

NATURAL RESOURCES

With a variety of forestry, farm, and soil types, numerous plants, wildlife species, and significant lakes, brooks, wetlands and other water resources, Bradford’s 22,574 acres of land is rich in natural resources. There are 1,756 acres of permanently protected land and approximately 16,279 acres of land in current use. It is estimated that 90 percent of the town’s land area is forested. Wetlands are found scattered throughout the town, and many tracts of land remain undeveloped, providing wildlife habitat for a number of diverse species. Many hills exist in the town, and two types of bedrock geology underlay Bradford. The town boasts two prominent lakes, Lake Massasecum and Lake Todd, as well as the Warner River, and a number of brooks and streams, which not only provide resources for water recreation, but also provide additional habitat for the unique natural communities in the town. An Inland New England Acidic Pond Shore Community is found on the southern shore of Lake Massasecum. The Bradford Bog conservation area is the site of a rare stand of Atlantic White Cedar, and the Bradford Pines boasts some of the oldest remaining white pines in the state. This rich diversity is one of the reasons people have been attracted to Bradford throughout its history.

Bradford values and supports strong stewardship of its natural resources, committed to providing residents clean air and water, and a living legacy of active agriculture, forests, hills and water resources that reflect the rural character of the town.

The Bradford Conservation Commission developed a detailed Natural Resource Inventory in 2012 which builds much of the base of this chapter. The Natural Resource Inventory includes extensive information on the town’s natural resources and readers should refer directly to this report for more detail.

SUMMARY OF COMMUNITY INPUT

Community input indicates that the people of Bradford view local natural resources as playing a very important role in the town’s quality of life. These natural resources help shape the town’s rural character, produce scenic beauty, and also provide vast recreational opportunities. Residents identified Bradford’s rural atmosphere, scenery and conservation of natural resources as most important features in town. Also mentioned was a reasonable tax rate, educational system, people and community spirit.

Table 6.1: Residents identify important features in Bradford

Identified Feature	Very Important	Important
Rural Atmosphere/Scenery	67.7%	24.8%
Conservation of Natural Resources	65.0%	23.4%
Reasonable Tax Rate	56.2%	32.3%
Educational System	53.7%	26.9%
People/Community Spirit	52.2%	29.9%

Source: Bradford’s Master Plan Community Survey

Of all the resources in Bradford, the most highly valued by participants include lakes, rivers, and other water bodies, aquifers, fish and wildlife, forested land, open space, and rural farmland. Lake Massasecum, Bradford Bog, French's Park, Silver Hill, and the Tall Pines were specifically mentioned throughout the Community Survey and the Community Visioning Session as important areas to preserve.

The importance of recreation was a common theme throughout the community outreach process, as participants already use many of these natural resources for recreation, though would like additional recreational opportunities to be developed. This includes walking trails, bike paths, expanded lake access, and town-run recreation programs. Many indicated that they are also interested in the development of a rail trail, not only for its recreation opportunities, but for the economic development opportunities it could provide Bradford.

WATER RESOURCES

The ***Water Resources Map*** depicts the location of the best known water features within the town. Included on this map are lakes, ponds, rivers, brooks, wetlands, water supplies and aquifers. Landscape changes on the shores of streams, rivers, and lakes can have an immediate effect on local residents and towns downstream. As indicated in the Town's Natural Resource Inventory, Bradford is in large part responsible for the water quality of the Warner River. Control of flooding, erosion, and nutrient runoff are all important aspects of water resource management. Readers may refer to the Town's Natural Resource Inventory for additional information related to water resources.

WATERSHEDS

A watershed is an area of land where all waters flow to another river or ocean (such as the Atlantic Ocean). This includes precipitation, surface water, groundwater, wastewater discharges, and surface water runoff from natural and urban areas. Water bodies within a watershed include seasonal and perennial streams, rivers, ponds, vernal pools, and lakes. Bradford lies entirely within the greater watershed of the Contoocook/ Merrimack River. Its principal watershed is that of the Warner River. A small portion of the town's southwest corner also lies in the Beard's Brook watershed.

Because all surface water within a particular watershed drains as a unified hydrologic system separate from any other neighboring watershed area, knowledge of watershed locations and how their drainage system works, combined with knowledge about underlying water-bearing aquifers, plays a large role in helping town planners locate and protect town wells and regulate those surface land uses which could contaminate water resources.

GROUNDWATER & AQUIFERS

Groundwater is an important resource as it provides the drinking water for the majority of town residents. Groundwater is typically hydrologically connected to surface waters, and thus affects the quantity and quality of them. It is defined as the subsurface water, which saturates sand, gravel and other soil deposits, and fills the cracks within the underlying bedrock. The top surface of this saturated zone is called the water table, which may be just below the surface or at some depth.

Groundwater is replenished largely by rainwater and snowmelt, which percolate downward through the unsaturated soil. Other sources of replenishment, or recharge, may come from streams, lakes and ponds. There are many factors affecting this recharge including the presence and quality of plant cover, how much runs off as surface water to other

water bodies, and how much impervious surface covers the aquifer. Although rainfall will percolate into all soil and weathered rock surfaces to some extent, areas of more porous sand and gravel will allow a greater amount of infiltration, and are specifically noted as "recharge zones" to signify their importance in recharging groundwater reservoirs. Therefore, it is important to identify and protect these areas from certain land uses that may prevent the recharge of groundwater or be a significant threat of subsurface contamination.

DID YOU KNOW?

Impervious surfaces such as roads and rooftops increase stormwater runoff, carrying with it salt, chemicals and excess nutrients which can contaminate surface and groundwater.

Aquifers are geologic formations, such as fractured bedrock, glacial sands or gravels, which contain water and yield significant quantities of water to springs and wells. A stratified drift aquifer, typically an aquifer with layers of sand, gravel and silt, is a source of water for towns and other large volume water users. Several of these aquifers exist in Bradford, the largest of which is located mostly in neighboring Newbury, but extends under Pleasant View Road and Fairgrounds Road. There are no obvious pollution threats to this aquifer. The most accessible aquifer is under Lake Todd, stretching to Main Street and Route 103, into Warner at Melvin Mills and down to the northern shore of Lake Massasecum. The purity of this aquifer is threatened by pollution from significant development already present. A small aquifer also exists under Blood Meadow and Bradford Bog.

LAKES & PONDS

Lake Massasecum is the largest water body in the immediate area, spanning over 400 acres, with a maximum sounded depth of 50 feet at its deepest point. It serves as a major tributary to the Warner River, and is one of only two lakes in the state where the outlet become an inlet at times of heavy rain and snowmelt. Numerous streams flow into the Lake and the largest is an unnamed brook which flows into the Lake's south shore. This large lake is unusual for its natural ebb and flow unhampered by man-made dams. It is also unusual in New Hampshire for its predominantly sandy shoreline and rare plant communities and species. In some years, unusual freshwater jellyfish are noticed.

The shores of Lake Massasecum contain a rare "Inland New England Acidic Pond Shore Community." Along the southern shore of the Lake and in the associated wetlands, a small aquatic plant, sclerolepis, can be found. This is the only known site for this plant in New Hampshire. Unfortunately, the northern end of the Lake has been affected by the invasive aquatic plant water milfoil, which has spread to other areas of the lake but is being well managed by volunteers. The Lake Massasecum Improvement Association continues to work with the NHDES to control the spread of this invasive species.

Lake Todd shares its shores with both Newbury and Bradford, and its watershed extends into Sutton. The dam at the 'Brick Mill' on East Main Street in Bradford is a visible reminder of early industry in town. The Lake is highly valued by residents as it provides recreational opportunities and scenic views as one

enters the town. Lake Todd shore owners have formed a protective association to monitor the lake water and to care for the dam at Main Street, which was extensively renovated in 2012.

Bradford has many small ponds, some of which are manmade, and associated streams and wetlands. These are outlined with additional details in the Town's Natural Resource Inventory.

RIVERS & STREAMS

The Warner River is the only 4th order stream located within the boundaries of Bradford. The Warner River begins at the outlet of Lake Todd dam. North of Lake Massasecum the River visually materializes as water from the Lake is added to it. The Warner River then flows east and into the Town of Warner and on to the Contoocook River.

Bradford has two large streams which flow west to east in the town, Hoyt Brook and the West Branch Brook. Hoyt Brook begins at Avery Ledge and flows for several miles to the Warner River, with several large wetlands along its course which control annual flooding along the Brook. West Branch Brook begins from the side of Mount Sunapee and joins the Warner River at the junction of Routes 103 and 114. These brooks come together over Bradford's most accessible stratified drift aquifer- a possible source of public drinking water and also an area most susceptible to pollution issues.

Various other streams and brooks are found in Bradford and play just as equally important a role in the town's water resources. These can be found outlined in Bradford's Natural Resource Inventory.

In Bradford, brooks and streams are protected by wetlands regulations. The wetlands associated with the brooks in Bradford help to mitigate annual flooding by allowing flood waters to spread into the wetland areas surrounding them. Areas such as West Meadow, Fairgrounds Road wetland, Bradford Pines and Melvin Mills all flood annually. A major flooding issue is the filling of wetlands along Routes 114 and 103 which contributes to the back flow of Melvin Brook into Lake Massasecum. Impacts include the compromise of septic systems and wells, as well as the frequent flooding of commercially zoned land in this area.

WETLANDS

Wetlands are areas where water is present at or near the soil surface for at least part of the growing season and influences the plants that can grow there, as well as the soil characteristics. As defined by state and federal regulations, a wetland is an area that is inundated or saturated by surface or

WARNER RIVER DESIGNATION

In 2018, the Warner River was adopted as a protected waterbody under the New Hampshire Rivers Management and Protection Program. The designation includes the entire mainstream of the River from Bradford to Hopkinton as well as 1.1 miles of the West Branch Warner River in Bradford.

After designation, a volunteer Local River Management Advisory Committee is formed. This committee is tasked to develop and implement a River Management Plan so to protect the outstanding qualities of the River that lead to its designation. This plan identifies management goals and recommends actions that may be taken to protect the River and its resources.

For more information, please visit the Rivers [Management Protection Program's website](#).

groundwater at a frequency and duration sufficient to support, and that under normal conditions does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include, but are not limited to swamps, bogs, marshes, and similar areas.

Many wetlands have water present because the soils are poorly drained or the water table is very high. The US Fish and Wildlife Service National Wetlands Inventory shows wetland areas scattered through the town. These wetland systems provide significant water quality and wildlife benefits. Wetlands provide a multitude of services that include flood control, fish and wildlife habitat, pollutant removal, recreation, groundwater protection, and soil stabilization. The primary impacts facing wetlands in Bradford today are the effects of development within the wetlands or the adjacent buffer areas needed to protect them.

In 1979, NH's wetlands law was amended to provide an option for municipalities to designate high value wetlands for greater protection. In a 1998 study, conducted by the Bradford Conservation Commission with assistance from the University of New Hampshire Cooperative Extension the Community Environmental Outreach Program, 18 wetlands areas were identified using the New Hampshire Method. The NH Method is a technique for evaluation and comparison of wetlands areas, and not a tool for the delineation of wetlands. The wetlands areas identified include 4 sites recommended for designation as Prime Wetlands; Alder Plains, Bradford Bog, Smith Road, and West Meadow.

Bradford contains approximately 2,090 acres of wetlands, which are classified into three different wetland types. The wetlands listed in Table 6.2 indicates the total acreage of each type in Bradford. As seen on the **Water Resources Map**, concentrations of wetlands are found in the southwest corner of the town (Bradford Bog and Springs) and the northeast section of town (Lake Massasecum, Lake Todd, and surrounding streams). Several others are found near the center of town.

BENEFITS OF WETLANDS

Flood Control – Wetlands act as a giant sponge during periods of high run-off or flooding and then release this stored water slowly during drier periods;

Water Storage and Groundwater Recharge – The water wetlands can move up by means of evaporation, laterally by flowing in streams, and downwards, thus recharging groundwater;

Erosion and Sediment Control – Because vegetated wetlands absorb and slow down the rate of runoff, the water's erosive powers are decreased;

Pollution Filtration – Wetland vegetation and microorganisms reduce the harmful potential of pollutants such as bacteria, and nutrients found in runoff;

Wildlife – Wetlands vegetation and water provide food, habitats, and breeding ground for a wide variety of wildlife and fish;

Education and Recreation – Wetlands provide natural areas of study for all ages as they offer innumerable flora, fauna, and wildlife habitat and often serve as excellent sites for photography, canoeing, snowshoeing, hiking, fishing and hunting; and

Plant and Animal Diversity – Generally, only wetland plants can tolerate wet soils as they create unique habitats for wildlife.

Table 6.2: Wetland Types in Bradford

Wetland Type	Acres	Percent
Palustrine – vegetated nontidal areas characterized by the presence of trees, shrubs, or emergent vegetation.	1,484	71%
Lacustrine – large, open water-dominated areas.	606	29%
Riverine – deepwater habitats contained within a channel with flowing water.	0	0%
Total	2,090	100%

Source: National Wetlands Inventory GIS Database

According to the Natural Resource Inventory, the majority of Bradford’s wetlands are in good condition. Those that are showing signs of degradation are predictably located in the northern part of town where commerce and residential development have intruded (wetlands on Old Sutton Road, Route 103 and 114, and the south end of Blaisdell Lake Road) and on Fairgrounds Road where agriculture has altered the habitat considerably.



*Moose viewed along Forest Street. These moose are enjoying the wetland that has been preserved by the addition of a beaver exclusion device. This device maintains a water level that works for both the beavers and the road/culvert.
Photo Credit: Bill Duffy*

VERNAL POOLS

Awareness of the importance and necessity of vernal pools is increasing. Vernal pools are temporary and usually small bodies of water devoid of fish that, in most years, retain enough water to act as the essential breeding habitat for some amphibians and invertebrates. These include wood frogs, spotted

salamanders, Jefferson-type salamanders, fairy shrimp and some species of fingernail clams. Vernal pools vary in size, shape and location, but occur typically every spring in the same place except for very dry years. Usually the pool dries up in late summer.

An abundance of other plant and animal species use these pools, but may not be as critically dependent as those specifically known as vernal pool indicator species. In addition to being vital as small individual habitats for local plants and animals, vernal pools often provide valuable links as wetland “corridors” for other wildlife which might otherwise remain isolated and therefore more vulnerable to disturbance.

WATER USE AND CONSUMPTION

DAMS

There are currently ten active structures listed for the Town of Bradford in the NH DES Dam Bureau’s database. According to RSA 482:2 II, a dam is any artificial barrier which impounds or diverts water, has a height of four feet or more or has a storage capacity of two acre-feet or more, or is located at the outlet of a great pond. There are an additional ten inactive dams listed that do not meet the above definition and may be in ruins, breached, removed, or never built.

Every dam is categorized into one of four classifications, which are differentiated by the degree of potential damages that a failure of the dam is expected to cause. The classifications are designated as High Hazard, Significant Hazard, Low Hazard, and Non-Menacing. As can be seen below, Bradford has one Significant, one Low Hazard, and eight Non-Menacing dams.

Table 6.3: Active and In-active Dams in Bradford

Hazard Class	Name	Water Body/ Approximate Location	Use	Status
Significant	Todd Lake Dam	Ring Brook	Recreation	Active
Non-menacing	Private Pond Dam	Unnamed Brook	Recreation	Active
Non-menacing	Klein Recreation Pond Dam	Unnamed Stream	Recreation	Active
Non-menacing	Reeves Farm Pond Dam	Natural Swale	Conservation/agriculture	Active
Non-menacing	West Branch Dam	West Branch Warner River	Recreation	Active
Non-menacing	Bradford Recreation Pond Dam	Town Brook	Recreation	Active
Non-menacing	TR West Branch Dam	TR West Branch Brook	Recreation	Active
Non-menacing	TR Hoyt Brook Dam	TR Hoyt Brook	Recreation	Active
Non-menacing	Kincaid Dam	Unnamed Stream	Recreation	Active
Low	West Branch Dam	TR West Branch River	Recreation	Active
	Warner River	West Branch Warner River	Mill	Ruins
	West Branch Timber Crib Dam	West Branch Warner River	Mill	Ruins
	Cressy Pond Dam	Hoyt Brook	Recreation	Breached
	Rollins Dam	West Branch Warner River	Mill	Ruins
	Hoyt Brook A Frame Dam	Hoyt Brook	Recreation	Ruins
	Hoyt Brook Stone Dam	Hoyt River	Mill	Ruins
	TR Hoyt Brook	TR Hoyt Brook	Recreation	Exempt
	Massasecum Lake	Melvin River	Recreation	Ruins
	West Branch Brook Dam	West Branch Brook	Recreation	Exempt
	Bibbo Dam	TR Hoyt Brook	Conservation/agriculture	Exempt

Source: NH DES OneStop Mapper, October 2019

DRINKING WATER SOURCES

All of Bradford's residents rely on groundwater or surface water for their drinking water. A majority of the Town's well sites are private wells, but public water supply sites are present in some areas. As defined by the NH DES, public water systems are "systems that serve at least 25 people or 15 service connections for at least 60 days each year." Presently, Bradford has a total of 15 public water supply sites, four of which are inactive. Most of the sites are located along Main Street and Route 103.

The most accessible source of water for a potential future public water supply stretches from the western side of Lake Todd through to the southern inlet surface water of Lake Massasecum. It underlies Route 103 and Route 114 in these areas. There is already significant development over this aquifer. This aquifer covers approximately 1,324 acres and lies mostly in Bradford. It has 35 acres of high transmissivity- 4,000 to 8,000 square feet per day.

In addition to public water supply sites, the NH Department of Environmental Services issued 373 private well permits to Bradford residents between 1984 and 2017. Of those permits issued, 23% (85 wells) have been in the past ten years.

THREATS TO WATER SOURCES

Development of all types has the potential to adversely impact natural resources, especially water resources. Many commercial and industrial enterprises use various chemicals in everyday operations, which, if not properly handled and disposed of, can pollute water supplies. Therefore, development where groundwater recharge areas and aquifer areas exist should be thoroughly evaluated prior to approval and/or construction. Any potential development controls should be identified so that development proceeds where the least potential for aquifer recharge exists.

POINT SOURCE POLLUTION

In addition to naturally occurring contaminants, contaminants from various land uses, or activities business (e.g. fuel or oil spills), industry (e.g. improper use and disposal of hazardous materials/waste) and households (e.g. improper use and disposal of herbicides) also present threats to current and potential water supplies. Point source pollution, which is defined as any single identifiable source of pollution, such as a pipe or ditch, is a concern to local residents and business owners as it may have many different routes of entry. Leaking above and below-ground storage tanks, floor drains that directly release into the ground or water body, dry wells, burying waste, and inadequate septic systems are all examples of contamination entry methods. Larger point sources include industrial factories, sewage treatment plants, oil refineries, food processing, and pulp and paper mills.

As contaminated groundwater and surface water gathered by household wells can cause health issues, NH has taken many precautionary steps in the form of regulation of potential contaminants. This includes permits for the discharge of anything other than normal household waste to an on-site sanitary disposal system (e.g. floor drains) and for the discharge directly into surface waters.

According to the NH Department of Environmental Services, potential sources of contamination exist in Bradford. These include hazardous waste generators, underground storage tanks, aboveground storage tanks, auto salvage yards, and solid waste facilities. Because of the continuing need for clean, safe, and available drinking water for the residents of the town, there needs to be an awareness and emphasis placed on protecting this important resource.

Private wells are susceptible to the same pollutants as public water supplies; however, there are no state requirements regulating the quality of the water gathered through private systems. Common, naturally occurring contaminants, such as arsenic, radon and uranium, may be present in water derived from wells. A report published in 2013 on Water Supply Infrastructure and Protection by NHDES estimated about 55% of private well systems in NH exceed the state’s radon limits and 20% exceed EPA’s arsenic contamination level. Private wells should be tested regularly and appropriate treatment systems installed when necessary in order to protect public health. Public awareness through education of the importance of private well testing is critical.

NONPOINT SOURCE POLLUTION

Unlike point source pollution, non-point source pollution cannot be traced back to any specific source. It is water pollution that is caused by widely dispersed sources of pollutants that are carried by runoff from rain and snow melt. It is often referred to as stormwater runoff.

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, pesticides, nutrients, sediment, and other pollutants. The runoff water flows into storm drains or directly into water bodies, carrying the pollutants that have been deposited. As little as 10% impervious surfaces on a lot or larger area can begin to negatively impact a waterway. Thus, the more intensively used a piece of land is, the more nearby waterways are negatively affected by polluted runoff.

STORMWATER RUNOFF

Stormwater runoff, a type of non-point source pollution, occurs when water from intense rain and snowmelt flows over land instead of soaking into the ground. In addition to spreading containments, stormwater runoff can increase flooding patterns, channel erosion, and potentially cause harm to surrounding habitats. Flooding can also cause damage in developed areas where there is not adequate stormwater management.

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, impacting the infrastructures’ performance and design life.

Protection from nonpoint source pollution is challenging for many communities like Bradford. Low impact development (LID) is one method used to reduce nonpoint source pollution, and focuses on reducing impervious areas, using the natural landscape to manage runoff, decentralizing drainage infrastructure. Methods of LID design include infiltration trenches, rain gardens, permeable pavements and protecting sensitive areas.

WINTER ROAD MAINTENANCE (SAND AND SALT)

Sand and salt used in winter road maintenance during winter weather is often attributed to the high levels of salt (sodium and chloride ions) found in watersheds through runoff of road, driveway, and parking surfaces. Due to chloride’s highly soluble nature, it often settles at the bottom of a water body, where it can become toxic to aquatic life once a high enough concentration is reached. Sodium, due to its chemical properties, often undergoes ion exchange, which can alter the soil chemistry by replacing

and releasing nutrients, including calcium, magnesium and potassium into groundwater and surface water.

The UNH T² Center, in coordination with the NHDES, offers a Green SnowPro training course focused on efficient and environmentally friendly winter maintenance practices. The course covers the basics of salt reduction and allows public work employees to become state certified under the program. Readers can visit the [program's website](#) for more information.

LAND RESOURCES

This section describes the landforms in Bradford that are the product of the bedrock and superficial deposits, particularly as they affect biological resources and future development potential. An analysis of Bradford's terrain and the underlying deposits gives important clues about constraints for development in certain areas. Using this information as part of an analysis of site suitability is an important step in land use planning and drafting regulations, as assessing potential constraints can identify areas more suited to a particular use than others.

The ***Conservation and Public Lands*** depicts the conservation lands, public and quasi-public lands (lands intended for public use but privately owned) noted in this section.

GEOLOGY & SOILS

The soils of Bradford were formed on deposits left when the glaciers receded after the last ice age, about 10,000 years ago. The most common type of deposit is known as glacial till, an unsorted mix of all sizes of minerals- from rocks and boulders to coarse sands and gravels, to the finest clay particles. As the glaciers melted, rivers of meltwater washed away some of this material, taking the finest particles away to the ocean, but depositing the heavier gravels and sands wherever the current slowed, creating sorted deposits of sand and gravel known as glacial outwash or stratified drift. Please refer to the ***Farmland Soils Map*** and ***Forestry Soils Map*** for the locations of the different soils groups in Bradford.

The overall health of the soil in reference to the physical, mineral and biological conditions and its potential to sustain biological functioning, absorb water and promote plant and animal nutrition and health are critically important. Healthy, resilient soils are better able to retain function during, and recover after, stress or disturbance - such as too much or too little rain.

Healthy soil can be achieved through a combination of sound water management and a biodiversity of functional vegetation. Productive soils for farming and forestry are often prime development sites, that when built upon, become unavailable for those important uses.

FARMLAND SOILS

In New Hampshire, the soils most suitable for agriculture are classified as Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance. 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. While there is only a small percentage (0.2%) of prime farmland soils in Bradford, one key location of these soils is the Battles Farm easement that protects nine acres. Please refer to the Natural Resource Inventory for a more in depth review of farmland soils in Bradford.

BATTLES FARM EASEMENT

More central to Bradford’s landscape is the Battles Farm conservation easement completed in 2011. This easement was worked on by many volunteers over six or seven years. Grants were written, warrant articles argued, and money raised. Privately owned, it is a focal point for the town with views of the southern hills and inclusion of scarce Prime Agricultural Soils.



View of Jewett Road as it bisects the Battles Farm easement. The easement will help maintain prime agricultural soils and scenic views.

FORESTRY SOILS

Forest soils are organized into categories that identify important forest soil groups, using characteristics such as depth to bedrock, texture, saturated hydraulic conductivity, available water capacity, drainage class, and slope. These groupings can help in evaluating the relative productivity of soils and how soil and site interactions can influence management or land use decisions. There are definitions for each soil grouping with Group I soils having the highest potential for commercial forest products, suitability for native tree growth, and overall forest use and management. All soils have been grouped into one of six categories, including the category of developed or urban soils (see Table 6.4 for the forestry soils). For a complete list of definitions, please refer to [UNH Cooperative Extension](#).

Table 6.4: Forestry Soils in Bradford

Type	Acreage	Percent
Forestry Soil IA	4,140	18%
Forestry Soil IB	9,430	40%
Forestry Soil IC	1,430	6%
Forestry Soil IIA	4,140	18%
Forestry Soil IIB	1,840	8%
Not classified as forestry soil	2,300	10%

Source: Bradford Natural Resources Inventory, 2012

SAND AND GRAVEL DEPOSITS

Large deposits of sand and gravel are important for two reasons; they are permeable and therefore can hold and transmit groundwater in large quantities, so as to serve as an aquifer and location of water supply wells, and they also can be a valuable source of construction material. Because of their permeability, it also makes sand and gravel deposits very vulnerable to contamination; once contaminants are spilled or dumped, they can quickly spread. Therefore, special attention should be given to regulating land uses over sand and gravel deposits.

The most significant sand and gravel deposits occur along Routes 114 and 103. They coincide with the largest stratified draft aquifer in town. There are other smaller, private sand and gravel pits around town. A few are still used by landowners within the bounds of their property. Bradford addresses these areas with an Earth Excavation and Reclamation Regulations, which were adopted by the Town in 2007, and amended in 2014.

AGRICULTURAL RESOURCES

Agriculture plays a significant role in Bradford's rural landscape, stewardship of natural resources 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. Although population growth has seen only minor increases in recent years and is not expected to accelerate greatly in the near future, prime farmlands remain under development pressure.

Local farmers' markets continue to gain popularity through both the summer and winter seasons. 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 town centers and create a stronger community spirit.

Establishing an agricultural commission is an option for communities like Bradford that value their local farms and rural character, keeping land in open space and supporting locally produced foods. An agricultural commission is an advisory body that can help to promote local agriculture in the community. Just as a heritage commission advises, supports and communicates about historic and cultural resources, an agricultural commission advocates to the agricultural community and raises awareness of its contributions to the economy and rural character. In September 2019, an Agricultural Sub-committee was formed, in order to pursue development of an Agricultural Commission.

FORESTS

Forests are the natural cover for nearly all of Bradford. Today, forests cover approximately 90% of the town. These forests grow on wetlands, rocky hilltops, and on most of the land. As part of the updated 2015 Wildlife Action Plan, habitats were ranked that prioritize wildlife habitats for conservation across the state. The highest ranked habitat in New Hampshire is located in the southern portion of Bradford (along the town boundary with Hillsborough and Henniker) and along rivers and streams. The highest ranked habitat in the biological region was found to be more scattered across town, though mostly the central and southern portions of the town. Additional information on habitat maps and scoring can be found in the town's Natural Resource Inventory and online on the [Wildlife Action Plan's webpage](#).

Maintaining forestland is important to both the ecology and economy of Bradford. Forests provide wildlife habitat, clean ground water, and scenery. In addition, timber harvested from these lands helps

landowners pay their taxes, and creates jobs for foresters, loggers, truckers and sawmill workers. Forests furnish the backdrop for Bradford's tourism businesses and provide recreation areas for residents and visitors.

Bradford currently has two town forests managed by the Bradford Conservation Commission. The Forest Maintenance Fund, administered by the Conservation Commission, was formed from sale of timber on the Pearl Town Forest. The funds are used to maintain the Bog Boardwalk, purchase trail-making supplies, and for other similar purposes. Additionally, Bradford has six certified Tree Farms, totaling 2,296 acres. Much of Bradford's undeveloped land is enrolled in the current use program (see Current Use Section for additional information).

WILDLIFE HABITAT AND CORRIDORS

A diversity of wildlife habitat helps to ensure the quality of life in New

Hampshire and fuels a strong economy based on wildlife observation, hunting and fishing. Bradford is host to a number of rare natural communities and species. The shore of Lake Massasacum contains a rare Inland New England Acidic Pond Shore Community, and the western edge of Bradford, near the East Washington border, contains an important Atlantic White Cedar Basin Swamp and Atlantic White Cedar Stand. An uncommon form of aster, *Sclerolepis*, grows in town, and in the 1940's a plant known as green adder's mouth was documented. The blue-gray gnatcatcher, a bird listed as a state rare species, has been seen in the Bradford Bog area.

Wildlife corridors play an important role in the conservation and preservation of wildlife species and are normally made up of unfragmented or minimally developed stretches of land which serve to provide animal species with safe travel and sustenance as they move from one location to another. Quite often, such a corridor will be water based such as when wildlife uses the riparian edge of a river or stream as a passage for travel.

Bradford has a large riparian corridor that is located along the Warner River, which flows through the north eastern part of Bradford. Other corridors are located between large wetlands, tree stands, and open fields. With respect to their long-term conservation, these water-based wildlife corridors face a wide variety of threats which are primarily related to disruptive land-development activities. These corridors could be preserved for the long term should the town consider adopting strategies to mitigate the established threats to these corridors.

BENEFITS OF FORESTS

- Produce useful and valuable products, such as lumber, firewood, and maple syrup.
- Protect watersheds and groundwater by reducing runoff, recharging aquifers, and supplying clean water to other waterbodies.
- Reduce flooding by slowing release of stormwater and snowmelt to downstream areas.
- Provide habitat for wildlife.
- Contribute to soil formation.
- Mitigate the effects of extreme weather by cooling the air and reducing wind chill factors.
- Produce oxygen, capture carbon dioxide, and help clean air of pollutants.
- Provide scenic and natural beauty throughout all seasons.

RARE SPECIES AND NATURAL COMMUNITIES

The New Hampshire Natural Heritage Bureau (NHNHB) tracks exemplary natural communities and rare plant and animal species in the state. The natural communities of Emergent Marsh, Inland Atlantic White Cedar Swamp, Medium Level Fen System, and Sandy Pond Shore System, have all been mentioned by the NHNHB as important natural communities. Awlwort, Green Adder's Mouth, and Sclerolepis were listed as either threatened or engendered plant species, while the smooth green snake and wood turtle were listed as species of concern. More detailed information on the natural communities, plants, and animals identified in Bradford from NHNHB can be found outlined in the town's Natural Resources Inventory.

ATLANTIC WHITE CEDAR SWAMP

The Bradford Bog/Bradford Springs Hotel site is an area of unusual natural and historical features encompassing a rare inland Atlantic White Cedar swamp, quaking bog, and a hotel whose promotional hook was supposedly a cure-all sulfur spring. Its preservation was at times tedious and at other times edge of seat exciting. town-owned, the easement is held by the Ausbon Sargent Land Preservation Trust and was completed in 2008.

Also of interest are two locations in town that have supported great blue heron rookeries recently. Activities of loons and bald eagles are monitored on Lake Todd and Massasecum by local volunteers, reporting to New Hampshire Fish and Game, New Hampshire Audubon Society, and the Loon Preservation Committee. The Rural Heritage Connection of Bradford installed a loon nesting platform on Lake Massasecum in addition to a nighthawk nesting pad on the roof of Bradford Elementary school. In 2018, for the first time in more than 50 years, loons nested on Lake Massasecum. Eagles have nested for three years in a row, with two fledged in 2018.

INVASIVE SPECIES

Bradford is fortunate to have a diversity of fauna and flora, but invasive species present a threat to the many of the natural resources in the region and also to the economic value of property. The growing presence of invasive species is threatening New Hampshire's and Bradford's forests. In 2017, Hemlock Woolly Adelgid was reported in Bradford. This small, wingless insect feeds on small hemlock twigs and if left untreated can kill a tree in 4 to 10 years. It is often introduced to new areas by birds, other wildlife, and human activity. There are various best management practices to prevent its spread in addition to statewide regulations prohibiting spread of nursery stock with known infestations.

Another invasive plant species present in the Town of Bradford that is of particular concern is Eurasian milfoil in Lake Massasecum. Milfoil can spread rapidly through plant fragments which drift, slowly grow roots and then sink to form new growths. Identification of milfoil first occurred in 1997, and continued to spread to a dense growth at the north end of the Lake. In 2014, NHDES mandated enclosure of the most affected area with a floating net and arranged for herbicide treatment. Since then, the infestation has been properly managed and is currently under control through combined efforts of boat inspectors at the boat ramp, a volunteer weed watcher group to identify new infestation, and the hand-pulling of plants by local and state divers.

CONSERVATION CONSIDERATIONS

PROTECTED 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. Protected land ensures that valuable natural resources will be available for future generations. Bradford has twelve parcels that are permanently protected under a conservation easement. There are an additional 10 parcels that are used for forestry, public recreation, and wetland protection. However these lands are not permanently conserved and could potentially be sold for other uses in the future. These parcels can be seen in Table 6.5 and Table 6.6 below.

See the **Conservation and Public Lands Map** for the location of these lands.

Table 6.5: Land Permanently Protected by Conservation Easements in Bradford

Name	Acreage	Ownership	Easement Holder
Aiken Pasture Town Forest	136	Town of Bradford	ASLPT
Battles Farm	143	Private	ASLPT
Blitzer Easement	148.8	Private	ASLPT
Blitzer Easement #2	41.4	Private	ASLPT
Clark Easement	63	Private	ASLPT
Fearnley Easement	158	Private	ASLPT
Kisakanari Easement	318	Private	ASLPT
Nelson Family Easement	89	Private	ASLPT
New Forestry Easement	451	Private	SPNHF
Govener’s Grant Easement	30	Private	SPNHF
Bog/Spring Hotel/Goodridge - combined	177.9	Town of Bradford	ASLPT
Total acreage of permanently protected land			1,756.1
Total percentage of permanently protected land			7.8%

Source: Bradford Natural Resources Inventory, 2012

ASLPT = Ausbon Sargent Land Protection Trust; SPNHF = Society for the Protection of NH Forests

Table 6.6: Public Lands in Bradford (not permanently conserved)

Name	Acreage	Ownership	Restrictions (if any)
Low State Forest – in Bradford	900	State of NH	Restrictions
Bradford Pines	2.2	State of NH	
Pearl Town Forest	37	Town of Bradford	Deed restrictions
Tilly Wheeler Trail/Whitman Park	1.8	Town of Bradford	
West Meadow Wetland	42.8	Town of Bradford	
Dodge Meadow	6.8	Town of Bradford	
French’s Park	6	Town of Bradford	Deed restrictions
Lot abutting Bradford Bog	20.2	Town of Bradford	
Lot abutting Dodge lot	8.7	Town of Bradford	
Lot abutting Pearl Town Forest	6.5	Town of Bradford	
Total acreage of public land			1,032
Total percentage of public land			4.6%

Source: Bradford Natural Resources Inventory, 2012

As part of the Town’s Natural Resources Inventory, the Conservation Commission identified the following five primary areas for the focus of conservation efforts based on occurrences of valued habitat and local knowledge:

1. Lake Massasecum – rare species and exemplary plant communities and co-occurrence of seven of the wildlife habitats of interests;
2. Rowes Hill/Knight’s Hill/Low State Forest/Silver Hill to Durrell Mountain – important for its connection between conserved areas and eight known important wildlife habitats;
3. Bradford Bog/Atlantic White Cedar Swamp – noted primarily for its rare and exemplary plant communities;
4. Central Bradford wetlands/grasslands – seven habitats of importance within this area and a working agricultural landscape; and
5. Fairgrounds Road Grasslands – open grasslands and agricultural lands are becoming rarer as are the farmers and wildlife species dependent on these habitats.

SCENIC VISTAS

The landscape of a community defines its cultural, natural, and historical heritage and thus provides the residents of a community with a sense of identity. Bradford is a beautiful, scenic community which offers views of the surrounding mountains, fields, and other natural areas. In Bradford, much of the land is forested, so that wetlands and agricultural lands provide open areas where the surrounding hills may be viewed. Alder Plains Marsh from either Country Road or Alder Plains Road provides spectacular views of Mount Sunapee above a red maple swamp. Other wetlands in town provide equally beautiful views. Messer’s Farm, Battles’ Farm and the Lettvins’ home on Rowe Mountain are some of the most noteworthy viewing areas from open fields. Blood Meadow has been a pasture and wet meadow for 100 years. It is an open area with a view of Mount Kearsarge in the background.

OPEN SPACE

In its simplest definition, open space is land that has not been developed or converted to other uses. It includes forests, fields, river corridors, wetlands, wildlife habitat, and greenway corridors, as well as town parks or recreation areas. These are features that make Bradford a special place to live.

Open space is a very important part of any community. It provides aesthetic and scenic value, wildlife habitat, and helps to minimize impact from development. Recreational opportunities on open land include walking, hunting, fishing, biking, wildlife viewing, and photography.

Though trends statewide and in Bradford point towards slower development and slower population growth, it is important to protect open space areas to allow residents to continue to access the desirable rural character that originally attracted them to the town. One of the essential reasons to plan for open space is to set a course for the town of coordinated development that maintains Bradford's rural quality and high quality of life. In 2000, Bradford adopted an Open Space Trail System Plan, which among other things encompassed the overall larger vision of creating a trail system that circumnavigates the town and connects to the Sunapee/Ragged/Kearsarge Greenway.

CHALLENGES AND OPPORTUNITIES

OUTDOOR RECREATION & ACCESS

Access to outdoor recreation is important to the health and quality of life for 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. Recreation, scenic views, and appreciation of natural resources all play a role in the economy either through tourism or attracting the people who choose to live in this area for the quality of life, based on an appreciation of natural resources, environment, and recreation in the area.

Many residents make their strongest connections with Bradford's natural resources through recreation, particularly with its trails, including activities such as hunting, hiking, horseback riding, skiing, and snowmobiling. All would benefit from a more extensive trail system in town that connects to trail systems in neighboring towns. As demographics continue to shift now and in the future, providing accessible outdoor recreation opportunities to older residents as they age in place becomes more important.

This is also the case for residents of all ages who may rely on transportation methods besides the car. For these open spaces to continue to be valued assets, stewardship and often volunteerism play an important role in the maintenance of easements, trails, and facilities of open spaces so that they continue to be enjoyed by residents.

CONNECTIVITY

Over the years, Bradford has been fortunate in acquiring many lands through outright purchase and conservation easements. Connected conservation lands not only benefit wildlife but also preserve water quality, ensure a more robust ecosystem, maintain economically viable working lands and create an opportunity for a more enjoyable recreational experience for biking, cross-country skiing and hiking. There are also opportunities for multiple communities to collaborate to connect conservation lands across municipal boundaries. Continuing to work towards the goal of land connectivity provides an opportunity to organize priorities with neighboring municipalities, search out linkages and build stronger support for seeking out funding sources from potential partners.

MAINTAINING AGRICULTURAL LANDS

Economic sustainability is the greatest challenge to the sustainability of farms of all types. Farm businesses must be able to adapt and grow. The very small and small farms that predominate in New Hampshire are generally part-time or supplementary-income enterprises. Farms of any size may seek to diversify by adding new enterprises or finding alternative sources of income. The history of agriculture in the Central NH Region and Bradford is a story of continual change and evolution, to meet the needs of farmers and the population - the market - of the region. To maintain a rural landscape through working farms, communities will need to review their ordinances to allow farm-friendly practices, such as road-side farm stands and smaller farms selling specialty products. Local agricultural commissions can be the voice of agriculture in a town like Bradford where there is interest and support from local residents and town commissions like the Conservation Commission. An agricultural commission's role is not regulatory

OTHER CONSIDERATIONS

During the planning process, other considerations should be reviewed when altering forest management practices and the conversion of forest land to other uses. Even a change that seems innocuous can affect wildlife and natural habitat, like a road through a forest that consumes only a fraction of the forest but in effect creates two forest where before there was only one uninterrupted tract. The impact can at times be exacerbated when road-related activity follows, such as motorized vehicles and more active recreation, and development.

but one of advising other boards and commissions on agricultural concerns and serving as a source of information between farms and the non-farm public.

REGULATORY/NON-REGULATORY PRESERVATION TECHNIQUES

CONSERVATION EASEMENT

A conservation easement is a permanent, legally binding, agreement that ensures that certain uses will never be allowed on that property. Typically conservation easements prevent development of land uses such as construction, subdivision and mining while at the same time promoting uses such as agriculture, forestry, wildlife habitat, scenic views, watershed protection and education. A conservation easement typically exists between a willing landowner and a qualified recipient, which can be the town or State government or an appropriate conservation organization. Each such easement is tailored to the interests of the landowner, the receiving entity and the unique characteristics of the property. Land affected by a conservation easement can be sold or deeded by the original owner and subsequent owners but the easement is binding on all future owners.

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. 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 Taxation program. For more information on Current Use, visit [NH Department of Revenue Administration](#). See Table 6.7 for Current Use acreage for years 2010-2016.

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. In accordance with RSA 79-A:2, the definitions of eligible land type are farm land (cleared land devoted or capable of agricultural or horticultural uses), forest land (land growing trees), unproductive land (land, including non-forested wetlands, which by its nature is incapable of producing agricultural or forest products) and wetlands (areas of farm, forest, and unproductive land that are inundated or saturated by surface water or groundwater that is able to support a prevalence of vegetation).

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. Since a vote at the town meeting in 1992, half of this penalty fee has been placed in the town’s conservation fund to be used for protection of remaining valuable open space land in town. The other half is deposited in the town’s general fund.

Table 6.7: Current Use Trends in Bradford

Current Use Type (Acres)	2010	2011	2012	2013	2014	2015	2016
Farm Land	687	624	643	650	650	648	634
Forest Land	11,355	11,175	10,993	11,067	11,042	11,020	12,049
Forest Land with Stewardship	2,794	3,066	3,424	3,424	3,424	3,414	2,519
Unproductive Land	573	595	572	572	580	580	472
Wet Land	512	517	554	555	557	567	606
Total Acres	15,921	15,977	16,186	16,267	16,253	16,229	16,279
Current Use Land Change Tax Collected	\$0	\$0	\$0	\$2,370	\$85	\$2,950	\$3,450*

Source: NH Department of Revenue Annual Current Use Reports

* 2016 Annual Report for the Town of Bradford

LARGE LOT FORESTRY AND AGRICULTURAL ZONING

Planning theory states that dividing developing land, or potentially developing land, into larger lots will slow development and preserve open space and rural character. The goal of these two types of zoning is to provide large enough blocks of land that they can be managed for a specific resource value. If this technique is used, lot sizes that truly reflect the amount of land needed to allow for commercially viable use of the land and are related to the reality of the use of the land in the area must be established.

OVERLAY DISTRICTS

The creation of overlay zoning districts is a technique which is already used by the Town of Bradford to protect existing natural, historical and architectural resources. Typically, overlay zoning involves the targeting (or “overlying”) of certain resources in a geographical area with added land use or design protections to achieve a positive social good. An example of this would be the protection of important wetlands from destruction or the prevention of buildings and structures being constructed in known flood hazard areas.

LANDOWNER EDUCATION

Publications such as brochures/fact sheets could be part of an education program that would provide information on the advantages to the landowner and to the community of conserving land and the opportunities available for property owners to conserve the property via conservation easements or sale. Many other topics could be developed, particularly targeting some of the threats to resources identified in this chapter.

MITIGATION

For the purposes of administering sensitive areas, mitigation includes rectifying the impact by repairing, rehabilitating, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and compensating for the impact by replacing or providing substitute resources or environments.

CONSERVATION SUBDIVISION DESIGN

Rather than consume all developable land with houses centered on uniformly sized lots, this development strategy focuses the construction in a smaller portion of the total land being developed, and provides for permanent protection of the open space not used for construction. The land selected for permanent open space protection should be designed to fulfill the open space interests of the entire community.

ENVIRONMENTAL CHARACTERISTIC REGULATIONS

Science-based land use regulations are based directly upon measurable characteristics of the land-base of the community. Regulations based on the characteristics of the land may reflect the actual ability of the land base to handle development and are often easier to defend against legal challenges than those arbitrarily created. Examples of this technique include the wetlands conservation district and ridgeline protection zoning.

MULTI-DENSITY ZONING

Techniques such as transfer of development rights (TDR) and density transfer credits (DTC) are not new concepts in zoning and can be used to redirect further development away from areas where development may be physically feasible, but not desirable for reasons often related to ecological value. Density Transfer Credit is a more streamlined version of multi-density zoning and is a voluntary mechanism that allow developers to purchase density for additional house lots in one part of a zone (a receiving zone) and a town can then use revenue from the added density to purchase land or conservation easements in another part of the town (sending zone), typically an area with significant ecological value. DTC could be a consideration in Bradford once there is consensus and supporting documentation that certain areas have high natural resource value and should be protected through some mechanism.

LOW IMPACT DEVELOPMENT (LID)

Low impact development (LID) is one method used to reduce nonpoint source pollution, and emphasizes preserving natural landscapes and treating runoff before contamination. Unlike conventional stormwater management, which focuses on piping stormwater away from a site to large centralized stormwater treatment areas, LID focuses on controlling stormwater by using small, decentralized methods to treat stormwater close to the source. LID treatment practices can be used in existing development and can also be used in redevelopment projects to improve existing stormwater management. Methods of LID design can include rain barrels, rain gardens, and permeable pavements.

SUMMARY

The primary focus of this chapter is to identify the natural resources in town, recognize the role they play in giving the Town of Bradford its character, and decide what strategies would best maintain that character. Bradford’s natural resources include soil, water, forests, open space, and wildlife; developed resources include recreational facilities, trails and other passive recreational areas. Most of the town's resources are interconnected and any change to one can and will have a significant impact on the others. As the population increases, demands on many of these resources continue, some to the point of threatening the quality and quantity of the resource. It is the goal of this Chapter to help develop a balance between development and resource protection within the town.

The town's existing open space consists mainly of forests, fields, wetlands, and surface waters. Most of the dedicated conservation lands are carefully managed, though there are no management requirements for privately owned land other than what are found in the current use regulations. Any development pressure that is currently being felt by the town is focused on privately owned open space.

Because such lands can be targeted for development, it is important that the town prioritize critical habitats, greenways, and corridors that should be protected through purchase, easements, or other means. These actions will help to reduce land fragmentation, protect water quality, and help maintain the rural, cultural, and historic character of the town that makes Bradford the place it is today and the vision of what it wants to be tomorrow.

OBJECTIVES AND RECOMMENDATIONS

OBJECTIVE 1: Preserve the rural character of the town by protecting open space (undeveloped land), scenic vistas, and traditional rural pursuits.

- Work with the Conservation Commission on development of additional conservation zoning overlays that would protect important resources such as surface water, views, wildlife habitat, agricultural and forestry soils.
- Strengthen the existing conservation district to ensure protection of scenic vistas, ridge tops, wildlife corridors, hiking trails, wetlands, and other natural assets within development projects.
- Consider the preparation of a ‘Cost of Community Services’ study or similar mechanism that describes how different property tax categories affect the tax rate.
- Strengthen town ordinances regulating light and noise pollution.
- Evaluate the need for a buildout analysis prior to any proposed significant changes to regulations or in response to an increase in building activity that would allow the community to review the implications of any changes in regulations or building trends.

OBJECTIVE 2: Protect valuable water resources, including lakes, ponds, rivers, streams, wetlands, vernal pools, floodplains, and ground water.

- Amend the site plan and subdivision regulations to require naturally vegetated buffers along streams, lakes, and ponds. Removal of vegetation adjacent to water bodies should be avoided if at all possible.
- Establish construction setback requirements for streams and ponds using current Best Management Practices. Adjust as needed, taking into account soil type, bank, slope, and vegetation type.
- Amend the zoning ordinance to limit the maximum amount of impervious surface per lot.
- Work with the Board of Selectmen to establish policy guidelines for the reduction of the use of salt and sand on town roads, especially near waterbodies and their tributaries.
- Consult with NH Department of Environmental Services and other qualified agencies to evaluate the condition of the downtown aquifer.
- Develop and adopt an Aquifer Protection Overlay District that will prohibit or restrict new potential contamination sources from infiltrating the district.

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- Require that stormwater and meltwater be retained on site during development and as a permanent feature.
- Review and amend current policy and guidelines on culvert maintenance and installations to consider:
 - a. Provision for fish passage; and
 - b. Installation of flow devices ('Beaver Deceivers') at culverts that channel outflow from wetlands. This will allow beavers to maintain wetlands at the optimal level for wildlife and plant diversity, while protecting adjacent roads from flooding.

OBJECTIVE 3: Protect valuable forest and agricultural lands.

- Explore the establishment of an Agricultural Commission.
- Amend the zoning ordinance to include a definition for agriculture that is consistent with RSA 21:34a.
- Work with the Conservation Commission to identify and prioritize parcels of land that the town feels should be protected based upon the agricultural value and develop a plan for the protection of these parcels.
- Consider regulatory options that would protect important farmland soils that are necessary for economically viable agricultural activities.
- Support state legislation and local ordinances that are farm and forest friendly, including opportunities for agritourism.
- Continually monitor ordinances and regulations that could create barriers to agriculture and forest management.

OBJECTIVE 4: Protect valuable wildlife habitat.

- Identify large unfragmented blocks, travel corridors, deer yards, vernal pools and other important wildlife habitat features, and develop strategies for their protection.
- Require that a wildlife study be conducted before development of sensitive areas;
- Incorporate protection of riparian (river/stream side) corridors with buffers in the wetland ordinance.

OBJECTIVE 5: Preserve and enhance natural recreational resources.

- Evaluate the need for a 'Recreational Master Plan' that includes a community engagement process and provides a framework for the Parks and Recreation Committee, Conservation Commission and other boards and committees to participate in a coordinated effort that ensures the protection of natural resources and recognizes their contribution as recreational assets for town residents.

OBJECTIVE 6: Educate the public regarding Bradford's natural resources.

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- Increase understanding that when important farmland soils are built upon they are lost forever.
- Encourage farmers and forest landowners to follow “Best Management Practices” in the management of their farm including soil management, fertilization, and livestock waste management.
- Encourage residents to “buy local” to support local agriculture.
- Educate the public about residential, commercial, and agricultural practices that contribute to surface water pollution. Promote alternative practices that reduce or prevent surface water pollution.
- Continue efforts to prevent the spread of invasive species in lakes and rivers through education and monitoring.
- Increase awareness of vernal pools and the importance of their protection from destruction or disturbance from logging, landscaping or culvert placement.
- Encourage property owners in the shoreland zone to revegetate their property with native plantings to reduce the amount of stormwater runoff to the lake.
- Encourage stabilization practices for any currently unvegetated or unstable stream banks.
- Educate town boards and residents about the importance of reducing ‘non-point source pollution’ from sedimentation, fertilizers, pesticides, and hazardous wastes.
- Educate the public about the aquifer recharge process and the potential harm from increased paving and/or surface runoff.
- Develop town wide support and participation needed for the long-term health of our aquifers.