identified as "Concord Granite," which is medium to fine grained, white or gray.

Land-Based Resource Protections

Land use is shaped and natural resources are protected by state regulation and by the town's zoning and other regulations. Sunapee has five zoning districts: Village, Mixed Use, Residential, Rural Residential, and Rural Lands. Farming and forestry are permitted by right in the Rural Residential and Rural Lands districts, roughly two-thirds of the town's area. Commercial and industrial uses are restricted to the Village and Mixed Use districts, and residential development is allowed in all districts.

Sunapee utilizes cluster development and planned unit development techniques to promote the conservation of open space and natural features. These techniques permit developing portions of a parcel, while setting aside open space where environmentally sensitive areas may be protected

In a proposed major subdivision, the Planning Board may require that up to 15% of the total area be designated as open space.

In addition to these local protections, sand and gravel operations are regulated by the state under the provisions of RSA 155-e.

In addition to these regulatory protections, public ownership and conservation easements protect agricultural areas and productive forests. The Sunapee Conservation Commission has developed forest management plans for the town forests.

Water-Based Resources

The most prominent geographic feature of the town is Lake Sunapee, which forms the eastern edge of town. Several other water bodies dot Sunapee's landscape to the west and north.

The Lake Sunapee watershed includes sections of the towns of Goshen, New London, Newbury, Springfield, Sunapee, and Sutton. Threats to water bodies in Sunapee include:

- Pollution from stormwater runoff
- Sedimentation caused by erosion from land development activities
- Impacts of impervious cover to water quality and stormwater runoff
- Impacts from aging septic systems
- Road salt use and storage

Watersheds and Surface Waters

Sunapee is rich in surface water bodies, with five lakes or ponds over 100 acres and numerous smaller ponds (Table 2). Lake Sunapee covers 4,090 acres, with over half in Sunapee. This lake is identified as important wildlife habitat in New Hampshire (refer to Section 3.9 Wildlife Resources in the Natural Resource Inventory, [Appendix D](#)), and also provides recreational and scenic value to the town.

Table 2: Major Water Bodies in Sunapee

Name	Towns Bordering	Acreage
Ledge Pond	Sunapee	110
Mountain View Lake	Sunapee Newbury	105
Otter Pond	Sunapee New London	185
Perkin's Pond	Sunapee	157
Lake Sunapee	Sunapee New London Newbury	4,090
Wendell Pond	Sunapee	11
Total Acreage of Major Water Bodies		4,658

Roughly 40% of the town drains into Lake Sunapee. Lake Sunapee and all of the rest of the town drains into the Sugar River.

The Sugar River is the largest river in the region. It is tapped for hydroelectric energy near Sunapee Harbor, provides the town's primary water supply and serves as a secondary water supply for Claremont.

Wetlands

Wetlands play an important ecological role for wildlife, water quality, and flood retention.

Wetlands cover 2,100 acres in Sunapee, or 15.6% of the town's land area (Map 5 in the Natural Resource Inventory, Appendix D).

The extensive marshes and floodplain forests along the Sugar River in Sunapee provide flood retention, shoreline anchoring, wildlife habitat, and scenic views from Route 11. The many smaller wetlands provide similar functions.

Groundwater Resources

Sunapee has limited groundwater resources in the form of stratified drift aquifers. Stratified drift aquifers in Sunapee cover 390 acres, only 2.9 percent of the town's land area (Map 4 in the Natural Resource Inventory, **Appendix D**). Water stored in bedrock is another source of groundwater in Sunapee.

Roughly half of Sunapee's residents receive their drinking water from Lake Sunapee, through a service connection with Sunapee Water Works. The other half receive their drinking water from bedrock wells, either from the Georges Mills Water Works or private wells.

Groundwater wells draw water from a zone around the wellhead. The wellhead protection area, delineated based on the volume of water withdrawn from the well, represents the groundwater resource. Wellhead protection areas cover roughly 1,300 acres, or 10% of the town's land area (Map 6).

Floodplains

Floodplains are primarily found in the vicinity of the Sugar River with small areas of floodplain along the Lake Sunapee shoreline. Floodplains accommodate excess water during flooding and provide travel corridors for wildlife.

Development in floodplains presents some special problems, including the possibility of property damage during flooding, the restriction of flood water storage, and the increased likelihood of erosion and sedimentation which can cause increased turbidity and nutrient loading.

Water-Based Resource Protections

Surface waters and wetlands in Sunapee are protected by both state and local regulation. Sunapee's six major water bodies and the Sugar River fall under the jurisdiction of the Comprehensive Shoreland Protection Act which limits land uses within a 250' shoreland buffer to protect water quality and aquatic habitat. There are restrictions on the amount of impervious surface in this zone and provisions to preserve natural vegetation. A summary of Comprehensive Shoreland Protection Act standards is included in the Natural Resource Inventory, Appendix D. Activities impacting wetlands are regulated by the State Wetlands Bureau.

Sunapee protects its water resources through a Water Resources Overlay District comprised of wetlands, aquifers, and shoreline areas. Areas covered by these overlay districts have additional regulations which protect water resources and ecologically fragile areas.

The Wetlands Overlay District increases the minimum lot size and prohibits the construction of structures or buildings, and dredging or filling in wetlands.

Streets, roads, and utility right-of-way easements and water impoundments affecting wetlands require approval from the State Wetlands Bureau, USDA Natural Resources Conservation Service, and Sunapee Conservation Commission, as well as the Sunapee Planning Board.

The Aquifer Overlay District increases the minimum lot size and limits the maximum lot coverage. The Aquifer Overlay District allows construction of buildings, but prohibits potentially polluting uses, such as landfills, salt storage, and hazardous materials storage. In addition, natural drainage and vegetation must be maintained, to allow for recharge of the aquifer.

Sunapee's Shoreline Overlay District supplements the requirements of the Comprehensive Shoreland Protection Act. Within 300 ft. of lakes and ponds greater than 10 acres, erosion and sedimentation control plans are required for all construction, filling, grading, dredging and other land disturbance, using design standards in the Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire, 1992, Rockingham County Conservation District & USDA SCS. Also, within the 300-ft zone, only lime fertilizer application is permitted.

Within the Shoreline Overlay District, docks and beaches are permitted uses, subject to the requirements of the state. Cutting and clearing is regulated within 150 ft of the shoreline, and construction requires an approved erosion control plan.

The Sunapee Zoning Ordinance prohibits construction on slopes greater than 25%. Driveways, stairways, and utilities are exempt, but require a drainage and erosion control

plan. An erosion control plan is also required for land clearing of greater than 100,000 square feet.

Excavation is regulated by the state.

Lake Sunapee has been protected by concerned citizens since 1898 when the Lake Sunapee Protective Association (LSPA) was formed. LSPA provides environmental education about issues that affect the lake and its watershed. LSPA is active in managing the milfoil infestation on Lake Sunapee; divers harvest the plants; lake hosts educate boaters on milfoil and inspect boats. There is a boat washing station in Sunapee Harbor.

The Sunapee Area Watershed Coalition recently completed a watershed management plan for Lake Sunapee. The plan identifies seven focus areas for improving water quality in the lake and brings together the surrounding communities and stakeholders. Similar recommendations would likely prove effective in improving water quality in other watersheds in Sunapee.

Sunapee organizes household hazardous waste collections with neighboring towns and the Upper Valley Lake Sunapee Regional Planning Commission. These collections minimize the risk of inappropriate disposal or accidental release of common toxic materials into the water supply.

New Hampshire Department of Environmental Services (NHDES) and local lake associations monitor water quality in Lake Sunapee, Ledge Pond, and Mountainview Lake through the Volunteer Lake Assessment Program. Each year, a water quality report is produced and improvements or declines in water quality are identified.

The Federal Emergency Management Agency (FEMA) has prepared Special Flood Hazard Area maps which identify the 100-year flood areas. These maps may serve as planning tools to establish zoning districts that limit certain land uses in flood-prone areas.

Conserved and public land protect shorelines on Ledge Pond, Lake Sunapee, and the Sugar River as well as several smaller streams. The Georges Mills Water Works owns or has an easement on 15 acres near its wellheads. Several areas of wetland are also protected, notably Wendell Marsh and the Redwater Creek area.

Scenic & Wildlife-Based Resources

Ridges run generally north-south in town and provide remarkable views of Lake Sunapee and other water bodies, villages, forest, and open fields.

Sunapee's natural landscape is a mixed forest interspersed with grasslands, wetlands, and water bodies which provide habitat for many species of wildlife.

Agricultural activities are scattered throughout town, offering a scenic working landscape that contributes to Sunapee's rural character.

According to the New Hampshire Natural Heritage Bureau database of occurrences of rare, threatened, and endangered species and exemplary natural communities, there is only one record of a rare species in Sunapee, the common loon (Map 8 in the Natural Resource Inventory). Other rare plant and animal species have been found and recorded in surrounding towns (Table 4). It is possible that these species also utilize habitat in Sunapee.

Table 4: Rare species in Sunapee and surrounding towns

Species	Type	Species	Type
Common loon	Bird	Graceful clearwing	Insect
Least bittern	Bird	Brook floater	Mollusk
Common nighthawk	Bird	Fragrant fern	Plant
Pied-billed grebe	Bird	Loesel's twayblade	Plant
Northern leopard frog	Amphibian	Tubular thoroughwort	Plant
Wood turtle	Reptile	Peat moss (2 spp.)	Plant

Wetlands provide habitat for a great number of amphibians, reptiles, birds, and invertebrates; moose are a frequent visitor to marshes and shallow ponds during the summer months. Vernal pools provide breeding habitat to amphibians in the spring.

Grasslands are intermittent features in the landscape. They become established after a disturbance and are eventually taken over by forests. Several species of bird rely on the grasses for breeding grounds and as a source of food.

The aquatic habitats in Sunapee range from large lakes to small shallow marshes, and support a wide variety of fish and invertebrate life. Lake Sunapee supports both cold-water and warm-water species, including landlocked salmon, lake trout, smallmouth bass, pickerel, horned pout, and rock bass (NH Fish and Game, 2004). Perkins Pond supports warm-water species, including smallmouth bass, pickerel, and horned pout. The Sugar River provides a cold-water habitat for brook, brown, and rainbow trout.

Many of the lakes and wetlands in Sunapee have been ranked as top-tier habitat by New Hampshire Fish and Game. There are large areas of high-quality habitat around Ledge Pond, Perkins Pond, and Lake Sunapee, and, to a lesser extent, around Mountainview Lake and Otter Pond. The floodplain forests and wetlands along the Sugar River, near Wendell village and the Wendell Wildlife Management Area, are also high-quality habitat.

Wildlife travel corridors are an important resource. These travel ways are often disrupted by roads and development.

Small wind energy systems and solar power systems have the potential to further impact wildlife and scenic views from the resulting land clearing.

Scenic & Wildlife Resource Protections

Public land ownership and land conservation protect scenic and wildlife resources on roughly 1,900 acres in Sunapee. There are three state Wildlife Management Areas, 15 acres of water supply land, several parcels left by trust deeds to the town, and a large number of privately-owned parcels with conservation easements.

These resources may also be protected through the Cluster and Planned Unit Development regulations and the open-space provisions in the subdivision regulations. Through the state wetland permitting process, impacts to vernal pools and wildlife are included in the review of permit applications.

Table 5: Summary Spreadsheet of Natural Resource Protections

Natural Resource	Acres	% Protected *	Existing Regulatory and Non-Regulatory Protections	Policies to Consider
<i>Water Supply</i>			Erosion control plans for steep driveways/roads and large clearing No building on slopes >25%	Expand scope of erosion control plans. Incorporate Low Impact Development principles and Best Management Practices for siting, design, construction, and post construction
Wellheads	1,324	12%	Household hazardous waste collections Water quality monitoring on Lake Sunapee	Add additional potential drinking water contamination sources to prohibited uses
Shorelines	1,000	6%	Town restrictions on land uses within 300' of lakes Increase in minimum lot size Maximum lot coverage provision in Zoning Ordinance State restrictions on land uses within 300' of lakes and Sugar River	Widen shoreline overlay district beyond 300'
Aquifers	392	37%	Increase in minimum lot size Maximum lot coverage provision in Zoning Ordinance Prohibitions on potentially polluting land uses Restrictions on building and "intensive coverage"	Add additional potential drinking water contamination sources to prohibited uses
<i>Wetlands</i>	2,102	22%	Increase in minimum lot size. No building of structures in wetland Dredge/fill requires state permit under the Clean Water Act	Designate prime wetlands
<i>Agricultural soils</i>	3,772	16%	Agriculture permitted by right in Rural Residential and Rural Lands	PUD & Cluster incentives
<i>Forest soils</i>	12,896	15%	Forestry permitted by right in Rural Residential and Rural Lands	PUD & Cluster incentives

<i>Wildlife habitat</i>	2,179	14%	- no specific protections -	Seek conservation easements and land purchases
<i>Unfragmented land</i>			- no specific protections -	Density transfers from rural areas to village areas
<i>Scenic areas</i>			PUD & Cluster	Ridgeline Development restrictions

* % Protected: Percent of the resource area that is protected from development through public ownership and/or conservation easement.

Please note - All natural resources, including those that have no specific protections in the Town's land use regulations, may be protected by the open space set-aside provisions for a cluster development or planned unit development or may be protected by conservation easements.

Opportunities and Challenges

Among the challenges created by growth and development are opportunities to promote natural resource protection.

Institutional Practices & Partnerships

The town currently participates in regional efforts to foster the protection of natural resources. The Sunapee Conservation Commission works with landowners and regional or statewide land trusts such as the Ausbon Sargent Land Preservation Trust and the Society for the Protection of New Hampshire Forests to permanently protect land through conservation easements. Organizations such as the Lake Sunapee Protective Association (LSPA) and the Sunapee Area Watershed Coalition (SAWC) provide mechanisms for cooperation in the protection of shared water resources. Such a process is helpful regionally and locally in facilitating a cooperative approach to resource protection.

However, within the town itself, there is no institutional framework to address internal natural resource protection. The town should establish a process for addressing natural resource issues that are within the control of the town by identifying boards, commissions and staff to be responsible for the process.

Land Use & Development

Since 1998, the amount of land in residential use has increased by 600 acres,. Much of this growth has come from the conversion of forested lands. The development challenge is to encourage growth in identified village areas and discourage it in rural lands or sensitive areas.

Land availability in village centers is limited by restrictions on shoreland development and steep slopes. Zoning changes may be necessary to ensure that adequate land area away from surface waters is available for future village growth.

Rural areas within Sunapee have been identified for low-density residential development. Focusing growth away from rural and sensitive areas has the potential to significantly benefit natural resources. This land use policy should continue to be supported by land conservation efforts.

To assist with this component of Sunapee's land use policy, the town may consider providing for the transfer of development rights from rural lands to locations near village centers served by water and sewer infrastructure.

Centers of Activity & Tying Natural Resources to Recreation

There are a number of cultural and recreational opportunities that are unique to Sunapee, and are important centers of community activity. These include single-point resources such as the Town Hall and Abbott Library and linear resources such as river corridors and trails.

These "activity centers" can be linked by walkways and trails which provide accessibility to natural resources, raising awareness about the resources and providing the public with recreational opportunities. A comprehensive and contemporary concept for making these linkages is found on the following page.

Making connections among centers of activity and rural conserved lands can begin with the existing trail system. The existing Sunapee-Ragged-Kearsarge Greenway spans the town north to south and is proximate to many of the centers of activity. Identifying recreational corridors and nurturing their enhancement through permanent easements in subdivisions or by the purchase of land by the town, will produce a network of trails for hiking, horseback riding, cross country skiing, and snow-mobiling.

Recommendations

1. Protect Lake Sunapee.

Collaborate with towns in the Lake Sunapee Watershed (Goshen, New London, Newbury, Springfield, Sutton) and interested organizations such as Lake Sunapee Protective Association to protect Lake Sunapee as a public drinking water supply & recreational resource.

Support groundwater protection through creation of a local health ordinance to authorize septic system inspection.

Strengthen storm water management/erosion controls through approaches such as low impact development.

2. Improve/protect the quality of Perkins Pond.

3. Protect the natural environment.

Educate citizens on importance of natural resources.

Implement a Transfer of Development Rights ordinance/policy and introduce Low Impact Development provisions within zoning, subdivision & site plan review to encourage preservation of rural lands.

Introduce additional requirements for developers to protect natural resources and encourage easements for trails connecting conservation and recreation areas within zoning, subdivision & site plan review.

Create a list of significant natural/historic resources to be protected.

Actively protect water quality, wildlife habitat, scenic areas, and open space through conservation easements and land purchases.

Increase conservation funding.

4. Protect prime wetlands.

5. Provide public access to significant natural areas.

Investigate feasibility of Visual Protection District and/or a Ridgeline Development ordinance around scenic areas.

Focus low-impact recreation in undeveloped areas and higher-impact recreation in more disturbed areas.

6. Continue to support managed forests, mineral extraction, and farming.

Foster compatibility between their active use and surrounding land uses.