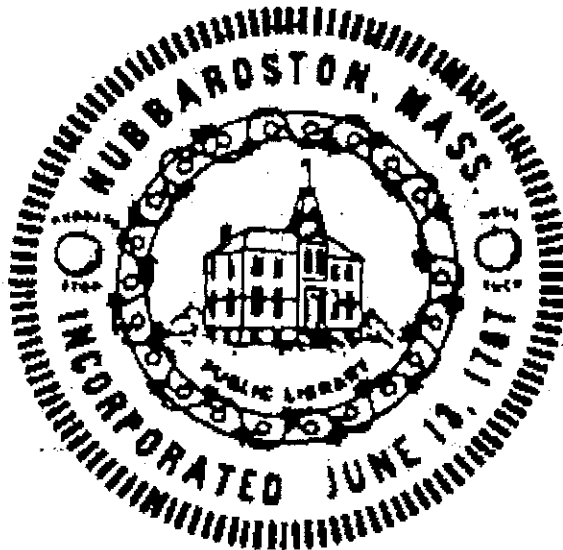


Town of Hubbardston  
OPEN SPACE AND RECREATION PLAN  
UPDATE

2007-2012



Prepared by:  
Hubbardston Open Space Committee

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# Section 1: Plan Summary

Located in central Massachusetts, just seven miles from Route 2 and within an hour's commute of several important urban areas, Hubbardston has joined the growing list of towns that are struggling to maintain the rural character cherished by residents while accommodating the growth demand which is spreading slowly but surely westward from the Route 495 corridor. In the five-to-six years since the 2001 Open Space and Recreation Plan was written, the town has performed admirably with regard to the original Plan objective—preservation of the town's rural character and enhancement of open space and recreational opportunities. Newly-adopted town by-laws and a state-wide slowing of housing demand enabled the town to make steady gains in providing improved open space and recreational facilities while moderating the pace of residential construction and development.

This update summarizes the demographic and physical changes to the community since the initial plan. It also expands and explores more thoroughly the environmental features and issues facing the town. It reviews and updates the open space and recreation properties and facilities, and incorporates community questionnaire results into the discussion. Finally, it presents a vision of Hubbardston's future recreational and open space ideals, and summarizes needs, challenges, and goals.

This update makes numerous specific suggestions toward the overall recommendation: that the town strives to achieve a healthful balance between conservation and protection of open space resources and residential and commercial growth, thereby enhancing and protecting the quality of life for the residents who value and treasure Hubbardston's forests, fields, clean water, and fresh air. The community aspires to continue to be quiet, safe, and sparsely developed, but with small-town, family-oriented amenities in an unspoiled setting.

At the same time, this update highlights some critical needs with regard to stewardship and maintenance of public recreation holdings throughout the town and water quality protection issues. Other needs, less critical but important, concern development of new recreational opportunities, e.g. bicycle trails, ice skating rink, and improvement of existing facilities, e.g. access for the disabled, relocation of basketball and tennis courts. This report also notes the desire to attract more community volunteers and involvement in open space planning issues. A survey sent out to the community elicited a successful response (about 14%, n=278). Educating and involving the community is one of the goals addressed in Section 8.

Specific actions toward implementation of this update are presented in Section 9. Although issues and projects facing the Open Space Committee are decidedly fluid and evolving, the major project challenging the committee at the time of this report is an effort to acquire a key parcel of open space which abuts the Mt. Jefferson Conservation Area. The parcel was put on the market as this report was "going to press," and will be the focus of the committee's energy for months to come.

## Section 2: Introduction

### STATEMENT OF PURPOSE

Hubbardston's first (2001-2006) Open Space and Recreation Plan provided a valuable guide for Hubbardston as it endeavored to meet the open space and recreational needs of its residents. It was also a necessary requirement in order to secure funding in the form of state Self-Help Conservation and Urban Self-Help Outdoor Recreation Grants which helped the town to achieve some of its goals. The plan encouraged preservation of the town's rural character through enhancement of open space opportunities and also outlined the need for additional recreational opportunities.

This document is an updated version of that plan. The purpose of this plan update is: 1) to provide an accurate current assessment of open space and recreational opportunities and needs for Hubbardston residents, and 2) to create a five-year action plan that optimizes those opportunities and satisfies those needs.

### SUMMARY OF ACTIONS SINCE ORIGINAL PLAN

Soon after the original plan was approved, the Open Space Committee of nine members was formed by a vote at the next town meeting. This committee is still intact and functions as an active citizen volunteer group in Hubbardston. Its mission is to facilitate the implementation of the Open Space and Recreation Plan. The committee is actively involved in pursuing and securing vital funds, through grants and other sources, for Plan projects and activities.

With the cooperation of other town boards, the overwhelming support of town residents, and the hard work of many ad hoc volunteers, virtually all of the goals and objectives of the five-year action plan outlined in the first Plan have been met or are in progress. Following is a summary of the accomplishments.

The Mt. Jefferson Conservation Area was created through land purchase using funding from a state Self-Help Conservation Grant, Metropolitan District Commission Conservation Restriction monies, and appropriated town funds. A stewardship plan for the conservation area was written utilizing funding from a state-administered EPA Source Water Protection Grant. A hayfield management and leasing plan for the property was approved, and previously neglected agricultural land has now been returned to active agricultural management. Templeton farmer Paul Laine is currently contracted to harvest hay in the open fields alongside Mt. Jefferson Road and pays cutting fees to the town. These fees provide a modest income which is deposited into the Fund for Hubbardston Preservation which was established in 2003.

The Open Space and Recreation Committee has been working with forester Roger Plourde since 2002 to develop a forest management plan for the wooded portions of the conservation area property. It is anticipated that monies from future conservation land timber sales will also be deposited into the Fund for Hubbardston Preservation.

Finally, a multi-use trail system through the Mt. Jefferson Conservation Area and abutting state forest properties was developed, marked, and mapped, and trail maps were printed and distributed throughout the community throughout 2003-2005. In 2006, advertising funding from area

businesses was raised to enable reprinting of this map. It is hoped that map distribution and availability will publicize the area and draw visitors.

Many local citizens have contributed to upkeep of the area. Eagle Scout projects provided picnic tables adjacent to the parking area and a trail bridge across a stream, and developed a new trail. An Americorps crew built a new trail and a small bridge that was funded by the Bay State Trail Riders Association.

With funding from a State Urban Self-Help Outdoor Recreation Grant and town-appropriated monies, the Open Space and Recreation Committee spearheaded a project to make considerable improvements to the Curtis Recreation Field. Several community members contributed their resources, advice, and skills to the project. In an ambitious period of many months, a skateboard park and walking path were constructed, and the parking area was paved.

Through considerable donations of time and money from many town residents and businesses, and the help of a state Mass ReLeaf Grant, a small park—Millennium Park--was developed at the site of an unattractive vacant lot adjacent to the fire station on Main Street. The spot was landscaped and planted with a variety of trees, shrubs, and flowers. A gazebo was built here—funded by sales of personalized, engraved bricks that form a patio around the gazebo, as well as a Recreational Trails Grant--and houses a map of the town which depicts area trails, points of historic interest, and local businesses. Space is provided for maps and brochures. The park and its features were designed with the intention of encouraging both tourists and local residents to take advantage of the town's attractions and businesses.

Mindful of the need to protect our most precious landscape and conservation assets, the committee spent many months exploring and considering the remaining undeveloped land in the town with regard to protection desirability. As a result, a map that prioritizes and delineates the parcels that are considered to be of primary importance for future protection efforts was developed [see Map 1, Land Protection Priority]. This will enable Hubbardston to be proactive and selective in its future conservation efforts.

Since the adoption of the original Open Space Plan, Open Space Committee members set up regional meetings with other area committees to discuss regional goals and common projects. The committee is working with the Montachusett Regional Planning Commission on a regional trails initiative, and worked closely with the Hubbardston's Planning Board in 2006 to develop a sound Open Space Residential Bylaw consistent with Plan goals. Hubbardston also adopted a Right-to-Farm Bylaw (June, 2006). Finally, in the final months of 2006, the committee focused its efforts on education about, and passage of, the Community Preservation Act (CPA), a significant source of funding for future projects. At the November 2006 election, residents voted in favor of the adoption of the CPA.

Three new town groups with interest relating to open space and recreation issues have been established since the original Open Space Plan. The Parks and Recreation Committee was formed for the purpose of scheduling management and budget for all town-owned open space, such as the recreation field, Millennium Park, Mt. Jefferson Conservation Area, cemeteries, etc. (A special town meeting vote in April, 2007, authorized the replacement of the Parks and Recreation Committee with the Board of Park Commissioners.) The 20/20 (Twenty-Twenty) Committee has been formed for the purpose of planning downtown enhancement and development. The mission of the Agricultural Commission is to promote agricultural endeavors in town.

The 2001-2006 Open Space Plan provided an invaluable tool and guide for Hubbardston's open space and recreation efforts. The updated five-year plan will provide the Open Space Committee with a guide that will assist the group in building on its past accomplishments --while working on unfinished and ongoing projects --and seeking input from town residents and policymakers in developing new goals.

## **PLANNING PROCESS AND PARTICIPATION**

This Open Space and Recreation Plan Update was developed using the 2001-2006 plan as a guide. Committee members/volunteers took on responsibilities for reviewing and updating each section of the plan, with each draft section then subject to review and discussion by the entire group before submission of the final text. One individual volunteered to edit and compile the document.

As part of the effort to gather current community information, a citizen questionnaire/survey was prepared by the Open Space and Recreation Committee and mailed with tax bills to all property owners in the town in spring, 2006. This was an effort to elicit comments and opinions from town residents regarding recreation preferences and actual use of open space and recreational areas. A copy of this survey, and the results, can be seen in Appendix I. In the same time frame, an email message was sent to all town board members asking them to contribute ideas and comments; board members were also invited to attend an Open Space Committee meeting to discuss the plan update.

A total of 278 questionnaires were returned; the Open Space Committee reviewed and compiled the results, attempting to characterize results as clearly as possible, in many cases presenting data in the form of pie charts. Much of the information gleaned from this citizen questionnaire is presented in this update.

In order to update community demographics, land use statistics, current environmental issues facing the town, and so forth, committee members researched state and federal documents and reports as well as the records of various town departments and boards. Every attempt has been made to ensure accuracy with regard to statistics and facts.

The actual work of producing enhancing, clarifying, and compiling this Open Space and Recreation Plan Update was an endeavor that took place throughout 2006 and into the beginning of 2007. Participants are noted at the beginning of this document.



## Section 3: Community Setting

### REGIONAL CONTEXT

The Town of Hubbardston is located in the hill country of north-central Worcester County, Massachusetts. Towns bordering Hubbardston are: Gardner and Westminster on the northeast, Princeton and Rutland on the southeast, Barre on the southwest, and Phillipston and Templeton on the northwest. Hubbardston is 19 miles northwest of Worcester and 56 miles northwest of Boston, with the urban areas of Gardner, Leominster, and Fitchburg nearby. This convenient location to urban centers of employment has contributed to the changing demographics of the town. The past twenty-five years have witnessed the transformation and growth of a rural, small- industry-based community into an increasingly suburban, commuter/bedroom community. Figure 1 locates Hubbardston in Massachusetts; Figure 2 is a map depicting the bordering communities.

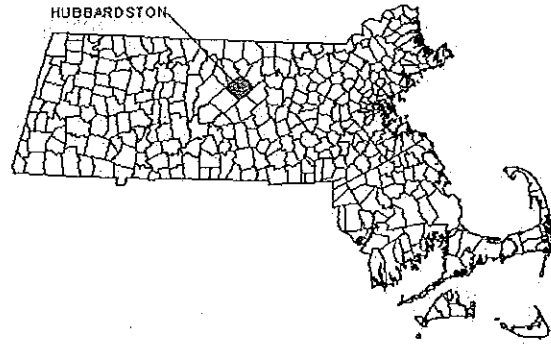


Figure 1: Locus Map

The hilly terrain and numerous streams found here powered many of the small mills and industries of the nineteenth century. Geographical location and the geological framework of Hubbardston contribute to the production of some of the best drinking water in Massachusetts. The cities of Fitchburg, Gardner, and Metropolitan Boston derive a substantial amount of their drinking water from surface and ground water sources located in Hubbardston.

The town's rich biological diversity is also attributable to its location. The boundary of two eco-regions—the Worcester Plateau and the Lower Worcester Plateau—divides Hubbardston in half. Eco-regions are defined by geology, hydrology, climate, and biological diversity. Where two eco-regions co-mingle, habitats and associated wildlife are much more diverse. (See Section 4, "Environmental Inventory & Analysis") Map A.1 provides a base-map overview of Hubbardston.

### HISTORY

Originally, Hubbardston was part of a district that included Rutland, Barre, Paxton, Hubbardston, Oakham and a portion of Princeton purchased from the Indians in 1686. This district was owned by thirty-three individuals who, in 1715, decided to set off in lots a tract six miles square. The area to be known as Hubbardston was called the Northeast Quarter and became a town on June 13, 1767. The little "notch" in the southeast corner of approximately 500 acres was

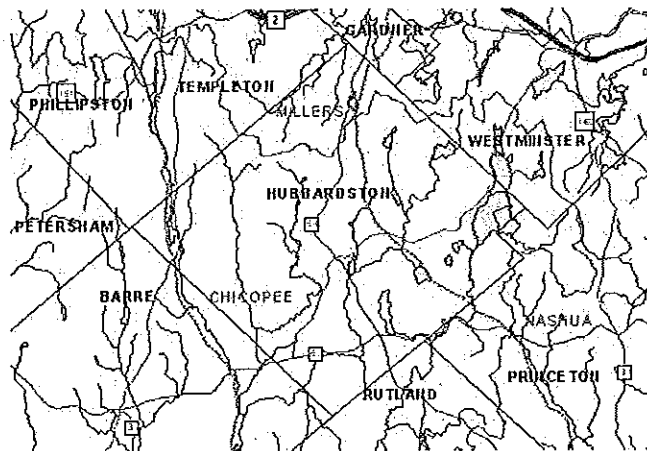


Figure 2: Area Map

deeded to Princeton in 1810 "for the convenience of the families living there."

Early surveys in the 1700s divided the town into "great farms," "house lots," and reserved land for churches, schools and a town common. The first European settlers to the area came here in 1737; there was a greater influx of people during the 1760s; the town was incorporated in 1767. The first colonial census in 1776 documented a population of 488 people. Many of the local settlers participated in the Revolutionary War. Hubbardston was sympathetic to Shays Rebellion and one of the leaders of the rebellion, Captain Adam Wheeler, was from Hubbardston. Eighty men from the town marched to Worcester under Wheeler's command and took control of the courthouse to protest the widespread foreclosures and seizures of property by creditors that occurred during the cash poor eighteenth century.

Despite the troubled time period, the town grew to a population of 1,113 to begin the next century. This rapid increase in population from 1760 to 1800 was greater in Hubbardston than in any other town in Worcester County.

The beginning of the 1800's saw the expansion of the town's educational and road systems that were started in the late 1700's. A total of seven school districts were established, each having its own school. Hubbardston's road system expanded toward the neighboring towns to accommodate the great amount of travel through town in all directions.

The town's early economy was based on agriculture and lumbering and small scale chair, boot, and shoe manufacturing. The early settlers extensively used the town's numerous waterways for powering the many mills and manufacturing sites located here. Historians describe the community at that time as being poor, sparsely settled and almost wholly agricultural, but having sawmills, potash works, and cottage industries such as the making of palm leaf hats. By the 19th century, dairy and berry farming and market gardening were major pursuits in the town, and immigrants from Ireland, French Canada, England, Sweden, and Russian Finland had moved into town to work with earlier settlers. Tourism was another active industry in Hubbardston; two hotels were destinations for summer vacationers.

This era also saw the coming of the railroad in 1873, a Fire Company in 1829, and a library.

Hubbardston continued to grow, reaching a population high of 1,825 in 1850, but then declined to around 1,400 in 1900. The mid-century Civil War had a large impact, with 120 men joining the Union Army and 44 of them losing their lives. The period from 1850 to 1890 saw many of the original families of the town disappear and the younger population move on, as industrial urban opportunities grew and enticed them to other parts of the county. From 1910 to 1930 the rate of population decline slowed, probably due to the influx of immigrants who purchased abandoned farms and worked both at agriculture and industrial employment. In 1940, Hubbardston had a rural population of 55.9%, the second highest in the county.

In 1926, the Massachusetts legislature passed the Ware River Act by which the Ware River was impounded for the purpose of drinking water collection; funds were appropriated for the construction of a 12-mile long aqueduct from Ware River to Wachusett Reservoir. The Metropolitan District Water Supply Commission (MDWSC) was set up to run the project. Considerable watershed acreage was taken by eminent domain. In addition to large tracts of land which were taken and inundated in the region to the west, some 20,250 acres were taken by the MDWSC in the towns of Hubbardston, Barre, Oakham, and Rutland. MDC began buying the land in 1928 and continued for the next 10 to 15 years, although the Ware River intake works were

completed in 1931. Coinciding with the Great Depression, this action, whereby the state took ownership of thousands of acres, had a great impact on Hubbardston's economy and population.

The first half of the 1900s brought two world wars, again resulting in the loss of some of Hubbardston's young citizenry and

community change. Yet more dramatic change came about after World War II when automobile ownership became commonplace. Ultimately, it became not only possible but economically feasible for residents to commute to a job in "the city" and enjoy living in a rural environment. Consequently, Hubbardston's population increased as it became a bedroom community to the surrounding urban areas.

Our location attracts new families now as it did in the 1700s, but probably for different reasons than entrepreneurial ambitions. Since 1975, Hubbardston has grown dramatically but the number of businesses and services that were available in the nineteenth century did not accompany this growth. At the present time there are several small industries, retail, and service businesses, along with numerous home-based endeavors.

#### POPULATION CHARACTERISTICS

Since the 1990 US Census, the population of Hubbardston has grown significantly. The 2000 US Census (see Table 1) reported that the town had 3,909 residents, an increase of 40% over the past decade. Furthermore, as of December, 2006, the town's total population has reached 4,598 individuals.

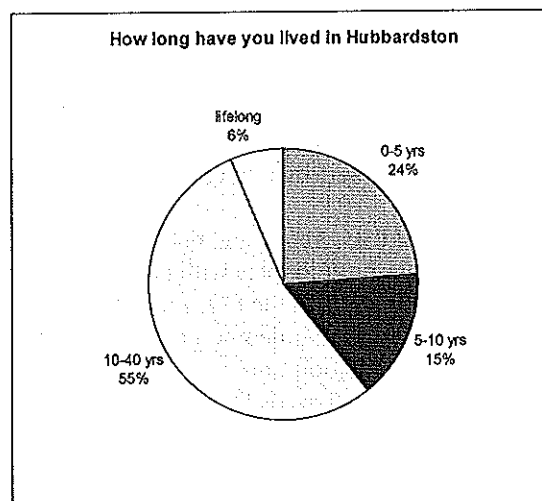
In response to the open space and recreation survey conducted prior to this plan update, most respondents stated that they have lived in Hubbardston from 10 to 40 years. Approximately one third of the respondents indicated that they had moved to town within the past 10 years. (See Figure 3)

**Table 1: 2000 US Census Age Distribution**

Age Group	Number	Percent
Under 5	293	7.5
5-14	745	19
15-44	1715	43.9
45-65	885	22.7
65 & Over	271	6.9
<b>Totals</b>	<b>3909</b>	<b>100</b>

**Table 2: 2000 US Census Income Distribution**

Income	Households	Percent
5,000-9,999	62	4.7
10,000-24,999	97	7.3
25,000-34,999	93	7.0
35,000-49,999	234	17.7
50,000-74,999	385	29.2
75,000-99,999	206	15.6
100,000-149,999	184	13.9
150,000-199,999	60	4.6
<b>Totals</b>	<b>1321</b>	<b>100</b>



**Figure 3: Citizen Term of Residency**

Table 2 illustrates income distribution by household in Hubbardston as of the 2000 U.S. Census. Median household income at that time was \$61,462, with a per capita income of \$23,072; about half of the town's households reported incomes in the \$35,000-74,999 range, but one percent of the town's population was considered to be living in poverty, and many households were considered "low-income."

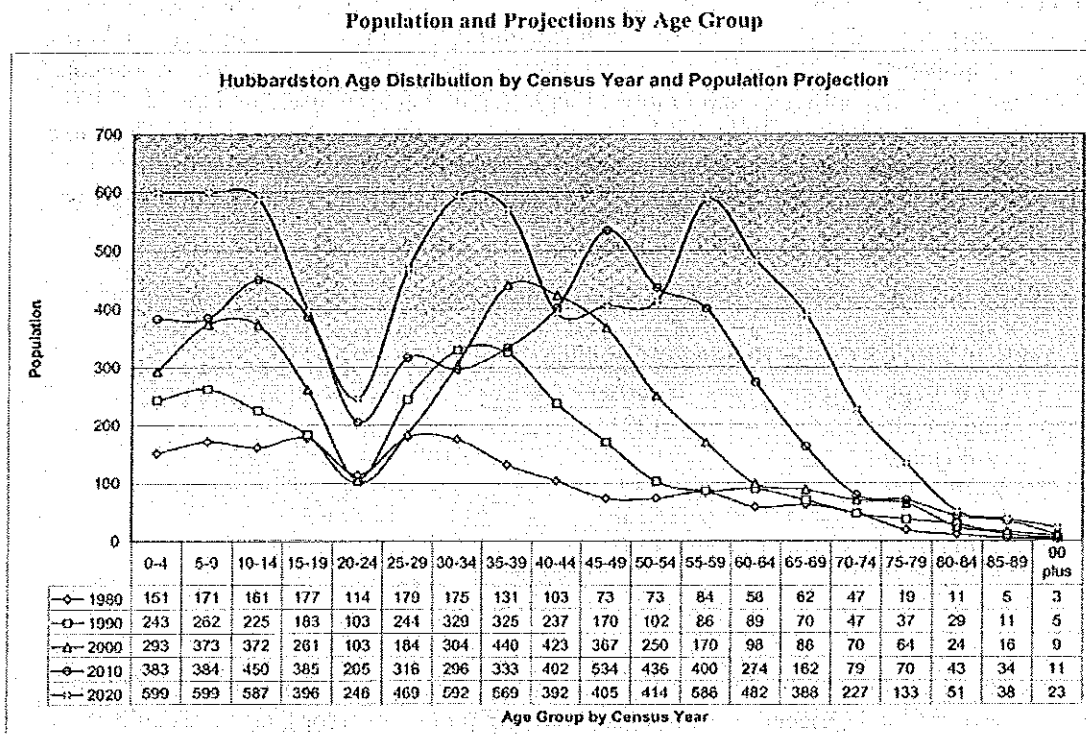
The growth in the number of young families has been particularly significant. The Hubbardston Center School (K-6) enrollment in 1991 was 353. A \$7.2M renovation and addition to the Hubbardston Center School was completed in 1992. According to US Census 2000 figures, total school enrollment of children from nursery/pre-school (age 3 years and up) through high school was 948, with 677 attending kindergarten/elementary school. By June of 2001, the number of elementary students at Center School had jumped to 479, an increase of almost 36%; enrollment reached its highest point during the 2001-02 school year, with 509 students. Interestingly, enrollment at Center School began dropping off somewhat in 2002-03, with 474 students, and has remained fairly stable since then, with the following numbers: 2003-04, 474 students; 2004-05, 477; 2005-06, 483; and current 2006-07 enrollment 471 students. Principal Joan Paula stated in a report to the school committee that the leveling-off of these school-age enrollment numbers over the past few years is consistent with a state-wide trend.

The most recent MISER (Massachusetts Institute for Social and Economic Research) population projections for 2010 and 2020 were released in December, 2003. That report and the Hubbardston Community Development Plan prepared by Montachusett Regional Planning Commission in 2003 confirm that Hubbardston's population expanded from 1980 through the early 2000s as young families moved here in search of affordable housing. At the same time, the average age of residents has increased. By 2010, the largest age group is expected to be those aged 45 to 49. By 2020, MISER predicts a large influx of young families with young children, and increases in the population of every age group. Figure 4 shows the town's population and projections by age group.

At the time of the 2000 US Census, the vast majority of employed residents reported that they commuted to work, with a mean travel time of 30 minutes. Although Hubbardston is home to some small and home-based businesses, most residents spend their working days away from the community. Worcester, Fitchburg, Leominster, and cities along the Route 495 corridor, as well as Keene, N.H., are all accessible points with a multitude of employment opportunities. Anecdotal community information indicates that many residents, especially those in the building trades, travel as far as Boston and environs, as well as other New England states, for lucrative job opportunities. A common thread running through the community seems to be a desire to live in a quiet, relatively-safe, and relatively-undeveloped—and therefore more affordable--town while making the necessary sacrifice in commuting time and costs for means of employment.

An examination of these social and demographic characteristics points to a community made up of many young families (couples with children) in which one or both parents work outside of Hubbardston. Responses to the Open Space and Recreation questionnaire regarding age and family size reflected similar demographic trends. Two hundred and fifty six respondents to the Open Space and Recreation Survey described their living situation, and many of the respondents (40%) described themselves as families with children (no ages specified) in the household. Nearly 21% of respondents were couples with no children in the household. The smallest number of respondents--13%--was senior citizens over the age of 65.

Figure 4



Planning for the open space and recreation needs of Hubbardston must balance the needs of the large number of working families and their hectic schedules as well as those households which are childless and have less demanding obligations. Planning must also take into account the change in recreational styles and needs of aging and senior residents.

#### GROWTH AND DEVELOPMENT PATTERNS

As European settlement of the “frontier” pressed westward during the seventeenth and eighteenth centuries, it tended to follow the “paths of least resistance”. In central Massachusetts, where forests were dense and terrain was rough, this meant using the established paths and clearings of Native Americans. These paths often followed streams and ridgelines, originally functional for hunting and gathering from the wild landscape. As settlement became permanent, these original footpaths became cart-paths, and cart-paths became roads. Much of Hubbardston’s current infrastructure still follows these same paths.

The economic framework that drove this settlement—agriculture and cottage industries—also provided the original patterns of development: a vibrant Main Street developed in the center of town, residential villages sprung up around mills, and farmhouses were dispersed amongst the fields and pastures of Hubbardston’s open land.

Hubbardston went through a period of relative abandonment during the nineteenth and early twentieth centuries as the economic forces of the region shifted to centralized industries and wars took men from farms and factories. Times and needs changed significantly following the two world wars. Automobiles were prevalent; most employment was to be found in urban areas. Improved automobile transportation infrastructure and the resultant mobility meant that people could choose to live further from the urban areas in which they worked. Consequently, by the 1950s, consistent with a pattern that was occurring throughout the northeastern United States, many of Hubbardston's residents were commuting to nearby cities for work, and people could choose to live in the outlying areas of town. Single-family homes situated on individual lots became the norm. Between 1950 and 1990, the town's housing pattern stabilized. Then, in a trend noted in many small Massachusetts towns in the early 1990's, a sudden growth spurt occurred. The past few years have seen a leveling-out of growth, a by-product of pro-active planning by the town.

As shown in Table 3, most of Hubbardston's residents currently live in single-family units.

**Table 3: 2000 US Census Housing Distribution**

<b>Unit Type</b>	<b>Number</b>
Single Units	1221
2-4 Units	85
5 -19 Units	37
Mobile homes	7
<b>Totals</b>	<b>1350</b>

Hubbardston has thus evolved from a landscape which was predominantly made up of large expanses of wetlands, second-growth forest, and farm properties (crops, orchards, animal pastures)—open space—with a centrally-located social and business sector to a residential community made up of 2+ acre (average) house lots—many in developments—sprinkled amongst fewer and fewer remaining fragmented, undeveloped parcels. The traditional zoning policy adopted by the town—a minimum of two acres per lot with a 200-foot frontage requirement—has led to a consumptive sprawling growth pattern. On the other hand, Hubbardston's zoning by-laws provide for several growth-management protections, including an Aquifer Favorability Protection District, site plan review for all special permit uses, a general wetlands by-law to control activities affecting wetlands, a Rate of Development Bylaw, and the newly-adopted Open Space Residential Bylaw.

Land available for commercial and industrial development in Hubbardston is strictly limited under the current zoning by-laws. A small retail and social (churches, town facilities) center remains, but several small businesses are located well away from the town center. This is a result of the formation of the "Town Center" zoning district, which prohibits mixed uses such as retail stores and restaurants and requires two-acre lots, intended to preserve the agrarian residential character of the town center. Because zoning provides for a commercial-use district along Route 68, and there is a natural extension here, northward from the town center, there is the potential for this Commercial zone to erode any town-center vitality which may exist, by spreading out and relocating the focus of daily activities even further from the town's core. On the other hand, although several small commercial enterprises are presently situated along Route 68, "brick-and-mortar" small business growth along this highway has remained fairly static.

Ironically, the burgeoning growth in family homes translates into demand for more land and facilities for recreation. Homes situated further and further from non-centralized open space and recreational opportunities mean a need for more attention to parking facilities. Additionally, the types of open space uses and recreational patterns are changing in response to community demographics. Once taken for granted, open space (especially contiguous tracts of land) for simple outdoor enjoyment has now become more precious. Unstructured outdoor play is more and more being replaced by organized and centralized recreation, one outcome of a predominance of young families with children in which both parents work outside of the home.

## **INFRASTRUCTURE**

### **TRANSPORTATION AND ACCESS**

#### **Rail**

The railroad played a major role in the Hubbardston's early infrastructure. A history of the railroad in our area is in Appendix II.

The final passenger train was removed from the Boston, Barre & Gardner railroad on 1953. Although the railroad line, now owned by Providence and Worcester Railroad, a Class II (mid-sized, freight-hauling) railroad, still passes through Hubbardston, it no longer has a significant impact on the long-term development pattern of the town, except with regard to the actual physical location of the tracks and adjoining property affecting land availability.

#### **Highway**

The principal highway providing access to Hubbardston—via Templeton or Gardner—is State Route 2, the old Mohawk Trail, which runs across northern Massachusetts. State Route 140 and Interstate 190 connect the region to Worcester. The major routes in and out of Hubbardston are Routes 68 (south to Holden, access to Worcester; north to Gardner, access to Route 2), and Route 62 (east to Princeton, west to Barre). Other busy routes are Elm Street/Barre Road, Williamsville Road, New Templeton Road, and New Westminster Road.

Since the 1960s, Hubbardston's system of streets, roads, and highways has been the infrastructure aspect which has had the most impact upon the town's growth and land use patterns. When Hubbardston entered its long growth period at the second half of the twentieth century, the layout of the streets and roads initially resembled the well-traveled routes of the prior century. An increase in new road construction began in the 1960s with the development of the Pinecrest area subdivision. Following somewhat of a lull in the 1970's and 1980's, new road construction over the past 15-20 years took place in conjunction with a few new housing developments such as Blueberry Farms, Rolling Woods, and some condominiums. Besides those new roads, the primary focus for the past 25 years or so has been on maintenance and improvement of existing roads and bridges. According to Lyn Gauthier, Hubbardston Highway Superintendent, an influx of increased state roads funds since about 1994 resulted in an increase in important maintenance projects, such as repair of one bridge on New Westminster Road and improvement to a badly-deteriorated segment of Elm Street. On the highway department agenda for 2007 are improvements and repairs to Route 62.

All of the highly-accessible roadways in and out of town have seen enormous single-family home building pressure over the past 25 years. The result is an infrastructure which is increasingly encroaching upon open space; also, the character and location of these parcels provides for

recreation on a private household/ lot-by-lot basis, but does not enhance general public recreational needs.

#### **Public Transportation**

Public transportation is non-existent in Hubbardston, another factor which should be noted in a discussion of long-term planning with regard to open space. Lack of public transportation suggests that recreation and open areas intended primarily for use by children and young people should be situated close to the more dense residential spots in town (although it is unlikely that location would significantly affect recreation space usage, given the current need for Hubbardston residents to “drive everywhere” anyway, due to sprawl, lack of sidewalks, etc.)

Although the town is a member of the Montachusett Regional Transit Authority/Massachusetts Association of Regional Transit Authorities (MARTA or MART), there is no fixed route service. However, MART provides Councils-On-Aging service to the community for elderly and disabled residents.

#### **Water and Sewer**

There is no public water supply or sewer system in Hubbardston. All residents are served by private wells and septic systems. (See Section 4, ENVIRONMENTAL INVENTORY AND ANALYSIS)

### **LONG-TERM DEVELOPMENT PATTERNS**

Current delineated zones in Hubbardston are: Residential-Agricultural, Town Center, Commercial, and Light Industrial [see Map 2, Zoning] Table 4 describes some of the pertinent requirements of Hubbardston’s zoning regulations. Important changes to the town’s zoning by-laws since the 2001 Open Space and Recreation Plan include the adoption of the Senior Residential By-Law in October, 2002, which allows clustered senior (age 55 and older) housing development with set-aside conservation land. There are currently two of these senior residential developments (condominium-style) under construction.

**Table 4: Current Zoning Regulations**

<b>Type</b>	<b>Minimum Lot Size (ft<sup>2</sup>)</b>	<b>Minimum Frontage (ft)</b>
Single Family*	80,000	200
2 Family	110,000	250
Multi-Family	special permit	special permit
Lt. Industrial	100,000	300

*\* Commercial, Town Center, and Single Family Residential requirements are equal.*

Also adopted since the original plan was the Open Space Residential Bylaw in June, 2006, which allows denser “cluster” housing on smaller lots, with a certain amount of the property is set aside for conservation (per Massachusetts “Smart Growth” policies) and the Rate of Development Bylaw.



## **Build-Out Analysis**

In 2001, the Massachusetts Executive Office of Environmental Affairs worked with MRPC and developed a detailed document--a "build-out,"--estimating the impact on land use if all developable lands were utilized according to zoning regulations in place during the late 1990's. According to Jane Pfister, the GIS/Graphics Information Specialist for that office, these estimates have not been changed, as of January 2007, in light of new zoning rules.

The build-out consists of a series of 4-5 GIS maps that visually show Hubbardston's development patterns and future growth projections [see Map 3, Build-Out.] The maps act as storyboards that unfold a picture of land use decisions the community had made to date and what these decisions might mean for the community in the future. These build-out maps project the default scenario for growth by graphically illustrating what the community may look like if all remaining developable lands were developed, to their maximum potential. Thus, the build-out provides a good basis for decisions about future development and potential impacts on the community.

Appendix III explains the methodology and presents the build-out projections and statistics in chart form. Given the zoning and land use controls in place six years ago, maximum dwelling units could expand to 4,618 and the number of residents could grow to 13,489, including 3,003 school children. Obviously this would strain the town support services, school system, and infrastructure. Where residents currently rely on private water and septic systems, a population increase as envisioned by the build-out analysis would probably result in the need for development of public water and sewer system, and therefore a dramatic impact on water quality management. Alternatively, zoning build-out analyses typically demonstrate that septic outputs on numerous contiguous lots of, for example, 1.5 to 2 acres, will, over time, result in nitrate concentrations approaching or exceeding the drinking water standard. These analyses are based solely on septic outputs and ignore additional contributions to nitrate concentrations from animal pens.

All of the environmental issues and challenges addressed in Section 4 of this report could potentially become more problematic under a maximum build-out scenario. With increased residences could come increased numbers of outbuildings, paved driveways, a demand for more commercial and retail services, increased traffic and the like--in short, the end of the quiet, rural town with numerous open spaces that is now Hubbardston.

While new housing construction permits hit highs of 52 and 37 in 1999 and 2000, respectively, the pace of new home construction slowed somewhat--to 26--in 2001. Then, in December, 2001, with an eye toward managing unplanned growth, the town passed the Rate of Development By-Law which limits building permits to 28 annually, with no more than five of these permits being granted to any one builder. It is no surprise that this measure has resulted in reduction of the number of new houses being built and discouraged applications for new subdivisions. On the other hand, developers are allowed to apply for waivers to this bylaw, and in fact have done so twice since 2004; developers were granted permission to build more condominium units at the Moosehorn and Madison Green senior residential housing projects. In 2006, there were 19 building permits granted for new home construction and 14 issued for condominium units. It should be noted that both Moosehorn and Madison Green plan the addition of many more units over the next few years.

## **Traffic Counts**

Another indication of growth may be linked to traffic flow. The state highway department and Montachusett Regional Planning Commission have conducted traffic counts at various locations in town. Along Hubbardston's main thoroughfare, Route 68, daily vehicle counts have remained surprisingly stable since 1997. In 1997, approximately 6,000 vehicles per day were counted at the Gardner line; in 1998, a little further south at the Brigham Street intersection, a total of about 6,300 vehicles per day was noted. Similarly, a count at the Gardner/Hubbardston town line on Route 68 in August, 2005, also resulted in a (factored) vehicle count of 6,300. Then in July, 2006, a count north of Morgan Street—also along Route 68/Gardner Road—resulted in a raw count of 7,096 vehicles, factored into a final analysis of 6,200 vehicles.

Traffic count numbers for the portions of Route 62 which pass through Hubbardston have also been fairly static over the past few years. At the Barre/Hubbardston town line in 2004, 1,800 vehicles per day were recorded; near the same area (south of Elm Street on Barre Road) in July 2006, a raw count of 2,002/factored count of 1,700 vehicles per day was recorded. A similar pattern emerged when 1,400 vehicles per day were counted at the Hubbardston/Princeton town line on Route 62 in 2004, and an MRPC count on "Route 62 east of Route 68 [Princeton Road]" in summer 2006 found 1,395 raw/1,200 factored vehicles per day.

See Appendix IV for Massachusetts Highway Department data for Hubbardston.

Somewhat surprisingly, traffic count data since the late 1990s for the Hubbardston area does not show any dramatic change and in fact has remained fairly consistent with regard to volume.

## **SUMMARY**

Although Hubbardston's geographical and geophysical setting places some limits on its population and economic growth, the town experienced an influx of new residents and new construction from the 1970's through the 1990's. Distance from urban and economic/retail centers ceased to be seen as problematic. New residents were drawn by the affordability of land and housing, the appeal of large tracts of undeveloped open space, and the perceived safety as compared to larger urban landscapes.

Like so many other small towns in Massachusetts, the town found itself increasingly challenged to provide necessary services and meet the needs of the growing community with a budget already strained by state-imposed taxation and spending restrictions. With an eye toward the future, key townspeople, committee and board members, and employees took an active role—particularly during the 1990's—in developing growth-management by-laws and protecting open space. There are many indications with regard to both demographics and development patterns that growth has slowed and become more manageable since the original Open Space Plan was written, thus giving Hubbardston residents an opportunity to reflect and take stock regarding future growth and open space needs.

# Section 4: Environmental Inventory and Analysis

## INTRODUCTION

Because one of the primary goals of open space protection is environmental protection, an inventory and analysis of the Hubbardston's environmental status is especially important and a lengthy topic. As a town approaches its "carrying capacity" in terms of infrastructure and services to its citizens—police and fire protection, roads and road maintenance, solid waste disposal, clean drinking water, etc.—open space protection is one tool that can be used to decrease expansion of some town services and at the same time remove the pressure on and over-use of the town's existing natural resources. Hubbardston residents often express their desire to live in a community with some undeveloped fields, woods, and ponds. Open space protection provides the balance between infrastructure needs and other human needs for solitude, clean air, clean water, outdoor recreation, and the like—a healthy natural environment.

The town's geography, natural resource base, and existing protected open space, however, present their own management issues and challenges.

## GEOLOGY, TOPOGRAPHY, & SOILS

The underlying geology of Hubbardston has been one of the primary influences on the natural and man-made landscape seen in town today. Geology affects topography by creating the varying elevations, and affects soil formation by providing some of the parent materials with their different fertility and drainage characteristics. Soils, in turn, affect the type of vegetation supported *and* the type of development that can occur. Geology, topography, and soils all affect surface and groundwater hydrology, also important to both the natural and man-made environments.

### Bedrock Geology

Formations: The *bedrock* geology of Hubbardston was formed approximately 350 to 400 million years ago, during the Devonian and the slightly older Silurian epochs, within the Paleozoic era. This bedrock was originally sedimentary, having been deposited when ancient seas covered the area, but later tectonic events to the west and east folded and heated the bedrock, which then became metamorphic. This bedrock occurs in two distinct formations running north to south through Hubbardston. These formations are the Paxton on the east side of town, and the Littleton on the west, with the Fitchburg formation interspersed in the Littleton. These formations are composed of sulfidic mica schist. The rocks are soft, and can break down into clays that can hold water tightly, thus making less water available to residential wells.

### Groundwater Resources

Well Yields: Despite the clays in the bedrock, well yields in Hubbardston are adequate for residential development on the minimum required lot size of 80,000 square feet. Aquifers in the town are bedrock aquifers; thus, wells in the town are bedrock artesian wells. The average residential well depth is around 100 to 150 feet deep; although well depths can range up to 400 feet deep when low yields (1 to 1.5 gallons per minute) require some storage capacity. However, well yields in the northwestern section of town are higher, with 20-30 gallons per minute

capacity. Thus, well yields in the town are quite variable, but on the average, wells in the town need to be deeper than in other surrounding towns.

**Well Water Quality:** Because of the iron sulfide in the bedrock formations, sulfuric acid forms when the bedrock decomposes, causing a low pH in ground water of 6.2 to 6.5. The iron and manganese in the bedrock affect secondary standards of taste and odor, causing a rusty appearance in well water. The iron sulfide can also cause a sulfur smell in water from about one out of every six wells in the town. The Paxton formation also contains arsenic, a naturally occurring element under these geological conditions. Radon gas is also likely to be a natural by-product of the geological character of our region. Both arsenic and radon, although present and with potential public health effects under certain conditions, must be evaluated on a structure-by-structure basis. (See "Environmental Issues and Challenges.")

### **Aquifers and Recharge Areas**

An aquifer is an underground layer of rock, sand, or gravel that contains water in sufficient quantities to supply a well. The stratified glacial deposits in the region's stream valleys form the best aquifers in the Otter River watershed. Templeton and Hubbardston Brooks flow through a landscape characterized by rich sand and gravel deposits that are extensively mined. (See "Environmental Issues and Challenges.") The drainage basin for Hubbardston Brook contains a medium-yield aquifer, and, according to Hubbardston's Executive Order 418 Community Development Plan, the Department of Environmental Protection has delineated this a Zone II Aquifer Recharge Protection Area.

### **Flood Hazard Areas**

Floodplains are considered to be the lowlands adjacent to streams, rivers, or lakes which are susceptible to flooding. Floodplains serve two primary functions: channeling of floodwaters downstream, and impeding the flow of floodwater throughout the area. Floodways adjacent to water bodies serve as channels for diverting high waters. At the outer edge of the floodplain, the flood fringe is subject to flooding less often and at more shallow depths.

Floodplains are determined by the frequency of a flood that covers a specified area, e.g. a 100-year floodplain may flood every 100 years. Flood frequencies are calculated by plotting a graph of the occurrence and size of all known floods for a specific area and thus determining how often floods of a particular size will occur.

The 100-year flood plain areas (those designated as Zone A by FEMA flood insurance maps) in Hubbardston occur along all mapped streams and ponds in Hubbardston, although the widths of the floodplains vary with the topology. Map 4 shows these areas. The most extensive floodplain areas occur along the East and West Branches of the Ware River, and the lands adjacent to Moosehorn Pond, all in the southern portion of town. (Interestingly, although the acreage of floodplains within developed lands of the Miller's River Watershed [Montachusett Regional Planning Commission catchment region] are small, approximately 3.7% (563 acres) of the 100-year floodplain and an estimated 6.9% (205.2 acres) of the 5-year floodplain are developed, and some of that acreage is in Hubbardston.)

### **Surficial Geology**

The *surficial* geology of the town is more variable than the *bedrock* geology. In many ways, the topography, soils and hydrology of the town have been more influenced by the surficial geology,

created by the most recent geologic event: the great glaciers of the Pleistocene Epoch (10,000-15,000 years ago). These glaciers churned over the landscape and left behind remnants that can still be seen today. River courses follow distinct north-south routes (the same direction as glacial movement), large deposits of sand and gravel are prevalent (from outwash from glacial melt-water), and huge boulder erratics carried from northerly mountaintops are strewn across town.

Most of Hubbardston is covered by unsorted rocks, stones, and soils called "till". Till is eroded geologic materials deposited as glaciers retreat. Where glaciers scoured over bedrock, bedrock outcrops remained. Where they rode over loose material on top of bedrock, rounded hills, called "drumlins," were formed. Depressions carved out by the glaciers created today's ponds, bogs, wetlands, and stream valleys. Since the glaciers, wind and water erosion have left numerous alluvium deposits along flood plains. Map 5 shows the correlation between the surficial geology and the hydrology of the town.

### **Topography**

Hubbardston's terrain is comprised of rolling hills with elevations from 780 feet above sea level along the West Branch of the Ware River to 1,313 feet above sea level at the peak of Canesto Hill, at the Templeton border. The terrain is relatively level in eastern parts of town at around 1,000 feet. (Refer to **Map A-1, Base Map** for reference to Hubbardston's topography.) Slopes range from 0%, up to 25%, with 8% - 15% predominating. The steep slopes over 15% are more susceptible to erosion, and thus, are a constraint to development.

### **Soils**

Due to glacial deposits of soil materials from distant origins, soils in Hubbardston are partially non-indigenous. However, the parent material of the underlying bedrock has influenced the soils acidity and rusty appearance.

Wetlands cover much of the town of Hubbardston. A look at the town's soil structure illustrates this well. Approximately 34% of Hubbardston's soils consist of Bucksport/Wonsqueak and Pillsbury/Peacham Associations, characterized by the poorly- to very -poorly-drained organic soils (mucks). These soils' qualities, such as wetness, low strength (bearing capacity) and stoniness (Pillsbury/Peacham) severely limit a site's development capabilities for septic suitability and buildings.

Much of the remaining soils in town consist of well-drained to excessively well-drained soils. Approximately 38% of these soils consist of Peru/Marlow and Woodbridge/Paxton Associations, generally considered significant for agriculture. These areas are gently sloping to very steep, with very deep, well- drained to excessively well-drained soils on drumlins. Formed in compact glacial till, these soils have the following qualities: 1) friable fine sandy loam, 2) sandy loam surface soil and subsoil with moderate permeability over very firm, fine sandy loam, or 3) sandy loam substratum (hardpan) at 15 to 30 inches, with moderately slow to very slow permeability. Use limitations in these associations are related to wetness, slow permeability in the substratum, slope and stoniness. They have a perched, seasonal high water table at 18 to 24 inches.

In the 2001 Open Space Report, it was noted that an interim Soil Report for our region was published in 1996 by the Northern Worcester Conservation District, in cooperation with the U.S. Department of Agriculture Natural Resources Conservation Service; a soils map and descriptive soils listing was included in the Appendix. Soil surveys are being completed and published by the USDA/NRCS on a continuing schedule. As time passes, the data in published surveys

become dated. The official information about the soils in our area is now available on-line at [soildatamart.nrcs.usda.gov](http://soildatamart.nrcs.usda.gov).

## LANDSCAPE CHARACTER

According to land use statistics available prior to the first Open Space Plan, Hubbardston's land use is dominated by forests, a landscape that is exactly opposite to that of a century ago. Today, over 80% of Hubbardston's land is covered by woodlands, wetlands, and other mixed habitat. Just over 7% is open land, pastures, and crop land. Nearly 3% of town is under water, and about 4.5% is developed as low-density residential. Table 5 shows a complete breakdown of land use in town; Map 6 graphically denotes the town's land use as of 1995-97.

### Land Use Summary\*:

86.4% forest, wetlands, & mixed  
3.9% agriculture  
5.7% residential  
1.3% commercial, industrial, transportation  
2.7% water

### Land use data MassGIS 1999

\*The Land Use Summary Statistics tables aggregate land use areas on a town-by-town basis for the Commonwealth of Massachusetts. The statistics were generated from the polygon attribute table from MassGIS for the years for which land use data have been collected statewide, 1971, 1985, and 1999. The 21-class MacConnell land use categories were used as the basis of the tables, which summarize acreage of each land use type, "developed" vs. "undeveloped" land, and change from 1971 to 1985 and 1985 to 1999.

Table 5: Land Use

	Acres	Percentage of Town
<b>Land Use Type</b>		
Crop Land	535	1.99
Pasture	640	2.39
Forest	21736	81.02
Non-forested Wetland	673	2.51
Mining	214	0.80
Open Land	801	2.99
Participation Recreation	11	0.04
Spectator Recreation	2	0.01
Water-based Recreation	2	0.01
Multi-family Residential	13	0.05
Medium-density Residential	34	0.13
Low-density Residential	1187	4.42
Commercial	80	0.30
Industrial	31	0.12
Urban Open	95	0.35
Transportation	7	0.03
Waste Disposal	9	0.03
Water	731	2.72
Woody Perennial	27	0.10
<b>Total:</b>	<b>26829</b>	<b>100</b>

**[NOTE ON NAME CHANGE]**

On July 1, 2003, the Metropolitan District Commission and the Department of Environmental Management were merged into a new agency, the **Department of Conservation and Recreation**. All references in Hubbardston's original Open Space Plan to the Metropolitan District Commission Division of Watershed Management (MDC/DWM) are interchangeable with the current DCR Division of Water Supply Protection, Office of Watershed Management.]

One of the reasons that Hubbardston is predominantly undeveloped is because of its placement in the state's watershed system. The DCR Division of Water Supply Protection is responsible for the stewardship of over 92,000 acres of critical lands and 45.6 square miles of reservoir surface water within the watersheds of the Quabbin, Wachusett, and Sudbury Reservoirs, and the Ware River in order to protect the municipal drinking water supply for current and future generations. Hubbardston is part of the approximately 60,000-acre Ware River watershed (also wholly or partly situated in the towns of Rutland, Phillipston, Oakham, Barre, Templeton, Princeton, and Westminster), and DCR-DWSP owns approximately 22,000 acres of that total acreage. DCR land acquisition and water supply efforts have created some large, unfragmented, and undeveloped tracts of land in Hubbardston.

**SCENIC RESOURCES AND UNIQUE ENVIRONMENTS**

Hubbardston contains within its borders several natural and managed features which are valuable from a scenic standpoint. The southernmost section of Mare Meadow Reservoir, Barre Falls Dam Reservation, and many of the town's ponds provide attractive waterfront views. There are several points of high elevation that offer outstanding looks toward Mt. Wachusett, the region's most prominent landscape feature. The Mt. Jefferson Conservation Area, which maintains open fields and offers dramatic views of both Mt. Wachusett (east) and Mt. Monadnock (north), as well as attractive vistas of church steeples amongst the rolling hills, is a valuable scenic asset to the town. Not as well known because of its seclusion on private property, but no less beautiful, is the view of Mt. Wachusett from the cliffs above Natty Pond. Many of the open vistas in town remain that way because of periodic grazing, mowing, clearing, and stewardship. While a number of our town's most treasured scenic aspects are available on public property, many of the most aesthetically-pleasing viewing points and scenic locations in town are in private ownership. Certain privately-held open-space properties here offer public benefits by contributing to all the positive aspects associated with open space; thus it is wise for the community to work with landowners to ensure the future of the town's character and scenic resources and with citizens with regard to respect of the rights and privacy of these landowners. Map 1 helps to identify the location of these scenic areas. Some of Hubbardston's more popular vistas are:

- ✧ Mt. Wachusett from upper Mt. Jefferson Road;
- ✧ Mt. Wachusett and open meadow from Curtsey Farm on Hale Road;
- ✧ Brigham Pond from upper Brigham Road to Evergreen Road;
- ✧ Mare Meadow Reservoir from New Westminster Road near Westminster line;
- ✧ Mt. Wachusett from George Howard Road;
- ✧ Mt. Wachusett from the former Nampara Farm on Bemis Road/New Westminster Road;
- ✧ Comet Pond from Old Princeton Road.

Many of Hubbardston's roads are winding lanes that pass by preserved images of rural New England: woods, open fields, stone walls, ponds, and clapboard houses. In 1975, following the recommendations of the Conservation Commission and the Planning Board, under the provisions

of M.G.L Chapter 40, Section 15c, the town approved the designation of the following as scenic roads: Barre Road, Bemis Road, Brigham Street, Flagg Road, Grimes Road, Hale Road, Halfrey Road, Healdville Road, High Street, High Bridge Road, Kruse Road, New Templeton Road, Old Princeton Road, Old Westminster Road, Lombard Road, Mile Road, Mount Jefferson Road, Morgan Road, Pitcherville Road, Ragged Hill Road, Thompson Road, Twin Hill Road, Underwood Road, Upper Intervale Road, Williamsville Road, and Williamsville-Templeton Road. The intention of this designation is to assist with planning along the roadways with regard to preserving aesthetic and natural resources. Repair, maintenance, reconstruction, or paving work on roads with this designation "shall not involve or include the cutting or removal of trees or the tearing down or destruction of stonewalls or portions thereof, except with prior written consent of the Planning Board" and after a public hearing.

## **SURFACE WATER RESOURCES**

Hubbardston's surface drainage network of streams, ponds, and wetlands is the direct result of the topography. The drainage network is perhaps the most important environmental feature that should be considered in open space planning. Phil Lewis, a Wisconsin land-use design expert who based his state's open space protection plan on drainage networks, refers to them as a "string of pearls" where rivers and streams are the "string" and ponds, wetlands, endangered species habitats, rich floodplains, historic sites, etc. are the "pearls". Protection of these networks thus provides prime wildlife habitat, recreational opportunities, water supply protection, historic preservation, and other important aspects.

The drainage network can be partitioned into drainage basins, often called watersheds. A watershed is the land area over which water from precipitation collects and flows to a particular stream or river and its tributaries. Drainage basins can be subdivided into smaller sub-basins surrounding a particular river or stream. Hubbardston is located at the "top" of three of the state's twenty-seven major watershed basins: the Chicopee, Millers, and Nashua River Basins. Most of Hubbardston lies within the Chicopee River Basin (Ware River Watershed) (90%), with the remainder of Hubbardston in the Millers River Basin (Otter River Watershed) (9%) and the Nashua River Basin (less than 1%). The Chicopee and Millers River Basins are part of the Connecticut River Drainage System.

Various rivers and streams in the drainage system make their way through Hubbardston. The Burnshirt River enters Hubbardston from Templeton, to the northwest, and then travels for almost six miles through Hubbardston, combining with Canesto and Natty Pond Brooks and entering the Ware River before flowing into Barre. The East and West Branches of the Ware River are also significant watercourses within Hubbardston. The West Branch originates in Hubbardston and flows for five miles south before entering Rutland. The East Branch begins in Westminster, flows for almost three miles in Hubbardston and continues southward to Princeton. The Ware River ultimately supplies drinking water to Quabbin Reservoir or directly to the Wachusett reservoir through the Quabbin Aqueduct during the nine high-water months from October through June. Diversions of water from the river are conveyed into the Quabbin Reservoir through the two-way Quabbin Tunnel. Water flows west from the Ware River to the Quabbin during the high-water months and east from The Quabbin to Wachusett the rest of the year.

Numerous streams and brooks are tributaries to these rivers, some of which are small and join to form the larger streams. Canesto Brook, Hubbardston Brook, Joslin Brook, Mason Brook, Natty Pond Brook and Templeton Brook are a few of the most significant tributaries



There are fifteen ponds in Hubbardston that range in size from 2 to 127 acres (see Table 6) and a few other small ponds which are smaller than two acres. These ponds are great recreational assets in Hubbardston, providing opportunities for boating, swimming, and fishing and other pastimes. In the 2001 citizen questionnaire, Comet Pond was ranked the primary open space recreational opportunity in town, and in 2006, questionnaire respondents also mentioned frequent use of the pond. (See also the section on water quality regarding ponds.)

**Table 6: Ponds of Hubbardston**

<b>Name</b>	<b>Acreage</b>
Asnacomet Pond	127
Bemis (Road) Pond	16.4
Bennett Pond	2
Bents (Sawyer's) Pond	28.7
Bickford Pond	163 (Half in Princeton)
Brigham Pond	46.9
Cunningham Pond	27
Cushman (Perry Hill) Pond	23
Lovewell Pond	81.6
Marcen (Marean) Pond	62
Mare Meadow Reservoir (southern [main] portion)	240 (most of which lies in Westminster)
Moosehorn Pond	67.4
Natty Pond	3
Tannery Pond	5
Waite Pond	34.4
Williamsville Pond	57

Wetlands are a very important resource for wildlife habitat, water purification, groundwater recharge, and flood control. Many species of flora and fauna only occur in wetlands. Numerous types of wetlands exist in Hubbardston, comprising approximately 1,200 acres. Refer to Map 7 to see these wetlands and their associated habitat types.

Numerous federal and state reports and public documents regarding surface water quality, watershed management, wetlands delineations, etc., which provide more information beyond the scope of this Plan, are available and easily accessed.

See also "Environmental Issues and Challenges" later in this section.

#### **VEGETATION**

The plant life of this region is determined by land use, climate, elevation, topography and aspect, and soils/geology. As described earlier, Hubbardston is divided into two eco-regions—the

Worcester Plateau and the Lower Worcester Plateau—as defined by these factors. This means that Hubbardston has a diverse variety of trees and plants.

Hubbardston's landscape is dominated by secondary growth forests that have grown back since the time more than 100 years ago when there was substantial clearing of land for timber and agriculture. A majority of these forests are considered "upland," or sites that are fairly dry and well-drained. Oak, hickory, and ash trees dominate the uplands, interspersed with black cherry, basswood, yellow and black birches, and sugar maple. Large stands of white pine are also common in Hubbardston's upland forests. Understory shrubs include witch hazel, striped maple, hazelnut, blueberries, and a variety of ferns and other herbaceous plants.

North-facing slopes and damper, protected areas are dominated by beech, red maple, birch, and green ash. Groves of hemlocks fill valley bottoms, especially at the toes of north-facing slopes. These places are also known to accommodate some balsam fir and red spruce—softwood trees common to more northerly regions, found here at the southernmost limit of their range. Large, forested wetland complexes are very prevalent along Natty Pond Brook, the lower stretches of Joslin Brook, and at the headwaters of the East Branch of the Ware River. These areas have important wildlife and flood control values.

Hubbardston also has numerous non-forested wetlands and bogs. A large bog is located around Natty Pond, and another just south of Cunningham Pond along Joslin Brook. Bogs provide unique habitats for many species of wildlife, with deep mats of sphagnum moss (which become peat), Labrador tea, pitcher plants and other plant species. Shrub swamps, with thickets of dogwood, willow, and alder, are also very common in the lower and more level valleys in the southern part of town. Shrub swamps often have wet meadows associated with them. These wetland habitats are displayed in Map 7.

Many open fields remain throughout Hubbardston. Hayfields, pastures, other cropland and open fields are important components of the town's character. These are also key habitats, especially for migrating and nesting songbirds and waterfowl. Some bird species, such as Bobolink and Killdeer, rely on open fields and clearings for nest sites. A number of neo-tropical migrant bird species—many of them declining in population—use early-successional cropland for nesting. These areas, dominated by birch, cottonwood/aspens, and other small saplings, provide great cover and food sources for these birds. Because many of these lands are privately owned and managed, working with landowners is one way to help protect these resources for the future.

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) recently developed a BioMap identifying site-specific "Core Habitats" which exist in Hubbardston. The map identifies the most critical sites for biodiversity conservation, and a summary of each site highlights characteristic natural communities and their associated plant and animal species. Four core habitats are identified: BM518, which also extends into Rutland and Barre, includes riparian habitat and extensive upland forest along the Ware and Burnshirt Rivers and several brooks; BM609, much of which is in the Hubbardston Wildlife Management Area, contains a variety of wetlands, including a Level Bog (dwarf shrub peatland); BM647, which contains a high-quality example of a classic northern Kettlehole Level Bog (acidic dwarf shrub peatland); BM622, which comprises the shoreline and waters of Bickford Pond.

The BioMap/Core Habitat report for Hubbardston identifies three rare plants which are present in BM518: Bartram's Shadbush (*Amelanchier bartramiana*), classified as "Threatened," and Dwarf Mistletoe (*Arceuthobium pusillum*) and New England Blazing Star (*Liatris scariosa* var. *novae-angliae*), both species of "Special Concern." Two plant species documented in towns adjacent to

Hubbardston--Thread Rush and Great Laurel—have not been documented but may be present. Further exploration of likely habitats of rare plants is needed in order to complete the assessment of the town's important natural resources.

## FISHERIES AND WILDLIFE

Combine Hubbardston's great structural diversity of habitats with its large expanses of protected, undisturbed land, and it's easy to see why one of the town's biggest assets is its fish and wildlife resources, both game and non-game species. State biologists recognize this area for its impressive biodiversity. Sportsmen enjoy its ample fish and game opportunities [see Section 5]. Naturalists, birdwatchers, photographers and others appreciate the opportunity to study and observe a variety of wild creatures. Both citizens and visitors alike utilize and benefit from the presence of a rich mix of native animals.

Non-developed areas of Hubbardston are utilized as feeding and resting areas for many migrant bird species and for nesting by still more neo-tropical migrant birds that use Massachusetts as their breeding grounds. Passage migrants that occur in Hubbardston and which are considered Threatened or of Special Concern in the state include Northern Parula and Blackpoll Warbler. It is likely, although not confirmed, that Cooper's Hawk and Sharp-shinned Hawk, species of Special Concern, nest in Hubbardston. Meanwhile, it should be noted that many migrant bird species, although not on the state's endangered species list, are considered to be declining in population and/or uncommon, and therefore merit some attention on the part of town planners. These species include Bobolink, Barn Swallow, sparrow species associated with certain types of grasslands, and warblers that use specialized forest habitat.

Hubbardston is home to many common species of wildlife. White tailed Deer, Coyote, Beaver, Raccoon, Porcupine, and Red Fox are abundant mammals here. Black Bear, Fisher, and Moose are found in small numbers. Native brook trout, large and small mouth bass, perch, and a variety of other fishes live in Hubbardston's waters.

In addition to identifying significant plant species (noted above) the BioMap/Core Habitat project has identified rare and endangered animals associated with the four natural communities cited above. The four locations are: (1) Bickford Pond off of Lombard Road; (2) the wetland area adjacent to Moosehorn Pond; (3) the wetland downstream from Brigham Pond on the west side of Route 68 and (4) the wetland area surrounding Canesto Brook on both sides of Williamsville Road. These areas are delineated on Map 7. Core Habitat BM518 lists the status of four invertebrates—three moths and one beetle--which are found there as "Threatened" or of "Special Concern." Also present in that area are American Bittern (*Botaurus lentiginosus*) (Endangered) and Eastern Box Turtle (*Terrapene carolina*), Four-toed Salamander (*Hemidactylium scutatum*), Jefferson Salamander (*Ambystoma jeffersonianum*) and Spring Salamander (*Gyrinophilus porphyriticus*) and Wood Turtle (*Clemmys insculpta*), all of "Special Concern" status. Core Habitat BM622 is important in supporting Common Loon nesting habitat. The loon is a species of Special Concern in Massachusetts. A rare dragonfly, Beaverpond Clubtail (*Gomphus borealis*), has been found in Core Habitat BM609, and it is likely that other rare vertebrates are also present at this location.

Vernal pools, or areas of pooled water that dry up for periods during the year, are prevalent and very well documented resources in this community. The Natural Heritage & Endangered Species Program (NHESP) of Massachusetts Division of Fisheries and Wildlife (DFW) has established criteria for certification of vernal pools, and Hubbardston has more Certified Vernal Pools--311--than any other township in the Commonwealth. Vernal pools host a unique biotic community;

they are fish-less and thus lack a heavily predatory trophic system, so many species of animals, especially reptiles and amphibians, rely on these abundant resources for breeding grounds and specialized food sources. Many other animals whose life cycles are predominantly or entirely terrestrial depend upon vernal pools for nesting materials and food sources (e.g. certain bird species, certain small mammals), for use as watering holes (e.g. deer), and grazing of emergent vegetation (e.g. moose, small mammals). Vernal pools also act as storage “tanks” for groundwater, allowing surface water to slowly percolate into the ground over time and recharge aquifers. Vernal pools are displayed on Map 8.

### **Wildlife Corridors**

A healthy community ecosystem includes wildlife corridors and “greenways” that allow animals and birds to travel easily over many miles of terrain and therefore not create isolated “islands” of populations. Wildlife populations that are unable to move about can put too much pressure on a given tract of land, depleting the food resources and thereby starving themselves out of their own living spaces. Further, isolated wildlife populations suffer from lack of genetic diversity. Large migration-enabling tracts of land add to overall species biodiversity, too. Fortunately, Hubbardston’s present land use structure provides many opportunities for sheltering wildlife and allowing wildlife movement over large, unbroken tracts of undeveloped areas. Interconnected parcels of woodlands and wetlands can be seen on the town’s land use map. Hubbardston also shares much unfragmented open space with neighboring towns to the west/northwest and south/southeast. The only section of town which probably blocks movement of many, although not all, wildlife species, is the northeastern corner which abuts the outskirts of metropolitan Gardner.

## **NATURAL RESOURCE-BASED RECREATION**

Hubbardston offers thousands of acres of open space where people may enjoy many non-consumptive activities which are dependent upon open, undeveloped tracts of land and clean, unobstructed waterways. While many of these activities are allowed and encouraged, there are certain tracts of land in town which are regulated and operate under various restrictions.

In the 2006 citizen questionnaire, Hubbardston residents listed with frequency the use of open space for hiking, horseback-riding, canoeing, bicycling, cross-country skiing, nature study, and hunting and fishing. Some of the uses are directly dependent upon the availability of undeveloped woods, fields, waterways and their ability to support wildlife, while other modes of recreation—bicycling, walking, and team sports, for example—can take place outside of protected open space areas. Additional kinds of recreational activities which are not reliant on the town’s natural resources are discussed in Section 5.

### **Hunting and Fishing**

Hunting and fishing are two popular activities which are dependent upon Hubbardston’s open space resources. (See Section 5: “Inventory of Conservation and Recreation Lands” regarding properties that allow licensed hunting and fishing in season.)

Under state regulation, there are specific hunting seasons and bag limits for numerous mammal species, trapping regulations and limits for various fur-bearing mammals, and management of hunting seasons on resident and migratory waterfowl and game birds. Game species populations in Hubbardston are monitored and managed by Mass Wildlife with regard to species’ health and the carrying capacity of the animals’ habitat.

In addition to native game birds, such as Ruffed Grouse and American Woodcock, Ring-necked Pheasants are stocked annually at the Hubbardston Wildlife Management Area. (This area was logged in 2005, so stocking did not take place in fall, 2005, but will resume in future years.) Wild Turkeys, descended from wild transplants originally established in the western part of the state in the early 70s, have become well-established and may be hunted here.

Hubbardston has several ponds and streams that offer excellent fishing and access throughout the year. Comet (Asnacomet) Pond, with its cool, spring-fed water, is stocked by MassWildlife both spring and fall with good numbers of brown, brook and/or rainbow trout, and brood-stock salmon are also stocked once in fall/winter whenever they are available. Fish sampling operations continue to show that Asnacomet contains stocked trout, smallmouth bass, largemouth bass, yellow perch, pumpkinseeds, bluegills, rainbow smelt and a few bullheads and golden shiners. Due to the infertility of this pond, bass and pan-fish are not abundant and display slow growth rates. Comet is also a favorite site for ice fishermen since it freezes early, holds its ice late and is a premier pond for taking trout and salmon through the ice.

Moosehorn Pond, Brigham Pond, and Williamsville Pond are other large ponds offering easy canoe or small boat access and excellent bass fishing. The Mare Meadow Reservoir, which only permits fishing from the shore, is another excellent bass fishing area. Streams that are annually stocked with trout include the Natty Pond Brook, Burnshirt River, Canesto Brook, Joslin Brook and both branches of the Ware River.

According to the state Division of Fisheries and Wildlife in Westborough, the most recent sample for native brook trout in Hubbardston was done on Templeton Brook in 2000. Two brook trout were sampled there, one was 52mm (2 inches) long and the other was 255mm (10 inches) long. Historical records show that six streams were surveyed in Hubbardston between 1971 and 1988: Templeton Brook, Canesto Brook, Natty Pond Brook, the West Branch of the Ware River, Joslin Brook, and an unnamed tributary to the West Branch of the Ware River. Brook trout were found in Canesto Brook in 1971 and 1984; in Natty Pond Brook in 1980, 1983, and 1987; and in Joslin Brook in 1980 and 1983. Joslin Brook was also sampled in 1971, but no brook trout were found. Templeton Brook was sampled in 1981 but no brook trout were found at this time. Apparently there is fluctuation of native trout populations in these water bodies.

#### **Other Natural Resource-Based Recreation**

Some respondents to the 2006 questionnaire noted that they take part in such activities as bird and wildlife watching, nature and wildlife photography, animal tracking, and swimming. Most aspects of these pastimes are dependent upon undeveloped open space for their enjoyment. See Section 5, "Inventory of Conservation and Recreation Lands," for further discussion of recreational opportunities.

## ENVIRONMENTAL CHALLENGES AND ISSUES

### WATER QUALITY

#### OVERVIEW

A very important environmental concern for Hubbardston, and, indeed, most communities, is water quality protection. Hubbardston's situation is even more important, however, because, as mentioned earlier, much of the town lies within DEP Class A Water Supply District, contributing to the public drinking water supplies of many Massachusetts residents. Most of Hubbardston—the Ware River Watershed--has been designated as an Outstanding Resource Waters region because waters for both Quabbin and Wachusett Reservoirs originate here. These waters are considered exceptional for their socio-economic, recreational, ecological and/or aesthetic values. They are valued for their high drinking water quality and have more stringent protection requirements than other waters; no lowering of water quality is permissible.

In the 2004 Massachusetts Water Policy report, the Water Policy Task Force of the Executive Office of Environmental Affairs stated that one of the state's biggest challenges is maintaining sufficient quantities of stream flow so as to sustain ecological and anthropogenic demands. Massachusetts receives a significant amount of precipitation—the equivalent of 44 inches of rainfall per year—that fills our reservoirs and streams, and sustains our aquifers. In dry years, the amount of water remaining in our streams often becomes dangerously low. In the summer months, the thin, discontinuous aquifers of eastern and central Massachusetts and the limited aquifers (mainly fractures in bedrock) of western Massachusetts provide the only source of stream flow. The combination of high summer demand and low stream flows can adversely impact water availability and quality, vegetation and fish counts.

The report advises that better use patterns will help minimize the need to develop new sources of water supply, and that we also need to rethink where the water that we use goes. Existing infrastructure often transports precipitation away from where it lands instead of letting it infiltrate. Transporting dirty water far from its source made sense historically, but today, with significant improvements in wastewater treatment techniques and standards, treatment levels often make the water available for reuse or recharge, thereby replenishing the natural stream flows and aquifers in the basin or sub-basin.

The report goes on to state that the Commonwealth also has impaired waters and debilitated aquatic habitat areas. Ensuring clean water requires that we do a better job of limiting point and non-point source pollution. Recent patterns of growth have introduced impacts due to runoff (e.g., changes in temperature and oxygen, suspended solids and bacteria), discontinuous critical habitat areas, and altered habitats. As a result, alarming changes in fish populations are evident in many of the Commonwealth's rivers.

The Task Force believes that the problems described above will only get worse if we continue to grow and manage water in the way we have over the last half-century. During the past 20 years, considerable land mass has been developed, rippling outward from Boston, even as total housing starts have not sufficed to meet the state's housing needs. Assuming growth continues on the basis of recent land use patterns, demand for water and the development of land critical to future drinking, recreational and habitat purposes will increase significantly. In addition, this will, over the long run, undermine the state's ability to ensure sufficient drinking water supplies for new growth and will overextend state resources.

Water quality management is multi-faceted, and several state and federal agencies are responsible for and regulate various aspects of water quality, based upon the types and purposes of water bodies. A huge body of information made up of reports, surveys, sampling, observations, and more are available through the Massachusetts Department of Environmental Protection, the Department of Conservation Resources Division of Water Management, the US Environmental Protection Agency, and more. Key information relevant to Hubbardston is presented in this section.

#### **Drinking Water--Private**

Protection of groundwater—water found beneath the surface of the ground within drainage basins—is of vital importance here since residents obtain their drinking water primarily from private drilled wells. In addition, there are five non-community public water systems within the town that meet the definitions of the federal Safe Drinking Water Act and the Massachusetts drinking water regulations as “a system for provision to the public of piped water for human consumption if such a system regularly serves an average of at least twenty five (25) individuals daily for at least sixty (60) days per year”: Hubbardston House Apartments, Hubbardston Center School, Silverleaf Hollow Condominiums, Briarwood Townhouses, and Peaceful Acres Campground. Mr. Mike’s gasoline station and convenience store recently agreed to operate its existing well in accordance with requirements for a public drinking water supply as a result of a Consent Order with MassDEP (see “Contamination”). Hubbardston’s Board of Health assists DEP /DSW in the regulation of these non-community public water systems, and regulates (with the State Department of Public Health) the private water systems--those which do not meet the definition of a public water system.

The Department of Environmental Protection maintains several on-line sites, reports, and recommendations with regard to drinking water quality and private and public wells ([www.mass.gov/dep/water](http://www.mass.gov/dep/water)). It also provides numerous tables identifying potential well water contaminants and suggested testing parameters and monitoring frequency schedules ([www.mass.gov/dep/water/laws/priwells.doc](http://www.mass.gov/dep/water/laws/priwells.doc)).

#### **Drinking Water--Public**

Although the town doesn’t have its own public drinking water supply, nearly all of Hubbardston’s water resources are critical to the drinking water supplies for many of Massachusetts’ residents. The city of Fitchburg gets drinking water from Mare Meadow Reservoir and has access to Bickford Pond as an emergency back-up supply. (According to the July 2002 DEP Source Water Protection Report for the Fitchburg Department of Public Works, the Fitchburg water system is an extensive, complex system which includes over ten water supply reservoirs serving four pressure service areas. The city’s population grew rapidly between 1907 and 1930 and more water sources were acquired. Then, due to periodic drought conditions, Mare Meadow Reservoir and Bickford Pond were added to the system. Bickford Pond has never been used and Mare Meadow Reservoir is used approximately four to six weeks each year during periods of high demand.)

The city of Worcester’s Quinapoxet Reservoir receives water from the Quinapoxet River sub-basin, the headwaters of which originate in the eastern part of town. The 90% of Hubbardston that is located in the Chicopee River Basin is all part of the Ware River sub-basin, a major water supply for the City of Boston and surrounding communities. All contributing surface sources are classified by the Department of Environmental Protection as “Outstanding Resource Waters”, their highest classification.

The northern section of town, located in the Millers River Basin, is mostly within a delineated Zone II for the groundwater supply for the city of Gardner. (A Zone II is the area that contributes to the recharge of a public groundwater supply.) Much of this area is currently unprotected, which could have severe effects on Gardner's water supply in the future. All surface and groundwater drinking water supply areas are identified on Map 9.

Water quality of the Ware River is susceptible to impact by regulated (MSL Chapter 375) diversions of its water into the Quabbin-Wachusett aqueduct for delivery to either the Quabbin (usually) or Wachusett Reservoirs. The Division of Watershed Management (DWM)/Metropolitan District Commission (MDC) may divert the river, under certain flow conditions, between October 15th and June 15th. Because diversions contribute to compromised water quality, DWM has established numerous water quality sampling stations in the region, and primary sampling stations are located on tributaries and small ponds in Hubbardston (Williamsville, Natty, Asnacommet, and Brigham Ponds, and the West Branch of the Ware River). A sampling station also exists at the outlet of Queen Lake in Templeton. A sampling plan involving 2 to 10 stations is developed annually by DWM. Water is sampled on a regular basis for coliform bacteria, chemical properties and composition, nutrients, metals, algae, macroinvertebrates, and *Giardia* and *Cryptosporidium*.

#### **Watershed Planning**

(Note: The Commonwealth owns the larger lakes [Great Ponds] in the state, but neither owns nor controls their watersheds.)

In 2006, the Division of Watershed Management's Watershed Planning Program issued the *Proposed Massachusetts Year 2006 Integrated List of Waters*, a proposed listing of the condition of the state's waters pursuant to Sections 303(d) and 305(b) of the Clean Water Act. The report explains that Massachusetts has adopted a watershed approach to planning and implementing water resource protection activities, emphasizing that water quality is influenced not only by natural ecology, hydrology, and geomorphology, but also by the mosaic of land-use patterns resulting from human activity within respective drainage basins. The result is a comprehensive, integrated program that addresses all aspects of water resource management, such as drinking water protection and pollution abatement, and focuses more efficiently the programs of various governmental and non-governmental organizations that are charged with restoring and protecting the water resources of Massachusetts. Obviously, Hubbardston's water quality issues are the result of both local and regional factors.

The major watersheds that fall within Hubbardston's borders are monitored and assessed by the Department of Environmental Protection on a rotation basis. Surface water quality standards goals have been adopted; beneficial uses are assigned to specific defined water bodies, and the standards specify criteria which must be met in order to reach the goals. This method of establishing water quality standards is a policy decision which takes a number of factors into account and is a public process.



## WATER QUALITY PROBLEMS AND ISSUES

### INTEGRATED LIST OF WATERS

The *Proposed Massachusetts Year 2006 Integrated List of Waters* is a good starting point for examining some of Hubbardston's water bodies and associated water quality concerns. The surface water quality standards designate the most sensitive uses for which the surface waters of Hubbardston shall be "enhanced, maintained, and protected." Various definitions and parameters are used to assess the waterways regarding *Aquatic Life, Fish Consumption, Drinking Water, Primary Contact Recreation, Secondary Contact Recreation, and Aesthetics Usage*.

The Integrated List of Waters categorizes water bodies based on their attainment of designated uses. Those waterways lying within Hubbardston and their assessments can be found in Appendix III. Some of the water bodies have been assessed as "attaining some uses; others not assessed" (Category 2), while a few have not been assessed (or had insufficient assessments) (Category 3). The 2002 National Assessment Database summarizes the Integrated List of Waters information submitted by the states to EPA in 2002, and water quality attainment charts on Hubbardston ponds and lakes designated as "impaired" can be found in Appendix V. Unfortunately, Moosehorn Pond is considered "impaired" and is listed in Category 4c due to the presence of an exotic plant species. Although listed in Category 3, "No Uses Assessed" for 2006, Cunningham, Lovewell, and Williamsville Ponds were found to be impaired in 2002 for the same reason—the presence of non-native aquatic plants. (See "Exotic and Nuisance Plants" later in this section.

As an outcome of the federal Clean Water Act, waters that impaired or threatened for one or more uses and that require development of a Total Maximum Daily Load (TMDL) are listed on the 303(d) List of Impaired Waters. The state is mandated to develop TMDLs for parameters of concern and establish pollution control strategies. A TMDL is a calculation of a maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. See Appendix VI.

Two other bodies of water related to Hubbardston are considered Category 5 Waters, waters requiring approval of TMDL of pollutants by EPA: the outlet of Bickford Pond to the confluence with the East Branch of the Ware River in Barre—due to organic enrichment and low dissolved oxygen—(see below) and the source of the Otter River, north of Pitcherville Road, which ultimately flows to the Gardner Wastewater Treatment Plant—for the presence of priority organics and metals (Seaman Paper Company is permitted and regulated by EPA to discharge treated process wastewater to the Otter River).

Several of Hubbardston's ponds were not assessed for the reports noted above.

In addition to the above, in 2003, DEP issued an updated Non-point Source Action Strategy for the Chicopee River Basin which described water quality issues for three water bodies in our region. The 12.9 mile Bickford Pond to Barre segment of the East Branch of the Ware River was placed on "alert status" due to the frequency of low dissolved oxygen levels, low pH, and low buffering capacity; these properties placed the rivers below Surface Water Quality Standards for Class A water bodies. The 4.6 mile West Branch segment from Brigham Pond to Barre had the

same status. The Burnshirt River suffers from a frequency of elevated temperature. Although not listed as impaired in the same way, the 7.3 mile Canesto Brook Hubbardston-to-Barre segment was also noted as having low pH and low buffering capacity. The low pH is considered naturally-occurring, likely related to wetlands chemistry. The frequency of low dissolved oxygen, percent saturation, and elevated temperature in the East and West Branches of the Ware River, all of which coincide with low stream flow measurements, is of concern, although they may be naturally-occurring. The water withdrawals and /or reservoir operations in the upper watershed may exacerbate these conditions.

## **CONTAMINATION**

There are many sources of contamination of both surface and groundwater, both natural and man-made. Human waste disposal practices, such as those for sanitary, solid, and industrial waste, are the most serious sources of groundwater pollution. Contamination also results from hazardous material spills and leaks and from the application of fertilizers, pesticides, and road salt.

Contaminants often enter groundwater from the land surface where they are dumped or spilled and percolate down through the zone of aeration, until they reach groundwater. Some contaminants, such as fuel from leaking tanks and effluent from septic systems, occur underground. In either case, once pollutants enter groundwater, they flow according to the same hydrologic principle: from recharge areas toward discharge areas, thus contributing to surface water problems.

With regard to DCR lands located within Hubbardston, the Division of Watershed Management "controls and manages public access to reduce the risk of introducing waterborne diseases according to standard public health practices, applicable environmental regulations, and on-going scientific research."

Following are discussions of potential contaminants which could affect Hubbardston's water resources.

### **Non-Point Source Pollution**

#### **Roads**

Topography, surface type, and distance to nearby water sources affect the impact that land clearing, construction, and new and existing roads can have on water quality. Rural roads in particular follow the courses of rivers and streams, and untreated stormwater run-off discharges to the water bodies. The run-off from dirt roads and exposed areas of soil due to lot-clearing carries debris and sediment. Contaminants from vehicles, roadway maintenance activities, and heavy equipment wash into wetlands and waterways during rain-storms and periods of rapid snow melt. In more developed areas, storm water run-off from paved surfaces is often channeled to the nearby waterways at greater velocities, carrying silt, maintenance chemicals, and motor vehicle residue. Excessive debris sediment and storm water velocity can erode stream banks and hillsides, undermining infrastructure and destroying beneficial habitat and vegetation as well.

Most of Hubbardston's asphalt-paved roads have storm water drainage systems incorporated into their design to improve road safety. Many roads are drained according to old design standards which simply direct the untreated storm water away from the road and into nearby ditches, low areas, and waterways. Modern road drainage systems provide for storm water collection systems

and, sometimes, treatment, before the water drains into waterways.

Hubbardston has some unpaved roads within its boundaries, not only old logging and farm roads or “temporary” roads, but more heavily used roads that serve residential areas, such as Birches Road and portions of Mt. Jefferson Road. These graded earth roads are subject to constant erosion and breakdown, in spite of grading and ditching systems which have been attempted in order to alleviate these problems. In many areas alongside the unpaved roads, bank stabilization is non-existent or deteriorating.

Many of those who responded to the open space questionnaire reported dissatisfaction with Hubbardston roads.

### **Sand and Gravel Extraction**

The mining of sand and gravel can contribute to degradation of water quality. For many years, resource extraction of this type has been taking place in Hubbardston, and several large sand and gravel pits are located in the Pitcherville area of the community. Because this region is in a Zone II Aquifer Recharge Area, the status of this area may influence future open space planning.

At the June, 2007 town meeting, Hubbardston residents voted to adopt an Earth Removal Bylaw for the purpose of preventing degradation of soil, surface and groundwater and naturally occurring vegetation due to the improper or uncontrolled removal or redistribution of earth and vegetation and to protect the right of residents to enjoy the natural, scenic, and aesthetic qualities of the environment. Future earth removal enterprises in town will only be allowed in the Residential Agricultural zoning district and not permitted in the Aquifer Protection Favorability overlay district. Quarrying is now prohibited.

Gravel and sand extraction has slowed or temporarily stopped in some portions of these large gravel pits, while some sections are still active. One large pit on the north side of Pitcherville Road is currently for sale.

The new bylaw states that existing earth removal permits shall remain in effect until their expiration, so the status of further use and/or reclamation or abandonment of these sites will be variable.

With regard to open space planning purposes, it is interesting to note that the extensive disturbance and change to the landscape in this region of town has resulted in the creation of a biologically unique (for Hubbardston) landscape which supports plant and animal species that thrive in dry, sandy, successional habitats.

## **NATURALLY-OCCURRING CONTAMINANTS**

### **Iron and Manganese**

Two of the most common types and sources of groundwater contamination in Hubbardston are iron and manganese. Iron, one of the earth's most abundant elements, occurs naturally throughout Massachusetts; manganese is less common but it is often found in association with iron in groundwater. Iron and manganese in drinking water do not pose a health hazard; in fact, iron is needed for oxygen transport in the blood, so it is essential to good health. However, both iron and manganese can impart an unpleasant taste to water and can stain plumbing fixtures and laundry. In the original Open Space Plan, it was noted that metal levels at some of the MDC sampling

stations were high only for *secondary* drinking water standards (aesthetics of taste and odor) for iron and manganese. However, even with the presence of these metals, the applicable EPA Class A *primary* drinking water standards were satisfied.

### **Radionuclides**

Certain minerals are radioactive and may emit forms of radiation known as alpha radiation, photons, beta radiation, and/or radium. These radionuclides are naturally occurring and are occasionally present in bedrock, similar to other minerals such as iron, arsenic, and quartz. Bedrock wells (often called artesian or drilled) can contain elevated concentrations of one or more radionuclides even if nearby bedrock wells have low concentrations. Wells that derive water from sand and gravel deposits, also known as dug or point wells (shallow wells), generally have substantially lower concentrations or no dissolved mineral activity.

Radionuclides exist throughout Massachusetts. In some areas the concentration of these minerals exceeds the public drinking water standards for radioactivity. EPA finalized new health standards for radionuclides in drinking water for public water systems in 2000. However, these standards only apply to community public water systems. There are currently no standards established for private wells or Hubbardston's other non-community public water systems.

**Radon** can be a problem in private wells drilled into bedrock, also known as artesian wells. Gas can dissolve and accumulate in underground water sources, such as wells, and in the air in your home. Breathing radon can cause lung cancer. Drinking water containing radon presents a risk of developing cancer. Radon in air is more dangerous than radon in water. Presently, there are no federal or state standards for radon in drinking water, only suggested action levels. Although present and with potential public health effects under certain conditions, radon must be evaluated on a structure-by-structure basis.

### **Microbes**

The fecal coliform count is an indicator of the sanitary quality of water. Coliform bacteria are common in the environment and are generally not harmful, but high levels may indicate the presence of other pathogens that can cause waterborne diseases. Both fecal coliform and *E.coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms.

In past years, the DCR sampling station at Queen Lake (in our region, but actually in Phillipston) has found fecal coliform bacterial contamination exceeding the EPA Class A drinking water standard. Some summers, including in 2006, the public beach at Queen Lake is closed due to contamination. Fecal coliform colonies have been measured at some of the other test sites, but they are usually at safe levels. Unfortunately, the public beach at Comet Pond had to be closed for one day in summer 2006 due to the same type of contamination. Local water bodies which allow swimming and other water-based recreational activities are susceptible to this type of contamination during summer months when water levels are low and water temperature increases. In some cases problems are related to malfunctioning septic systems.

Fundamental public health policy prohibits human or animal wastes in or adjacent to tributaries to water supplies because of the potential of feces to contain viruses, bacteria, protozoa (e.g. *Cryptosporidia*), and other organisms which could threaten human health, if transmitted to a water supply.

*Cryptosporidium* enters lakes and rivers through sewage and animal waste. It causes cryptosporidiosis, a mild gastrointestinal disease. However, the disease can be severe or fatal for people with severely weakened immune systems.

*Giardia lamblia* is a common parasite that enters lakes and rivers through sewage and animal waste and can cause an illness of the intestines known as Giardiasis. The disease can be found throughout the world and is widespread among mammalian, avian, and reptile species, including humans, companion animals, wildlife, sheep and cattle, and wading birds. *Giardia* goes through two stages: during the "active" stage, it is in the intestine of the host and cannot survive on its own. It becomes infectious when it enters the tough, protected cyst stage, and is shed in the feces of the host. In the cyst form, *Giardia* can be killed between 54-56°C (dies instantaneously at boiling point, 100°C), but it can last 2-3 months in cold water (<10°C). When humans become sick with *Giardia*, the *Giardia* parasite is predominantly spread via person-to-person contact due to poor hygiene practices. Contamination of food and water sources from human or animal infected fecal material is also a means of transmission.

There can be a connection between microbe contamination and turbidity. Turbidity in itself has no health effects. However, it can interfere with disinfection and provide a medium for microbial growth, and may indicate the presence of disease causing organisms.

Elevated, unhealthy levels of these microbes can present both surface and groundwater contamination problems. Because Hubbardston has no public sewage/water treatment facility, and therefore no outfalls, contamination which occurs is likely to originate from non-point sources such as use of manure too close to surface waters, compromised human sanitation situations (swimming and camping), improper pet or livestock management, septic system failure, sewer overflow, and wildlife waste.

#### **Inorganic Contaminants (Metals and Nutrients)**

**Arsenic** may occur in drilled wells. It causes bladder, lung and skin cancer when it is consumed over a long period of time. According to a 2003 U.S. Geological Survey study, the arsenic belt in Massachusetts appears to run from New Hampshire to Connecticut. It's bounded on the west by Ashburnham, West Brookfield, and Douglas and on the east by Northbridge, Westborough, Stow, and Maynard up to the Merrimack River, and along it to the coast on the New Hampshire border (see Map 10.) Taking effect in January, 2006, the Environmental Protection Agency (federal) limit on arsenic in public drinking water supplies is 10 parts per billion. Private groundwater sources, however, are not regulated and do not have to meet the federal or state standard. Although present and with potential public health effects under certain conditions, arsenic must be evaluated on a structure-by-structure basis.

**Lead** typically leaches into water from plumbing in older buildings. Lead pipes and plumbing fittings have been banned since August 1998. Children and pregnant women are most susceptible to lead health risks.

According to the USGS, concerns over contamination of groundwater and streams from **nutrients** continues to be among the most significant and widespread of the environmental issues faced by government agencies at all levels as well as the private sector. Elevated nutrients in the water supply is most commonly an issue in agricultural areas where run-off from fields adds nutrients from fertilizer application to streams and other surface water, and from there into shallow groundwater. Fortunately, deeper groundwater is usually protected from nutrient

contamination. The greatest risks to human health from nitrate contamination exist in shallow household wells in these areas. These wells may not be monitored regularly since they are not regulated under the Safe Drinking Water Act and well owners may not be aware of potential risks posed by adjacent cropland. At high levels, nitrates can interfere with oxygen uptake by the blood.

Where cropland is being rapidly converted to residential developments serviced by household wells, drinking-water risks should also be considered. Case studies show improvements and degradation of ground water quality in response to changes in cropland management. Because nitrate leached to groundwater from cropland can be stored for decades, changes in water quality may lag far behind changes in land use. Agriculture is the largest source of nutrients to the environment. Even though Hubbardston's land use is in transition from forested and rural landscape to increasingly residential, this type of contamination may persist

Another frequently occurring nutrient contaminant is **phosphorous**. There are no direct health risks associated with elevated phosphorous; however, it can impart a bad taste to the water and contribute to water quality decline. While nitrate is readily soluble in water and thus can more easily wash off the land surface to streams, phosphate is less soluble and tends to move with the soil. Many of the current Best Management Practices are designed to reduce soil erosion and, thus also help limit phosphorus transport to streams. These same Best Management Practices would have less effect on the transport of nitrogen to streams.

In addition to the health issues, elevated nutrients can cause excessive algae growth that can choke out other aquatic life in the body of water and cause eutrophication.

Point source discharge of nutrients from wastewater-treatment facilities is not an issue in Hubbardston, where wastewater is treated by private/on-site in-ground septic systems. Systems that are carefully sited, constructed, and maintained can be effective and inexpensive wastewater treatment systems. Even the best septic systems, however, release some bacteria and nitrates into the ground. Septic systems that are poorly designed, sited, or constructed can be sources of severe pollution. Effluent from septic systems can contain bacteria and viruses, nitrates, heavy metals, detergents, and elevated levels of chloride, sulfate, calcium, magnesium, potassium, and phosphate. Pollution from this effluent poses a threat to groundwater quality. Nitrate-nitrogen is highly mobile and thus can be leached through the crop root zone to ground water, especially on sandy soils. Nitrate concentrations > 10 mg/l can cause human infant methemoglobinemia, which can be fatal. It can also result in cattle abortion and other livestock disorders.

(A decrease in the concentration of bacteria and viruses in groundwater depends on soil type, amount of effluent, and distance that the effluent travels. In Massachusetts, a distance of 400 feet is considered adequate for the removal of most pathogens. However, when many septic systems are concentrated in a small area with highly permeable soil, it cannot be assumed that all bacteria and viruses are being removed from the effluent. In fact, some micro-organisms persist in groundwater and can be transported through an aquifer for hundreds of yards. When many septic systems are located within the area of influence of a public supply well, the water supply is likely to be degraded.)

Nutrient sources from suburban lawns, gardens, golf courses, pet waste, power generation, and vehicle emissions can also be important, but their relative contribution is difficult to define. Since World War II, the use of commercial fertilizers on crops, lawns, and golf courses has increased steadily. The major constituents of commercial fertilizers are nitrogen, phosphorous, and potassium, all nutrients required by plants. Potassium and phosphate do not move into

groundwater as readily as nitrogen compounds do. Nitrogen in fertilizer is oxidized to form nitrates; nitrates percolate into the soil with rain and irrigation water and can contaminate groundwater. Where fertilizers are applied year after year, nitrate levels in groundwater may gradually increase and eventually exceed the 10 ppm limit allowed for drinking water by state and federal standards.

Because most of the above contaminants cannot be identified by taste or odor, it is difficult for homeowners to know if the water quality of their wells has changed. Hubbardston does require sampling of private wells after they are initially installed and 30 days subsequent to the first test, and lenders usually require well-testing when a property is sold. However, it is the responsibility of all homeowners to periodically test their wells for contamination.

## OTHER CHEMICAL CONTAMINANTS

### Road Salt

In winter, rock salt and liquid calcium chloride are spread on Hubbardston's public ways to melt ice. Both types of salt are very soluble in water and move easily into groundwater. Aquifers and recharge areas crossed by highways or located near uncovered salt storage piles are liable to be contaminated by sodium. Road salt storage, handling and application have the potential to increase levels of water pollution and impact residential wells, which may affect people who have health risks associated with elevated levels of sodium in their diets. Road run-off can drain directly into reservoirs. If the road salt reaches fast-flowing rivers and lakes, however, run-off will usually have little impact.

According to a 1988 report by Samuel J. Pollock, *Massachusetts Highway Department: Highway Deicing – Salt Contamination Problems and Solutions in Massachusetts*, the factors that determine whether the salt will actually enter nearby wells and other water supplies include the depth of the wells and their distance from the road, the permeability of the soils and the direction and rate of groundwater flow. Ground water flow in Massachusetts generally moves slowly, ranging from a few feet per year to a couple of hundred feet per year. Therefore, sodium contamination, which may have originated as highway run-off will vary greatly in the time it may take to be detected in nearby wells.

Since 1993, the EPA and Massachusetts DEP do not regulate sodium as a contaminant because of the minor contribution of drinking water to daily sodium consumption. However, as a general guidance level the EPA recommends that the sodium levels in drinking water not exceed 20 mg/l for the at-risk population, i.e. people on low-sodium diets. The EPA requires that all public wells be monitored for sodium and that concentrations in excess of 20 mg/l be reported to local health officials.

Although the effects of road salting as a source of non-point source pollution are most commonly associated with groundwater, there are other environmental impacts associated with road salt. Road salt has the potential to cause harm to aquatic life and vegetation such as roadside trees, shrubs and grasses, because elevated levels of sodium chloride in soils generate an osmotic imbalance in plants, which can inhibit a plant's water absorption and stunt root growth. The salt can also interfere with the uptake of plant nutrients and inhibit the plant's long-term growth. Sodium chloride can cause severe injury to flowering, seed germination, roots and stems, as well as damage vegetation up to 200 meters from roads that are treated with deicing salts (Keating, Janis. "Environmental Impacts of Road Salt and Alternatives in the New York City Watershed." Published in *Stormwater*, May/June 2001; p.9)

Damage to roadside vegetation can also intensify the impacts on drinking water quality by limiting the retention and processing of pollutants transported in run-off, and by diminishing the buffer zones to groundwater sources and reservoirs (Keating, p.10). Damage to vegetation can also have an impact on wildlife habitat by destroying food resources, shelter and breeding and nesting sites. Another impact common to wildlife is the ingestion of high levels of sodium. For example, many animals drink the salty snow-melt to relieve thirst, which may be toxic to salt-sensitive species. Birds also often mistake the road salt crystals for seeds. The impact of road salt on aquatic life varies. Salt tolerance of fish, depending on if they are fresh or salt-water species, range from 400-30,000 mg/l. Stream studies in upstate New York suggest that diversity of aquatic species decreases when salinity increases, and that salt tolerant species become dominant during periods of road salting activity (Keating, p.13).

Hubbardston Highway Superintendent Lyn Gauthier acknowledges that the town is currently using somewhat more salt on the roads than it was 10-15 years ago. This seems to be a result of community demand for speedily-cleared roads and safer driving conditions following winter storms.

#### **Synthetic Organic Contaminants, including pesticides and herbicides, and Volatile Organic Contaminants**

Although a number of industrial, domestic, and public supply wells in Massachusetts have been contaminated by organic solvents, Hubbardston, due to its predominantly non-industrial land use patterns/usage, has had some immunity from a major contamination problem of this sort. (Industrial sources include waste chemical storage sites, areas with illegally stored and dumped barrels of hazardous wastes, industrial sites with complex occupancy histories, leaking sewer lines, and smaller generators of hazardous wastes such as machine shops and barrel-and-truck-washing facilities.) According to the Toxics Release Inventory (TRI), a publicly available EPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities, there is "no data for TRI On-site and Off-site Reported Disposed of or Otherwise Released for All Chemicals, in zip code 01452 by All Industries during 2004, 2003, 2002" (released to the public April 12, 2006).

However, the use of organic solvents is not limited to industry. These chemicals are present in various household products (e.g. spot and stain removers, degreasers, paint and varnish removers, drain cleaners, etc.). Groundwater contamination can also be caused by hazardous chemicals that homeowners pour down their drains or on the ground, by septic systems cleaners that contain strong acids or organic solvents, or by improper disposal by dumping along roadsides or directly into water bodies. Currently there is no regular provision for household hazardous waste disposal in Hubbardston, although residents can responsibly dispose of these materials at special hazardous waste collection events when they occur in Hubbardston or nearby towns.

#### **MTBE**

Recent studies in New England have also identified contamination of some private wells from methyl-tertiary-butyl ether (MTBE). MTBE is a fuel additive commonly used in the United States to reduce carbon monoxide and ozone levels caused by auto emissions. Due to its widespread use, reports of MTBE detections in the nation's ground and surface water supplies are increasing. There has been no known well contamination from MTBE in Hubbardston.



## **Underground Fuel Storage Tanks**

Underground tanks are a potential source of groundwater contamination. Fuel oil, diesel fuel, and gasoline are stored in underground tanks in town, and there have been a small number of reportable (to DEP) underground storage tank (UST) leaks here in the past few years which required remedial action. In the most recent situation, MassDEP in December, 2006, executed a consent order for Waste Site Clean-up violations at Mr. Mike's gasoline station and convenience store on Main Street. A release of gasoline to the groundwater contaminated the drinking water well serving the business. The company did not immediately notify MassDEP of the contamination, and inaccurately identified the drinking water well as a private well in its submittals to DEP. Because the well is used for service of coffee in the convenience store, the well should be designated as "public" and therefore requiring a suitable permit. As a result of operating as an unapproved public water supply, DEP entered into a Consent Order with parent company Peterborough Oil; bottled water began to be used at the site, and the company has agreed to operate the existing well in accordance with requirements for a public water supply while a new compliant well is developed. Additional property has been purchased to site a new well with a protective Zone I, and proper permit submitted.

According to the State of Massachusetts Department of Fire Services, only one other UST is still in use in Hubbardston, at the former Mac-Mae Bus Company site, 116 Worcester Road. The Department lists a 10,000 gallon UST for gasoline still in use, but the Massachusetts DEP UST Program 12/01/06 report on Certificate of Compliance Status indicates that the certificate expired in 2001 and that COC was revoked.

## **Dumps and Landfills**

Leachate is the liquid that is created beneath dumps and landfills when precipitation percolates through decomposing solid waste, and it can contain large quantities of both organic and inorganic contaminants. The volume and characteristics of landfill leachate depend on the amount of water that passes through the refuse and the materials that are buried at the site. Unless landfills are covered with impermeable material (such as clay) to prevent precipitation from percolating through them, leachate continues to be produced for many years after dumps and landfills are abandoned. Leachate can seep out of dumps and landfills into surface water or it can percolate downward into groundwater and move in a contamination plume toward a discharge area.

In recent history, Hubbardston had two landfills—on Williamsville Road and Worcester Road (municipal solid waste)—which became inactive as of 1968 and 1955, respectively. Neither of these two old landfills was lined or capped. In later years, the town had a solid waste landfill on the New Templeton Road from 1970-1990. It was unlined, but capped in 1991; closing was certified in December of 1993. Hubbardston's Board of Health monitors six groundwater wells and three gas vents at the New Templeton Road site. The groundwater monitoring program consists of the monitoring well network, sampling schedule, analytical list of parameters to be measured, and a quality assurance/quality control plan. Gas vents are a means of passive gas control and provide a conduit for the escape of landfill gas to the atmosphere. Testing is on a regular basis as required by DEP and will continue for 30 years following the site's closure (although it may be extended if the DEP determines that a longer period of maintenance and monitoring is required to adequately protect human health and the environment).

According to DEP's *Landfill Technical Guidance Manual*, landfill gases are produced as a result of biological degradation of solid waste. The composition of landfill gas is roughly 50%

methane, 50% carbon dioxide with trace amounts of nitrogen, oxygen, non-methane volatile organic compounds (NMOCs), hydrogen sulfide, and hydrogen. Trace compounds (NMOCs) that have been detected at municipal solid waste landfills are listed in an EPA table which is reproduced in the *Manual*.

The Environmental Protection Agency's Emission Inventory Group prepares a national database of air emissions information with input from numerous state and local air agencies, from tribes, and from industry. According to the 2002 draft of the EPA National Emission Inventory, the closed landfill on New Templeton Road emitted various contaminants as follows:

Contaminant	Emissions
Total Emissions	46,354.20
Toluene	30,707.18
Xylenes (Mixture of o, m, and p isomers)	2,594.78
Methylene Chloride	2,453.60
Benzene	1,751.40
Tetrachloroethylene	1,249.47
Hexane	1,143.74
Methyl Ethyl Ketone	1,032.75
Ethyl Benzene	988.59
Vinyl Chloride	926.68
Trichloroethylene	748.40
Acrylonitrile	678.46
Ethylidene Dichloride (1,1-Dichloroethane)	469.72
Methyl Isobutyl Ketone	378.35
1,1,2,2-Tetrachloroethane	376.36
Ethyl Chloride	162.91
Methyl Chloroform	129.37
Methyl Chloride	123.41
Carbon Disulfide	89.19
Ethylene Dichloride	81.96
1,4-Dichlorobenzene	62.36
Carbonyl Sulfide	59.46
Chlorobenzene	56.84
Propylene Dichloride	41.08
Vinylidene Chloride	39.16
Chloroform	7.24
Carbon Tetrachloride	1.24
Ethylene Dibromide	0.38
Mercury & Compounds	0.12

This list of toxics is consistent with those listed in the EPA's NMOCs table, and are not unusual with regard to chemical types and amounts. Also, note that these emission values are in pounds

per year; this summary only provides information about the kinds of contaminants emitted by the old landfill and their relative volumes, not expected/allowed values. DEP and the Board of Health monitor for public health risk. [At the time of this Open Space Plan update, final version of the 2002 NEI—posted in February, 2006—was available and awaiting public commentary, but research was beyond the scope of this chapter.] In the most recent (6/07/06) Hubbardston Board of Health test available at the time of this update, elevated levels of dissolved metals—cadmium, arsenic, iron, manganese, and lead were noted, as were exceedences in pH, manganese, and iron. Except for the cadmium, these elevated levels are consistent with the natural geology of the area as noted in the earlier part of this section. No gas was found at the gas vents.

Since the old landfill represents a small portion of the open space available for use by Hubbardston residents, it is important to keep in mind the unique problems associated with old landfill sites with regard to the generation of leachate and landfill gas and instability due the differential settling of the fill (landfills will typically settle from 10% to 30% of their original thickness). In addition, the site has to be maintained and monitored for many more years to come. Currently the site is used for recreation such as walking or hunting, compatible uses which likely will continue.

### **Exotic and Nuisance Aquatic Plants**

Many lakes are afflicted with rampant plant growth. Some of these aquatic plants are native species which are fed by an overabundance of nutrients and some are non-native (exotic) species which have gained access to a water body and proliferated in the absence of natural controls. The presence of nuisance aquatic vegetation is often related to nutrient overloads.

The 1998 Chicopee River Basin Water Quality Assessment report found three non-native aquatic species in our region's lakes: *Myriophyllum spicatum* - Eurasian water milfoil, *Myriophyllum heterophyllum* - Variable milfoil, and *Cabomba caroliniana* - Fanwort. These species have high potential for spreading and are likely to have established themselves in downstream lake and river segments in the Chicopee River Basin. Moosehorn, Brigham, Williamsville, and Lovewell Ponds were noted as being "impaired" due to the presence of variable milfoil.

See also "Invasive/Exotic Plant and Animal Species" later in this section.

### **Eutrophication**

Lakes are dynamic ecosystems that over time undergo a process of succession from one trophic state to another. Under natural conditions most lakes in this region move from a nutrient poor (oligotrophic) condition through an intermediate (mesotrophic) stage of nutrient availability and biological productivity to a nutrient-rich or highly productive (eutrophic) state. In the 1998 Chicopee River Basin report, DEP evaluated the trophic status of some of Hubbardston's water bodies, primarily using visual observations of macrophyte cover and phytoplankton populations. The report listed Moosehorn, Cunningham, and Williamsville Pond as eutrophic. Although it is natural for lakes to become eutrophic over time, various factors contribute to the acceleration of the process and result in compromised lake/pond water quality, primarily with regard to aesthetics, but also affecting the ability to support some species of fish. Over-development of the shoreline and a subsequent increase in phosphorus and nutrient loading is generally the cause of premature eutrophication. Title 5 controls, storm water controls, and informed land use are the major means of minimizing eutrophication beyond that which may occur naturally.

(The effects of varying concentrations of nutrients and other factors on algal growth rates in streams is not well understood, but is essential for development of water body specific criteria and Total Maximum Daily Loads [TMDLs] for streams with impaired water quality. USGS and other agencies at the national level, along with various state and local agencies, monitor and study these effects.)

## **WILDLIFE ISSUES and PROBLEMS**

With an abundance of open space, Hubbardston is more subject to human-wildlife interactions than would be experienced in a more urban setting.

### **Beavers**

Beaver populations are on the rise in every community in central Massachusetts. The two most common human-beaver conflicts are the flooding that results from dam-building and the damage to trees that are used for food or building materials. These activities can be a nuisance to landowners and public works employees, particularly when located near human infrastructure. Beaver activity can cause safety hazards (such as flooding of roadways and precariously damaged trees), as well as septic problems and basement flooding due to raised water tables associated with their dams.

But, while problems sometimes arise when beavers come into contact with humans or human property, it's important to remember that beavers do not create problems in natural or wilderness areas. According to a 2003/2004 document entitled "*Solving Human-Beaver Conflicts: Practical Solutions for Local Health Officials and Conservation Commissioners*," prepared by Living With Wildlife, a program of the Massachusetts Society for the Prevention of Cruelty to Animals, wetland ecology is an important aspect to consider in the management of beaver populations. Beavers play an integral role in establishing and maintaining the wetlands that provide critical environmental functions. Beaver ponds, or impoundments, provide habitat for fish, amphibians, turtles, otters, and many other animals. Trees that are killed by beaver-induced flooding of wooded swamps provide nesting sites for great blue herons, wood ducks, and other birds. Beaver dams hold water within the landscape, maintaining local groundwater levels and providing flow to streams during even the driest portion of the summer season. The wetlands that beavers create support not only an abundance of animal and plant life, but they also serve many vital functions that benefit humans as well. Beaver habitat improves water quality by acting as a settling basin, controls flooding and reduces erosion by slowing water movement, processes organic wastes, removes toxins like pesticides and fertilizers, filters runoff, and protects against droughts. Beaver created wetlands are dynamic, rich environments that go through regular cycles with different ecological values at each stage. For example, after wetlands age and beavers abandon them, they are transformed into fertile meadows supporting a myriad of plant and animal life. Partially or completely breaching beaver dams can have negative impacts on all of the species inhabiting the impoundment.

The Living With Wildlife website offers practical, legal, and effective solutions to human-beaver conflicts and also makes the following suggestions:

Conservation commissions should allow only the minimum amount of beaver dam removal necessary to abate an immediate public health, safety, or property damage threat. Usually, this means allowing the removal of a small section of the top of the dam, down to a specific elevation (typically no more than two feet below the top of the dam).

Seasonal issues should be addressed in conservation commission's conditions. For example, in the fall turtles and amphibians enter a resting state for the winter season. Many of these animals will be present in shallow muddy areas around the edges of the beaver pond. If the water level is drawn down during the fall or winter, these animals can be killed due to exposure to freezing conditions. Similarly, if water levels drop below the entrances to the beaver's lodge, they too will be exposed to freezing air. Beavers also may lose access to their food caches, either because the cache is exposed and freezes, or because the lodge entrances are now above frozen, lower water levels. This is an inhumane way to address the beaver problem, leaving them to a slow death from cold and starvation. Whenever possible, fall and winter drawdowns should be strictly conditioned and limited to prevent these kinds of impacts.

Recent changes to state law have an impact on local public health officials. Under these changes, local health officials must respond to requests from the public to determine whether or not specific beaver activity poses a threat to public health and safety. The law makes suggestions about what may constitute such a threat, but it is up to each health official to decide whether the threat is real or not. The Massachusetts Department of Public Health (DPH) has written guidelines to assist local boards of health with determining whether or not beaver activity poses a real threat to human health and safety.

*(Please note that the Department of Environmental Protection (DEP) shall make any determination of a threat to a public water supply. This is not the responsibility of local health officials.)*

The Living With Wildlife program and Beaver Solutions (a private company) has assisted Hubbardston with beaver control on almost a dozen roadways over the past several years. In the past, culvert damming by beavers repeatedly caused flooding of sections Route 62, Flagg Road, Pitcherville Road, and many other roadways. Beaver Solutions has installed large culvert protective fence systems. These devices have eliminated beaver from damming of the culverts without needing to remove any beaver.

### **Black Bears**

According to MassWildlife, the bear population in the state has grown from about 100 in the early 1970s to about 3000 in 2005, in response to increased legal protection, changes in forest structure and composition, and increased availability of supplemental fall foods. Bears are becoming more common in central Massachusetts.

Massachusetts bears are typically active in daytime during spring and fall, but are more active during dawn and dusk hours in summer. Males may be nocturnal during the breeding season. Typical spring habitats in Massachusetts include wetlands with lush emergent vegetation and hardwood areas with leftover nuts from the previous fall. In summer, wetlands and cutover areas with emerging berry crops are preferred. Corn fields and oak, beech, or hickory stands are favored in fall. Bears have good long-term memory and are capable of recalling the location of periodic food sources years after the first visit.

In Massachusetts, adult females use home ranges averaging 9 to 10 miles while adult males may have ranges exceeding 120 miles. Depending on food availability, Massachusetts bears enter the den between mid-November and early December and exit between early March and mid-April. Pregnant females often enter early and those with newborn cubs exit late. Bears commonly den in brush piles, under fallen trees or a jumble of rocks, or in a mountain laurel thicket.

Despite popular belief, black bears are not fierce. Their first response is usually to flee, and in woodland areas the bears may disappear long before they are seen. Black bears sometimes can become habituated to human presence and conditioned to human food sources. These circumstances may then lead to damage or depredations which have unfortunate consequences if people then destroy the bear out of fear or to alleviate the damage. Black bears rarely harm

people, although minor defensive attacks can occur when people tease or closely approach bears in parks or campgrounds. Female black bears defend their cubs by putting them up a tree. The sows may huff and blow and make short rushes at people who get near the cubs, but will almost never press home an attack. Deliberate predatory attacks are very rare and typically occur in remote areas.

William G. Davis, Central District Manager for the state Division of Fisheries & Wildlife, commented in 2006 that while bear sightings are still something of a novelty, there is no good estimate of the population in central Massachusetts. However, he said it is known to be widely dispersed and considerably less than the bear population west of the Connecticut River. "By the same token, there is every indication that the bear population in central Massachusetts will continue to rise, in much the same way there has been an influx of moose and coyote," Mr. Davis observed. More often than not, reports of black bear sightings come as a result of a raid on beehives or the plundering of a bird feeder, especially in the spring when they emerge—hungry—from hibernation. In spring of 2006, there were numerous bear sightings and reports of damaged birdfeeders in Hubbardston, and one bear was legally destroyed when it made repeated visits to a large, unprotected (by electric fence) beehive operation.

MassWildlife recommends preventing human-bear conflicts by taking various precautions, including removing all potential sources of food from outdoor locations, use of bear-proof trash receptacles, and protection of beehives, livestock, orchards, and crops with electric fencing and other methods. Details are available on the MassWildlife website.

## Ticks

The past several years have seen an increase in species of ticks, and an increase in incidence of Lyme-disease carrying ticks in Hubbardston. The deer tick (*Ixodes scapularis*) is a carrier of the corkscrew-shaped bacterium *Borrelia burgdorferi*, which causes Lyme disease. The bacterium normally lives in mice, squirrels, and other small mammals and is transmitted among these animals—and to humans—by the bite of infected ticks. Although adult ticks often feed on deer, these animals do not become infected. Deer are nevertheless important in transporting ticks and maintaining tick populations.

Lyme disease can cause serious long-term joint, heart and nervous system problems, if not recognized and treated early. According to the Center for Disease Control and Prevention, in Massachusetts, the incidence of Lyme disease in 2003 was 23.7 cases per 100,000, which is almost three times higher than the most current estimate of the national incidence rate (from 2002, 8.2 cases per 100,000). In 2002, Massachusetts had the fifth highest incidence rate for Lyme disease nationwide. The highest incidence of Lyme disease in Massachusetts occurs on Cape Cod, southeastern Massachusetts, the islands of Nantucket and Martha's Vineyard, in areas north of Boston, and along the Quabbin Reservoir watershed and the Connecticut River Valley in western Massachusetts.

The ticks that transmit Lyme disease can occasionally transmit other tick-borne diseases as well. Ehrlichiosis is caused by bacteria (germs) that attack specific types of white blood cells. Human granulocytic ehrlichiosis (HGE) is caused when the bacteria attack the granulocytes, one type of white blood cell. The bacterium that causes HGE is transmitted by the deer tick. [The bacterium that causes human monocytic ehrlichiosis (HME) is transmitted by the lone star tick, which is rarely found in Massachusetts.] In the United States, HGE is most often reported in the

northeastern and upper-midwestern states. In Massachusetts, the majority of cases are reported from the southeastern coast, Nantucket, and Martha's Vineyard.

Babesiosis is a rare and sometimes severe disease caused by a microscopic parasite (a type of germ similar to those that cause malaria) that infects red blood cells. The parasite is spread by deer ticks. The disease is found most commonly in coastal areas in the northeastern United States. In Massachusetts, the majority of cases are reported from Nantucket, Martha's Vineyard, and Cape Cod.

### **Mosquitoes**

Viruses mosquitoes transmit are referred to as arthropod-borne viruses or arboviruses. Two different arboviruses found in Massachusetts are West Nile virus and eastern equine encephalitis virus. The Massachusetts Department of Public Health runs an arbovirus surveillance program throughout the state. Hubbardston residents can avail themselves of detailed information on these two rare but serious mosquito-borne diseases at the website maintained by the Department at [www.mass.gov/dph](http://www.mass.gov/dph).

According to the CDC, **eastern equine encephalitis virus (EEEV)** occurs in the eastern half of the United States where it causes disease in humans, horses, and some bird species. Because of the high mortality rate, EEE is regarded as one of the most serious mosquito-borne diseases in the United States. EEEV is transmitted to humans through the bite of an infected mosquito. The main EEEV transmission cycle is between birds and mosquitoes. Horses are susceptible to EEE and some cases are fatal. EEEV infections in horses, however, are not a significant risk factor for human infection because horses are considered to be "dead-end" hosts for the virus (i.e., the amount of EEEV in their bloodstreams is usually insufficient to infect mosquitoes). EEEV transmission is most common in and around freshwater hardwood swamps in the Atlantic and Gulf Coast states and the Great Lakes region. Human cases occur relatively infrequently, largely because the primary transmission cycle takes place in and around swampy areas where human populations tend to be limited. However, during August--September 2005, the Massachusetts Department of Public Health reported four cases of human EEEV disease, five times the annual average of 0.8 cases reported from Massachusetts during the preceding 10 years.

**West Nile virus (WNV)** can cause illness varying from a mild fever to more serious disease like encephalitis or meningitis. WNV grows in birds and is spread from bird to bird by infected mosquitoes. If mosquitoes infected with the virus bite horses or humans, the animal or person can become sick. In the United States, WNV was first identified in New York during the summer of 1999. Since then, it has spread throughout most of the continental United States.

Serious illness caused by WNV is uncommon and has been identified in a small number of people in Massachusetts over the past several years. In 2005, six human cases of WNV were identified in five towns in three counties of Massachusetts. In 2004 there were none, while the two previous years saw larger numbers of human infection; in 2003, there were two confirmed cases in Worcester. WNV has been found in horses, mosquitoes and many species of birds throughout the state. The mosquitoes that carry this virus are common throughout the state, and these mosquitoes are found in the city as well as in the woods and other less populated places.

### **SOLID WASTE/ILLEGAL TRASH DUMPING/LITTER**

Another environmental issue in Hubbardston which has some bearing on open space and recreational planning is the large volume of illegal trash dumping and roadside littering on both public and private lands. While it is beyond the scope of this report to speculate on the many social and psychological facets of this problem, a discussion of some facts is helpful.

After Hubbardston's sanitary landfill was closed in 1990, town residents had to begin paying flat-rate user fees for private trash removal services with designated town-approved haulers.

The town operates a recycling facility, open one morning per month May through October, for disposal of certain kinds of waste: automotive batteries, used motor oil and oil filters, used clothing, large appliances (fees for those with Freon), scrap metal, tires, and antifreeze. Televisions, computers and microwaves are not accepted, but may be recycled in Gardner.

Although the recycling center accepts large appliances, these and other large items such as furniture and demolition debris make up a portion of dumped items. Unfortunately, open space, with its sheltered trails and wooded tracts invites illicit and anonymous dumping.

The author of this chapter, the town's Police and Highway Departments and Board of Health, and many other town residents can testify to the large volumes of trash gleaned from both public and private lands on a regular basis. In 2005 the police department received twelve calls complaining of illegal dumping—with reports highest in May, October, November, and January—but acknowledged that there is more dumping that goes unreported. Prosecution is extremely difficult; witnesses to these events are highly unlikely. The police chief at the time this report was being prepared stated that approximately eight prosecutions for illegal dumping had taken place since 2000, most of them against building contractors.

It is frequently the case that illegal dumping takes place along rights-of-way abutting public land and therefore in areas of questionable jurisdiction. MDC/DCR has little or no resources for dealing with this problem, and it is the town's highway department that ultimately ends up retrieving and disposing of these items. This creates a huge burden on the highway crew and also the town coffers, since the town must pay for off-site disposal.

Roadside litter represents an equally unsightly and unhealthy portion of the illegal littering in town.

Besides being an issue of aesthetics, trash dumping can be harmful to wildlife, vegetation, and water quality, especially when food, soiled diapers, solvents, paints, antifreeze, and the like are part of the rubbish stream.

### **Household Hazardous Waste**

The bordering communities of Gardner and Barre host household hazardous waste collection events from time to time, usually once annually. Hubbardston residents can avail themselves of this service, but must pre-register and pay disposal fees. Hubbardston has had household hazardous waste collection events in the past. It is unknown whether more frequent events of this type would lead to a decrease in the amount of hazardous substances that end up on public land or roadsides; residents who are unwilling to hold onto these substances until they can go to a proper disposal day in a neighboring town are probably just as unlikely to wait for a local collection day. The impact of offering little or no drop-off fee as an incentive is also unknown.



## **ALL-TERRAIN/OFF-ROAD VEHICLE USE**

According to a 2000 document entitled *Environmental and Social Effects of ATVs and ORVs: An Annotated Bibliography and Research Assessment*, by Patricia A. Stokowski, Ph.D. and Christopher B. LaPointe of the University of Vermont, there are several environmental effects related to off-road motorized vehicle use. Soil and vegetation impacts are widely discussed in the literature, and obvious to even casual observers. Soil compaction and the sheer forces of motorized vehicles create mud holes and gullies that alter hydrologic patterns and intensify erosion. Trail erosion and compaction caused by off-road and all-terrain vehicles reduce the quality of recreational trails and require enhanced management action to develop and maintain safe, usable trails. Also, ATV use has been found to widen and rut forest roads, and to increase the sediment load to streams which may threaten fisheries. ATVs and ORVs offer access to resource areas that are typically less accessible and more remote. ATV use often conflicts with non-motorized uses, such as hiking and cross-country skiing. Additionally, noise and intrusion of the modern world into nature often compromises the enjoyment of many users.

Impacts and negative effects increase with more intensive or repetitive use. Also, the fragility of the environment affects the level of impact.

Information about this subject is accessible on numerous Internet sites.

All-terrain vehicle use is prohibited on MDC/DCR property in Hubbardston. ATV/ORV use is also prohibited at the Mt. Jefferson Conservation Area and on state forest property.

Since it is beneficial for public lands to be linked by unfragmented "greenways" (for wildlife movement and human enjoyment), ATV users can easily cross boundaries into banned areas.

In spite of prohibitions and designated trails, ATV users persist in using many of the off-limits trails in town. In 2005, the Hubbardston Police Department received 33 complaints regarding improper recreational vehicle use, with calls coming in fairly regularly throughout the year, but with an increase in January and no complaints in March and November of that year. Because many illegal ATVs on public property go unreported, the 2005 figures are likely only the "tip of the iceberg." The general public perception is that illegal motorized vehicle use is not enforceable in most cases.

In March, 2007, DCR announced that an Off-Highway Vehicle (ATVs and off-road motorcycles) Policy had been adopted by DCR's Stewardship Council. It is available on-line at [www.mass.gov/dcr/recreate/orv.htm](http://www.mass.gov/dcr/recreate/orv.htm). The policy establishes a two-tiered process for assessing and designing OHV trails. The policy also includes provisions to encourage safe and enjoyable motorized recreation areas, including mileage goals, coordination with local communities, and cooperation with local clubs and supporting organizations. The Stewardship Council added an important condition to their approval of the new policy. Recognizing that illegal OHV use is widespread on public and private lands across the Commonwealth, the advisory board challenged the agency to produce a plan for addressing enforcement concerns by early August, 2007. Any plan to improve OHV enforcement must address penalties for misuse of these vehicles and the capacity of law enforcement agencies to catch law-breakers.

This complex topic will continue to spark energetic debate. This is an environmental issue which is relevant to the town's open space concerns and a challenge for property stewards.

## **INVASIVE/EXOTIC PLANT AND INSECT SPECIES**

Identification, management, and control of non-native invasive plant and animal species are of environmental concern to open space managers.

## Plants

The New England Wildflower Society defines exotic and invasive plants as follows:

- **Exotic species** – a non-native plant or animal introduced into a new location by human activity, either intentionally or by accident.
- **Invasive species** – a non-native (adventitious) species that is capable of moving aggressively into a habitat and monopolizing resources such as light, nutrients, water, and space to the detriment of other species.

According to the Society, the issue of invasive plants is critical because, second only to loss of habitat, it is the primary cause of the reduction of diversity in native plant populations worldwide. As of today, more than 28% of the world's native plant species are threatened or endangered, including over 200 species in Massachusetts alone. The organization has developed an expansive list which evaluates 85 plant species (conducted in two phases over 6 years) and includes an annotated list of Invasive, Likely Invasive, and Potentially Invasive species.

Hubbardston is host to many invasive plant species, including Japanese barberry (*Berberis thunbergii*), purple loosestrife (*Lythrum salicaria*), oriental bittersweet (*Celastrus orbiculatus*), and several types of honeysuckle (*Lonicera*).

Many lakes in Massachusetts are afflicted with rampant aquatic plant growth. Some of these plants are native species which are fed by an overabundance of nutrients and some are non-native (exotic) species which have gained access to a water body and proliferated in the absence of natural controls. In addition to affecting water quality with regard to health, invasive species spread rapidly and form dense mats that can make boating, fishing and swimming impossible. As the recreational and aesthetic value of the lake declines, property values around the lake also decrease. The Lakes and Ponds program of DCR explains why nuisance aquatic plants are of concern:

- The spread of invasive species can cause native species to decline, and the animals that depend on them must either relocate or perish. This reduces the biological diversity of the area and disrupts the delicate balance of the environment.
- The aesthetic appeal, recreational value and surrounding property values of a lake or pond may quickly decline as the exotic invasive species takes over.
- Once exotic plants are established, they are almost impossible to eradicate. The United States has invested millions of dollars annually to manage the weeds and repair the damage.

Reduction of nutrients is the long-term control measure at least for the native species. But in some instances for native species and especially for non-native species, management of the water body is the only realistic option. Control measures include a wide range of tools that vary from physical, such as drawdown, to chemical herbicides so long as all controls meet state and federal requirements. Preventing the spread of non-native species is the single most effective control measure for exotic species.

The major effort on the state level here in Massachusetts is to prevent the spread of such plants. While there are regulations governing the importation of foreign plants, many of the plant species

are already established in water bodies throughout the Commonwealth; the prevention strategy involves education and best management practices. Boaters in particular are urged to wash the hulls and clean the propellers of their boats before leaving a water body since most of these plants can be ferried from one water body to another. For those areas where nuisance and exotic plants are established, management techniques range from chemical controls to desiccation by lowering water levels during the winter. Massachusetts has issued a review of lake restoration practice—Lakes Generic Environmental Impacts Report--that serves as a guide for control measures. The final GEIR for *Eutrophication and Aquatic Plant Management in Massachusetts* and its companion document, *The Practical Guide to Lake Management in Massachusetts*, are now available on-line at [www.mass.gov/dcr/waterSupply/lakepond](http://www.mass.gov/dcr/waterSupply/lakepond).

## Insects

According to the University of Massachusetts Cooperative Extension Service, high population levels over the past several years of three species of caterpillars have become problematic as they defoliate trees and shrubs in the state. The **winter moth** (not prevalent in our area), **gypsy moth**, and **forest tent caterpillars**—both present in our area--have caused various levels of tree damage in our region. Outbreaks are cyclic and respond to various forms of pest management.

Perhaps more alarming is the advance of the **Hemlock Woolly Adelgid** (*Adelges tsugae* Annand). This non-native insect was introduced into Massachusetts in 1988 from an already existing infestation in Connecticut. It attacks both the Carolina and Eastern hemlock and is capable of severely weakening and killing its host plants. Healthier plants, prior to infestation, may endure longer but previously stressed plants may die in 3-5 years. The key to its management is to recognize it early and implement the proper control strategies. Once this pest is in any given area, it will constantly pose a threat to all hemlock, even those that have been treated. Therefore, all hemlocks in these areas should be monitored carefully several times a year and treatments applied when it's found. Wind and birds are the primary means for moving this pest from one area to another but humans can also move this pest on plants if care is not taken.

## SUMMARY

Of all the environmental issues facing our community, water quality protection is of great importance. Because of Hubbardston's geographical placement within the watersheds of two major drinking water reservoir systems, water quality protection is not only a local concern but is vital with regard to statewide water health and cleanliness. Wise land use and regular monitoring for potential hazards and contaminants are necessary.

Geology, soils, intensity of development, the type of land usage and other factors have a great impact on water quality protection, both now and in the future. Numerous regulatory mechanisms are in place to ensure the safety of public water supplies. However, Hubbardston residents must exercise personal responsibility with regard to waste disposal and private well testing. Solid waste disposal and illegal dumping are ongoing problems that impact the town's open spaces and water quality and present a huge challenge to the community.

Reduced developmental pressure and protection of tracts of open space are known to contribute to water quality protection.

Protection of wildlife and increased abundance and diversity of wildlife species result from open space protection. The positive environmental effect of open space extends to the residents who enjoy increased opportunities for natural-resource based recreational activities. Open space provides many scenic and aesthetic community features.

In addition, in our community, open fields, waterways, and forest tracts, especially along roadsides, attract illegal dumping and littering. Remote and undeveloped pieces of land invite illegal use of motorized recreational vehicles which can cause damage to soils and vegetation and disturb wildlife and/or other users who may be present.

Residents of Hubbardston express support of the town's many acres of protected open space and its rural character. Although numerous tracts of land and many streams and water bodies are part of the town's acreage, there are some particularly attractive and scenic parcels which are in private ownership and may not remain available as open space without outright ownership transfer.

## Section 5: Inventory of Conservation and Recreation Lands

The town of Hubbardston has within its boundaries a wide array of conservation and recreation lands. This section outlines the nature of current usage and attempts to characterize the features of the properties. When possible, attempts are made to comment upon the level of protection from destruction or degradation that is afforded to these various parcels. Following is a summary of these lands and their allowed uses. See Map 11, Open Space.

Table 7 depicts Hubbardston acreage categorized by various levels of protection from development, updated from the 2001 Open Space Plan. Data was gathered from the Assessor's Office and is accurate to the best ability of that office at the time of the update (spring 2007).

### TOWN-OWNED LANDS

Town-owned acreage as noted in Table 7 is primarily land with specific designated uses such as cemeteries and municipal services, uses unlikely to change within the near future and with little bearing on future open space decisions. Exceptions are those parcels which are designated as "Other." While most of this acreage is town-owned for the purposes of maintaining rights-of-way, fire pond access, and important drainage areas, a few parcels are currently undeveloped and contribute minimally to open space values simply by virtue of being unused at this time.

**Table 7: Land Ownership and Protection Summary\***

<u>Description</u>	<u>Acres</u>
<b>Total Town Acreage</b>	<b>25,985.90</b>
<b>Town-owned, Limited Protection Acreage</b>	<b>391.51</b>
<i>Cemetery</i>	<i>16.00</i>
<i>Municipal Service</i>	<i>73.85</i>
<i>School</i>	<i>7.30</i>
<i>Tax-title</i>	<i>20.04</i>
<i>Other</i>	<i>275.20</i>
<b>Private-owned, Special Taxation</b>	<b>3,348.38</b>
<b>Programs (Temporary Protection)</b>	
<i>Chapter 61</i>	<i>1,173.47</i>
<i>Chapter 61A</i>	<i>1,743.04</i>

<i>Chapter 61B</i>	426.87
<b>Permanent Protection Acreage</b>	<b>10,859.12</b>
<i>Private, spec. taxation CR/APR</i>	71.60
<i>Fitchburg Water Department</i>	463.15
<i>DEM/DFWELE &amp; US ACOE</i>	1,392.78
<i>(owned or managed)</i>	
<i>DCR (owned and managed)</i>	8,674.69
<i>Town-owned (Mt. Jeff CA &amp; Rec)</i>	256.90
<b>Remaining Private-owned,</b>	<b>11,391.89</b>
<b>Unprotected Acreage</b>	

\* Figures accurate to the best of our ability

Town authorities have been discussing the appropriate dispensation of a few large holdings since the original Open Space Plan was written. Coming to bear on this discussion are the methods by which properties were acquired and the suitability of the properties for various uses. At the time of this report (spring, 2007) the town was making decisions about several town-owned properties, five of them greater than 15 acres in size. The Open Space Committee was involved in some of the decision-making process. It is expected that some parcels will be sold either to abutting property owners (in the cases of parcels which cannot be developed due to zoning restrictions) or for development as house lots. Three large parcels which are likely to remain undeveloped, and therefore of some interest to with regard to open space planning, are two adjoining parcels on the east side of New Templeton Road—together 38.2 acres--which are mostly shallow swamp with some marginal woodland. These plots have thus far been deemed to have little wildlife or economic value to the town, they are unsuitable for house lots, and DCR is interested in neither purchase nor a land swap. The status of the property will likely remain unchanged unless it is found to have important wildlife and/or plant species within its boundaries.

The town owns a 17.6 acre "back lot" situated close to the sand and gravel operations off Pitcherville Road. The Pitcherville lot may be of more interest in future years; the parcel adjoins an expanse of exposed and non-reclaimed earthworks. The present ownership and intermittent sand and gravel extraction and the location of the parcel at present preclude any solid planning for its future use. Town authorities worked on a bylaw to address site clean-up and land reclamation following sand/gravel extraction, and the bylaw was passed at the June 2007 town meeting; characteristics of this site may change in future years.

Another large parcel of 17 acres, located on Mile Road, is being researched by the town with regard to its means of acquisition before any decision about it can be made. Meanwhile, it appears that it may have some value as part of a contiguous piece of woodland serving as a wildlife corridor.

## **PRIVATE PARCELS**

### **Chapter 61 Lands**

Table 7 presents a breakdown of acreage which private owners have placed into special Chapter 61 programs. Since the original Open Space Plan, the town has seen a slight overall decline in the total number of properties with Chapter 61, 61A, and 61B status. There has been somewhat of an increase in both Chapter 61A and 61B categories, but a decrease to those in the Chapter 61 category. The assessor reports that, soon after the time of this update, additional properties were expected to be added in 2007. Most of these properties constitute parcels of land with structures; they vary in size, but some constitute significant large parcels. Because of the frequent de facto use as open space and recreation land—albeit often by just the owners or designated private users—they are mentioned here as contributing to the present open space landscape.

Although these Chapter 61 properties afford some protection for the designated lands, this protection is temporary in nature and not at all a guarantee that holdings are safe from destruction or degradation in the future.

### **Other Private Agricultural and Forested Land**

Hubbardston has some large, uninterrupted parcels of undeveloped land, most of it in woodland and wetland, which are privately owned but not in any Chapter 61 program.

The Open Space Committee, since the publication of the original plan, has generated a list of private parcels of priority interest with regard to future open space protection options. Some have been part of various temporary protection strategies (Chapter 61 status) while others have not. The parcels range in size from 24 acres to 350 acres, with most falling in the range of 60-100 acres. A few of the properties are used for agriculture (hay, grazing, and food crops). Many of the properties have been selected for a list of lands of priority open space interest because of their 1) relatively large size; 2) their proximity to existing protected tracts of land; 3) the fact that they are under single ownership; 4) working land value, e.g. farms; 5) scenic views.

See Land Protection Priority Map 1 which shows significant privately-owned, undeveloped open space tracts.

### **Private Recreation Lands**

Hubbardston has some noticeable and important private holdings which are used for recreation by a limited number of “members” or landowners.

One private recreational holding of interest is the Hubbardston Rod & Gun Club located on Williamsville Road. Comprised of 16 acres abutting other state-owned (DFWELE /DCR) property and Natty Brook, the Club land includes one structure which is used for numerous non-profit and private functions and a section which has been developed as a baseball field. Much of the undeveloped acreage is wetland.

The Pinecrest Property Owners Association owns about 180 acres of open woodland and Cushman (Pinecrest) Pond, which are used for recreation and outdoor enjoyment by Pinecrest housing development residents. There are trails through the wooded portion, as well as a beach



and children's play area on the shore of the pond. Although there is no general public access to the pond, the Association maintains a lodge there which may be used for special functions by both Pinecrest and other town residents. In addition, this property has the distinction of housing the largest old barn in town, which was built early in the 20<sup>th</sup> century and completed around 1918. The beautiful old cobblestone and shingle/wood structure, of historic interest, was used in years past as a site for large community functions after it ended its function as a farm structure. See <http://ppoa.hubbardston.net/barn.html> for more information. The Pinecrest woodland is also a Chapter 61B property.

Sawyer's (Bents) Pond contributes to the open space landscape of Hubbardston and is one of the towns' larger ponds. The pond is privately owned, however, and is open for use only by residents of Silverleaf Hollow and the newly-constructed Madison Green senior housing condominiums. There are some limited uses of the pond for recreation, e.g. ice-fishing. (Interestingly, Sawyer's Pond was used to store salvaged lumber following the 1938 hurricane and flood. Since the pond is shallow, one can catch glimpses of the logs—which were never used—when the water table is low during dry periods.)

Located at the end of Flagg Road is a moderately-sized private campground, Peaceful Acres Campground. Although the campground is not well-publicized, it has been here for many years and has steady patronage throughout the summer season. Of interest with regard to the town's open space is that fact that the campground—and other surrounding parcels—abut the Mt. Jefferson Conservation Area.

A private, fenced-in baseball field is located on the Barre Road.

### **Major Institutional Holdings**

Hubbardston is home to the Ron Burton Training Village, founded by professional football player Ron Burton, Sr. in 1985. The facility is a summer camp for Boston-area underprivileged and at-risk youth ages 11-17. The five-week program uses athletics to teach teamwork, sportsmanship, and moral conduct. Much of the 305-acre parcel is developed as playing fields/areas with pertinent administrative and program buildings, parking areas, etc.

### **PERMANENT PROTECTION ACREAGE**

Table 8 also notes the amount of town acreage which is permanently protected. The total number of protected acres differs slightly from the amount noted in the 2001 Open Space Plan for a couple of reasons, according to the Assessor's Office. The assessor has been working over the past year on reconciliation of all holdings and making corrections as needed. In addition, it appears that the original Open Space Plan incorrectly noted the acreage held by the Fitchburg Water Department (Mare Meadow Reservoir and Bickford Pond), using a larger figure which seems to reflect some acreage lying within Westminster and/or Princeton. Thus the total number of acres is reduced by about half compared to the first Open Space Plan.

### **Agricultural Properties**

There is one private, actively-managed agricultural property in Hubbardston which is part of the state's Agricultural Preservation Restriction Program. This property of 40 acres is of interest with regard to future land use planning because it has been placed under a permanent deed

restriction which precludes any use of the property that will have a negative impact on its agricultural viability. Located on the north side of the town center, the property's undeveloped land is currently maintained in orchards and hayfields.

### **Conservation Restrictions**

Two private properties in Hubbardston have placed conservation restrictions on the undeveloped portions of their land, for a total of slightly more than 51 acres.

### **HISTORIC PRESERVATION INTERESTS**

Hubbardston does not have any conservation or recreation property restrictions with regard to historic preservation. Some of the town's sites of historic interest enjoy *de facto* protection because they are located within the boundaries of areas which are already permanently protected. For example, locations of now-buried pits dating from the town's early mining industry (copperas, an iron-sulfur substance used in making dyes and inks, a wood preservative, and disinfectant for privies), are located on either DCR or state forest properties.

Similarly, most of Hubbardston's extensive network of early mill sites is now within the confines of DCR watershed protection property. Most of the mill site dams and structures were destroyed during severe storms and floods in the 1930s or were dismantled or deteriorated after DCR (formerly MDC) took ownership of land within the watershed. But a few remnant sites remain. Hubbardston's Historical Society is currently embarking on an ambitious project of marking and documenting the old mill sites, and there has been some discussion about developing an interpretative trail encompassing at least one remaining mill pond that lies within the Mt. Jefferson Conservation Area/Hubbardston State Forest trail system.

Another historical landmark, The Big Rock, which is situated off New Templeton Road on private property, is of interest to town historians in terms of protection because of its long tradition as an object of interest. Because of its enormity and shape, with a circumference of about 100 feet, the rock has been a scenic attraction in Hubbardston since at least the 19<sup>th</sup> century. Funds for purchase of a small piece of land surrounding the rock, should the landowner wish to sell, have not been available. Gary Kangas, a local historian, reports that there has been some preliminary discussion with the landowner regarding donation of the land and construction of a narrow, boulder-gated footpath, but no firm plan.

Also mostly within the boundaries of public lands are a series of natural caves which may have been used by early indigenous peoples of the region. There are indications that at least one of these caves—just over the town line in Templeton, off New Templeton Road—was altered by people, possibly traders and prospectors in the 1600s who were searching for gold. It is also speculated that some caves were used as prospecting and camp sites by transient miners while the copperas mine pits were in operation. Also found amongst the rocky outcroppings in the area is one excavated underground trench/chamber covered with heavy, flat stones, a very old man-made construction of unknown origin and purpose, but possibly a type of cool storage chamber or root cellar.

The aforementioned old barn in the Pinecrest area of Hubbardston is also of historic interest with regard to open space lands, although it is on privately-owned open space land.

## **PUBLIC PARCELS**

The great majority of protected open space lands in Hubbardston which are conservation and recreation assets are public lands. Mostly due to Department of Conservation and Recreation (formerly MDC) ownership, the town boasts a high percentage of acreage that is permanently protected by this state entity. These properties offer many recreational opportunities, both consumptive and non-consumptive, but because the major purpose of land protection by DCR is for water quality protection, certain activities are regulated, restricted to designated tracts of land, or prohibited.

The Hubbardston Wildlife Management Area, leased from DCR, comprises 600 mixed acres of forest, field, and upland and encompasses Cunningham Pond, a portion of Joslin Brook, and adjoining marshland. The primary purpose of the property is game management and hunting, but other passive uses are allowed.

Hubbardston State Forest is a section of public land which is also managed by DCR (formerly managed by the Department of Environmental Management, which was merged with other departments in 2003). For recreational purposes, it is managed as part of the Ware River Watershed.

The Barre Falls Dam and DCR Ware River Watershed contain approximately 23,000 acres located within the towns of Hubbardston, Barre, Oakham, and Rutland. The U.S. Army Corps of Engineers owns and manages the dam itself and some surrounding acreage. The area offers many recreational opportunities: canoeing, bike riding, picnicking, hunting, fishing, hiking, sightseeing, horseback riding, cross-country skiing, horseshoes, 18-hole disc golf, and wildlife observation. A carry-down canoe site is located near the dam and many other canoe access areas are located on the Ware River above and below the dam. The Barre Falls Dam area is crossed by the Mid-State Hiking trail and has a picnic and restroom area. The recreational benefits offered at this site are an "extra dividend" to the main purpose of this flood damage reduction project.

The 250-acre Mt. Jefferson Conservation Area, the newest public property in town, is a multi-use property which allows use and access for a variety of natural-resource based activities. This parcel was created through land purchase using funding from a state Self-Help Conservation Grant, Metropolitan District Commission Conservation Restriction monies, and appropriated town funds.

Trail and area maps for some of these public lands are available. Detailed maps of the Barre Falls Dam and Ware River Watershed are available, most easily accessed on the Internet. The Mt. Jefferson Conservation Area/Hubbardston State Forest interconnected system of trails is available through the town's Open Space Committee, at Millennium Park, and at many other town facilities.

Hubbardston's Curtis Recreation Field and Skateboard Park, 6.42 acres in size, was designed to provide for various organized and casual family recreational activities: baseball and soccer, walking/running/rollerblading (paved pathway around the perimeter of the area), children's play (swing set, etc.), skateboarding (fenced, paved area with ramps).

Another parcel of open space which is protected but which is somewhat limited in terms of recreational access is protected land around Mare Meadow Reservoir and Bickford Pond, both

owned and managed by the Fitchburg Water Department as public water supplies. Recreational use allowed on these properties is similar to that of the Ware River Watershed.

#### **RECREATIONAL USES AND ACTIVITIES ON EXISTING OPEN SPACE/PUBLIC LANDS**

Following are descriptions of various allowed/ not allowed uses of Hubbardston's open space resources. It is important to note, and is reinforced throughout the list of activities, that the Department of Conservation and Recreation Division of Watershed Management regulates public access to all DCR water-control management property in town. The Ware River Public Access Plan was developed in 2000 in order to protect public water supply lands.

General public access, sometimes through gates and barways, sometimes sign-posted, is allowed in designated areas only. Any activity which injures or defaces State property is strictly prohibited. Prohibited uses include:

- Operating ATVs, dirt bikes, ORVs, etc.
- Fires and cooking, including with gas grills
- Operating personal watercraft/jet skis
- Trail marking/advertising
- Trail clearing
- Possessing alcoholic beverages
- Collecting/metal detecting
- Target shooting

#### **Hunting and Fishing**

Hunting and fishing are two popular activities which are dependent upon Hubbardston's open space resources. All DCR properties, the Mt. Jefferson Conservation Area, the Hubbardston Wildlife Management Area (owned and managed by Massachusetts Department of Fish & Wildlife, or MassWildlife), and Hubbardston State Forest allow licensed hunting and fishing in season.

Barre Falls Dam and the Ware River Watershed allow shoreline fishing and hunting with certain restrictions.

Comet (Asnacomet) Pond, a 127-acre cold water pond with public access and a town beach, has long been one of the most popular trout ponds in central Massachusetts. The shoreline is more than 50% developed with year round homes and summer cottages, but the area remains generally scenic. The water is exceptionally clear with a transparency of approximately 25 feet. This pond is extremely infertile and there is very little aquatic vegetation.

Boat access is provided by a paved ramp just off Route 62. There is also good shoreline access here, extending for some distance up the southeastern shore. A paved parking lot adjacent to the ramp has space for 25 or more cars. In the spring and fall, shore access is also available at the

town beach entrance off Route 68.

(See Section 4, “Environmental Inventory and Analysis,” regarding wildlife resources.)

### **Horseback Riding**

Different state agencies have different policies concerning horse trails on state lands.

MDC/DWM's Watershed Protection regulations (i.e., 350 CMR 11.00) allow horses on designated trails on MDC/DWM lands in the Ware River Watershed. Since 1988, after a public hearing, the MDC/DWM designated specific horseback riding access trails on its lands in the Ware River Watershed in its Public Access Plan. In 2000, these trails were revised in the Public Access Management Plan Update; the Plan with a map of the designated trails is available at all libraries and town clerk's offices in the watershed, the State library, and the maps are available through the Ware River watershed map page on the Internet. Horseback riding access is allowed on DCR/MWSP Designated Horseback Riding Roads and Trails only in the Ware River Watershed and according to specific restrictions (e.g. no riding during mud season, permit required for group rides of 15 or more, no watering of horses in tributaries, etc.) The DCR/MWSP Designated Horseback Riding Roads and Trails Map is available from the Quabbin Visitor Center, Ware River Field Office and the DCR/DWM web site.

Horseback riding is limited to designated trails at Barre Falls Dam, and is permitted at the Mt. Jefferson Conservation Area, Hubbardston State Forest, and some trails within the Hubbardston Wildlife Management Area.

Although riding during mud season is restricted on DCR/ Ware River Watershed property, it is not specifically restricted at The Mt. Jefferson Conservation Area or within the state forests. Individual riders are expected to exercise good judgment about riding when rainfall and ground conditions create deep mud and potential trail erosion and degradation.

### **Bicycling**

On DCR and other public lands within the Ware River Watershed, bicycling—generally mountain-biking—is permitted on designated roads and trails. There are some areas at Barre Falls Dam which are gated and prohibit bicycle use during mud season. Since there are no gates at the Mt. Jefferson Conservation Area and within the state forest, individual judgment must be exercised with regard to riding trails during mud season.

Bicycle touring on Hubbardston's public roadways has its limitations, primarily due to the lack of wide breakdown lanes coupled with the deterioration of the roads. Add to the infrastructure problems the popularity of large motor vehicles (vans, trucks, SUVs) and the prevailing speed limits on Hubbardston's “rural” roads, and it is easy to understand why roadway bicycling is an uncommon form of recreation. There are no formal bicycle paths alongside popular travel routes or obvious links between bicycle-friendly routes, thereby discouraging use of bicycles as alternatives to motor vehicles and cycling as a recreational pursuit overall.

### **Primary Contact Recreation (Swimming, Surfing, Water-Skiing, Diving)**

Hubbardston is fortunate to have a beach at Comet (Asnacomet) Pond. Since Comet Pond is one of the state's Great Ponds, use of the beach and pond is open to all state residents. More than half of the 2006 Open Space questionnaire respondents stated that they had visited Comet Pond at

least once per year, and many indicated that they frequently swim there. Since Comet Pond lies within the boundaries of the Ware River Watershed, but Off-Reservation, limited swimming access is allowed in a designated area on Comet Pond, according to posted restrictions and during the designated season.

Because of water quality and safety issues, swimming is prohibited at Barre Falls Dam and within the boundaries of the Ware River Watershed Reservation.

### **Snowmobiling**

Snowmobiling is a popular winter-time activity which requires open space. Many residents make use of private properties at their disposal, but within Hubbardston there are also some public trails open to snowmobile use. The Mt. Jefferson Conservation Area permits snowmobiling. Hubbardston State Forest and the adjoining tracts of Templeton State Forest are also open to snowmobiling. (Snowmobiling is also allowed on designated trails within designated sections of the Ware River Watershed, but these areas are outside of Hubbardston town boundaries to the south.)

A portion of the DEM Rail Trail passes through Hubbardston's northwest corner near Williamsville Pond. Stewarded to a great degree by the Cold Brook Snowmobile Club, the abandoned rail bed is a popular snowmobiling route.

### **All-Terrain Vehicle Riding**

Within the boundaries of Hubbardston, there are no public trails allowing the use of all-terrain vehicles. They are not allowed on any MDC/DCR property or state forest land in Hubbardston or at the Mt. Jefferson Conservation Area. The use of off-road/all-terrain vehicles on public lands within the Ware River Watershed, including the Corps of Engineers acreage at Barre Falls Dam, is also prohibited.

Although ATV/ORV use is prohibited on the aforementioned DEM Rail Trail, it should be mentioned that the old rail bed is often used by ATV/ORV riders.

It is important to note that because many trail systems for allowed uses are vast and interconnected, it is easy to see why illegal motorized recreational vehicle use can present problems to open space managers. (See "Environmental Issues and Challenges" in Section 4.)

### **Boating**

Motorized boating is allowed on two of Hubbardston's water bodies. Motorboat access from DCR/MWSP lands in Hubbardston in the Ware River Off-Reservation is allowed with these restrictions.

- Motorboat access facilities (ramps) are provided only on DCR/MWSP lands at Brigham Pond and Comet Pond.
- Boat motor size off these ramps is limited to 20 hp (2 stroke) and 25 hp (4 stroke).

Non-motorized boating is allowed on waterways in the DCR/DWM region. Many residents enjoy using canoes or kayaks on Hubbardston's smaller and shallower ponds. There is an access point for non-motorized watercraft at Moosehorn Pond located off the Healdville Road. An unimproved boat access point to Brigham Pond is located at the south end of the pond off of

Route 68. Williamsville Pond has private access, and rustic access of the west side by means of portaging along the old railway bed is possible. Canoeing and kayaking are permitted through a designated section of the Barre Falls Dam area.

### **Miscellaneous**

Miscellaneous recreational uses of public lands by Hubbardston residents include hiking, walking, snow-shoeing, dog-walking, bird watching, nature study and photography, etc. These activities, because they are by foot access, are permitted on all public lands. With regard to dog-walking or hunting with dogs, the DCR/DWM requests visitors to pick up and properly dispose of fecal waste within 100' of any brook, stream, pond, or other surface water.

Walking and/or running is also encouraged at the Curtis Recreation Field where a paved walking path encircles the central playing fields. This path is not plowed in winter, is open to the elements, and use is sometimes impeded when sports events audiences block the paths, so the site has its limitations.

A Trail Inventory Map for the town (Map 12) which identifies current multi-use formal and informal trails, as well as potential trails, has been developed and continues to be used as a planning tool by the Open Space Committee.

### **Organized Recreation**

Hubbardston's many organized youth sports teams make regular use of the playing fields at the Curtis Recreational Field. There is provision and space for soccer and a baseball diamond and batting cage. Private baseball fields are also found at the Rod & Gun Club and on the Barre Road.

An enclosed skateboard park and children's play area are also at the recreation area.

Town tennis courts and a basketball court are located next to Center School.

A private facility which is available to residents of Hubbardston and surrounding communities with regular fitness classes and exercise equipment is the Fitness & Exercise Center on the Williamsville Road.

### **SUMMARY**

According to the Assessor's Office, about half of the town's acreage is utilized for, or zoned as, residential, commercial, and/or industrial, or is town-owned property. While over 10,000 acres are permanently protected, there are numerous significant tracts of woodland or other open space which remain unprotected from degradation or destruction; for the immediate future, some pieces of land—just over 3,000 acres--have been afforded some measure of protection through special taxation programs, but those properties too are subject to sudden changes.

Due to Hubbardston's vital location within important water quality protection areas, residents are fortunate to have the recreational benefits that exist. The vast acreage owned by DCR and within the Ware River Watershed is permanently protected open space.

Hubbardston residents may take advantage of a wide array of recreational activities, ranging from

individual outdoor challenges and pursuits on both public and private property to team or group sports under the auspices of the Recreation Commission. Many residents are fortunate to have undeveloped areas, woodlands, or fields inviting unrestricted foot access "right out their back doors." Allowed uses, even in the highly-regulated Ware River Watershed, are many.



## Section 6: Community Vision

### PROCESS DESCRIPTION

After the adoption of the 2001 Open Space and Recreation Plan, the town voted to form an Open Space Committee whose mission would be to facilitate the implementation of that plan. Since its formation the OSC has used the goals and objectives set forth in the plan as guidance for its work over the past five years. As noted in Section 2 of this plan, with the cooperation of other town boards and the overwhelming support of town residents and many volunteers, virtually all of those goals have been met, and others have at least been addressed to some degree. There is much work yet to be done, however, and this updated plan will be used as a guide for the next 5 years.

As a first step in updating the plan the Open Space Committee once again arranged to have a community survey sent out to all property owners with the December 2005 tax bills. The survey included questions generated by both Open Space Committee and the Recreation Commission, and printing was financed by the Recreation Commission. Surveys were mailed to about 2,200 property owners and were also made available on the town website. A copy of the survey can be found in Appendix I.

The survey generated a very similar response to the one sent out in 1999, with 278 returned. The results were tabulated and displayed graphically for ease of interpretation. All handwritten comments were tracked and recorded. The information was then scrutinized carefully by the Open Space Committee, Recreation Commission, and Parks and Recreation Committee and the results then integrated into the new goals, objectives, and action plan.

### OPEN SPACE AND RECREATION GOALS AND OBJECTIVES

During the formation of the original Open Space Plan, survey respondents indicated that what they liked best about living in Hubbardston was the amount of “wild” open space and the rural atmosphere. The population of Hubbardston has increased since 1999. In spite of that growth, residents are still able to express that what they like and treasure most about Hubbardston is its rural character and wealth of non-developed space. Reasons given ranged from the pleasures of being close to wildlife to the enjoyment of quiet and lack of heavy traffic. It is perhaps indicative of good growth planning on the part of the town since 2001 that residents still feel that Hubbardston is uncrowded and rural. It is clear that many residents would like to see the town’s fields and forests remain the dominant landscape features and that the “small town” friendly atmosphere prevails.

There is overwhelming support for zoning changes that will protect open space and a continued positive outlook on permanently protecting more of our fields and forests for conservation, wildlife management, and water protection. One slight change in attitude that came through in the 2006 survey is that the residents would rather see improved access to passive recreational opportunities, such as trails, as opposed to more developed recreational sites, such as parks. A notable exception to this is enthusiastic support by several respondents for designated bicycle trails and a public ice skating area.

The “big picture” for Hubbardston, then, indicates that town and Open Space and Recreation Committee planning for the past years seem to be on the right track with regard to balancing the need for undeveloped open space with the desire for growth. Both have proceeded at a moderate

and cautious pace in an effort to ensure that the character of the town has not drastically changed. Citizens continue to enjoy and use existing open space and parks in town, supported passage of the CPA, and say that they choose to live in the community because of the rural landscape. That survey respondents felt inclined to make specific suggestions about some recreational opportunities that are missing, as opposed to making sweeping generalizations about the need to prevent encroaching sprawl, for example, seems to indicate that many residents are comfortable with the current balance in land use.

At the same time, respondents stated with great frequency that the things they liked least about Hubbardston are the taxes and the roads. Without many specifics attached to each of these single-word statements, it is presumed that many residents feel that the road system infrastructure is unsatisfactory and that taxes are "too high."

An "ideal" five-year plan for Hubbardston should continue seek to strike a balance between necessary residential growth—which appears to be inevitable due to the town's location, affordability, and positive qualities—and protection of the town's treasured open spaces, small farms, and historical properties. With careful planning, it is possible to plan suitable location of new development while preserving critical parcels of land. Support and implementation of the Community Preservation Act will be part of this process over the next five years.

# Section 7: Analysis of Needs

## RESOURCE PROTECTION NEEDS

In Section 4 of this plan, the need for water quality protection is emphasized. Survey respondents agree with this view. This is a quality-of-life and health issue for residents in addition to being a concern due to Hubbardston's location within important watershed areas. Nearly all of Hubbardston's water resources are critical to the drinking water supplies for many Massachusetts residents. Most of Hubbardston lies within the Ware Watershed which is part of the larger Quabbin Watershed. Mare Meadow Reservoir provides drinking water for Fitchburg, and the City of Gardner has a well that is recharged from the ground water in a Millers River Watershed section of Hubbardston. Watershed protection will continue to be of critical importance. In prioritizing land for future protection the Open Space Committee gave those parcels that were important for water protection high priority. Exploring partnerships with DCR, the City of Fitchburg and the City of Gardner may provide excellent opportunities for pooling resources in future protection projects.

It is important for the town to maintain current levels of land use regulation and protection—much of it state-mandated—and cooperate with further land protection efforts. There appear to be needs for improvement with regard to non-point source pollution from unpaved and poorly drained roadways, as well as possible water contamination and health risks from illegal trash dumping and littering. The health of some of the town's ponds and small swamps is compromised due to erosion and run-off, the presence of non-native plant species, and dumping and littering of everything from soiled diapers to used fast-food containers.

With regard to future land use protection, there are many gaps in the public trail system in Hubbardston. Many important greenways and recreational trail links cross private land. There is a need to work with landowners to connect existing trails through land acquisition/easements or appropriate zoning bylaws.

The town is fortunate to have hundreds of acres of public green space as noted in Section 5. Many existing trails in town, especially the wide trails which originated as forest management roads in the state forest, are badly deteriorated. Some portions of the "new" Mt. Jefferson Conservation Area are badly eroded. There is a need for continued stewardship, maintenance, and care of these properties. The Mt. Jefferson Conservation Area and town-owned properties are not immune to erosion, landscape deterioration, and wildlife disturbance caused by illegal ATV/ORV, "four-wheeling" and motorized trail biking, especially where trails owned by different entities are interconnected. In addition, the town and its residents are faced with the constant challenge of inadequate oversight and enforcement of illegal ATV/ORV use on the many acres of DCR-owned land.

Illegal trash dumping and littering are ongoing concerns. Large items like furniture and appliances, demolition debris, and household hazardous waste end up on both public and private lands. This is a huge burden for Hubbardston and merits serious policy study and consideration.

Hubbardston, like other communities, is home to a variety of non-native, invasive plant species. Removal or "knocking back" some of these species would improve the overall quality of existing open space.

At present, the town has no formal identification or protection system in place with regard to areas of historical interest lying within public lands' boundaries. The town may wish to examine the possibility of enhancing and protecting these sites.

## COMMUNITY NEEDS

According to the Statewide Comprehensive Outdoor Recreation Plan of 2000, 43% of the residents of central Massachusetts say that they like to hike. This compares to 30.8% of residents throughout the rest of the state. A high percentage also enjoys picnicking and watching wildlife. They have expressed dissatisfaction with the availability of trails and greenways and also with the lack of preservation of agricultural and wildlife conservation land. The SCORP Plan also found that residents feel the most need for more hiking facilities and agricultural land and favor the protection of water quality of rivers, streams, and ponds.

Given that the overwhelming majority of survey respondents stated that they live in Hubbardston because of its rural atmosphere and large tracts of undeveloped land, it is not surprising that the majority also support protecting the town's natural resources. While respondents indicated that it is considered important to preserve open space for recreation, 68% also value wildlife habitat protection, 65% would like to see farmland protection, and 61% say that conservation and water protection are important. About 65% of respondents also indicated their support of protection of historic resources.

In order to meet these community needs, 87% indicated that they would support zoning changes, 67% supported town acquisition of undeveloped land, and about 32% said they would consider special conservation/use restrictions on their properties and/or donating money for open space protection. These percentages are remarkably similar to the 1999 survey responses.

Protection of open space for wildlife habitat was most frequently indicated as an important goal. In prioritizing parcels for future protection in 2001 the Open Space Committee gave high priority to those parcels that connected "greenway" corridors, an important consideration in protecting wildlife habitat

Development pressure on agricultural land continues to be high; in order to protect its remaining arable lands, Hubbardston must focus on reaching out to landowners, urging them to be proactive in preserving their land for future generations. Protection of agricultural land should also be an important part of any zoning changes. Not only is an agricultural business the largest employer in Hubbardston but survey respondents rate agriculture as the most desirable type of business to have in town. Most of the scenic resources important to residents are associated with views only available due to agricultural land (see "Scenic Resources" part of the Environmental Inventory and Analysis Section)

Hubbardston residents make good use of their open space and recreational facilities. Consistent with the survey responses from 1999, Comet Pond Beach is the most frequently used facility with 71% of the respondents saying they use it at least once per year. Ponds and trails follow closely with 66% and 63% respectively using these resources at least once per year. The recreation field walking path has been hugely successful, and 61% responded that they use it at least once per year. The recreation area baseball and soccer fields and playground follow in popularity, with about 55% of respondents saying that they use them at least once per year. The basketball court, tennis court and skateboard park are used less frequently, with around 20% of respondents

indicating they use these facilities at least once per year. There were many write-in notations, however, commenting that the tennis court and basketball court should be moved from their present locations at Center School and re-located to the recreation field. When asked what additional recreational facilities residents would like to, see the highest number of respondents mentioned bicycle trails, closely followed by hiking trails, conservation areas, and a public ice-skating area. Noticeably fewer respondents wanted more developed facilities such as sports fields, a golf course, or children's play areas. This could be a result of the high use rate and popularity of the recreation ball fields and playground, as these facilities seem to have filled the needs lacking five years ago. Interestingly, there were many write-in requests for some sort of public ice-skating facility.

At present, recreational offerings for persons who are physically challenged and/or wheelchair bound are limited, and efforts to improve this situation, perhaps by the addition of handicapped-accessible nature trails, should be considered.

Many respondents stated that they would like to see additional hiking trails, but only 49% stated that they used Mt. Jefferson Conservation Area and state forest lands at least once per year. It is reasonable to assume that many residents simply don't know where trails are available for public use. Town-wide trail maps might provide the necessary information. In addition, the promotion of various outdoor events, such as nature hikes, snowshoe walks, or bird watching field trips could help introduce residents to trails on public land.

Many written comments on the questionnaire also alluded to improvement of the town common and town center and expansion of the library.

## **MANAGEMENT NEEDS**

Positive steps have been taken in the last five years towards managing Hubbardston's Open Space and Recreation facilities. A Parks and Recreation Committee was formed in 2004, and included citizens who serve on the Recreation, Recreation Field, and Open Space Committees, the Historical Commission, the Cemetery Commission, and several members-at-large. The purpose of this committee was to coordinate management efforts, unify visions, build partnerships and improve communications between the different groups managing different facilities. In May, 2007, the town voted to form a Board of Park Commissioners to replace the Parks and Recreation Committee, thereby separating the management of park lands and cemeteries. Communication between town boards has improved with the cooperation between the Open Space Committee, Planning Board, Recreation Commission and Conservation Commission on issues relating to zoning, land protection and management and events. The recent revival of regular department head meetings instituted by the Board of Selectmen will help immensely with communication efforts.

Hubbardston has very limited funding, but the town's commitment to preserving its character is evidenced by its establishment of the Hubbardston Preservation Fund in 2003. Monies from fees charged to use town-owned facilities, hay leases, and forest harvest profits are deposited into the fund. The resulting monies can then be used for open space, recreation, or historic preservation efforts and projects. Further commitment to fundraising for open space protection was demonstrated with the town's passage of the Community Preservation Act in March 2007.

It is often hard to find enough volunteers to help manage the present facilities and run existing programs. The Recreation Commission especially has great difficulty finding help to run their excellent programs and would like to hire a part time administrator. While the survey results

show that residents may not be ready for this step yet, it is something that needs to be investigated for the future if residents are to continue to enjoy the facilities they have.

Many acres of land deemed "high priority" for protection from development by the Open Space Committee remain at risk of being lost if the settlement and housing boom of the 1980's and 1990's—currently slowed—resumes. The town should continue to manage and guide growth through existing by-laws. Managed growth can then proceed at a pace which has more chance to be matched by open space and conservation protection efforts. Several properties noted on the priority protection map developed by the Open Space Committee, some of them abutting undeveloped public land, are at risk of being sold and developed into residential housing, and the Open Space Committee is challenged to raise the funds needed to protect some of these key properties. At the time of this report (spring, 2007), the Committee is pursuing acquisition of 67.47 acres abutting the Mt. Jefferson Conservation Area and encompassing a variety of habitats, an outstanding scenic view shed, and borders on probable breeding territory for a state-listed Endangered bird, American Bittern.

The Open Space committee is also working with various landowners to protect priority lands through methods other than town acquisition. Recent adoption of the Open Space and Senior Residential Bylaws allows for development while simultaneously providing protection of woodland, farm land, trails, and/or views. In addition, the implementation of conservation or agricultural preservation restrictions would allow continued private ownership along with protection of open space. It is likely that the Open Space and Recreation Committee will focus on facilitating these more practical and realistic methods for land protection over the next five years.

## Section 8: Goals and Objectives

The needs identified by this plan touch upon several different topics. Interest in preserving the town's rural character while accommodating its growth is ongoing. Goals and objectives for satisfying these needs overlap, but can be broken down into categories.

Preserving the rural character of the town is of uppermost importance. This goal involves continuing efforts to protect open space, cooperating with and working through town government toward sensitive land development and landscape improvements, and increasing community support and involvement.

Two major environmental goals are water quality protection and wildlife habitat protection, for numerous reasons explored in previous sections.

The need for continued and improved resource protection and ongoing stewardship of open space lands is present. The town's slow-but-sure residential growth likely will lead to increased use (and misuse) of the town's open space resources. It is hoped that the increased visibility of the Open Space and Recreation Committee's accomplishments will attract more community members to become involved with environmental opportunities and management needs of the Mt. Jefferson Conservation Area and other important open space issues.

Another goal involves increasing and enhancing recreational opportunities on open space land, following ideas and suggestions from residents regarding needs. Some of the improvements and/or changes involve structured recreational facilities, while others focus on passive recreation.

In an effort to meet the overall goals and objectives, a five-year action plan with specific tasks has been developed and follows in Section 9.

## Section 9: Five-Year Action Plan

Preserving Hubbardston's rural character and improvement and enhancement of the town's open space and recreation opportunities requires a grassroots, community-based approach. An ambitious action plan for attaining the goals and objectives noted in Section 8 are presented below.

GOALS AND OBJECTIVES	ACTION ITEMS	SCHEDULE/ACTION GROUP
<b>Land Protection</b>		
Protect water quality Protect wildlife habitat Protect agricultural resources Enhance quality of life	1. Review and update the Land Protection Priority map as needed, based upon changes in ownership, use, status, character, etc. 2. Continue to make connections and build relationships with landowners to encourage protection of priority acreage with landowners to encourage protection of priority acreage through conservation restrictions and/or environmentally-sensitive development 3. Continue connections and relationships with land conservation organizations and agencies, land trusts, etc. 4. Encourage town to develop protective protocol for lands being removed from Chapter 61 status 5. Continue applications for relevant grants and funding as needed 6. Advocate for adoption of town bylaws that encourage environmentally friendly "green" development	Year One/OS  Ongoing/OS  Ongoing/OS Year One/OS, SB Ongoing/ OS Year One/OS, PB
<b>Town-Wide Improvements</b>		
Support balanced "green" development Enhance open space protection	1. Work with 20/20 Committee on efforts to improve downtown area	Year Two-Five/OS, 20-20
Increase and improve recreation opportunities Protect water quality	2. Work with Board of Park Commissioners regarding specific developed recreation sites, such as possible relocation of tennis and basketball courts, ice-skating rink, opportunities for the disabled, etc. 3. Participate in Community Preservation Act fund allocation decisions. 4. Work with Planning Board to promote green and low-impact development 5. Offer assistance in the event of town Master Plan update.	Year Two/OS, BPC, RC  Ongoing/OS, CPC Year One/OS, PB As needed/OS, SB
<b>Community Involvement</b>		
Increase community involvement Educate residents	1. Sponsor and organize special events and field trips to expose residents to open space and recreational opportunities, e.g. a series of Mt. Jefferson Conservation 2. Develop a "green team" of volunteers for hands-on projects, such as landscape maintenance, trash clean-up, trail monitoring, etc. Publicize. 3. Hold public meetings and hearings regarding major land use goals and decisions, e.g. wood harvesting; land clearing; erection of fencing, gates, or other structures;	Year One/OS, RC  Year One/OS Ongoing/OS, CC



## Trail and Open Space Land Improvement

Enhance recreation opportunities on existing open space	1. Continue assessing and mapping existing and historic cart paths and trails within the town; produce a town-wide recreation map	Ongoing/OS, HC
Increase community involvement	2. Repair, enhance, and maintain existing trails through volunteer and cooperative efforts	Ongoing/OS
Protect water quality	3. Explore possibility of including current and/or future trail and recreation maps with annual town report	Year Four/OS, SB
Promote historically important sites	4. Continue partnership with Montachusett Regional Planning commission and abutting towns with regard to region-wide trail system development	Ongoing/OS
	5. Explore funding opportunities for improvement of existing trails (culverts, bridges, etc.)	Ongoing/OS
	6. Plan for and facilitate trail connections wherever practically possible	Ongoing/OS
	7. Encourage and assist Historical Commission efforts to develop a mill pond/mill site interpretive trail within existing trail network; promote trail access to other significant historical sites	Year One/OS, HC, CPC

## Resource Protection and Enhancement

Protect water quality	1. Locate and engage volunteers to take part in statewide environmental monitoring programs, e.g. Weed Watcher, Adopt-A-Stream	Year Two-Three/OS, CC
Protect wildlife habitat	2. Encourage and support the formation of a town lake association which would address local pond issues and concerns	Year Two-Three/OS, CC
Enhance existing open space	3. Support and cooperate with efforts to create a town trash "task force" or committee, for the purpose of addressing illegal dumping and littering and town management of same	Year One/OS, SB
	4. Initiate a project to educate residents about invasive plant species; make efforts to eradicate or control undesirable invasive species on public and open space properties	Year Two-Three/OS, GC
	6. Explore open space land plantings of Nonesuch apple trees and/or other fruit trees and plants beneficial to wildlife	Year Two/OS, GC
	7. Encourage conservation and reclamation efforts at the Pitcherville gravel pits with regard to aquifer and wildlife habitat protection	Ongoing/OS, CC, SB

## Mt. Jefferson Conservation Area Stewardship

Enhance and improve existing open space	1. Improve parking area with regard to location and drainage	Year One/ OS, CC
Educate residents	2. Improve picnic area through clearing/mulching	Year One/ OS, CC
	3. Explore development of sledding area on hillside	Year One/ OS, CC
	4. Acquire funding and implement landscape plan for south boundary of west field	Year Two/ OS
	5. Address illegal ORV/ATV use	Ongoing/ OS, PD
	6. Address trash dumping and littering	Ongoing/ OS, HD, BH, SB
	7. Develop self-guided nature trail	Year One/ OS
	8. Involve and engage community in resource management (forests and fields) decisions and land use planning	Year One/ OS, CC

- (forests and fields) decisions and land use planning
- |   |                    |
|---|--------------------|
| 9. Explore use of the property as a forestry management education site for schools, landowners, community | Year Two-Three/ OS |
| 10. Involve community in property stewardship and maintenance   | Ongoing/ OS        |
| 11. Build new trailhead sign  | Year Three/ OS     |
| 12. Maintain and improve existing signs   | Ongoing/ OS, SF    |

## Other

- |   |  |                           |
|---|--|---------------------------|
| Maintain fiscal responsibility          | 1. Explore potential fund-raising methods for the purpose of raising money for small projects, materials purchases, printing and postage costs, etc.   | Ongoing/OS                |
| Continue relationship with state forest | 2. Develop a liaison relationship with local state forest administration and advocate for town open space needs relating to state forest funding and protection issues; consider political advocacy efforts regarding wood harvest funding allocations | Year Two/OS,SF            |
| Communicate with legislators            | 3. Initiate regular informational meetings to include local legislative representatives, open space committees from other towns, and/or regional land trust representatives, for the purpose of discussing mutual concerns                             | Year Two/OS               |
|   | 4. Explore possible development of a "green" cemetery  | Year Two-Five/OS, Cem, SB |

OS=Open Space Committee  
 SB=Board of Selectmen  
 PB=Planning Board  
 PD=Police Department  
 HD=Highway Department  
 Cem= Cemetery Commission  
 BPC=Board of Park Commissioners  
 RC=Recreation Committee  
 CC= Conservation Commission  
 BH=Board of Health  
 20/20= 20/20 Committee  
 HC=Historical Commission

SF=Hubbardston State Forest  
 DCR=Department of Conservation and Recreation  
 GC=Nonesuch (Hubbardston) Garden Club

## Section 10: Public Comments

This Open Space and Recreation Plan Update DRAFT has been submitted to the Board of Selectmen, Planning Board, Board of Health, Board of Park Commissioners, Zoning Board of Appeals, Highway Department, Town Administrator, and Historical Society for review. Their letters of review are to be included in Appendix VII.

