

TOWN OF WARWICK
OPEN SPACE
AND RECREATION PLAN

2010-2017



Prepared by the
WARWICK OPEN SPACE PLAN
COMMITTEE

Edwin Cady, Jr., Chair,
and the

FRANKLIN REGIONAL COUNCIL OF GOVERNMENTS
PLANNING DEPARTMENT

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Massachusetts Department of Housing & Community Development*

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Prepared by the
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SECTION 1

PLAN SUMMARY

The Warwick Open Space and Recreation Plan (OSRP) coalesces the interest, effort, and motivation of community members to identify, prioritize, conserve and protect Warwick's natural, recreational, cultural and historical resources. The purpose of the OSRP is to provide a framework for land use decisions and community planning efforts that may impact valuable natural resources and the lands that contain unique historical, recreational, and scenic values.

The 2009 Warwick Open Space and Recreation Plan reflects the high regard Warwick residents have for the forests, streams, wetlands, agricultural fields, scenic views, and significant historic and cultural resources that make the town unique. The OSRP illustrates the role that all undeveloped open spaces have in providing wildlife habitat and recreational opportunities and how appropriate economic development strategies, such as promoting agriculture and encouraging cottage industries, can help maintain the characteristics of the town that its residents cherish.

The Seven-Year Action Plan gives concrete substance to the goals and objectives, which were developed from the results of the 2009 Open Space and Recreation Survey and from community members' understanding of their Town's vast yet vulnerable natural resource base. The 2009 Warwick Open Space and Recreation Plan prioritizes actions that will:

- ❖ Utilize teens and other volunteers to GPS and where appropriate make more accessible significant archaeological, geologic and historic sites.
- ❖ Explore options for creating a meeting place for residents, especially teens and seniors.
- ❖ Continue the inventory of ecological resources including certifying vernal pools.
- ❖ Develop a trail map of Warwick utilizing GPS and GIS with assistance from youths and other volunteers and establish a hiking club at the Community School.
- ❖ Eliminate ATV damage to natural resources and trails.
- ❖ Minimize the impact of invasive species.
- ❖ Minimize the impact of beavers.
- ❖ Mark the boundaries of town owned land.
- ❖ Permanently protect farm land, encourage big and small farming, and adopt a Right-to-Farm bylaw.
- ❖ Construct dry hydrants and rehabilitate or build new fire ponds throughout town.

SECTION 2

INTRODUCTION

The Warwick Open Space Plan Committee (OSPC) was convened in February 2009 to work with staff from the Franklin Regional Council of Governments to update the 2002 Open Space and Recreation Plan (OSRP), which had expired in June 2007. The Committee was composed of representatives from the town's Open Space Committee, Planning Board, Select Board, and Conservation Commission, as well as members of the community and neighboring communities. Ted Cady was elected Chair of the OSPC and, under his strong leadership, the Committee has produced an updated Open Space and Recreation Plan that embodies the town's commitment to protecting and enhancing its recreational, scenic, cultural, historic and natural resources, while encouraging appropriate economic activity. The Plan also shines with the spirit and enthusiasm of the Committee members.

The collective knowledge of the Committee members about the town's children and teens, and the town's flora, fauna, forests and cultural and historical resources was formidable. Because of the variety and wealth of professional expertise that the Committee possessed, several subcommittees were formed to explore in depth the following:

- The open space and recreation needs and ideas of Warwick's children and teens. A Youth Subcommittee was formed under the leadership of Clare Green and Chris Duerring and outreach was conducted at the Warwick Community School for elementary school students and a meeting of teens was held at the Town Hall (complete with pizza);
- The need for a survey. The Open Space and Recreation Survey Design Subcommittee and later the Open Space Compilation Subcommittee were responsible for the Open Space Survey. Both efforts were spearheaded by Matt Hickler;
- The needs of equestrians. These were addressed by the Equestrian Caucus under the leadership of Mary Wall;
- The need to update the species list contained in the 2002 OSRP. The Species Space Cadets Subcommittee, under the leadership of David Brown, reorganized the species list format, added invasive species and migratory species to the categories, and compiled the extensive species list contained as an Appendix to Section 4;
- The need to update the list of Warwick's cultural and historic resources. Countless hours were spent reviewing historical maps and texts to update the

Scenic Resources and Unique Environments map by the Mapping Subcommittee, which was coordinated by Dave Shepardson;

- An unnamed subcommittee, which was led by Mary Williamson, wrote *Opportunities for Funding Open Space and Conservation Projects in Warwick*. This information was added to Section 5;
- A detailed discussion about *Criteria for Open Space Protection* was added to Section 5. This effort was led by Mary Williamson.
- The huge amount of work involved in maintaining the email lists, posting meetings, developing agendas and recording the Minutes and distributing information to committee members was handled by the Secretariat Subcommittee led by Karro Frost; and
- Sometimes little things make a big difference to the ambiance of a meeting and the Hospitality Committee led by Clare Green played an important role.

A. ACCOMPLISHMENTS

Since 2002, the Warwick Open Space Committee has worked diligently and enthusiastically to accomplish many of the goals and objectives listed in the 2002 OSRP. The Open Space Committee is proud of their accomplishments and grateful to the many people who participated in the Committee's achievements. The Open Space Plan Committee thought it helpful to note the accomplishments of the previous 7 years as a context for updating the OSRP and developing the new Seven Year Action Plan (2010-2017). The status of the First and Second Tier Action Steps from the 2002 OSRP is described below. A more detailed discussion of the status of the remaining 2002 Action Plan items is included as an Appendix to this section.

2002 Six Most Important (First Tier) Action Steps

1. Form an Open Space Committee – This step has been *successfully completed*. An Open Space Committee has been formed and is very active. It has acquired two unique parcels of land for the town, the Hockanum Road Lot and the Black Gum Swamp (“owned” by the Conservation Commission) and has assisted in the acquisition of other parcels.
2. Adopt a Cell Tower Bylaw – This step has been *successfully completed*. The matter was put before town meeting and the town meeting voted to proceed on developing a cell tower bylaw and bring it to the next annual town meeting. A Cell Tower Bylaw Committee was formed. It decided against a cell tower zoning bylaw to guide the Zoning Board of Appeals because the technology was rapidly changing, and instead developed a comprehensive policy for guiding the ZBA. This policy was approved by the Selectboard and Planning Board and forwarded to the ZBA. The ZBA had two suggestions for changes to the Zoning Bylaws, one of which was to allow the hiring of consultants at the applicant's expense, which were presented to town meeting and passed. In addition, the Broadband Committee has developed high speed internet access that uses both the cell tower and fire tower on Mt. Grace as part of the internet network.

3. Ensure the Inventory of Ecological, Historical, and Recreation Resources is complete – This step has *not been completed*.
4. Develop a rapport with Local Land Trusts – This step has been *successfully completed*. The primary land trust for our area is Mt. Grace Land Conservation Trust (MGLCT). In 2009 the chair of the Open Space Committee is President of MGLCT. MGLCT has acquired land and deed restriction to create the Arthur Iversen Conservation Area and has been a partner in assisting with the preservation of other key properties, sometimes with conservation restrictions, sometimes by fee acquisition, and sometimes by acquiring and holding title to the land until funds become available from other sources. It has provided critical advice and assistance to the Open Space Committee; and the Open Space Committee has provided support to MGLCT. Warwick is fortunate to have such a fruitful working relationship with MGLCT.
5. Form a Committee representing all Town Boards that will create a plan for benign disposition of the Warwick Prison Camp - This step has been *successfully completed*. All buildings within the prison camp have been bulldozed and the area turned into an open field.
6. Explore zoning revisions or adoption of measures that would encourage small business development without detracting from Warwick's rural character – This step has been *successfully completed*. The Planning Board developed and the Annual Town Meeting passed zoning amendments to encourage cottage industries.

2002 Second Tier Action Steps

1. Study Feasibility of Transferring Authority of Town-owned Open Space to the Conservation Commission – *Not done*.
2. Appoint a Liaison to the North Quabbin Regional Landscape Partnership – This step has been *successfully completed*. A representative of the Open Space Committee frequently attends the meetings.
3. Determine the best process for assigning the Town's right-of-first-refusal to a third party if appropriate (when a Chapter 61, 61A, or 61B parcel is put up for sale) - This step has been *successfully completed*. However, continued education of elected town officials is needed especially as new officials are elected who are unfamiliar with the procedure.
4. Develop a Master Calendar for Town Events – This step has been *successfully completed*. A Master Calendar is maintained on the second floor of the Town Hall and is updated regularly by the Town Coordinator. In addition, events are now listed on www.Warwick.org web site, on the Warwick L (an online chat room), and in the monthly Warwick Newsletter. The Women's Guild has also provided a marquis located on the Town Common and updated by the Town Coordinator.
5. Identify Parcels of Land in Need of Protection – This step has been *successfully completed*. The Open Space Committee decided against a specific list of parcels for a variety of reasons. Instead of a specific list of parcels to protect the Open

Space Committee developed a comprehensive list of criteria for the acquisition of open space. The criteria are listed in Section 5.

6. Develop a Trail Map for Warwick – This step has been *partially implemented*, and more work is being done. There is a general reluctance to publish trail maps because it might encourage ATV usage. In the past this concern has resulted in a lack of action. As part of the discussions for this update to the Open Space Plan the Open Space Plan Committee came up with a new solution. There will be no published maps, nor will there be maps available on line, however there will be maps available at the Warwick Free Public Library. In addition as part of the teenagers’ involvement with Open Space Planning a group of them have volunteered to GPS the trails and others have agreed to develop the GIS data layer.
7. Assess Specific Facilities and Programming Needs of Warwick Seniors – The Town Hall and Library have become important meeting places for seniors and a number of programs have been developed and are ongoing. The long term goal expressed by seniors in a prior open space survey was to have a place “to hang out,” which has *not been achieved*. It is also a high priority of teens.

B. STATEMENT OF PURPOSE

The purpose of this plan is to provide an accurate and thorough basis for decision-making involving the current and future open space and recreation needs of the residents of Warwick in harmony with appropriate economic development. This plan brings together and builds upon the planning efforts and accomplishments of the past twenty-two years including the 1987 and 2002 Open Space and Recreation Plans, as well as the 2009 survey results. This OSRP represents almost a year of consensus building on the most important community and natural resource needs of the Town and the best solutions for addressing them. The Seven Year step-by-step Action plan, when carried out by the Warwick Open Space Committee and other town boards and commissions, will successfully implement the Town’s open space and recreation goals and objectives.

C. PLANNING PROCESS AND PUBLIC PARTICIPATION

The process to update the 2002 Warwick Open Space and Recreation Plan officially began with the first public meeting on March 4, 2009. Ted Cady was elected the Chair of the newly formed Open Space Plan Committee. Over the next nine months, the Committee met 22 times, a grueling schedule for the members, most of whom serve on other town boards and work full-time. The staff from the Franklin Regional Council of Governments attended 9 of these meetings. The agendas and sign-in sheets for each of these meetings are included as Appendix A. A survey was sent to all residents and the results were used to develop Sections 6 – 9 of this Plan. The survey and a summary of the survey results are included as Appendix B.

The Open Space and Recreation Plan Public Forum was held on October 14, 2009 and over 50 residents attended (we even ran out of sign-in sheets!). Draft copies of the 2009

Warwick Open Space and Recreation Plan maps were on display during the Public Forum and attendees were encouraged to review the maps and write down any comments or suggestions for improving the maps and numerous comments were made. Attendees were also given a copy of the draft Section 9 and the Seven Year Action Plan at the Public Forum. A copy of the flyer advertising the Public Forum and the sign-in sheet and PowerPoint presentation given at the forum are included as Appendix C. Preceding and following the forum, copies of the draft maps and Seven Year Action Plan were made available for a public comment period at the Warwick Free Public Library. Comments expressed at the public forum were recorded and included in Section 10 – Public Comments. After review and discussion by the Open Space Plan Committee, all ideas, comments, and corrections received during the public forum and comment period pertaining to the different sections of the plan, maps and the action steps have also been included in the final version of the Warwick Open Space and Recreation Plan.

APPENDIX to Section 2

Status of the Recommended Actions of the Open Space and Recreation Plan listed in Table 9-1 of the 2002 OSRP:

Some of these have been addressed in the narrative above, and others may not be included for other reasons, so this should be considered a partial list.

A3. Review Need for Fire Ponds and Dry Hydrants – Partially completed. The primary fire pond which serves as the reserve water source for most of the town was dredged in 2006 which increased its capacity from under 10,000 gallons to 60,000 gallons. It had not been dredged in 30 years. Additional dredging was planned for 2008, but was postponed to 2009 because of heavy rains during the normal low flow period. The new fire chief has developed a priority list for installing dry hydrants and improving fire ponds.

A4a. Encourage . . . Inventory, Protect and Make More Accessible Significant Historical, Geological, and Archaeological Sites – This is an *ongoing* project of the Historical Society and much work has been done.

A4b. Consider Creation of a Historic District for the Center of Town – This *was done* by the Planning Board. It was rejected based on the experiences of the Town of Royalston which had adopted such a district.

A5. Explore Options for Creating Space that Would Serve as a Meeting Place for Residents – This has *not been accomplished*, but not for lack of trying. There have been frequent discussions about meeting space for seniors, sub-seniors, and teens, but so far to no avail. A meeting place was one of three top priorities for teens.

B1. Consider Zoning Alternatives to Conserve Open Fields, Farmland, Forestland, Streams, Ponds, Wetlands, Woods Roads and Trails, and Scenic Vistas – This has *not been accomplished*, however the Planning Board did present Town Meeting with a new Conservation Development Bylaw to protect open space which was passed by the Town Meeting.

B4. Develop a Land Protection Education Program – This program would be for townspeople to include estate planning, land protection options, and presentations by regional land trusts. Insert already published information on land protection alternatives in the newsletter. – This has *not been accomplished*.

Develop an education program for landowners using the Newsletter as a vehicle. - This has *not been accomplished*.

B6. Certify Vernal Pools – This is being done as an *ongoing* program of the Conservation Commission and over 20 vernal pools have been certified to date.

B7. Consider changes to bylaws and Board of Health Regulations to better protect public health by reducing the possibility of failed septic systems. – This has *been accomplished* by amendments to Title V.

B8. Consider (contracting for) a Cost of Community Services Study for Town of Warwick – This has not been done.

C1. Consider the Pros and Cons of Acquiring Open Space for Recreational Use. – Purchasing the swimming beach at Moores Pond was considered and the *idea rejected* because of cost and liability issues.

C2. Assess Specific Facilities and Programming Needs of Warwick Seniors and Others with Potential Mobility Impairments. – This program is *ongoing*. Handicap ramps were installed at the Town Hall, Library and Trinitarian Church. An elevator was installed in the town hall.

C3a. Work . . . to Address Concerns Relating to Need for Better Access to Recreational Opportunities on DCR Land – Very active efforts were undertaken to undo the damage caused during salvage logging of the DCR Picnic Area in the Gulf. In addition preliminary efforts were undertaken to form a Friends of Warwick Forests group. Some progress has been made. It is difficult to address improvements during a time of significant budget cutbacks.

C3b. Work with DCR to Educate State Forest Users About Appropriate Uses of State Forest Lands. – This has *not been accomplished*.

C4a. Appoint a Recreation Committee. – This has *been accomplished* and the Recreation Committee has developed a Recreation Program. Its members are email members of the Open Space Plan Committee.

C4b. Inventory and Assess the Potential Recreation Uses for Each Town Parcel. – This has not been accomplished.

C5b. Identify Parcels Needing Trail Easements and Seek Assistance in Acquiring Them. – This has not been accomplished.

SECTION 3

COMMUNITY SETTING

Over the past several hundred years, human settlement and development has slowly changed and shaped the landscape of the Town of Warwick. Today, the pace, scale and type of growth is very different from previous times, and if not attended to could degrade the rural character, abundant open lands, and diverse natural resources that townspeople cherish. It is important that the Warwick Open Space and Recreation Plan include an analysis of growth and development and their affect on the landscape and natural systems upon which residents and the region's wildlife depend. Unplanned growth without consideration of its impact on the Town's rural character and natural resources will likely reduce the quality of life for future generations.

A. REGIONAL CONTEXT

The Town of Warwick is located in north central Massachusetts, in the eastern part of Franklin County. With 32.6 square miles, it is the largest town in Franklin County. It is bordered by Royalston on the east, Orange on the south and southeast, Northfield and Erving on the west and southwest, and Winchester and Richmond, New Hampshire on the north. Bisecting the Town in a north-south direction, Route 78 is the principal highway serving Warwick. It provides access to State Route 2 via State Route 2A through West Orange. Route 2 is the major east-west transportation route across northern Massachusetts.

Warwick's geographic location has influenced its development and land use since its establishment in the 1760s. Its steep, forested hills and high-gradient fast running streams provided waterpower for all types of mills, but especially those that manufactured wood products. The town's extensive forest resources attracted entrepreneurs interested in establishing tanneries and saw, box, glass, and brick mills.

Despite limitations in its agricultural potential (very poor soils), low land prices attracted growing numbers of farmers to Warwick through the first half of the 19th Century. Clearing forests for conversion to agriculture and to generate much needed cash proceeded rapidly. In 1845 some million board feet of timber were sent to the mills from Warwick and by mid-century most of the land in town had been cleared for agriculture. Farms produced modest quantities of field-crops for local consumption with most land devoted to unimproved pasture for raising livestock. Cattle were favored over sheep (a reversal of the trend in many of the surrounding hill towns) and were sent to market for meat, milked for butter and cheese production and supplied hides to local tanneries. However, Warwick's distance from commercial centers in the Connecticut River Valley and limited agricultural potential hampered commercial ventures.

Placeholder for regional context map

In the mid-1830s, the town's mountainous terrain proved too much for the railroad, which located on more level land along the narrow Millers River flood plain. Additionally, residents left Warwick for vast acres of prime farm land that opened in the mid-west and centralized manufacturing centers located along the region's large rivers near reliable transportation routes. This resulted in a swift decline in population that continued into the late Twentieth Century when the automobile enabled people to move to rural areas like Warwick and easily commute to work in the surrounding towns of Orange, Athol, and Greenfield.

Vast acres of nearly worthless abandoned farmland characterized the landscape in the late 19th and early 20th Centuries. Much of this land was purchased by the State at rock bottom prices. Now reforested, the Warwick State Forest is the core of the Commonwealth's many holdings in Warwick and one of the Town's most important open space assets.

A.1. Natural Resources Context

Two regional landscape-level features are important to the development of Warwick and surrounding communities: abundant and contiguous forestland on steep, mountainous terrain, and a network of rushing rivers, streams and brooks that crisscross Northwest Massachusetts. Warwick is part of the Millers, Connecticut and Ashuelot River watersheds. The Millers and Ashuelot Rivers are major tributaries to the Connecticut River, New England's longest river and largest watershed. These rivers, mountains and forestland resources present opportunities and challenges to open space and recreation planning.

A.1.1. Large Blocks of Contiguous Forestland

Forests are one of the most important natural resources in Warwick. According to the Massachusetts Geographic Information System (MassGIS) 2005 land use data, approximately 90% (21,693 acres) of the 24,103 acres of land in Warwick is forested land. The forests encompass large tracts of uninhabited or road-less land of the type that provide the North Quabbin region its rugged and rural character. Blocks of contiguous forest in Warwick abut equally significant tracts of forest in the surrounding towns. The Commonwealth owns 48 percent of the forestland in Warwick, which is overseen by the Department of Conservation and Recreation (DCR) and includes Mount Grace and Warwick State Forests. The state land is made up of groups of protected parcels some of which are separated by privately owned woodlands.

Mount Grace State Forest is located to the north and west of Warwick Center along Route 78, just south of the New Hampshire border. The topography of this state forest includes 1,690 acres of steep terrain. The summit of Mount Grace rises 1,617 feet – the highest in Franklin County and the second highest peak in Massachusetts east of the Connecticut River. Mount Grace State Forest is best known for its trails used for hiking, cross-country skiing, horseback riding and

snowmobiling. Several of these trails connect to the interstate Metacomet-Monadnock-Mattabesett Trail (MMM Trail).¹

Warwick State Forest, with a number of parcels throughout Town, totals 11,677 acres. It includes Sheomet Pond, a thirty-one acre impoundment, which is stocked in the spring and fall with trout by the Department of Fish and Game (DFG), and Richards Reservoir, a thirty-five (35) acre impoundment which is primarily used for fishing, is situated on Black Brook.

In 1995, DCR and the Mount Grace Conservation Land Trust (MGCLT) acquired 492 acres of open space to link a large tract of Warwick State Forest with MGCLT land, known as the Arthur Iversen Conservation Area. The MGCLT tract includes Gale Pond, portions of Hodge² and Rum Brooks and their associated wetland systems – a black spruce bog, several vernal pools and a cascade known as Devil's Washbowl.³ Land uses include trail activities, hunting, and forestry.

Large blocks of contiguous forestland are important regional resources for several reasons. They are areas with a low degree of fragmentation. They provide habitat for wildlife species that require a certain amount of deep forest cover and separation from humans. Some animals do well alongside humans and development (e.g. raccoons and squirrels); others require larger home ranges and unique habitat which Warwick's forest lands provide (e.g. fishers and bears).

Large blocks of forest protect and provide clean water, air, and healthy wildlife populations. Warwick is a town that was settled in part because of its forest resources. By having much of its forested landscape permanently protected from development, Warwick retains its rural heritage and helps the region by providing unique opportunities for recreational trail development, wildlife habitat, and protection of fresh ground and surface water resources.

Warwick's lands are part of a regional forested landscape that stretches from the Quabbin Reservoir, west to the Connecticut River and north to Cardigan Mountain into New Hampshire (Quabbin to Cardigan Region – Q2C). The North Quabbin Region in Massachusetts has statewide importance because a significant portion of the area is comprised of vast tracts of permanently protected forest that safeguard the water resources of Quabbin Reservoir, Greater Boston's water supply, and the Millers and Ashuelot Rivers, major tributaries to the Connecticut River.⁴

The Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) views the North Quabbin Region, and some places in particular, like the Tully Mountain area in Orange and Royalston (recently designated a Bioreserve), as priorities for protection; they are large blocks of contiguous undeveloped forest that support biodiversity within the Commonwealth.

¹ The Metacomet-Monadnock-Mattabesett Trail in Warwick recently became part of the New England National Scenic Trail (2009).

² Although listed as "Hodge Brook" on the USGS map, it is "Hedge Brook," named after Lemuel Hedge, an early minister in Warwick. See Charles A Morse, 1963 Warwick, MA, Biography of a Town. For planning purposes and consistency with state and federal publications, FRCOG will refer to it as Hodge Brook.

³ An additional 16 acres have been added since 1995.

⁴ According to the US Fish and Wildlife Service, the Connecticut River has 38 major tributaries and many more small tributaries.

The Department of Fish and Game and DCR have invested monies for land protection in Warwick and the region as a whole. Also, land trusts like Mount Grace Land Conservation Trust (MGLCT), Franklin Land Trust (FLT), and New England Forestry Foundation (NEFF) and statewide conservation nonprofits like Massachusetts Audubon Society (MAS) and The Trustees of Reservations (TTOR) provide financial, administrative and technical support for land protection projects by working in partnership with the state to purchase the land in fee or as conservation restrictions.

A.1.2. Watersheds

Watersheds are areas of land that drain to a particular water body – a stream, river, pond or ocean. Large/major watersheds are made up of smaller tributary basins (sub-watersheds); their streams and brooks are more sensitive to land use, both the negative impacts of runoff and the positive effects of forest cover. Warwick’s intact forest lands support the long-term integrity of wildlife habitats and protect the quality of surface and ground water in town and in the Millers and Ashuelot watersheds.

Warwick’s lands drain into the Millers River to the south and east and the Ashuelot River to the north. In southwest Warwick, Darling Brook converges with Moss Brook, which flows through western Orange to the Millers River. Southeast of the center of Warwick, Rum, Black, and Hodge Brooks flow into each other to create Gales Brook, which enters Hubbard’s Pond in Brush Valley. The outflow from Hubbards Pond that enters and exits Wheeler Reservoir is Orcutt Brook. Orcutt Brook flows into the Millers in West Orange less than a mile upstream from Moss Brook. In eastern Warwick, Tully Brook carries drainage from the Warwick State Forest to Sheomet Lake, the outflow of which is the West Branch of the Tully River. The West and East Branches of the Tully Brook join up on the Orange Athol Town Line. Tully Brook is a tributary of the Millers River. Mill Brook flows along Northfield Road and becomes Pauchaug Brook (in Northfield), which flows directly into the Connecticut River.

Most of Warwick is located in the eastern portion of the Millers River Watershed, which includes portions of sixteen Massachusetts communities and four towns in New Hampshire. The Millers River Watershed is located in north central Massachusetts and southwestern New Hampshire. It is bordered on the north by the Ashuelot River Watershed, on the south by the Chicopee River watershed, and on the east by the Nashua River watershed.⁵

From its tributaries of origin in New Hampshire, the Millers River flows south, then gradually west, ultimately flowing into the Connecticut River in Erving. The Connecticut River is the longest river and largest watershed in New England. It encompasses 11,260 square miles and has its headwaters at Fourth Connecticut Lake in New Hampshire at the Canadian border. From there the Connecticut flows 410 miles south forming the border between Vermont and New Hampshire and passing through central Massachusetts (Northfield to Springfield) and Connecticut to empty into Long Island Sound at Old Saybrook, Connecticut.

⁵ The Nashua River is not a tributary of the Connecticut River but is part of the Merrimack River watershed in eastern Massachusetts.

The Millers River drains a landscape that is 392 square miles in size, 320 of which are in Massachusetts (DEP; 1995). The total river length is fifty-one (51) miles, forty-four (44) of which are in Massachusetts. Although the Millers River fluctuates between sluggish and rapid flows, there is an average drop of twenty-two (22) feet per mile which has made it ideal for hydropower generation. This, in turn, made the Millers River and its tributaries a magnet for manufacturing and prompted its industrialization in the late 1700s.

Many town centers between Erving and Winchendon are located along the Millers River, or on one of its main tributaries. In the past, the presence of growing industries, residential development, and the use of the river and its tributaries for waste water disposal produced serious pollution problems. Many of the point sources of pollution have been regulated as a result the Millers River is much cleaner today. However, the continued presence of dangerous levels of mercury and poly-chlorinated biphenyls (PCBs) from manufacturing are buried in the stream sediments of the Millers River, which means that the river's classification as swimmable/fishable has still not been achieved.⁶ Fish flesh has been found to contain these chemicals at levels that have caused the Massachusetts Department of Public Health to issue public health warnings against consuming fish caught in the Millers River. The full extent of the PCB contamination is under continued study by the State Department of Environmental Protection (DEP). The effects of PCB contamination in the Millers River will undoubtedly have a long-term impact on the recreational potential of the resource.

In northern Warwick, three brooks start in Warwick and drain into the Ashuelot River in southwest New Hampshire. Mountain and Kidder Brooks flow together to become Mirey Brook, which drains into the Ashuelot River. The Ashuelot, which is 64 miles long, begins in Washington, New Hampshire; it flows south and west to the town of Hinsdale where it enters the Connecticut River. Its watershed is 420 square miles and is home to the federally endangered dwarf wedge mussel. According to the U.S. Fish and Wildlife Service, the Ashuelot River is one of the four most important refuges for this mussel in the Connecticut River watershed. The Ashuelot River is currently included in the Connecticut River Anadromous Fish⁷ Restoration Program for smelt rearing and fry release. Lovers Retreat Brook flows into Bent Pond, whose outlet flows into Pauchaug Brook, which drains to the Connecticut River.

The Ashuelot River has been designated Class B by the New Hampshire General Court. The upper reaches have met or exceeded the standards for this classification. However, sections of the lower reaches have had some difficulties meeting the water quality standard. Efforts are underway to meet the standards through regulation, monitoring, land protection, and advances in municipal standards.

The Connecticut River Watershed was designated the Silvio O. Conte National Fish and Wildlife Refuge by an act of Congress in 1991. It is the first national refuge of its kind encompassing an entire four-state watershed ecosystem including the Millers and Ashuelot watersheds. The Connecticut River also received special recognition in 1998 when it became one of only fourteen rivers in the U.S. designated as an American Heritage River. The EOEEA has outlined

⁶ Fishable/swimmable rivers are designated by the State of Massachusetts as Class B waters.

⁷ Fish that live in saltwater but return to freshwater to spawn.

watershed priorities for the Connecticut River which include: promoting and/or creating riparian buffer zones along the waterways within the watershed; reducing barriers to migratory fish passages; reducing the negative effects of non-point source pollution, primarily storm run-off; and increasing the amount of water quality data available within the watershed.

As a result of the two designations, communities within the Millers and Ashuelot watershed could take advantage of assistance from the federal government and work with nonprofits such as the Connecticut River Watershed Council, Millers River Education Center, Millers River Watershed Council, and The Nature Conservancy to help them protect their rivers and riparian habitat. Since protection of forests is inextricably linked to safeguarding water resources, the designations could also help preserve each watershed's forest land.

A.2. Socio-Economic Context

Warwick is a small rural bedroom community where 80 percent of its working residents earn a living outside of Town. Few businesses are left in Warwick, and of those that do, many are natural resource based – a woodworking shop, a campground, and family farms. A small percentage of residents say they derive income from open space – most from forest products or farms.

North Quabbin Woods, sponsored by the New England Forestry Foundation and the North Quabbin Regional Landscape Partnership (NQRLP) are two nonprofit efforts that focus their programs on the multi-town region. North Quabbin Woods supports the use of the forest resources for forestry, wood products and recreation. The NQRLP is many organizations, communities, and businesses working together to identify, protect and enhance strategic ecological, cultural and historic open space within the rural region.

Recognizing the importance of the internet to Warwick's economy (cottage industry and small business), residents have created a municipal wireless network. They want better telephone and internet service, both of which will enable existing businesses to grow and new companies to spring up through marketing and sales via the technology. Much like the automobile and the interstate highway system, the internet gives people the option of living in rural areas, which in turn, could increase sprawl in rural areas by attracting more residential development.⁸

Warwick has grown significantly within the past thirty years. Its remote rural character, good elementary school, and relatively inexpensive land prices have attracted new residents each year. With high-speed internet added to the mix of incentives that attract people, the Town should consider protecting its natural, open space, and recreation resources as a priority. Property values are relatively low, so development rights can be purchased at much lower rates now and over time, than if the Town or local land trusts wait.

⁸ Warwick is ahead of the curve for acquiring high-speed internet by creating its own municipal system. However, it may eventually be able to access the Western Massachusetts internet system being developed by Pioneer Valley Connect, a project of FRCOG.

A.3. Regional Open Space and Recreation Opportunities and Issues

Warwick is part of two regional greenways – the Quabbin to Cardigan (Q2C), which is in north central Massachusetts and southwest New Hampshire, and the North Quabbin Region, which overlaps with Q2C and is solely in the Commonwealth.

The North Quabbin Region is a circular belt of permanently protected open space that stretches northwest from the 60,000 acre Quabbin Reservation through New Salem, Wendell, and western Orange into Warwick. The eastern half of the circular belt continues up to the state line through Royalston, then extends south to Tully Mountain in North Orange, Tully Lake, Birch Hill and Harvard Forest in Petersham. Another network connects the western part of the belt in Erving and western Orange through Wendell, Montague, and Sunderland to the Connecticut River.

Within these networks of open spaces there are eleven state forests or reservations that are popular for activities such as camping, fishing, hiking, and swimming. These include Warwick State Forest, Mount Grace State Forest, and the State Forests of Wendell, Orange, Erving, Montague, Shutesbury, and New Salem. According to the Mount Grace Land Conservation Trust, these lands together are the single largest continuous tract of protected land in southern New England.

Other protected open space and natural resources in the region that Warwick residents can use include the Metacomet-Monadnock-Mattabesett Hiking Trail, which passes through Warwick and Mount Grace State Forests. Laurel Lake, in southwestern Warwick and eastern Erving, the Quabbin Reservoir, Lake Wyola, Lake Mattawa, Tully Lake, and the Northfield Mountain Recreation Area are other regional recreational attractions used by outdoor enthusiasts. There are many critical natural and recreational resources that can only be conserved by permanently protecting networks of land that cross town and state boundaries. Warwick could play a prominent role in helping to expand its two greenways by protecting key parcels that add to these regional resources.

A.4. Regional Strategies for the Protection of Open Space, Natural and Recreational Resources

Protecting open space, wildlife habitat, and natural, scenic and recreational resources requires the ongoing actions at many different levels by many different organizations, agencies, communities and people – local, state and federal government; national, state and regional nonprofits; and interested citizens and landowners.

As such, regional efforts like the North Quabbin Regional Landscape Partnership (NQRLP) are key, because they represent local interests and attract financial and political support to the local agencies, nonprofits (NGOs) and towns doing the work. Agencies like FRCOG partner with nonprofits like MGLCT to plan for and acquire important lands with funding from state and

federal agencies and foundations, and towns to implement local changes in land use patterns through zoning and open space protection that collectively save rural character and resources. Warwick and other communities in the North Quabbin Region are fortunate because property values remain low, landowners are interested in preserving their lands, and the region is one of the last areas in the State with large contiguous forested blocks with significant biodiversity, making it easier for everyone to work together to preserve land and their communities.

According to the Mount Grace Land Conservation Trust, The Nature Conservancy considers the North Quabbin one of the two areas in the State most suitable for large-scale landscape protection. This gives the region national status and recognition.

In addition, the Commonwealth has completed the Statewide Comprehensive Outdoor Recreation Plan (SCORP), *Massachusetts Outdoors 2006*, an update of the SCORP 2000, five-year plan. SCORP plans are developed by individual states to be eligible for federal Land and Water Conservation Fund (LWCF) grants and serve as a tool for states to use in planning for future needs and uses of outdoor resources for public recreation and relaxation. This plan notes the significance of forests and wildlife management areas as part of the protected land in the region, and specifically mentions the Mount Tully Wildlife Management Area in Orange, which while not in Warwick is part of the Quabbin Region Landscape Partnership and the Quabbin to Cardigan Region. These two conservation efforts rely on the quality of Warwick's open space and recreational trails.

Recent major additions to this inventory include the 1460 acre Montague Plains Wildlife Management Area, the Mt. Tully Wildlife Management Area in Orange, and 660 acre French King Gorge acquisitions in Erving, Gill, and Northfield.

The SCORP also provides information about use of and demand for outdoor recreational resources in the Connecticut River Valley region that may be relevant to Warwick's open space and recreational planning efforts. When assessing resource use in this region, the SCORP notes that rivers and streams, historic and cultural sites, lakes and ponds, forests, coastal beaches and shorelines, and mountains, all have 40% participation rates or greater. When reporting on satisfaction levels of users of resources in this region, residents report being most satisfied with historic and cultural sites, mountains, and trails and greenways resources. Somewhat lower satisfaction levels were reported in the region for rivers and streams, and lakes and ponds. Rivers and streams were the area where Connecticut Valley Region residents who use these facilities were least satisfied overall. When considering new recreational projects, the Town may want to consider the following response from regional residents about future needs and interest from the SCORP:

"In contrast to demand (or present use patterns), respondents in this region place the highest priority for new facilities on road biking (14.5%), walking (13.9%), swimming (13.8%), playground (11.3%), hiking (10.0%), and mountain biking (10.3%)".

Planning for the protection of critical natural resource systems requires both regional and local planning. Local planning and conservation boards and commissions are responsible for implementing zoning changes, land protection measures, and targeting/protecting land that will

ensure the long-term preservation of the town's vulnerable natural, open space, and recreational resources.

Between 1999 and 2000 the FRCOG Planning Department developed open space data layers for each town in the County to provide an accurate depiction of the lands that are permanently protected in the region. The Planning Department continues work with towns to update and produce Open Space and Recreational Plans that assist Massachusetts and the many NGOs working in the region to identify and protect natural and open space resources that are important to greenway development.

The Massachusetts Natural Heritage and Endangered Species Program Biomap, which identifies areas that are critical to the biodiversity of the state, is very helpful to communities wanting to prioritize lands that should be permanently protected from development. Warwick has 2,591 hectares of core habitat identified and mapped (*See Section 4 Environmental Inventory and Analysis*).

While Massachusetts has discontinued the Watershed Initiative, the State has five-year action plans for the Millers River, which towns can use to protect their rivers, aquifers and drinking water supplies. Also, many more people and organizations are active in helping to protect and restore rivers. For Warwick, this means partnerships, planning, water quality monitoring, GIS mapping, erosion control, local zoning, land protection, and growth management will all play a role in helping it to safeguard fresh water in town and across the region.

Warwick can work with other towns, State agencies, local watershed organizations, and residents to protect its water resources. As with land protection, this regional approach, based in community and grassroots action, will safeguard the health of water resources, which in turn will protect public health and wildlife habitat.

B. HISTORY OF THE COMMUNITY

The Town of Warwick was originally given to veterans of the Canadian Expedition of 1690 as Roxbury and Gardner's Canada land grant in 1735. The original Warwick Township was six (6) square miles in size and laid out in sixty-three equal shares for the first settled minister, the ministry, school and sixty settlers. It was incorporated as the Town of Warwick in 1763 and although it is generally unknown, it is believed the name of Warwick was given to honor the Earl of Warwick, England, who played a prominent role in the colonization of New England.

The original acreage of Warwick was altered on two occasions. In 1740, the township lost 183 acres to the town of Richmond due to a dispute between New Hampshire and Massachusetts over its boundary. Another alteration to the Town took place in 1783 when the southeast corner of Warwick was given to the newly created District of Orange. This came about as the residents of south Warwick complained they had to travel a great distance to Warwick Center to attend

church and engage in town affairs and preferred to create their own town with land from Warwick, Athol, Royalston and Ervingshire (now Erving).

B.1. Contact Period (1500 – 1620)

There are no native Contact Period sites documented in the Town of Warwick. The area's rugged terrain and absence of high quality agricultural land and large freshwater ponds or lakes suggest that period occupation was likely focused on areas of relatively level land, which are located in the general vicinity of Warwick village and south to Hastings pond, the hill overlooking Hastings Pond, the hill immediately southeast of Richard's Reservoir and the mixture of dry and marshy lowlands south of Moores Pond.

It is unlikely that native agriculture was undertaken in Warwick. Native fishing likely occurred throughout the Town's streams and natural ponds.

Warwick was probably utilized as a secondary resource area by the native occupants with the major population center situated in neighboring Northfield. The occupants were likely related to the Squakheags, the dominant group located in Northfield by the 17th Century.

B.2. Plantation Period (1620 – 1675)

Warwick probably continued to be utilized primarily as a secondary resource area for the native residents of Squakheag until late in the Colonial Period. Colonial interest in Warwick continued to be discouraged due to its vulnerability to native attack and the lack of high quality land. Native subsistence patterns were probably much the same as those for the previous period although the development of the Anglo-Indian fur trade in the Middle Connecticut River Valley probably increased native hunting and trapping of fur-bearing animals in the area.

B.3. Colonial Period (1675 –1775)

Initial settlement in Warwick took place c.1739 with the construction of six homes, however, much of Warwick's early settlement did not occur until the early 1760s. Then, development took place in the vicinity of the present village center of Warwick. The Town's first meetinghouse, completed in 1760, was erected in the general area of the present Unitarian Church and the first minister, Reverend Lemuel Hedge, established his home that same year. Later settlement in this period took place north, northwest, and southeast of the early community. Warwick's first tavern was established by Deacon James Ball prior to 1775 probably at the junction of Old Winchester and Rum Brook Roads.

The colonial community earned its livelihood by livestock production and lumbering. The construction of the first local sawmill was completed in 1759 by Mattias Stone on Black Brook. This mill was followed by the first gristmill built in 1760 and also located on Black Brook.

Close economic ties with Northfield were created due to Warwick's limited resources and lack of industrial base. As an example, prior to the construction of the gristmill on Black Brook, residents carried their grain to Northfield to be ground.

The first official census of the Town of Warwick was done in 1765 with 191 inhabitants recorded. The next census, taken eleven years later, found Warwick with 766 inhabitants. This far outstripped the neighboring Town of Northfield. It was theorized that many found well-established Northfield to be too expensive and instead chose to purchase inexpensive abundant land in Warwick where opportunities to establish industry and skilled professions and trades were in demand. Between 1764 and 1774 Warwick continued to grow as more and more roads were laid out and accepted by the town. In 1776, the Town could boast a tavern, stores, a blacksmith shop, gristmill, and sawmill.

B.3.1. Surviving Historical Resources

Less than one half dozen houses of the Colonial Period survive in Warwick and all date from the 1760s or early 1770s. Although not part of the Massachusetts Historical Commission's (MHC) database, the Stephens Place off Old Winchester Road is thought to be the oldest surviving house (c. 1760). Other houses that are on the MHC list are on Richmond, Athol and Winchester Roads. Of these the best preserved is the Morse House (1772) on Richmond Road. It is a two and a half story center chimney plan structure. Other houses include the Hedge House, a double interior chimney house dated circa 1760-1777 but with an appearance of c.1820. There is also a second double interior chimney house dated 1770 and a center chimney plan gambrel roofed cottage noted on Richmond Road.

B.4. Federal Period (1775-1830)

In 1781, the Town of Warwick voted to give 4,060 acres in the southwest corner of Town to assist with the creation of the District of Orange. The creation of this new town was initiated as the large number of residents of the village of South Warwick complained of the great distance to Warwick Center. The District of Orange also obtained land from Athol, Royalston and Ervingshire. By this action, the Town of Warwick lost many of its prominent citizens who became leaders in the new District.

Warwick Center remained as the local civic focus with development of the Upper and Lower Village along the axis of the current Route 78. Upland farming extended to the limits of potential cultivation, which was around the Town center with a secondary area at Four Corners.

The increasing population in the Town of Warwick brought a demand for more roads. These roads were often crude and impassable. To alleviate this situation and to assist the Town in connecting its roads to those leading to the eastern part of the state, corporations were authorized to build turnpikes, or toll roads, to be used by the public who paid a toll every ten miles. In 1799, the Fifth Massachusetts Turnpike was authorized leading from Northfield through Warwick to Leominster. Other turnpikes followed connecting Warwick to Athol, Orange,

Brattleboro, VT and Winchester, NH. A number of these roads passed through upper Warwick Center. In 1805, William Dike set out from Warwick bound for Boston with a load of chestnuts. This was the first mention of an enterprise making use of the new turnpikes. At the same time, William Cobb and his wife ran a store, post office, and boarding house in the Center with Cobb making frequent trips to Boston to purchase merchandise for his store.

Like most other rural communities of this period, Warwick was forced to provide for itself most of the necessities of life. There were eight sawmills and three gristmills in Warwick by 1778. Other industrial development took place as well during this period. Two brickyards were known to have been operating in Warwick from 1790 to 1825, supplying the bricks used in construction of the homes in town. One industrious resident, Justus Russell took advantage of the abundant supply of domestic animals and built a tannery about 1800 on the Winchester turnpike, now Route 78. While many homes had looms to weave thread into cloth, there was an increasing demand for cloth on a larger scale. Opposite the Russell tannery, Jacob Rich erected a shop for the manufacture of cloth, which eventually specialized in the manufacture of black satin.

In 1812, Dr. Ebenezer Hall influenced Warwick's most prosperous men to organize the Franklin Glass Co., as glass was expensive and there was no nearby competition. The enterprise required the construction of several buildings, which were erected on both sides of Orange Road at Cemetery Hill. Tenements were also built to house the workers. In 1813, after hiring five glass blowers from New York, it was discovered that the clay found in Warwick was not suitable for the manufacture of the high temperature melting pots used in the kilns for making glass. Thus, clay was shipped from Philadelphia at great expense. Production and sales failed to meet expenses and the glass works closed in 1815, financially ruining many of Warwick's citizens.

Between 1820 and 1830, Warwick had as many as twelve sawmills, two mills manufacturing shingles and clapboards, four gristmills, two tanneries, two cabinet shops, three blacksmith shops, two shops manufacturing cutting tools, one potash plant, and two cloth-making shops. Also during this period, Warwick resident Captain Daniel Smith received a patent for his development of a machine called the revolving timber plane, believed to be what in modern times became known as the revolving plane.

Warwick's population peaked in 1820 at 1,256. Thereafter, the population began to decline. A rash of bankruptcies in 1824 and the opening of the West to emigration are supposed to be responsible for the start of this decline.

In 1827, the Fifth Massachusetts Turnpike relocated a new section of turnpike through Warwick. This section now passed through the village, but at some distance from the previous road. Mayo's tavern, and Cobb's store and post office, were no longer on the main thoroughfare in the center of the village. Due to this construction the Upper Village became of secondary importance with future expansion now expected to be toward the north. Land east and north of the Town Common thus became valuable and a new tavern, store and post office were built at more advantageous locations on the new road.

Despite the constant changes in routes, the tavern remained the center around which the Town revolved. Thus, the Warwick Inn, provided travelers with many years of service and hospitality. In 1828, a hall was built over the Inn's horse sheds. This hall served as the site of many of the town's community gatherings such as town meetings, religious services, dances and weddings for over a century. The Inn generally prospered until the end of the stagecoach routes, after which it became increasingly difficult to remain in operation. It changed ownership many times and even closed several times, however it was always rescued by some enterprising individual. The Inn is not in operation at this time.

B.4.1. Surviving Historical Resources

There are thirty houses of the Federal Period located in Warwick. These include nearly equal numbers of center chimney and double interior chimney houses. A similar number of cottages, nearly all with center chimney plans and five bay fronts also survive from the Federal Period. The finest concentration of period houses stands at the Town center but other houses stand at Four Corners and along Winchester, Athol, and Wendell Roads. Of note are a twin/rear wall chimney house at the Town center and a house with a double hip roof on Hastings Heights Road; the double hip roof is virtually unknown in the region. Other notable houses include the preserved Smith House (c.1800), the Stow House (1804), the Bass House (1812), and the Russell House (c.1800). The Russell House, which incorporates such Georgian features as an entrance surrounded with a deep segmental pediment and windows with crown moldings, could date earlier than the construction date given. Eight schoolhouses were indicated on an 1830 map and only one may have survived. There is a two-story, two bay-wide, side-hall plan structure located on Winchester Road south of the Center, which may be a schoolhouse of this period. Only one religious building was constructed during the Federal Period, a meetinghouse for the First Parish built in 1786-1788, however, this no longer stands.

B.5. Early Industrial Period (1830-1870)

In July of 1835, the railroad from Boston to Worcester opened. Consideration was given to constructing a rail line from Athol through Warwick to Winchester; however, the rugged hills of Warwick proved too great an obstacle. The rail line was therefore reconsidered and the change sent the line via Baldwinville to Athol, Orange, Northfield and Vernon, Vt. With the denial of this means of transportation, the decrease in Warwick's population accelerated. The railroad brought an end to the stagecoach lines running through Warwick from Brattleboro to Worcester. Towns located on the rail line began to prosper and businesses in Warwick could no longer compete. Many businesses began to fail or move to more prosperous towns.

Between 1865 and 1875 emigration West continued, as farmers no longer chose to work the difficult New England soil. There were several manufacturers who felt Warwick still had something to offer. In one instance, a chair making shop located on Wheeler's Pond was switched to brush manufacturing. It employed six to eight workers and produced 2,500 gross of brush woods. It continued in operation until 1872, thus giving the entire area the name, "Brush Valley." In 1872, it once again changed product lines, this time to the manufacture of wooden

boxes and continued this business until 1920 when it was destroyed by fire. Nahun Jones of Boston moved his boot-making business to Warwick. He employed forty workers who manufactured 20,000 pairs of leather boots per year. In 1870, Mr. Jones donated land to the Town for the creation of a Town park, which later saw the addition of a bandstand. At this time sawmills also continued in operation, now shipping lumber to New England cities and New York. A tannery in operation employed eight and produced fifty tons of leather annually. The cottage industry of weaving palm hats between 1850 and 1900 replaced the weaving of cloth in Warwick. These hats were often bartered for dry goods and groceries at the stores that sold the hats.

The population of Warwick in 1830 was 1,150 and dropped to 769 by 1870.

B.5.1. Surviving Historical Resources

Cottages became the predominant house type of the Early Industrial Period. While a number of side-hall plan cottages in the Greek Revival and Italianate styles were built, by far the most common plan for cottages was the traditional center entrance, five-bay plan with either a single chimney or double interior chimneys.

Two important religious buildings were built in Warwick Center during this period. These were the Baptist Church (1844), which has been the Warwick Library since 1919, and the present Unitarian Church (1836). The Baptist Church, a one and one half story gable front Greek Revival building, is the more modest. The Unitarian Church, two stories tall with a projecting porch with pediment and double entrances, incorporates Greek Revival and Gothic Revival details including lancet windows and a two-stage square belfry with pinnacles and a spire.

B.6. Late Industrial Period (1870 – 1915)

During the Late Industrial Period, Warwick Center remained as the focus of the local highway system with the primary axis north-south from Orange and east-west from Northfield. No rail or trolley lines were constructed or planned. As a result, Warwick's population continued to decline.

The agricultural economy of Warwick remained dominated by the lumbering and woodworking industries, though both declined as the period progressed. Dairy farming continued on the highlands near the Town center. The boot production of Nahun Jones' company accounted for 57 percent of the Town's total product value while lumbering accounted for another 36 percent. In the 1890s, many families moved into Warwick to work in area sawmills, when there was a surge in timber cutting. The population of Warwick in 1890 was 565 but by 1900 it had grown to 619. When the timber was exhausted, however, these families left town.

Given the timber cutting of the 1890s and the subsequent reforestation of the forests and abandoned farms, Warwick's residents began to become increasingly concerned about conservation. One citizen, Dr. Paul Goldsbury, was instrumental in placing a bill before the

Massachusetts Legislature in 1915 to establish a state park at Mount Grace. The bill was passed and by 1927 the state had acquired most of Mount Grace for a total of 3,000 acres, with smaller parcels purchased over the years as they became available. By 1962, over 8,361 acres had been acquired.

At the start of this period, Warwick had a population of 769, but by 1910, the population dropped sharply to 477.

B.6.1. Surviving Historical Resources

Very limited residential construction took place during this period. The only exception occurred after 1900 when some resort development took place around Laurel Lake and Moores Pond. Small cottages, most one story, gable roofed structures with clapboard, shingles, or novelty siding, were built. Another form of resort development was the conversion of Colonial and Federal Houses to summer use and the construction of additions to existing houses for use as summer hotels.

Two important institutional buildings were constructed at Warwick Center during this period. These are the Town Hall constructed in 1894 and the Center School built c. 1910. The Town Hall is a two and a half story hip roofed Colonial Revival structure and the School is one story with a hip roof.

B.7. Early Modern Period (1915 – 1940)

During the Early Modern Period, the main improvement of the north-south transportation axis from Orange to Keene, New Hampshire was secondary highway Route 78. Route 78 passed through Warwick Center to the Mount Grace Ski Area.

No new industries were identified during this period and agriculture remained the dominant source of income. The last remaining industry, the box shop owned by George Wheeler, closed in 1918 when Mr. Wheeler retired.

The Depression of the 1930s had little immediate effect on the Town as most residents earned their livelihood within Warwick. With the coming of the Roosevelt administration, the agencies created to relieve unemployment extended to Warwick. The Work Progress Administration (WPA) provided work for the unemployed three days per week. Projects in Warwick consisted of roadwork and brush cutting along roadsides. The WPA provided work until about 1941.

A transient work camp, built in 1934, was also located in Warwick by the Federal Emergency Relief Administration. This was set up to provide work and shelter for the ever-growing numbers of homeless men. The camp, which operated for three years, accommodated 200 and was located near Richards Reservoir. In 1962, this site became home to a prison camp operated by the Massachusetts State Department of Corrections. Prisoners worked under the direction of foresters and the Department of Natural Resources to assist with reforestation and conservation efforts.

In 1935, two Civilian Conservation Corps Camps were located in Warwick. These camps were designed to employ young men who were unable to find work after completion of their education. Water holes and roads were built in an effort to protect forests from destruction by fire. Picnic areas were also constructed. By 1938, the CCC Camps were closed.

The Hurricane of 1938 created the need for timber salvage operations in Warwick due to the extreme number of fallen trees in the area. As a result, five sawmills were set up in Warwick to deal with the fallen timber.

B.7.1. Surviving Historical Resources

In 1925, the Town of Warwick voted to purchase 100 acres of land at the junction of Wendell and Hockanum Roads. This purchase resulted in the creation of the Warwick Town Forest.

Table 3-1: Significant Historical Structures and Sites in Warwick

MHC #	STREET NAME	HISTORIC NAME	COMMON NAME	YEAR
4	4 Hotel Rd	Warwick Inn – Shlomet House – Putnam’s Hotel	Mount Grace Inn	1828
5	Athol Rd	Cobb, William House and Post Office	Atherton, Capt. Arlin S. House	1828
9	Athol Rd	Hedge, Rev. Lemuel – Reed, Rev. Samuel House	Green, Leslie W. – Francis, Howard House	1768
10	Athol Rd	Goldsbury, Capt. James House		1826
11	Athol Rd	Smith, Rev. Preserved House	Metcalf Memorial Chapel	1827
13	Athol Rd	Wheelock, Col. Lemuel – Lincoln, Frederick A. Hse		1820
14	Athol Rd	Wheelock, Col. Lemuel Double House	Cook, Rhoda House	1836
23	Athol Rd	Mayo, Caleb and Edward House	Morse, Arthur – Bailey House	
29	Athol Rd	Wheelock, Col. Lemuel – Wright House	Morse, Gillman – Cook, George S. House	1835
30	Athol Rd	Warwick Town Hall		1894
15	Flower Hill Rd	Whitney, Daniel – Child, Phineas House	Barber, Dea. Harvey House	
16	Flower Hill Rd	Hanson, C. – Maynard, Nelson House	New England Box Company – Shepardson, Detroit Hse	
17	Flower Hill Rd	Simonds, William – Daniels, Moses House	Hardin, Moses – Goddard, David House	
18	Flower Hill Rd	Bowman, Samuel – Gale, Jacob R. House	Ellis, Ezekiel House	1773
3	Gale Rd	Rich, Lt. Thomas – Conant, Josiah House	Gale, Appleton – Green, Frank House	1770
24	Gale Rd	Stow, Amos and Thomas House	Johnson, Daniel House	1804
902	Hastings Pond Rd	Warbeek – Wawbee Rock		
904	Laurel Lake Rd	Erving State Forest – Laurel Lake		
905	Laurel Lake Rd	Erving State Forest – Laurel Lake Dam and Bridge		1933
906	Laurel Lake Rd	Erving State Forest – Laurel Lake Beach Stonework		1933
21	Old Winchester Rd	Shearman, Abner – Bancroft, Ebenezer House	Kidder, Aaron – Hatch, Irving H. House	1775
22	Old Winchester Rd	Lawrence, William Jr. – Forbes, Sabin House	Ladd, E. – Brown, R. House	1860
6	Orange Rd	Sanger, Joshua T. House	Hatch, Rev. Roger – Conant, James A. House	1827
8	Orange Rd	Franklin Glass Company Showroom and Storehouse	Smith, Capt. Daniel N. – Wheelock House	1813
12	Orange Rd	Franklin Glass Company Superintendent	Synes, James – Taylor, Dr. Amos House	1812

MHC #	STREET NAME	HISTORIC NAME	COMMON NAME	YEAR
		House		
25	Orange Rd	Wheaton, Reuben – Wheeler, James House	Jennings, N. House	
27	Orange Rd	Atwood, H. House		
28	Orange Rd	Williams, Charles House	Tyler, Mary A. House	1895
31	Orange Rd			
32	Orange Rd	Warwick General Store and Post Office		1894
33	Orange Rd			
34	Orange Rd	Trinitarian Congregational Church Parsonage	Moore, Dea. George – Dresser, Lee J. House	1856
35	Orange Rd	Warwick Unitarian Church		1836
801	Orange Rd	Warwick Center Cemetery		
903	Orange Rd	Brush Valley Bridge	Orange Road Bridge over Orcutt Brook	1920
1	Richmond Rd	Stearns, Capt. Nathaniel House		1772
907	Rte. 78	Mount Grace State Forest – Council Ring		1936
908	Rte. 78	Mount Grace State Forest – Adirondack Shelter		1936
909	Rte. 78	Mount Grace State Forest – Gulf Brook Stonework		1933
910	Rte. 78	Mount Grace State Forest – Gulf Brook Dam		1933
911	Rte. 78	Mount Grace State Forest – Gulf Brook Fireplaces		1933
2	Warwick Rd	Fifth Massachusetts Turnpike Tollhouse	Sawyer, Eliakin – Williams, Melzer House	
26	Warwick Rd	Williams, Melzar – Nelson House	Hastings – Bass, Dwight House	
900	Wendell Rd	Wendell Road Bridge over Moss Brook		1925
7	Winchester Rd	Morse, Nathan – Procter, Laban House	Cobb, William – Fisher, Rueban House	1809
19	Winchester Rd	Bancroft, Ebenezer House – Warwick Poor Farm	Anderson, Augustus G. House	1785
20	Winchester Rd	Russell, Justus House	Bicknell, Margaret House	1800
36	Winchester Rd	Warwick Baptist Church – Warwick Public Library		1844
901	Winchester Rd	Warwick Grist Stones		
A		Warwick Center		
B		Erving State Forest – Laurel Lake Area		
C		Mount Grace State Forest – Ohlson Field Area		
D		Mount Grace State Forest – Gulf Brook Picnic Area		

Source: Massachusetts Historical Commission; 2002.

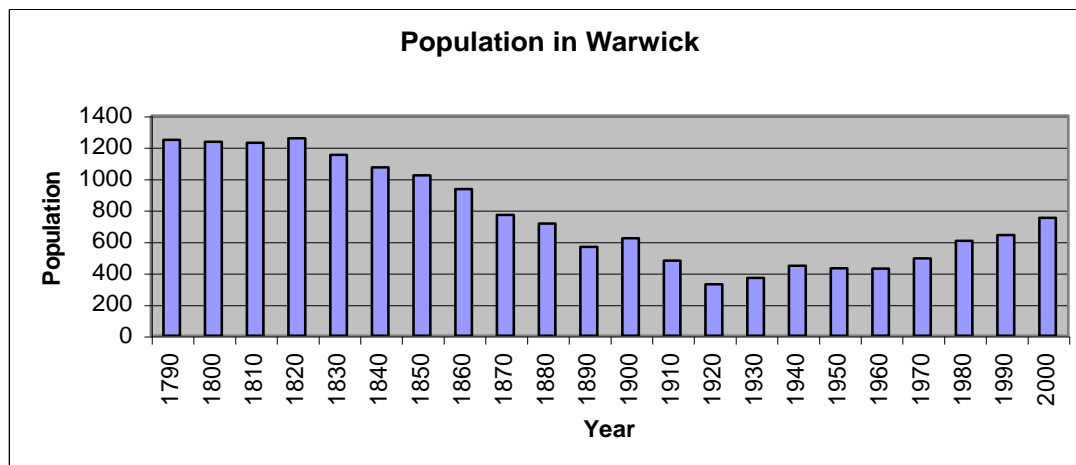
C. POPULATION CHARACTERISTICS

In this section, Population Characteristics, Warwick’s needs for open space and recreational resources are assessed based on an analysis of demographic and employment statistics. The demographic information includes changes in total population, the relative importance of different age groups in Warwick, and development patterns. In small towns like Warwick, traditional sources of employment figures rarely provide an accurate description of the economic base and labor force. However, federal and state statistics have been combined with informal surveys of local officials and anecdotal information to provide a more accurate representation of the local economy.

C.1. Demographic Information

In 1765, the first official census of the Town of Warwick recorded 191 inhabitants. Subsequently, Warwick's population began to increase dramatically. Land was inexpensive and residents of surrounding towns wanting to purchase a homestead, open a business, or ply their trade in a new location turned to Warwick. By 1776, when the next census was taken, Warwick boasted 766 inhabitants. Then new roads were built and Warwick's population rose further as outlying areas in town became accessible. In 1820, the population of the Town of Warwick peaked at 1,256 but thereafter began a slow decline. One hundred years later in 1920, the population had plummeted to its lowest point at 327.

Figure 3-1: Historical Population Figures for the Town of Warwick 1790-2000



Source: US Census and Massachusetts Census, various years.

Poor farming conditions, emigration west, bad business decisions causing bankruptcy, and the lack of modern modes of transportation such as a rail line, were all factors contributing to this decline. Between 1930 and 1970, Warwick's population averaged 432 residents, for a 32 percent increase over the low point of 1920. The population of Warwick continued to rise during the decades 1970-1980, which saw a 23 percent increase, and 1980-1990, which saw a 6 percent increase. Interestingly, the decade 1990-2000 saw an increase of 17.2 percent for Warwick when Franklin County's growth was only 2.1 percent, while the Commonwealth grew by 5.5 percent. Warwick's rate of population growth from 1990-2000 is extremely high as compared to the rest of Franklin County and the Commonwealth (see Table 3-2). However, since 2000, the population in town has essentially remained the same, fluctuating from a high of 754 in 2002 to the current low of 749 in 2008.⁹

⁹ Data from the Massachusetts State Data Center/Donahue Institute at UMass. Census Estimates 2000-2008.

Table 3-2: Comparison of Population Growth Rates for Warwick, Franklin County and Massachusetts 1990 – 2000

Location	1990 Census*	2000 Census	% Change from 1990 - 2000	2008	% Change from 2000 - 2008
Warwick	640	750	17.2%	749	0.14%
Franklin County	70,092	71,535	2.10%	71,735	0.28%
Massachusetts	6,016,425	6,349,097	5.50%	6,497,967	2.30%

Source: U.S. Census 1990 and 2000 Population Data; Massachusetts State Data Center/Donahue Institute, UMass (2008 data).

*Note: The 1990 Census counted state prison inmates as residents in 1990. The figure of 640 does not include the number of inmates estimated to have been residing in the state prison during that year. This state prison closed in the early 1990's, which ensures that the 2000 figure does not include inmates.

According to the U.S. Census 2000 General Demographic Characteristics, the Town of Warwick has a relatively middle aged population with the median age of residents being 40.6 years. When comparing age groups, or cohorts, between 1990 and 2000 (See Table 3-3), the most significant change in population occurred with the 45-64 years cohorts. By the year 2000, the number of people who were between the ages of 45 and 64 years jumped 81 percent. This occurred while the numbers of Warwick's youth under 19 years of age increased by only 4 percent and those over 65 years decreased. One reason for the decrease in elder numbers is the decrease in extended families in Warwick. Even so, based on the last decade alone, Warwick's population as a whole got older.

Table 3-3: Age Distribution of Warwick's Population 1990-2000

Census	0-4 years	5-19 years	20-44 years	45-64 years	65-84 years	85+ years	Total
1990	44	143	*242	118	85	8	640
% of Total	7%	22%	38%	18%	13%	1%	100%
2000	46	149	259	213	79	4	750
% of Total	6%	20%	35%	28%	11%	1%	100%

Source: U.S. Census, 1990 and 2000.

*Note: Because there were an estimated 100 inmates in the state prison in 1990 between the ages of 20 and 44, the number shown above has been reduced by 100, from the US Census figure of 342.

In comparing the Town of Warwick's age distribution characteristics to that of Franklin County and the State, they were found to be quite similar. Franklin County's median age is slightly less than Warwick's at 39.5 years, while that of Massachusetts's residents is 36.5 years. Overall, the County and State are experiencing a similar trend involving increases in the 45-64 year cohorts, although the shift is more extreme in Warwick, than in the larger regions. One difference that is important to note is that while the numbers of people in Warwick who are 85 years and older are declining, in the County and the State they are increasing.

Table 3-4: Population Count and Estimates

Location	2000 Count	2001 Estimate	2002 Estimate	2003 Estimate	2004 Estimate	2005 Estimate	2006 Estimate	2007 Estimate	2000-07 Change
Warwick	750	753	754	750	753	754	753	750	0.0%
Franklin County	71,535	71,601	71,820	71,864	71,918	71,913	71,706	71,602	0.1%
Massachusetts	6,349,097	6,407,631	6,431,788	6,438,510	6,433,676	6,429,137	6,434,389	6,449,755	1.6%

Source: U.S. Census Bureau: 2000 Population and Population Estimates Division

Based on this analysis, Warwick has had stagnant growth, which is similar to that of the County and, to some degree, the State. Warwick may need to plan for youth and middle-aged adults in its open space and recreation programming, even if some of these resources are provided outside of Town and especially in regards to sports fields for youth. Although the elderly in Town might benefit from well-maintained walking paths as compared to hiking trails, survey results show that much of the treasured recreational activities (walking, gardening, hiking and picnicking) are already available on the many parcels of open space. Gardening as a recreational activity probably refers to the work residents do on their own grounds. In fast growing communities like Warwick it is probably prudent to set aside a few parcels of land for sports fields and other facilities.

In identifying the best location for new recreation fields, trails and facilities, the town should consider where population growth is likely to occur. Future growth (density and location) will depend in large part on soil and groundwater constraints, town zoning, and which lands are permanently protected from development. It is best to have parks and walking/hiking trails that are close to concentrations of development and areas that would be developed for residential use. Officials could be looking for opportunities to conserve land in Warwick that protects valuable scenic and natural resources and provides public access to trail networks and open spaces.

To assess the ability of Warwick residents to pay for additional recreation resources and access to open space, its income level is compared to that of Franklin County and the State. The income figures for Table 3-5 are from the 1990 and 2000 census.

Table 3-5: 1990 and 2000 Census Median Household Income Statistics

Geography	1989 Median Household Income	1989 Income in 1999 Dollars*	1999 Median Household Income	Difference of Median Income in 1999 Dollars
Warwick	\$31,731	\$42,632	\$42,083	-\$549
Franklin County	\$30,350	\$40,777	\$40,768	-\$9
Massachusetts	\$36,952	\$49,647	\$50,502	\$855
United States	\$30,056	\$40,382	\$41,994	\$1,612

* \$1 in 1989 was the equivalent of a \$1.3435 in 1999.

Source: U.S. Census Bureau: 1990 Census and 2000 Census.

In 1989, Warwick's median household income was \$31,731 and in 1999 it was \$42,083. Based on these figures (1989 per capita income figures are not being used because the prison inmates

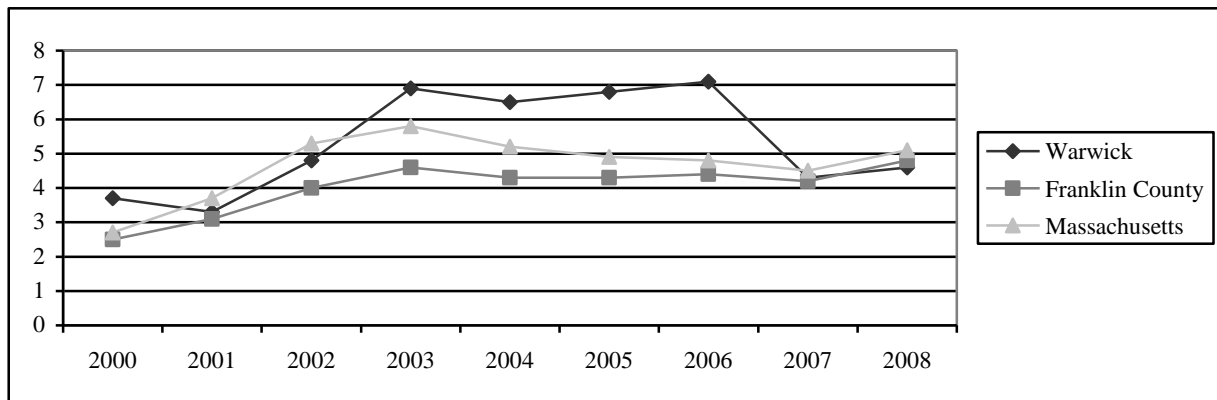
are counted), Warwick’s households earn more than the County median but less than those of the State. Whatever the generational make up of the future community, recreation and open space needs may change over time. What would Warwick’s response be to these potential increasing and changing needs? Given the modest wealth of its residents, how will the Town create these services and facilities in an inexpensive manner for its residents? The answers to these questions may depend in part on the current and potential economic and financial well being of Warwick.

Warwick’s most valuable resources are its people and landscapes. Both make Warwick what it is today, and the Town’s economic well being depends on the interdependent relationship between the two. Community services are paid for by taxes which differ in amount based on the land use (agricultural, residential, commercial, or industrial) and acreage. Developed properties have higher valuations than undeveloped lands, because they require more community services – waste disposal, road maintenance, etc. Even then, some properties may not pay for all the services they are provided, e.g. the annual cost of schooling one household with three children is more than the taxes paid by that same household based on the property’s assessed valuation. Many towns (not Warwick) encourage economic development to offset this inconsistency; commercial and industrial land uses are taxed at a higher rate than residential and agricultural lands so share more of the tax burden. On the other hand, protected open space requires few services and provides a meager share of tax revenues, but reduces the amount of housing that can occur. This relationship is explored in more detail in subsection D. Growth and Development Patterns.

C.2. Employers and Employment Statistics

The Town of Warwick, in the year 2008, had a labor force of 346 with 330 residents employed and 16 unemployed. This was a 4.6% unemployment rate for Warwick, whereas both Franklin County and the Commonwealth of Massachusetts had rates of 4.8% and 4.5%, respectively (Source: Mass. Department of Workforce Development). During the earlier part of this decade, the unemployment rate in Warwick was consistently higher than that of Commonwealth, with the exception of 2001, 2002.

Table 3-6: 2000-2008 Unemployment Rates



Source: MA Department of Workforce Development: Local Area Unemployment Statistics Program.

According to the Massachusetts Division of Employment Security, Warwick had six establishments in 1999. The average annual wage earned at these businesses was \$26,305 and there were ninety-four employees. In comparison, Warwick had an average weekly wage of \$490 in 2007, compared to \$670 for Franklin County and \$1,063 for the Commonwealth.

Table 3-7: Top Worker Destinations of Warwick Residents in 2000

Year	Number of Establishments	Total Wages	Average Monthly Employment	Average Weekly Wages
2001	7	\$2,705,557	112	\$466
2002	5	\$942,833	47	\$386
2003	5	\$855,281	36	\$452
2004	8	\$1,424,913	54	\$510
2005	8	\$1,593,859	56	\$547
2006	8	\$1,790,401	66	\$522
2007	8	\$2,011,470	79	\$490

Source: MA Department of Workforce Development: Employment & Wages, ES-202.

The top five destinations of Warwick's labor force in 1990 are shown in Table 3-8. Overall, 19.8 percent of Warwick's labor force worked in Town, roughly 15 percent worked each in Athol and Orange, while another 12 percent commuted to Greenfield. Just over 5 percent of Warwick's labor force crossed over to Winchester, New Hampshire.

Table 3-8: Top Worker Destinations of Warwick Residents in 2000

Destination	Number of Workers	Percent of Total Workers
Athol	88	25%
Warwick	56	16%
Greenfield	34	10%
Orange	25	7%
Deerfield	17	5%
Northfield	17	5%
Other Destinations	113	32%
Total	350	100%

Source: U.S. Census Bureau -2000 Census, Journey to Work Data.

Interviews with Town officials found that there are few businesses left in Warwick. Among them is Michael Humphries Woodworking, which employs twelve, four of whom reside in Warwick. This woodworking shop creates high-end furniture, custom cabinetry, and architectural millwork. It opened a storefront in the Town of Northfield in 2001. The Wagon Wheel Campground located in the southern section of Warwick, encompasses seventy-eight (78) acres of woodland with 102 campsites. It operates on a seasonal basis, but has no payroll. Chase Hill Farm is a dairy farm with thirty-two milking cows located in the eastern section of Warwick. It is a member of the Pioneer Valley Milk Marketing Cooperative, which produces "Our Family Farms" products. Besides milk, Chase Hill Farm produces Colby and Cheddar cheeses. The farm is operated by family members. The Warwick Community School, the elementary school

serving the children of Warwick, is part of the Pioneer Valley Regional School District and employs thirty-two, ten of whom live in Warwick. The Town itself employs four individuals.

Table 3-9: Warwick Journey to Work Data

Worker Destination	Number Of Workers	Percent of Total Workers
In Warwick	56	16%
In Franklin County	120	34%
In Worcester County	121	35%
Other counties in Mass.	26	7%
Outside of Mass.	27	8%
Total Workers	350	100%

Source: U.S. Census Bureau - 2000 Census.

The community survey suggests that seventeen respondents derive income from open space – most from forest products or farms. However, available information suggests that farms or wood producers may engage in work that represents a source of supplemental income. In addition, people employed in the environmental and conservation fields may feel that open space may be indirectly responsible for their work.

It appears that Warwick is a rural bedroom community; 80 percent of its working residents earn their living outside of Town. The lack of small businesses outside of home-based companies in Warwick means that expenses incurred community/public services, must be paid for with revenues generated from taxing residential uses and open space.

Warwick's 2002 Open Space Survey indicated that residents support the provision of better phone and Internet service and the development of cottage industries. Western Massachusetts Connect (formerly Pioneer Valley Connect) has studied the subject extensively. The Connect considers access to affordable, quality voice and broadband services throughout Western Massachusetts as essential. A study completed by the Connect in 2007, documented the need for public investment as well as private investment in infrastructure and a regional implementation model, in order to achieve ubiquitous broadband access in the region. Many of the findings of this study were reflected in the state broadband legislation enacted in August 2008 that created the Massachusetts Broadband Institute (MBI) and the \$40 million Incentive Fund. The MBI is currently working to make broadband access available in unserved areas of the Commonwealth in 2011. To complement these efforts, the MBI is pursuing federal broadband investment funds from the American Reinvestment and Recovery Act of 2009.

At the same time, the Town of Warwick has implemented a wireless broadband service available to government departments, residents and businesses in select areas. Residents of Warwick recognized early that better telephone and broadband Internet service would be very important to the Town and the community has been working diligently to find a way to develop or improve these services. Consequently, Warwick's Broadband Committee established a wireless broadband system, utilizing a tower located on Mount Grace and a cell tower located on the property of Brian Gale on Orange Road. The service was created using municipal resources and

the technical expertise of the firm of Access Plus Communications. As Warwick's municipal wireless broadband network and the MBI efforts proceed, additional areas of Warwick will have access to broadband services.

As telecommunications services become increasing available, this may attract greater residential development and for Warwick residents, this is likely to encourage greater home-based business development. Although an increase in cottage industries does not translate directly into significant tax revenues, it may allow more residents to work within the community. Some residents believe that community members will have a greater quality of life if people have the opportunity to work in Town. The town has been and continues to be actively engaged in the ongoing process of identifying and supporting types of small businesses that would compliment Warwick's identity as a small, rural community.

North Quabbin Woods is an initiative of the New England Forestry Foundation (NEFF) that fosters local, forest-based industries such as recreation, fine artisan crafts, woodworking, and lumber manufacturing in Warwick and the eight other towns in the North Quabbin region. The Foundation connects land conservation efforts with local businesses and promotes the region as a destination for people who cherish nature in an historic setting rich with architecturally preserved town commons, mill buildings, and agricultural character. Eco-tourism and high quality recreation depend on access to the permanently conserved 94,000 acres of open space, rivers and ponds, and rugged forestland. By working with NEFF to provide hiking, mountain biking, paddling, fishing, cross country skiing, snowshoeing, birding, and animal tracking opportunities, Warwick and its neighboring towns will improve the economy of the region. Also, the Town could increase revenues and supplement its annual budget by periodically harvesting timber from Town forestlands. At present, Warwick owns approximately 89 acres of land that is identified as Town Forest. The Town could purchase or otherwise acquire more forestland and managing the lands primarily for growing timber, although forestlands can be used for recreational activities year-round. Well-managed Town Forests can become one of Warwick's most important fiscal assets.

D. GROWTH AND DEVELOPMENT PATTERNS

D.1. Pattern and Trends

The Town of Warwick is a sparsely populated community. Its population peaked in 1820 when it began a slow steady decline until the 1970s when residential development began to grow by following early patterns.. Historic development patterns included agricultural, manufacturing activities, and the construction of roadways.

Today's development patterns echo the past where farms were set apart along or near roadways and civic, commercial and industrial activities clustered at a crossroads, along main routes, and often near a river or brook becoming the town center or forming a neighborhood. In Warwick, these first roadways included Old Winchester, Rum Brook, Richmond, Athol, and Wendell Roads.

Warwick's early settlement (1760s and 1780s) saw most development occur around Warwick Center and in the northwest and southeast following the industries of the time: lumbering and livestock. Mills were built and used products from the forest and farms and low land prices attracted new businesses to Warwick so the town's population grew.

Although Warwick lost many of its citizens when the southeastern portion of the Town was transferred to create the District of Orange in 1781, the next fifty years saw the community transformed into a manufacturing center with no fewer than 1,256 residents and thirty mills producing lumber, leather, shingles, cloth, boxes, flour, and bricks.

The population began a 100-year decline in 1835 when the railroad was built along the Millers River to the south in Orange. . The only increase in population occurred in 1900 when there was timber to be harvested in Warwick's forests. Interestingly the exhaustion of the timber supply resulted in a land protection movement, which would help to limit the number acres that could be settled in Warwick.

Between 1960 and 1990 the population of Warwick increased significantly from 426 people to 640. In the first ten years of that thirty-year period, Warwick grew by more than 15 percent, while in each of the next two decades the population grew by roughly 23 percent. Where these new residents chose to settle can be seen using MassGIS data. The 1971 and 1997 land use data show the predominant land use changes in Warwick to be the conversion of forest to residential uses of ½ acre or larger.

According to the 1971 GIS maps, Warwick had (and still has) a predominantly forested landscape with small, scattered patches of surface water, farmland, and residential uses. The largest patches of pasture were located at Four Corners, off Chase Road, and around the town center. The three largest pieces of cropland were located north of the intersection of Winchester and Flower Roads near the New Hampshire border, Chase Road, and south of Four Corners off Hastings Road. Residential uses that created openings in the forest cover of between ¼ and ½ acre in size were located on Route 78 within Warwick Center, off Hastings Road, and around Moores Pond. Residential uses in general were located around the town center and scattered along major routes.

According to the County Building Inspector, between 2001 and 2008, twenty-three new homes were built:

YEAR	Number of Houses
2001	No Data
2002	5
2003	4
2004	7
2005	1
2006	6
2007	0
2008	0

Most of this development is considered to be large lot residential development and has occurred as Approval-Not-Required (ANR) lots. ANR lots meet Warwick's required minimum lot size and frontage on an existing public way and therefore do not need to comply with State subdivision regulations. This is the only type of residential development occurring in Warwick.

There is one zoning district (Residential/Agricultural) in Warwick that requires a minimum lot size of two acres. The main reason that the two-acre lot size is required is to insure that a minimum distance between private wells and septic systems is met. Clean drinking water is dependent on locating the septic field in soils that clean the wastewater effectively before reaches the groundwater. The drawback of 2-acre zoning is that it may be encouraging a sprawling pattern of development, currently the most common way towns are being developed across the Commonwealth.

There are a number of ways to address the "sprawl" (development spread along rural roads and across the forested/farmed landscapes) created by ANR lots. One way Warwick has attempted to do this is to enact a conservation development provision for new subdivision in its zoning bylaw. The new single and/or two family dwellings can be clustered in one or more groups within a development. Building lots are of reduced in size and concentrated together with a permanent conservation restriction place on the remaining open space to prevent future development. Also, Warwick passed a zoning amendment allowing the addition of an apartment to a house. The bylaw recognizes that the size of many older homes is larger than currently needed given the significant decline in average family size over the last few decades.

D.2. Infrastructure

D.2.1. Transportation

The principal highway serving the Town of Warwick is secondary Route 78. Route 78, which passes through Warwick Center, is the major north-south route running through town. It intersects with State Route 2A at its southern terminus; Route 2A connects to State Route 2 which is the major highway through northern Massachusetts. At its northern terminus Route 78 intersects with Route 10 in Winchester, New Hampshire. Also passing through Warwick Center is the east-west route of Northfield, Gale and Athol Roads. These east/west routes connect Warwick to the neighboring towns of Northfield, Orange, and Athol.

There are no designated bicycle or pedestrian facilities in Warwick. The only sidewalk is located at the Town Common and connects the old elementary school with the Town library.

There are also no public transportation systems in Warwick. However, the elderly and people with disabilities may access Demand Response transportation services through the Franklin Regional Transit Authority (FRTA).

D.2.2. Water Supply

The Town of Warwick is served almost entirely by private wells. Most residences rely on deep wells; approximately one third to one quarter have shallow wells; and a small number depend on springs. The exceptions are the Town Hall and the Library which are served by a water system that originates from a spring on Mount Grace.

D.2.3. Septic Systems

In Warwick, all sewage is disposed of via private systems. The effectiveness of septic systems is variable and depends on topography, water table, and soils. Dependence on private sewage disposal requires that housing be restricted to soils and slopes that can reasonably be expected to handle on-site sewage systems. Soil types are critical for determining this capacity, and many soils in Warwick are wet, shallow-to-bedrock, or are coarse and stony which provide very little filtration to septic leachate since water passes through soils very quickly. While not precluding development in Warwick, the density and total amount of new development in the near future will in large part be determined by soils and their ability to pass percolation tests.

In many communities across the region, development follows infrastructure improvements. Given Warwick's lack of a community sewer collection system, the relationship between development and infrastructure appears to be a conditional one. If the soil, drainage, and topographical characteristics of the land are favorable, development will occur. If technology remains static, development may be limited to those areas that are already developed. As population increases and the land most able to accommodate development becomes scarce, developers may adopt new and/or alternative septic technologies that would allow for the construction of homes in areas once thought to be unsuitable for development.

D.3. Long Term Development Patterns

Long-term development patterns will likely depend on a combination of land use controls, the amount of permanently protected land, population trends, the impact of development on quality of life issues, and the willingness of people to commute relatively long distances to work, and the amount of available land for housing or other uses is property not permanently protected from development. This topic is discussed in more detail in the buildout analysis.

D.3.1. Land Use Controls

The Town of Warwick has three local land use controls: a zoning district, board of health regulations, and the inclusion of conservation development in its zoning bylaws.

Zoning District

The entire Town of Warwick is one zoning district, Residential-Agricultural.

There are prohibited uses and uses allowed by special permit in the Residential-Agricultural district. Warwick's Planning Board assumes that future development will be predominantly residential. Table 3-7 lists the dimensional requirements for single- and two-family houses. According to the Warwick Assessor's Clerk, in 2009 there were 334 single-family housing units, 1 two-family home and 2 multi-unit dwellings.

Table 3-7: Selected Features for the Residential-Agricultural Zoning District

Dimensional Requirement	Single-Family House	Two-Family House	Conservation Development
Min. Lot Area	87,120 sq. ft. (2 acres)	174,240 sq. ft. (4 acres)	21,750 sq. ft. (1/2 acre)
Min. Lot Frontage	300 feet	300 feet	100 feet
Min. Front Yard	35 feet	35feet	25 feet

Source: Town of Warwick Zoning By-Law; May 12, 2008.

One zoning district potentially produces both positive and negative impacts on the conservation of Warwick's natural resources. A two-acre minimum lot size may be too small given the soil, ledge, steep slopes and high water characteristics that presently constrain development in many areas of Town. On the other hand, a two-acre lot size helps to restrict development on unsuitable lands, conserves private drinking water supplies, and provides a better safety margin for protecting water supplies from cross contamination from on-site septic systems. However, a minimum lot size of two acres creates a large footprint that uses more land than may be necessary for a housing unit. As Warwick's population grows, the remaining unprotected open space may be converted at a faster rate than if higher density development was allowed.

Board of Health Regulations

According to the Town of Warwick's Board of Health Private Well Regulations, all wells for residential development must be located a particular distance from potential contamination sources: sub-surface sewage disposal field (100 feet), cesspool (100 feet), septic tank (50 feet), defined property line (25 feet), dwelling or other structure (25 feet). Also, the regulations state that wells need to be up gradient from all potential sources of contamination, accessible for repair and maintenance, and not in topographically low areas where surface water could accumulate. Combined with Title 5 regulations, these minimum requirements could result in constraining the location and number of new house lots in Warwick in the foreseeable future.

Conservation Development

Conservation Development as described in Warwick's Zoning Bylaws is described as: "single or two family residential development in which the houses are clustered together into one or more groups within the development and separated from adjacent properties and other groups by undeveloped land. This type of development, which is intended to protect open space, may be utilized for new subdivisions with access by way of a newly constructed road. The minimum

area for a conservation development is ten (10) acres which does not have frontage on an existing way. A development would cluster the same number of houses allowed in a standard subdivision of the same gross acreage with the remaining land held as common open land that is permanently protected. There are a number of methods of determining the number of houses that are allowed and open space that must be protected. Warwick recently amended its Zoning Bylaws to minimize hurdles and costs to developers who create conservation subdivisions.

D.3.2. Build Out Analysis

To illustrate the long-term effects of current zoning, the Executive Office of Energy and Environmental Affairs) conducted a build-out study in 2001. The methodology and results of the build-out study and associated GIS mapping are explained below. Changes to the Warwick Zoning Bylaws since the build out analysis would not significantly alter the conclusions, but significant additions of permanently protected land would reduce available land. Also, the Planning Board thinks that other constraints would reduce the potential impact. For example, while it is possible to get permission to cross state forest land to access a woodlot for logging, the state would not allow a paved road to be built across its land to access private developable land.

The purpose of a build-out analysis is to determine potentially developable land areas for residential development. Based on the 1997 MacConnell Land Use data, the State identified existing development areas, which were subtracted from the Town's total acreage leaving the remaining area classified as undeveloped. Undeveloped areas were then screened for environmental constraints such as steep slopes in excess of 25 percent, wetland areas, Rivers Protection Act buffer areas, and Zone I Recharge areas to public water supplies. In addition, protected open space was removed from consideration, but only acreage that is permanently protected, such as farmland in the Agricultural Preservation Restriction Program. Interestingly, some areas such as town water supply districts are not protected because a conservation restriction or some other legal mechanism is not in the deed to permanently preserve the land as open space. Slopes between 15 and 25 percent were considered a partial constraint, since certain types of land use typically cannot occur on relatively steep slopes. However, the State did assume that large lot residential zoning could occur on slopes of 15 and 25 percent because individual homes are more flexible to grade and site limitations. The areas that remained after the screening process were considered developable.

The State then applied the zoning district to the developable areas and a "build factor" was calculated based upon the requirements of each zoning district in terms of minimum lot size, frontage, setbacks, parking required and maximum lot coverage permitted. Once calculated, the build factor is used to convert potentially developable acreage into residential house lots. Once house lots are calculated this can be translated into estimated population growth, miles of new roads, and additional water consumption and solid waste generation.

The results of the build-out analysis were and are often quite startling. Table 3-8 describes the results of the build-out in numerical terms. While it might take many decades to reach "build-out," it is quite clear that Warwick's current zoning will not protect the community's rural

character or natural resource base. Open Space Planning is the first step in identifying key resources the Town should protect and areas that are most suitable for development. Once completed, Open Space and later, Master Plans can be translated into zoning revisions and land protection programs that balance the desire by a community to protect natural resources and encourage growth and development.

At full build-out several new elementary schools would be needed to accommodate the estimated 2,140 new school children. Approximately 119 miles of new roads would have to be built and maintained from the new house subdivisions. Fire and police services would have to expand to protect the increased population and water shortage may have taken hold. It is likely that at some point on the path towards complete build-out, the Town of Warwick would seek to control this expensive development.

Table 3-8: Summary Build-out Statistics of New Development and Associated Impacts

Potentially Developable Land (acres)	9,819
Total Residential Lots	4,203
Total Residential Units	4,221
Comm./Ind. Buildable Floor Area (sq. ft.)	0
Residential Water Use (gallons per day) [2]	949,751
Comm./Ind. Water Use (gallons per day) [2]	0
Non-Recycled Solid Waste (tons/year) [3]	4,620
Total Population at Build-out	13,452
New Residents [4]	12,663
New Students [5]	2,140
New Residential Subdivision Roads (miles)	119

Notes:

1. All wetlands removed from potentially developable land
No development on slopes in excess of 25%
No development in Zone I Water Supply Protection Areas
No development in permanently protected open space
No development within 150-foot buffer of transmission lines
2. Estimate from the Department of Housing & Community Development's Growth Impact Handbook
3. Statewide Average
4. 1990 Census; Population/Housing Units
5. MISER; 1997 School Children/Population

There could be both ecological and economic impacts caused by this degree of population growth and development. Ecological impacts could include a reduction in the quantity and quality of wildlife and fisheries habitats, a reduction in the quality of streams, lower air quality, and diminished biodiversity. The economic impacts of this level of population growth and development would be felt well before maximum build-out is reached in the manner of higher property taxes.

Given the rapid growth rate exhibited between 1990 and 2000 (17.2%), the challenge for Warwick will be to find a model for growth that protects the Town's rural character and promotes a stable property tax rate. In designing the model it is important to understand the measurable values of different land uses. Permanently protected open space (e.g.

farmland/forest), residential, and commercial /industrial development each have a different fiscal impact depending on the relationship of property tax revenues generated to municipal services consumed. There is a process by which the fiscal value of these three different land uses are compared within a town to determine whether a use has a positive or negative fiscal impact. This process is called a Cost of Community Services (COCS) analysis.

In 1991, the American Farmland Trust conducted a Cost of Community Services analysis for several towns in the region including Deerfield and Gill. The results of that study showed that in Deerfield, protection of farmland and open space is an effective strategy for promoting a stable tax base. The American Farmland Trust (AFT) studies found that for every dollar generated by farmland and open space, the municipal services required by that land cost only \$0.29 resulting in a positive fiscal impact to the town. Similarly, for every dollar generated by commercial and industrial tax revenues only \$0.38 was spent by the town in municipal services. In contrast, the AFT study found that for every dollar generated by residential development, the municipal services required by that land cost \$1.16, indicating that residential development costs more in terms of town services than it generates in tax revenues.

In 1995, the Southern New England Forest Consortium (SNEFC) commissioned a study of eleven southern New England towns that confirmed the findings of the earlier AFT study. The purpose of the SNEFC study was to evaluate the fiscal contribution of developed land versus that of open space using the methodology developed by the American Farmlands Trust. This study was based on allocating one year's worth of income and expenses to different land use sectors to show the impact of these land uses on the local economy. The results of the study concluded that for eleven southern New England towns, the conversion of open space for residential development had a negative fiscal impact. For every dollar of tax revenue raised from the residential sector, these towns spent an average of \$1.14 on residential services. The commercial and industrial development sectors on average cost the towns only \$.43 on services for each dollar of tax revenues received, generating a positive fiscal impact. This figure does not, according to the study, take into account other costs associated with commercial and industrial development such as the potential for increased residential development, increased traffic and noise pollution, the loss of open space to filter water and air, or the need to provide recreation opportunities. Farm and forestland and open space in comparison cost on average \$.42 in municipal services. That left \$.58 to pay for municipal services for the residential sector. The study also found that there is a correlation between a town's population characteristics and cost of community services. Towns that have larger and growing populations experience greater losses on their residential development. The study concluded that a "well balanced" land use plan would, in the long run, develop a stable tax base.

The challenge for Warwick and other communities is to define what "well balanced" looks like in their community. A land use plan that supports a stable tax base would also need to respect the capacity of the natural resource base. It might allow for the development of small home businesses in a way that encourages local entrepreneurship and modest business expansion, concentrates residential development where possible, and protects forests, remaining farmland, and the most significant scenic, ecological, and historic resources.

SECTION

4

ENVIRONMENTAL INVENTORY AND ANALYSIS

This section of the Warwick Open Space and Recreation Plan provides a comprehensive inventory of the natural resources and significant cultural assets within the Town. The purpose of this section is to provide a factual basis upon which assessments can be made. The inventory identifies and qualifies Warwick's soils, special landscape features, surface waters, aquifers, vegetation, fisheries and wildlife, and unique environments and scenic landscapes.

Each of these resource areas is analyzed from two perspectives. First, the Town's natural resources provide Warwick residents with basic ecological services and cultural amenities. Ecological services include for example, drinking water filtration, flood storage capacity, maintenance of species diversity, and soil nutrient levels. Cultural amenities include the recreational use of open spaces; the quality of life benefits that are maximized by maintaining the area's rural character and scenic beauty; and the direct and indirect beneficial impacts that well-conserved natural resources, such as good drinking water and open spaces, have on the local economy. Second, it is important to determine whether the resources require conservation so that the quantity and quality required by the citizenry is sustained.

A. TOPOGRAPHY, GEOLOGY, AND SOILS

Decisions about land use must take into consideration the inherent suitability of a site for different kinds of development. Understanding the geology, soils, and topography of Warwick are essential for determining the suitability of sites for residential, commercial and industrial development as well as new parks, hiking trails and open space.

A.1 Topography

The Town of Warwick is composed primarily of large rolling hills and steep-walled narrow valleys. Elevations in Warwick range from 466 feet above mean sea level where Mountain Brook leaves the Town on its northern border to 1,617 feet atop Mount Grace. Although most of the narrow stream valleys are steep-sided, portions of two valleys are broad and quite flat, and have much of the best agricultural land in the Town of Warwick. One is the valley adjacent to Mountain Brook north of Flower Hill. The other broad valley is along Darling Brook south of Moores Pond. Other primary stream valleys include those along Orcutt Brook and Tully Brook. The Town of Warwick lies in the Connecticut River watershed which encompasses the Millers River, Ashuelot River, and Mill Brook Basins (sub-watersheds). The southern portion and northeastern quadrant of Warwick drain to the Millers River. The three principal watercourses in

the Town that flow into the Millers are Moss Brook, Orcutt Brook and West Branch Tully Brook. Other streams flowing to the Millers River include Rum, Gales, Darling, East Branch Darling, and Hodge Brooks. The northwestern quadrant drains to the Connecticut River via Mill Brook. Mountain (Mirey) Brook flows north into New Hampshire and is a tributary of the Ashuelot River, which flows into the Connecticut River just north of the Massachusetts-New Hampshire border. There are fourteen lakes and ponds, which are in part of or totally within the Town of Warwick.

A.2 Geology

The Town of Warwick is the result of millions of years of geologic history: the movement of the earth's crust (continental drift), the great eruptions of volcanoes, and the sculpting power of moving water, ice, and wind. This distinctive physical base has determined the distribution of the Town's water bodies, the types of soils and vegetation, and the settlement patterns, both prior to and since colonial times.

Approximately 65 million years ago, the entire eastern United States including Warwick was part of a large featureless plain, known as the peneplain. It had been leveled through erosion, with the exception of a few higher, resistant areas. Today, these granite mountaintops, named monadnocks, are still the high points in this region and include Mount Monadnock in New Hampshire; Mount Wachusett in Worcester County and Mount Grace in Warwick.

Most of Warwick's hydrological system is a remnant of the last ice age (approximately 13,000 years ago). The major streams follow a north-south course with the topography. Smaller streams flow from uplands feeding the extensive wetlands formed by sedimentation that filled drainage points when the glaciers receded.

The glacier left gravel and sand deposits in the lowlands and along stream terraces. Where deposits were left along hillsides, they formed kame terraces and eskers. Kames are short hills, ridges, or mounds and eskers are long narrow ridges or mounds of sand, gravel, and boulders formed under glacial streams. Both are formed by glacial melt waters.

A.3 Soils

Soils have five basic characteristics: their depth to bedrock; the speed at which they allow water to percolate into the ground; their slope; the amount of surface water that exists in the area; and the amount of boulders and stones present on the surface that make them appropriate or inappropriate for different land uses.

As Warwick plans for the long-term use of its land, at least four soil related questions arise: Which soils constrain development given current technologies? Which soils are particularly suited for recreational opportunities and wildlife habitat? Which soils and substrates impact current and future drinking water supplies? And finally, which soils are best for agriculture? The answers to these questions will help lay the foundation for open space and recreation

planning in Warwick. The following describes the soils in Warwick and their uses for agriculture, drinking water, wastewater, recreation, and wildlife habitat.

A.3.1 Soils constraining development given current technologies

Large portions of Bolster Hill, Mount Grace, Little Mount Grace, Bennetts Knob, Mallard Hill, Mayo Hill, Chestnut Hill, Beech Hill and Barber Hill consist of Shapleigh soils. Shapleigh soils are shallow and are located on very steep slopes, from 15 percent to 60 percent, and many areas have ledge outcrops of schist bedrock. Depth to bedrock is generally less than eighteen inches. These soils may severely limit the installation of on-site sewage disposal systems and construction of house foundations.

Beech Hill, Barber Hill, Mallard Hill, Mayo Hill, and other uplands also have large areas of Essex soils, which are often found on the steep terrain. This soil has a slowly permeable hardpan within two and a half feet of the surface. Development constraints within this association vary considerably.

Soils in Warwick which have only slight to moderate limitations for development are the Gloucester soils occurring on flat to moderately steep slopes and Hinckley, Windsor, Carver and Merrimac soils on flat to moderate slopes. The Gloucester soils tend to be extremely stony with boulders also common on the surface. This soil has moderately rapid to rapid permeability and rate of infiltration. The Hinckley, Windsor and Merrimac soils consist of excessively drained, shallow gravelly soils. The Carver soils consist of excessively drained, loamy coarse sand and are found in wooded areas on nearly level to moderate slopes.

Deep fluvio-glacial deposits of sand and gravel accumulated in the valleys of Mountain and Mirey Brooks to the north of the village and Darling Brook to the south of Moores Pond. High quality sandy loam soils have developed on some of these deposits, however many areas have a shallow depth to the water table.

A.3.2 Soils suited for recreational opportunities and wildlife habitat

Different recreational uses are constrained by separate soil and topographical characteristics. Sports fields require well-drained and level soils. Lands with slopes over 25 percent may be attractive to all terrain vehicles (ATVs) and biking and hiking enthusiasts but only if the soils are not easily eroded. Erodable soils include those that are shallow, wet, sandy, or sloped or those with a combination of these characteristics. Depending on the combination of factors, highly erodable soils could have less than 15 percent slopes.

As Warwick experiences development pressures, soils that best support a variety of wildlife habitats may prove to be those that most constrain development. These soils include the shallow and fine, sandy Shapleigh soils, and the Ridgebury, Peat, Muck and Walpole soils found in the depressions and saddles in the hills of Warwick, and the areas bordering streams in the valleys. These soils have high water tables during all or most of the year. Warwick might consider identifying and protecting the areas surrounding such hydric or very wet soils. More than likely these soils provide for a diverse array of wetland species habitats. In addition, protecting any remaining high slope areas along ridge tops would protect habitats for large mammals as well as scenic views. Finally, protecting ridge tops and wetlands for wildlife habitat is not sufficient in

and of itself. The Town should also assess lands that link these special areas to allow for the movement of animals along corridors between the habitats.

A.3.3 Soils and substrate suitable for drinking water supplies

Soils of the Hinckley and Gloucester associations generally have high filtration rates and low runoff potential. The Hinckley association, which drains more easily, forms in valleys on stratified drift. The Gloucester association forms on gently sloping and steep upland areas on sandy till. Both associations provide high amounts of recharge to aquifers.

High infiltration soils are sometimes also poor filtering soils and include Agawam, Carver, Gloucester, Hinckley, Merrimack, and Windsor soils. These are found in the more easily developed areas. These soils provide little filtration to septic leachate as water passes through these soils very quickly, which may not be a problem when the depth to ground water is great. Unfortunately, potential aquifers are usually found where these soil types are located. Development could potentially pollute these aquifers if care is not taken to protect them.

A.3.4 Soils for agriculture

Although Warwick is not a strong agricultural community, it does contain a valuable resource, prime farmland soils. Prime farmland soils produce the highest yields with minimal energy and economic resources, and farming these prime soils results in the least damage to the environment. Prime farmland soils are also considered well suited for residential development. Even if Warwick prefers not to actively protect its farmland for its food producing value, existing farmland does contribute to the Town's scenic and rural character. Residents interested in conserving these remaining lands should consider all farmland soils to be rare, valuable, and vulnerable to development.

The Franklin County Soil Survey reveals that there are 1,664 acres of potentially prime farmland soil in the Town of Warwick. This constitutes 6.9 percent of the land area in the Town. The larger parcels of "prime" agricultural land can be found in the following areas: the valley south of Moores Pond along Wendell Road; south of the village center on the east side of Route 78; east of Hastings Pond; north and west of Harris Swamp; east and north of Wheelers Pond; Four Corners area; northwest of Mallard Hill; along the north end of Old Winchester Road; and, along Route 78 just south of the New Hampshire border.

Many of the soils that constitute Warwick's prime agricultural land include: Agawam, Essex, Charlton, Gloucester, Merrimac, Scituate, Shapleigh, Sudbury, Hinckley and Windsor soils.

A.4 Analysis

It is clear from the above that within Warwick, the geology, topography, and soils provide both ecological services (such as crop production and water purification) and cultural amenities (such as scenic views and hiking trails). The remote ridgelines and steep slopes helped to limit development, thereby enhancing the habitat value of these areas for flora and fauna, and provide opportunities for the State to purchase land that is now part of the State Park and Forest system – Mount Grace, Warwick and Erving State Forests. Residents throughout the region appreciate the

scenic value of the highlands such as Mount Grace. In addition, the hills are destination points for hikers and wildlife enthusiasts.

The ecological services and cultural amenities that Warwick's ridgelines, hills, and soils provide cannot be replaced. They will be diminished, however, with neglect and poor planning. Adopting ridge protection bylaws and exploring ways to conserve prime farmland soils will be required if residents want to sustain Warwick's rural character and the town's local recreational and agricultural economy.

B. LANDSCAPE CHARACTER

Warwick is in the Upper Worcester Plateau Ecoregion of Massachusetts; a landscape of hills and valleys dissected by small, high-gradient, headwater streams. The Warwick Dome, a gneiss dome of the Devonian age¹ with Mt. Grace at its center, is the central geologic feature of the town.

One of the main landscape features separating Warwick from surrounding communities is that many of its roads are on ridges and hills that run north to south and offer fantastic views of the dominant hills, mountains, and features in the region. The Quabbin Reservoir can be viewed from Mount Grace. Mount Monadnock may be viewed from many places in town including Hasting Heights, Old Winchester Road, and Chase Hill Road. Both the Millers River and the Tully River valleys can be viewed from Chase Hill Road. From Moores Pond Beach one can see Mt. Grace. The views south from Route 78, on top of Barber Hill, and north from Flower Hill Road are fine as well. Despite being a predominantly forested town, Warwick contains an extraordinary number of spectacular views.

Overall, Warwick's landscape is overwhelmingly forested, has exceptionally low road density and is very lightly developed. The conservation of large blocks of high quality, unfragmented forest has become a priority for regional conservation planners. The Nature Conservancy identified and mapped the best remaining matrix forest blocks in the Eastern Region as part of their Ecoregional Planning Program. The Warwick Matrix Forest Block covers the entire town and received the highest possible ranking.

In 2001, the Massachusetts Natural Heritage and Endangered Species Program completed its BioMap Initiative to identify and map areas that are critical to preserving the biodiversity of the State. Warwick had 2,591 hectares of core habitat identified and mapped (*See Open Space Map*).

¹ The Devonian Age was 416 to 359.2 million years ago when the mountains of western Massachusetts were being formed.

C. WATER RESOURCES

C.1 Watersheds

The Town of Warwick lies in the Connecticut River watershed² which encompasses the Millers River, Ashuelot River, and Mill Brook Basins (sub-watersheds). The Connecticut is nationally significant. In 1991, Congress established the Silvio O. Conte National Fish and Wildlife Refuge, the only refuge in the country to encompass an entire watershed – the Connecticut River watershed in New Hampshire, Vermont, Massachusetts and Connecticut. Seven years later, in 1998, the Connecticut River became one of only fourteen rivers in the country to earn Presidential designation as an American Heritage River.

C.2 Surface Water

The Town of Warwick has approximately 212 acres of fresh open water, which includes tributaries to the Millers, Ashuelot and Connecticut Rivers,³ and all or parts of fourteen ponds, lakes and reservoirs – Laurel Lake, Richards and Wheeler Reservoirs, and Lily, Hastings, Moores, Hubbards, and Johnsonian Ponds. Both the Millers River and Ashuelot River in New Hampshire are large rivers of statewide importance and historical significance.

The following inventory describes Warwick's streams, brooks, and ponds and focuses on water quality issues and the public access and recreational value of these waters. The 2008 Massachusetts Integrated List of Waters prepared by the Department of Environmental Protection (DEP) is used as a source document for the Millers River and all listed surface waters within the Town of Warwick.⁴

The northwestern quadrant of the Town drains to the Ashuelot River – Lovers Retreat, Black, Mirey, Kidder, and Mountain Brooks – while all the other brooks except Mill Brook, which is a tributary to the Connecticut River, drain to the Millers River.

C.2.1 Millers River

The Millers River is located in north central Massachusetts and southwestern New Hampshire. From its headwaters in New Hampshire, the Millers River flows south then gradually west through Athol and Orange, ultimately flowing into the Connecticut River. According to the US Fish and Wildlife Service, the Millers River is one of 38 major tributaries to the Connecticut River, New England's longest river and largest watershed. While the Millers River does not run

² The Connecticut is New England's largest watershed (11,260 square miles) and longest river (410 miles).

³ According to the US Fish and Wildlife Service, the Millers and Ashuelot Rivers are two of 38 major tributaries to the Connecticut River.

⁴ The State is required by the United States Environmental Protection Agency to identify water bodies that are not expected to meet surface water quality standards after the implementation of technology-based controls. In each case, the most severe pollutant is identified. Although the affected water bodies may contain other pollutants, the Integrated List of Waters only includes the results of evaluations upon which DEP has performed some measure of quality control.

through Warwick, there are eight tributaries to the Millers in the Town. From west to east, these include Moss, Darling, Tully, Orcutt, Poor Farm Brook, Black, Hodge, and Gale Brooks and one un-named stream, a tributary to Orcutt Brook.

C.2.2 Connecticut River

The Connecticut River watershed is the largest river ecosystem in New England. It encompasses 11,260 square miles and flows from its headwaters of Fourth Connecticut Lake in New Hampshire at the Canadian border to Long Island Sound at Old Saybrook Connecticut. Although wholly in New Hampshire, it forms the border with Vermont. The River travels through Massachusetts entering the Commonwealth at Gill and Northfield, draining all or part of forty-five (45) municipalities before entering the State of Connecticut. The watershed is 80 percent forested, 12 percent agricultural, 3 percent developed and 5 percent wetlands and water.⁵

All of Warwick's rivers and brooks drain to the Connecticut River. Mill Brook flows directly to the Connecticut, while the other streams in Warwick flow via the Millers and Ashuelot Rivers to the Connecticut.

C.2.3 Ashuelot River

The Ashuelot River watershed is located in northwestern Warwick and is a sub-watershed of the Connecticut River watershed. In northern Warwick, three brooks have their headwaters in Warwick and flow into the Ashuelot River in New Hampshire. Mountain and Kidder Brooks flow together to become Mirey Brook, which like Lovers Retreat Brook, drain into the Ashuelot River, which is located in southwestern New Hampshire.

The Ashuelot River is a Special Focus Area for the US Fish and Wildlife Service for rare species and fisheries.⁶

C.2.4 Other Rivers and Brooks

Mountain and Kidder Brooks

Mountain Brook originates on the eastern side of Mount Grace. It flows a distance of 3.3 miles from Warwick Center north to its confluence with Mirey Brook at the New Hampshire line. Mirey Brook flows through Sunny Valley in Winchester, NH for several miles where it then merges with the Ashuelot River in downtown Winchester. Kidder Brook is a tributary of Mountain Brook and is approximately 3 miles long.

Darling Brook and East Branch of Darling Brook

Originating at Moores Pond, which is fed by Grace Brook, in south central Warwick, Darling Brook flows southwest roughly following Wendell Road. It converges with Moss Brook in the southwest corner of Town, which eventually makes its way to the Millers River in western Orange. Darling Brook is at the center of a "Living Waters Critical Supporting Watershed" core

⁵ Silvio O. Conte National Fish & Wildlife Refuge Action Plan and Environmental Impact Statement, US Fish and Wildlife Service, 1995

⁶ Ibid

habitat area as identified by the Massachusetts Natural Heritage Program. Extensive flats border the brook and support a diverse mosaic of wetland and upland habitats. The area supports a healthy population of turtles. Wetlands include open marsh and wet-meadow communities, shrub swamps and wooded swamps. There is an unusually high diversity of open wetland species including many sedges, grasses, and wetland herbs. The headwaters of East Branch of Darling Brook originate in the wetlands on both sides of Route 78, just north of the Fournier Saw Mill site. The brook flows south-west as a rocky stream. It becomes a slow stream passing through wetlands and beaver ponds to join Darling Brook in the wetland area between Wendell Road and Hockanum Road. The lower end of East Branch Darling Brook is a good trout stream and moose habitat.

Moss Brook

Located in the southwest portion of Warwick, Moss Brook flows out of Black Swamp and converges with Darling Brook southeast of the intersection of Quarry and Wendell Roads. Moss Brook is at the center of a “Living Waters Critical Supporting Watershed” as identified by the Massachusetts Natural Heritage Program. There is a particularly scenic stretch of the Brook located north and south of the junction of Flagg and Quarry Roads. With a steep and boulder strewn channel, there are numerous small cascades and waterfall at this site. Flowing through hemlock woods, Moss Brook is particularly beautiful during spring run-off. Moss Brook supports a population of native brook trout and turtles and is stocked with trout.⁷ Fishing access is good via Wendell Road and Quarry Road.

Rum Brook

Located east of the Warwick Center, Rum Brook flows south towards Gales Pond. It converges with Black Brook and another unnamed perennial stream north of Gales Pond. Rum Brook consists of a twenty-four acre swamp and seventy-two acres of open wet wetland just north and south of Athol Road. Wet meadows require mowing or grazing to keep from succeeding to shrub or forested wetlands. This once common habitat type is growing rare. This meadow was historically kept open by mowing for hay. Most has grown up to shrub-swamp, but a portion has been recently reclaimed. “Reclaiming” wetlands even if they were once agricultural lands is illegal without a permit from the Conservation Commission and DEP.

Black Brook

Located northeast of Warwick Center, Black Brook through Richards Reservoir and Richards Mill Pond and converges with Rum Brook southeast of the intersection of Athol and Gale Roads. The Brook is the site of Warwick’s first mill (Ayer’s Mill, 1765) at Richards Mill Pond. The mill stones on the Town Common are from this site.

Hodge Brook

Hodge Brook, located near the center of town, is a perennial stream formed from the intermittent outflow of Hastings Pond and an unnamed tributary, and flows through a scenic gorge east southeast of the center of town at the base of the slope of the Warwick fault. It flows through one of the Town’s geologic scenic sites, the Devil’s Washbowl. Hodge Brook joins Gales Brook just below Gales Mill, as Gales Brook flows into Brush Valley.

⁷ MassWildlife web site January 2009.

Gales Brook

Located in southeast Warwick, Gales Brook flows out of Gales Pond and enters Hubbards Pond in Brush Valley just east of Route 78. Gales Brook is the site of the historic Gales Mill. This is one of the better-preserved mill sites in town. Much stonework is still in place and the mill stones are on-site. There is a huge open graminoid wetland south of the old mill site along the brook. Portions of the land Gales Brook flows through is owned by Mount Grace Conservation Land Trust and the State. Trail access (State right-of-way on privately owned woods road) across Gales Meadow could be improved or could be located on either east or west side of brook.

Orcutt Brook

Orcutt Brook is a perennial stream comprised from the flow of several smaller streams, including Black, Rum, Gales, and Hodge Brooks as well as several unnamed tributaries. Orcutt Brook becomes a named brook as it flows out of Hubbard's Pond in Brush Valley, at the confluence with another small tributary. Orcutt Brook flows through Wheelers Pond before entering the Millers River in West Orange. It supports native brook trout as well as blacknose dace, creek chub, common shiner, and common white sucker. The state stocks the brook with trout in 2009.

Tully Brook

Originating in the valley between Mallard and Mayo Hills in eastern Warwick, Tully Brook carries drainage from Warwick State Forest among other lands to Sheomet Lake. Tully Brook is one of the largest and most scenic brooks and runs through one of the least developed regions of Warwick. It is also reputed to be a great trout stream, although the dam at Sheomet Lake restricts fish access from the West Branch of Tully River to Sheomet Lake and Tully Brook. Sheomet Lake is stocked with fish by the state.

Mill Brook

Originating in northwestern Warwick, Mill Brook includes the drainage from Steven's and Bass Swamps and flows through the Town of Northfield on its way to the Connecticut River. Mill Brook is compromised by its proximity to Northfield Road, which follows the brook and contributes to bank erosion and siltation problems. Improving the stream might be a goal for the Town to consider. The state stocks the brook with trout in 2009.

Lovers Retreat Brook

Lovers Retreat Brook is in the northwest corner of Warwick. It flows into New Hampshire and, as Pauchaug Brook, is a tributary of the Ashuelot River.

Black Brook (NH)

Black Brook flows into New Hampshire and is a tributary of Mirey Brook which is a tributary of the Ashuelot River.

Wilson and Grace Brooks

Wilson and Grace Brooks are in the south central part of Town near Moores Pond. Grace Brook flows through Moores Pond and is a tributary of Wilson Brook to form Darling Brook.

C.2.5 Lakes and Ponds

Warwick has five natural ponds: Moores Pond, Hastings Pond, Laurel Lake, Bent Pond, and Lily Pond. All the remaining ponds in Warwick are artificial. Dams were built throughout the 19th Century to store water for mills. Many were restored or rebuilt by the Civilian Conservation Corps (CCC) in the 1930s. Warwick's small headwater streams typically experience periods of zero-flow in the summer, so to store enough water for summer operation, a series of impoundments were often created upstream from the mills. Several historic impoundments have been lost as dams failed, however some of these have been partially restored in recent years by beaver dams. Some of Warwick's finest wetlands are on the sites of former impoundments (e.g. Stevens Swamp, Harris Swamp, Black and Bass Swamps).

Bent Pond

Located in the northwestern corner of Warwick, Bent Pond is a small water body partially located in New Hampshire. It is a naturally occurring warm water, eutrophic water body with no public access, deepened by the dredging of Lovers Brook. This isolated pond is maintained, at least in part, by beaver and used by river otter.

Lily Pond

Located off Garage Road near Warwick Center, Lily Pond is a five acre natural pond of glacial origin and is termed a "kettle hole." A kettle hole is formed by a large glacial block of ice is left in a glacial outflow plain before melting and leaving a concave surface depression, usually without a definable inlet or outlet. Lily Pond is in the bog stage of pond succession supporting a ring bog around the central, shallow open-water area. Lily Pond has good potential for wildlife observation and nature study and was once renowned for hornpout fishing.

Hubbards Pond

Hubbards Pond is a five-acre warm water, eutrophic water body formed by the impoundment of Gales Brook, where the name changes to Orcutt Brook. It is located near the junction of Hockanum and Orange Roads in Brush Valley in the south-central section of Warwick but has no easy access. Hubbards Pond was originally built to store water for operating a sawmill. It has a maximum depth of about six feet. The original dam has partially washed out.

Hastings Pond

Located along the west side of Hastings Pond Road, southeast of Warwick Center, Hastings Pond is Warwick's only completely natural Great Pond and is approximately thirty acres in area and a depth of 25 feet in the southern end. Hastings Pond is classified as being a stratified, mesotrophic water body capable of sustaining both warm and cold-water fish. Although access to the pond is across private property along Hastings Road, no public access right of way is available and much of the shoreline is undeveloped. Hastings Pond is listed as Core Habitat by Massachusetts Natural Heritage Living Waters as an outstanding natural water resource.

Gales Pond

Located along the east side of Gale Road in east-central Warwick, Gales Pond is approximately twelve acres in size. It is an artificial, warm water, eutrophic water body. Gales Pond is part of Warwick State Forest.

Wheelers Pond

Located on Orcutt Brook along the west side of Route 78 in the southern section of Warwick, Wheelers Pond is an artificial pond of twenty-two acres. It is considered a warm water, eutrophic water body with dark, tannin water. Access to the pond is discouraged as the pond is privately owned.

Moores Pond

Located near the junction of Wendell and South Holden Roads, Moores Pond is an enhanced Great Pond. It is a stratified, mesotrophic water body of thirty-two acres and capable of sustaining both coldwater and warm water species of fish. It is stocked with trout. Moores Pond is developed on its eastern, southern and western shores. Public access is provided along the western shore near Shepardson Road. Motorboats of 10 or more horsepower are prohibited. The pond is considered to be the site of the unofficial Town swimming beach. There is a state installed unimproved public boat launch on Wendell Road. It is popular for swimming, fishing and paddling. The north end of the pond supports a nice pond-shore bog with classic bog vegetation.

Clubhouse Pond - See Sheomet Lake

Rum Brook Impoundment

This is one of the countless small beaver ponds in town. Ephemeral by nature, it is handy for nature study or ice-skating while extant.

Richards Reservoir

Located in Warwick State Forest, north of the intersection of Robbins and Richmond Roads in the northeastern section of Warwick, Richards Reservoir is a thirty acre impoundment. With a maximum depth of eight feet, the Reservoir is best suited for warm water fish. Access for parking and launching non-motorized boats is available along the west side of Richmond Road approximately 0.3 miles north of the former Warwick Forestry Camp.

Richards Mill Pond

Richards Mill Pond is located in Warwick State Forest in the northeastern section of Town between Robbins Road and Rum Brook Road. A seven-acre impoundment, Richards Mill Pond is a shallow, warm water, eutrophic water body and the site of one of Warwick's first mills. This scenic pond has the potential for boating/canoeing, fishing, hunting, and nature study. With only a 400 foot portage, a canoeist can easily access the thirty-acre Richards Reservoir to the north. Access is available to Richards Mill Pond along East Rum Brook Road.

Sheomet Lake

Sheomet Lake, known locally as Clubhouse Pond, is located in eastern Warwick near Athol Road in Warwick State Forest. It is a thirty-three acre enhanced pond considered to be stratified and mesotrophic. Tully Brook and two unnamed streams feed Sheomet Lake. It is stocked with trout and (in 2001) brood stock salmon. There is boat access via a ramp at the northern end of the lake, although motorboats are not permitted due to Town zoning prohibiting any motorboat over 10 horsepower. A swimming beach is located along the lake's southeast corner. Although owned and managed by the state park system, there is rarely any presence of rangers at this pond.

Laurel Lake

Fifteen of Laurel Lake's fifty-one acres lie within the Town of Warwick in its southwestern corner. It is managed by DCR as part of Erving State Forest. Laurel Lake is an enhanced Great Pond,⁸ which is stratified and mesotrophic, capable of sustaining both coldwater and warm water fish. The lake is stocked annually with trout. Laurel Lake is Core Habitat in Living Waters determined by Massachusetts Natural Heritage and Endangered Species Program. Laurel Lake has a public boat access ramp in Erving and a public swimming beach. Motorboats of 10 or more horsepower are not allowed in Warwick.

Johnsonian Pond

Johnsonian Pond is located in the southeast area of town, to the east of Hastings Heights Road with access from Town Farm Road in Orange. The pond is partially located in Orange. The dam receives drainage from streams and wetlands in Warwick and drains to Poor Farm Brook in Orange. It is considered good bass fishing.

C.2 Class A Waters

The Town of Warwick does not have any Class A Waters.

C.3 Flood Hazard Areas

Warwick did not join the FEMA flood plain mapping program when offered in the 1970s. The Flood Hazard Map from the 1960's is available, however. There are areas in Warwick that are likely to flood, and indeed have flooded during high water. However, there are no mapped flood hazard areas. In major storms, Route 78 and Chestnut Hill Road have washed out.

C.4 Wetlands

Warwick's topography of large rolling hills and narrow, steep-sided stream valleys is not conducive to the development of extensive, interconnected wetland systems found in the flatter topography of neighboring towns. Warwick also lacks any major river system with associated wetlands and well-developed floodplains. Despite this, Warwick has extensive wetlands throughout the town.

⁸ Great Ponds are naturally occurring ponds that are over 10 acres in their natural state, before humans "enhanced" them.

Most of Warwick's wetlands are small (under fifty acres) and scattered on the occasional flats along stream courses and in depressions between hills. The 1,227 acres of wetlands include wooded swamps, shrub swamps, shallow marshes, bogs and other wetland types. Although these areas are not considered to be extremely large, they seem to support abundant wildlife and fisheries resources. The named wetland areas in Warwick include the following:

Harris Swamp

This swamp is located in southern Warwick, along Wendell Road. This was formerly Harris Pond, the largest pond in Town in the late 1880s. It is primarily a red maple swamp today. It is included as Core Habitat in BioMap defined by the Massachusetts Natural Heritage and Endangered Species Program. The entire wetlands area includes the flats all along Darling Brook south of Moores Pond. This area is of particular importance not only for its size and diversity of wetlands types it supports, but because of its tremendous water holding capacity providing flood protection for downstream areas. Underlying soils are highly permeable, indicating the area is a likely aquifer recharge area.

Bass Swamp

Located along the west side of Northfield Road near the intersection of Bass Road, Bass Swamp is approximately fifty-seven acres in size. The swamp is formed by the height of the culvert above the stream under Bass Road which is (small dam) located at its northern end. About fifteen acres of the swamp consists of open, fresh water less than five feet deep, twenty acres consists of deep fresh water and eleven acres each of shallow fresh marsh and shrub swamp. Bass Swamp is an unusual and diverse example of a naturally maintained wet meadow. Periodic flooding appears to keep woody species in check sufficiently for a diverse community of grasses, sedges, and wetland herbs to persist. The stream, which meanders through the center of the wetland, is sandy bottomed, and sand underlies the shallow peat deposits of the meadow. This is among the most significant wetlands in Warwick. Bass Swamp was used as a migratory stopover by a Sandhill Crane in 2008; this is an unusual bird sighting for New England. It is also has excellent access and is considered as a site for skating and dog swimming.

Stevens Swamp

Located in Warwick State Forest on the Northfield-Warwick border west of Page Road Trail, Steven Swamp is approximately ninety-two acres in size. This wetland is formed by a small dam at its eastern end. About fifty acres of this wetland consists of open, fresh water less than six feet deep. Stevens Swamp is probably as fine an example of a pond-shore peat land as exists anywhere in Massachusetts. It has elements of both bog and poor-fen vegetation and supports an impressive diversity of peat land species. It is included as Core Habitat in BioMap as mapped by the Massachusetts Natural Heritage Program. This swamp is considered to be good for canoeing, picnicking, and dog swimming.

Black Swamp

This swamp is located near the headwaters of Moss Brook, west of Flagg Road, in southwestern Warwick.

Cranberry Bog

A small three quarter acre kettle bog exists approximately 0.3 miles west of Richards Reservoir and 0.2 miles south of Robbins Road. Bog laurel, pitcher plant, and wild cranberries are all members of the plant community covering the bog. This is a classic kettle-hole bog, roughly circular in outline, dominated by sphagnum moss and sedges with only a sparse shrub cover. Cranberries (both native species) are common, giving rise to the local name for this site. Species diversity is rather low as compared to other examples of similar habitats in the region.

Kettle Bogs on Gale Road

Two or three small kettle depressions along Gale Road have nicely developed (but small) bogs. Vegetation is fairly typical for the type. One on the west side of the road, north of Gales Pond has several vernal pools which breed huge numbers of wood frogs and spring peepers every year.

C.5 Aquifer Recharge Areas

An aquifer is an underground body of water that is typically found in layers of sand deposited during the glacial period. According to MassGIS, Warwick contains five major and six minor low-yield aquifers. A low-yield aquifer is said to provide a potential yield of between 0 and 50 gallons per minute. The major low-yield aquifers are found in soils surrounding the wetlands associated with Grace and Darling Brooks, Mountain and Kidder Brooks, Gales and Orcutt Brooks, Mill Brook and Bass Swamp, and Tully Brook and Sheomet Lake (*See Water Resources Map*). The six minor low-yield aquifers are scattered about in the northwestern and northeastern corners of Town, within Steven's Swamp, and around the headwaters of Moss Brook.

C.6 Surface Water Reservoirs

Although Warwick contains several water bodies, which are called reservoirs, there are no drinking water reservoirs in Town.

C.7 Potential Sources of Private Drinking Water Supply Contamination

The potential sources of contamination of private wells in Warwick are on-site septic systems, sub-surface fuel tanks, manure piles, feed lots, and driveways and runoff of road salt. According to the Private Well Regulations of the Warwick Board of Health, all wells must be located a particular distance from these potential contamination sources. These are all examples of non-point or point source pollution. Although most of these sources can be negated through regulation of uses, road runoff of salt, herbicides, and other contaminants may be best addressed through changes in winter road salt use and education of the general public in the proper handling, use, and storage of hazardous materials including petroleum based products like gasoline and motor oil. Warwick recognized this many years ago and had the foresight to adopt a low salt winter road maintenance policy and does not use herbicides to control roadside vegetation.

C.8 Analysis

From this inventory it is clear that Warwick contains a diverse array of ponds, lakes, and wetlands that have been utilized in the development of the community and for the enjoyment of its citizens since the Town's establishment. It is also clear that many of these water bodies contain special natural communities. The common element between wetlands, streams and brooks, ponds, and groundwater wells is obvious; it is water. Keeping that water clean everywhere in Warwick is very important to residents. The permanent protection of forests from development will do much towards ensuring that brooks and streams will continue to be home to a diverse array of plants and animals and that the associated wetlands will continue to exist to help slow floodwater energy. The main sources of contamination to the water in Warwick may be contaminated stormwater runoff and failing septic systems.

D. VEGETATION

Warwick is situated in north central Massachusetts, which is in the Transition Hardwoods-White Pine Forest Region (USDA; 1992). The transition hardwoods-white pine forest type commonly occurs up to an elevation of 1,500 feet above sea level in upland central Massachusetts and southern New Hampshire, northward through the Connecticut River Valley.

Warwick currently has many large patches of interior forest, which when combined with forest edges, fields, early successional tree growth, wetlands, and riparian corridors, are best for maximizing regional biodiversity. Larger contiguous patches provide more deep interior area for forest-dwelling species. Larger patches are also important for species that require areas without excessive disturbances from human-based factors, and that rely on other interior species for food. For example, unlike white tailed deer, bobcat are not normally observed along the field edges. The interior areas provide habitat for specialist predators and for mammals that require larger home ranges.

D.1 Forests

Forest areas are considered the Town of Warwick's most important natural resource. As of 2005, according to MassGIS, forests comprised 90 percent of the Town's total land area. Forests in Warwick are classified as transition hardwoods-white pine forest (USDA; 1992). Within this forest type, northern hardwoods such as yellow and paper birch (*Betula alleghaniensis* and *B. papyrifera*), American beech (*Fagus grandifolia*), and sugar and red maple (*Acer saccharum* and *A. rubrum*) are the major species. On the dryer sites, red oak (*Quercus rubra*) is the most abundant deciduous species. Hemlock (*Tsuga canadensis*) occurs in the moist cool valleys, north and east slopes, and sides of ravines of Warwick. White pine (*Pinus strobus*) is characteristic of the well-drained sandy sites. The transition hardwood-white pine forest type commonly occurs up to an elevation of 1,500 ft. above sea level in upland central Massachusetts and southern New Hampshire, northward through the Connecticut Valley.

Forests provide for many of Warwick's available recreational opportunities including walking, hiking, fishing, skiing, snowshoeing, hunting, snowmobiling, picnicking, and nature study. Access to the forests is primarily from Warwick State Forest, Mount Grace State Forest, Warwick Town Forest, Warwick Wildlife Management Area, Arthur Iverson Conservation Area, and from woodland roads.

Outside of state forests and the more prominent privately protected lands, the remaining forestlands in Warwick fit into a category called non-industrial private forestlands, or NIPF's. A 1998 article in the Journal of Forestry, "Ecosystem Management: Capturing the Concept for Woodland Owners," described the results of a survey of Franklin County NIPF owners. The results of the survey included the top five reasons for forestland ownership: privacy, personal use of wood products, aesthetics and beauty, part of residence, and recreation. The survey also provides selective information on a sample of woodland owners: most live less than a mile from the land; 60 percent have owned the land for at least fifteen years; 60 percent own less than fifty acres; 62 percent have annual household incomes of less than \$55,000; and 48 percent are over fifty-five years of age. The main results of the study show that Franklin County NIPF owners may hold attitudes that are favorable towards three concepts of ecosystem management: one's land fits into a larger ecosystem; one's land has smaller parts important to their own property and the larger landscape; and, one's land should be managed for today's uses and for future generations. The results of this study also suggests that Warwick NIPF owners may be open to participating in cooperative conservation measures that would seek to protect natural resources that cross property lines including drinking water supplies and biodiversity.

Two potentially unique stands of forest trees include an old growth stand on the steep western slope of Mt. Grace and a small pure beech stand on Town land near the town dump. (See NHESP maps of rare natural communities in Warwick.)

D.2 Agricultural Land

Agricultural land in Warwick comprises 6.9 percent (Franklin County Soil Survey) of the Town's total land area and is a rare and valued aspect of the landscape resource in Town. Agricultural land can be found in the following areas: the valley south of Moores Pond, along Route 78 at and south of the village, along Shepardson Road, east and north of Wheelers Pond, Mayo's Corner area, along Chase Hill Road, northwest of Mallard Hill, along the north end of Old Winchester Road, and along Route 78 just south of the New Hampshire border.

At present there is only one dairy farm, the 198-acre Chase Hill Farm, which is currently operated for commercial purposes, and a sheep farm on Route 78, east of Wheeler Pond. Agricultural land in Warwick is valued for its contrast to the predominance of forestland, providing scenic landscapes and open vistas. Recreational opportunities on these lands include cross-country skiing, snowshoeing, snowmobiling, and sledding.

D.3 Wetland Vegetation

The forested deciduous swamp is the predominant wetland type in the Town of Warwick. These areas are essentially red maple swamps. Also common in Warwick are mixed deciduous swamps, which include Eastern hemlock (*Tsuga canadensis*) and White Pine (*Pinus strobus*). Wetland understory shrubs are common in these swamps and can include mountain holly (*Nemopanthus mucronatus*), highbush blueberry (*Vaccinium corymbosum*), and winterberry (*Ilex verticillata*). Herbaceous vegetation such as sedges (*Carex spp.*), ferns, false hellebore (*Veratrum viride*) and skunk cabbage (*Symplocarpus foetidus*) are also found. (USDA; 1992). Spruce-fir boreal swamps are present but not common, typically consisting of the red spruce variant which lacks balsam fir. There are also a few large black gum (*Nyssa sylvatica*) swamps as well as scattered black ash (*Fraxinus nigra*) swamps.

According to a letter from the Natural Heritage and Endangered Species Program, a program of the Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement (2001), Warwick has several good examples of rare wetland types. These include Kettle Hole Level Bogs, Acidic Graminoid Fens, and Black Gum Swamps. The exact locations of these wetlands were not identified by the state agency because they fear that the habitats could attract collectors of rare plant and animals.

Acidic Graminoid Fens most often occur along pond margins, slow-moving streams, and along the outlet streams of stream headwater peat lands. They are considered the most species-rich of acidic peat land communities. They have similar species to acidic shrub fens, but graminoid and herbaceous species are dominant. Typical graminoids include beaked sedge (*Carex utriculata*), slender woolly-fruited sedge (*Carex lasiocarpa var. americana*), white beak-sedge (*Rhynchospora alba*), twig-sedge (*Cladium mariscoides*), and pond shore-rush (*Juncus pelocarpus*). Associated herbaceous species are St. John's Wort (*Hypericum spp.*), pickerel weed (*Pontederia cordata*) and rose pogonia (*Pogonia ophioglossoides*). Large cranberry can also be abundant.

Black Gum Swamps are deciduous swamp forest characterized by black gum (*Nyssa sylvatica*) and occur on mineral, shallow muck or peat soils that are either seasonally flooded or saturated. In Warwick, these areas have peat moss covering the ground. These swamps occur below 1000 feet in elevation, have relatively small watersheds, limited drainage and are usually isolated from perennial streams. They occur in depressions where the water seeps from groundwater, rainwater, or seasonal intermittent streams. They are characterized by hummocks and hollows that are seasonally flooded. A co-dominant species occurring with the black gum is the red maple (*Acer rubrum*). Under the tree canopy, in the shrub layer, Black Gum Swamps usually have winterberry (*Ilex verticillata*), and highbush blueberry (*Vaccinium corymbosum*). Cinnamon fern (*Osmunda cinnamomea*) is the most abundant herbaceous species and is prominent on the hummocks. Sphagnum mosses, primarily *Sphagnum spp.*, carpet the hollows.

D.4 Rare, Threatened and Endangered Species⁹

In general, the most important areas of Warwick to protect to maintain known biodiversity are the areas in and around the 2008 Priority Habitat, BioMap (2001), and Living Waters (2003) cores shown on the following maps. Any land managing activities in these areas need to include consideration of the rare species and their habitats. Because BioMap and Living Waters were intended as conservation planning tools, and Priority Habitats (and their subset, Estimated Habitats) are regulatory tools, BioMap areas are much larger. Because a large part of Warwick ended up in BioMap core areas, the discussion below will focus on particular areas within the BioMap cores and some newly recognized important habitats.

The following tables include a list of rare species known to occur or to have occurred in Warwick, which are protected under the Massachusetts Endangered Species Act (MESA); Certified Vernal Pools (twenty in Warwick);¹⁰ and other, not regulated, indicators of local biodiversity, including Watch Listed plants, delisted species, and priority and exemplary natural communities. Any MESA listed species with a most recent observation date within the past 25 years is considered to be current. Older dates may be species that have not been recently inventoried, or they may be lost from Warwick as land use has changed and water quality has changed. Fact Sheets describing many of the MESA listed species and their habitats are available from the state's Natural Heritage and Endangered Species Program (NHESP) website at www.mass.gov/dfwele/dfw/nhesp/species_info/ mesa_list/ mesa_list.htm.

All of the currently known rare animal species in Warwick are associated with wetlands, including: swamps, bogs, vernal pools, rivers and lakes. Rare species of freshwater mussels, damselflies and dragonflies occur in the rivers and streams. Both groups of species are good indicators of water quality. Although the various rare turtles and salamanders in Warwick have varied habitat requirements, they all require wetlands and adjoining forests, which are found in BioMap Cores C227 and C134 along the Moss, Darling and Orcutt Brooks, their tributaries, and other locations in town. In addition, the state's Division of Fisheries and Wildlife's Fisheries section has identified streams throughout Massachusetts that provide important habitat for native cold water fisheries (CFR, Coldwater Fisheries Resources). In Warwick, these CFRs include Mill, Kidder, and Tully Brooks. Buffers along these streams that maintain shade and filter inflowing sediments are important for maintaining their water – and habitat – quality. Culverts in the streams should be maintained to allow movement of fish, turtles, and other aquatic species.

Warwick has records of species in the suite of 'secretive' or inconspicuous marsh birds that include the American Bittern (Endangered), that nest in, and often forage in, dense marshes. The shrub fen and marsh habitat of these species is also used by turtles, dragonflies, and a large variety of other species.

In a survey for uncommon and exemplary natural communities during field work for the BioMap report, a large number of northern types of natural communities were identified in Warwick.

⁹ This section written by Patricia C. Swain, Massachusetts Natural Heritage and Endangered Species Program.

¹⁰ Only 12 certified vernal pools are shown on the following map, which has not yet been updated by the state to include 8 recently certified vernal pools.

Most are uncommon in much of the state, being more typical of cooler areas. Bogs, Fens, and Spruce–Fir Boreal Swamps are peat lands that need not only cool conditions (mostly not under the town’s control), but require high water quality and maintained water quantity. Alterations such as harvesting around bogs and forested wetlands and/or changes in hydrologic cycles may lead to the deterioration of these natural communities and the subsequent loss of known habitat for uncommon species like a rare dragonfly that breeds in bogs and the recently delisted Four-toed Salamander. Large, unfragmented forests that provide habitat themselves and buffer wetlands and streams, and patches of different upland conditions like cliffs, are important for maintaining the communities and habitats and allowing for natural mosaics of conditions that support a variety of rare and common species. One example of such a mosaic of communities and habitats for rare species is found in BioMap core C227 where a large, excellent example of the not-uncommon Northern Hardwoods – Hemlock – White Pine Forest occurs with smaller, included common and uncommon communities – much of it on land that was forested in the 1830s (described below).

One state protected rare plant, Giant Saint John’s Wort (Endangered), is currently known to exist in Warwick. It is generally found in wet meadows or thickets near streams. Musk flower (Endangered), is known only historically from Warwick. Its habitat needs are somewhat similar to the Giant Saint John’s Wort – cool, wet soil along water courses. However, Musk flower doesn’t compete well with shrubs or invasive exotic plants and may have been lost from Warwick as natural succession occurred.

Protecting any unprotected areas of the Priority Habitats and BioMap cores would protect habitat of rare, and also common, species and enhance their viability. Many of the areas of conservation land in Warwick are in BioMap core areas. Protecting areas adjacent to existing conservation land limits fragmentation and maintains a variety of habitats.

Warwick has 20 Certified Vernal Pools (CVP) and a large number (71) of Potential Vernal Pools (PVP), which have been identified from aerial photographs and need to be verified on the ground. Areas of swamps also provide habitat for vernal pool species. The PVP data are available as a data layer from MassGIS at www.mass.gov/mgis/pvp.htm and are shown on the following maps.¹¹ Certifying the PVPs that have not been examined would provide additional protection to these wetlands and the species that use them. Clusters of vernal pools provide extra habitat value for the species that use them since each pool is somewhat different and provides alternate habitats in different years and seasons. Any such lands already protected are good sites for biodiversity and good cores for larger properties. When clusters are on “1830s forest” described next, they are particularly good targets for protection.

Warwick is one of the towns with town wide maps showing areas forested in the 1830s, areas of possible Primary Forest, most of which were untilled woodlots and wooded pastures (areas shown on the following map). Such lands have greater biodiversity than areas that have been tilled. These are not Old Growth, they have been harvested and pastured, but the ground may not have been tilled. Harvard Forest digitized maps from the 1830s that the Massachusetts

¹¹ Only 12 certified vernal pools are shown on the following map, which has not yet been updated by the state to include 8 recently certified vernal pools.

legislature mandated that the Towns make.¹² Warwick's map exists and shows areas that were forested in the 1830s. NHESP GIS staff took those data and combined them with information from MassGIS' landcover datalayer made from 1999 aerial photos. Although a great deal will have gone on in those areas in the time between the map dates, some areas that were forested in both times may not have ever been tilled. Surveys of the soil structure in the individual sites are necessary to determine whether those sites are Primary Forest. The importance of primary forest is that such sites retain more native biodiversity than sites that have been tilled. In addition, a variety of species of wildflowers are more common in untilled forests than previously tilled lands. The areas of 1830s forest on private land would be good targets for conservation acquisition to maintain the biodiversity of the town and region. The Harvard Forest website contains information on the 1830s forest datalayer and copies of papers with discussion of the information www.harvardforest.fas.harvard.edu/data/p01/hf014/1830readme.html.

Large unfragmented conservation land provides the best opportunities to maintain populations of species and limit species loss from the Town. Land protection that ties in with open space in other municipalities, and other protected open space, public or private is one way to provide important large areas of biodiversity protection. For example, some of the 1830s forest is in conservation land, but there are areas adjacent to or near the protected open space that might be targeted as important areas for biodiversity protection.

BioMap and Living Waters core areas are shown on the following maps. A copy of the report can be downloaded from www.mass.gov/dfwele/dfw/nhesp/nhtwnreports.htm. BioMap and Living Waters cores were produced by NHESP to identify the areas of most importance for biodiversity: they are based on known locations of rare species and uncommon natural communities, and incorporate the habitats needed by rare species to maintain the local populations. BioMap focused on species of uplands and wetlands; Living Waters focused on aquatic species. BioMap and Living Waters polygons are also available from MassGIS at www.mass.gov/mgis/biocre.htm and www.mass.gov/mgis/lwcore.htm. Please note that the descriptions of the BioMap core areas include lists of species that occur anywhere in the Core areas: species not actually known from Warwick may be listed. These species might well be expected anywhere in the core areas.

In Warwick, there are several BioMap core areas – the areas of most importance to protect in order to maintain the biodiversity of the Town, region, and state, as discussed above. Protecting land within the core areas will enhance the habitat value of existing conservation land and protected open space. Large BioMap Cores (C227, C134 and smaller cores around town) occupy much of southern part of the town and extend into adjoining towns. Living Waters Cores were calculated separately from the BioMap cores, based on and emphasizing the aquatic conditions, both in and distinct from the BioMap Cores. As was noted in the 2001 letter from NHESP for the 2002 Warwick Open Space Plan, because there have been few surveys in the northern part of town, there are no BioMap or Priority Habitat polygons in those areas. There are areas of high

¹² Harvard Forest. 2002. 1830 Map Project. Harvard Forest Archives, Petersham, MA. Hall, B., G. Motzkin, D. R. Foster, M. Syfert, and J. Burk. 2002. Three hundred years of forest and land- use change in Massachusetts, USA. *Journal of Biogeography* 129: 1319-1135.

quality streams, some 1830s forest, and PVPs identified – which make the area good candidates for inventory.

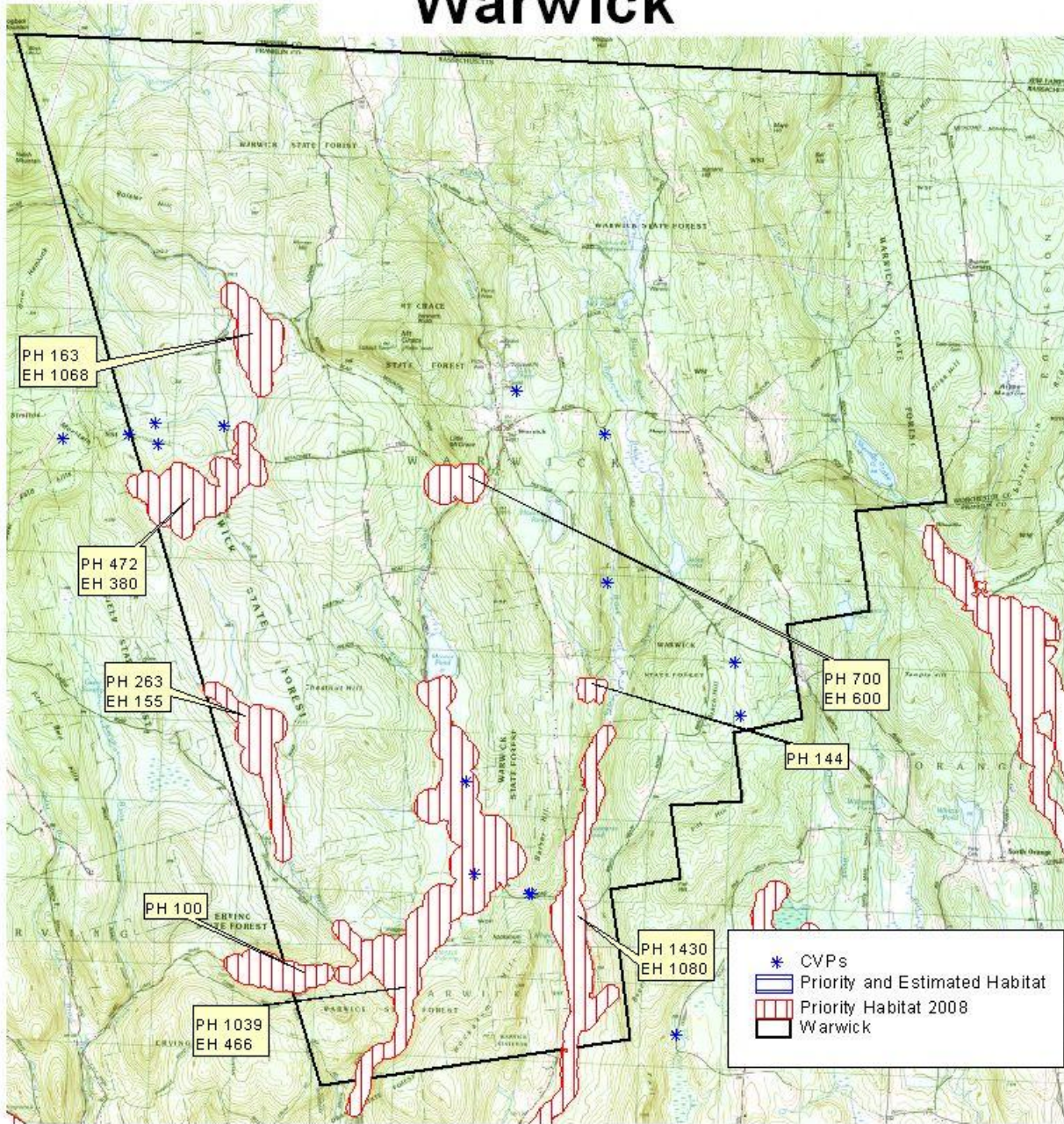
Just to differentiate the BioMap and Living Waters core areas from the following Priority and Estimated Habitats: BioMap and Living Waters core areas identify areas particularly important for conservation planning purposes. Priority and Estimated Habitats are regulatory. However they are updated regularly (most recently in late 2008), and the BioMap / Living Waters report is static (data from 2001 and 2003), so misses some of the most recently identified rare species areas. Together, the two separate sets of polygons now best reflect the known aspects of biodiversity in town.

The NHESP produces maps for use under the Wetlands Protection Act (Estimated Habitat maps, provided to the Conservation Commission and shown in reduced form in the Natural Heritage Atlas, and the Massachusetts Endangered Species Act (MESA) (also in the Natural Heritage Atlas). These data layers are also available from MassGIS, requiring access to some form of GIS to view them, at www.mass.gov/mgis/wethab.htm and www.mass.gov/mgis/prihab.htm. These two sets of maps are created for regulatory use. Estimated Habitats are a complete subset of Priority Habitats that focus on habitat of rare wetlands wildlife. Priority Habitats are drawn for all rare species, so include all Estimated Habitats as well as habitat for MESA listed plants and upland animals. Early planning and review of development projects under the Wetlands Protection Act regulations and Massachusetts Endangered Species Act plays a very positive role in protecting rare species habitats. Town commissions and boards are encouraged to request the assistance of the Natural Heritage and Endangered Species Program in reviewing any project proposed in the habitat areas of the regulatory areas of the maps in the Natural Heritage Atlas.

Management and monitoring of conservation lands become important as protection is accomplished. Wetlands particularly need to maintain their natural water regime, including normal fluctuations and connections with the uplands and other wetlands. Maintaining water quantity and quality are ongoing issues. Another important management issue is invasive non-native species that alter the land and occupy space that native species would otherwise use. We strongly recommend monitoring conservation land and removing non-native species before they become a problem and impact native species.

The BioMap and Living Waters core areas and the more recently updated areas of Priority Habitat are particularly valuable in ecological terms, and important to the conservation of many species. Completing conservation protection of remaining unprotected land in those areas would improve the viability of these special areas – size and continuity of open space is particularly important for supporting wildlife populations. Preventing habitat fragmentation is vital in protecting the ecosystem, for the rare species on the enclosed list, as well as for additional common species, particularly reptiles and amphibians.

Priority and Estimated Habitats Warwick

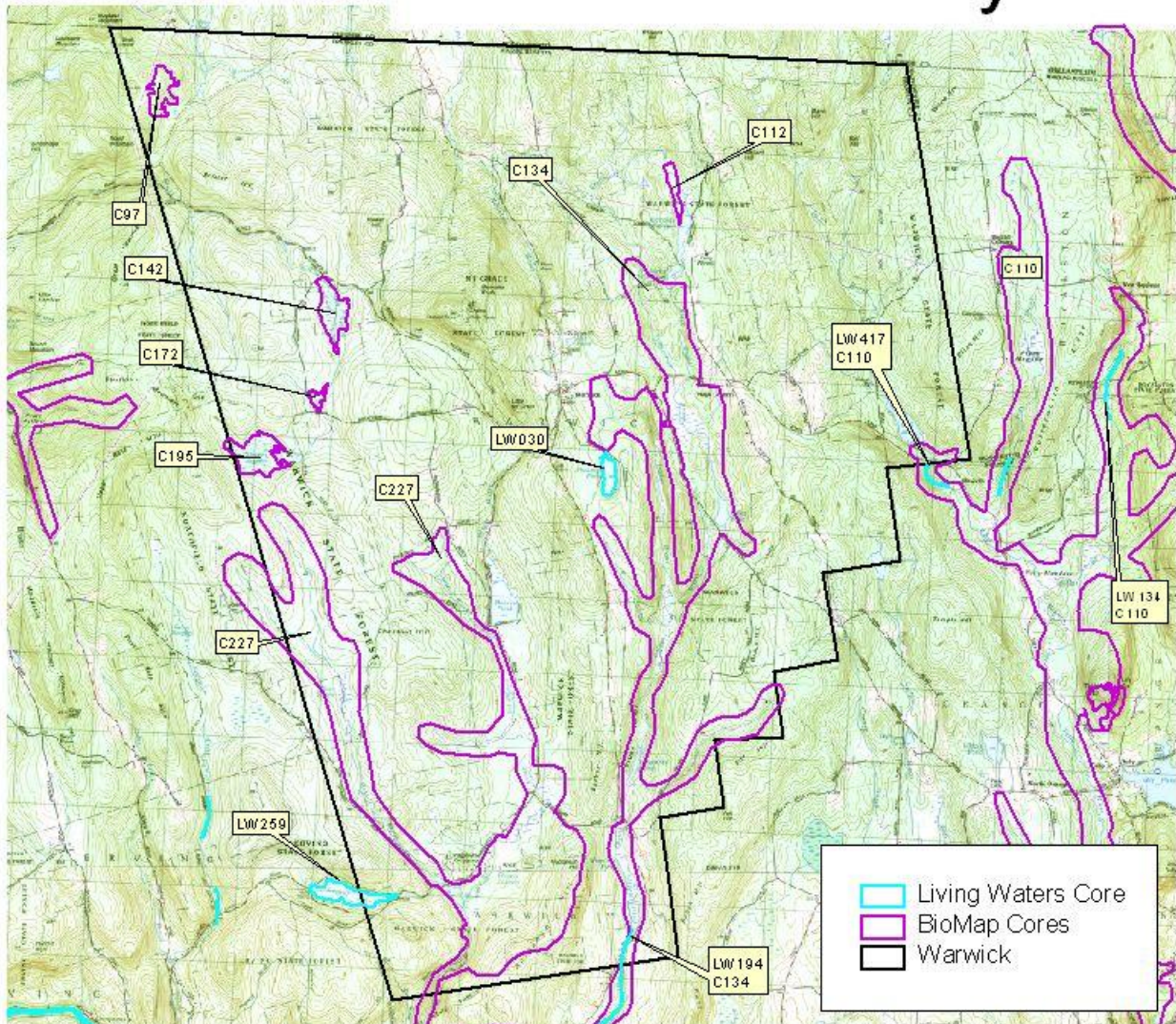


1 0 1 2 Miles

Data source: NHESP and MassGIS
Map created: May 8, 2009



BioMap and Living Waters: Guiding land and freshwater conservation for biodiversity



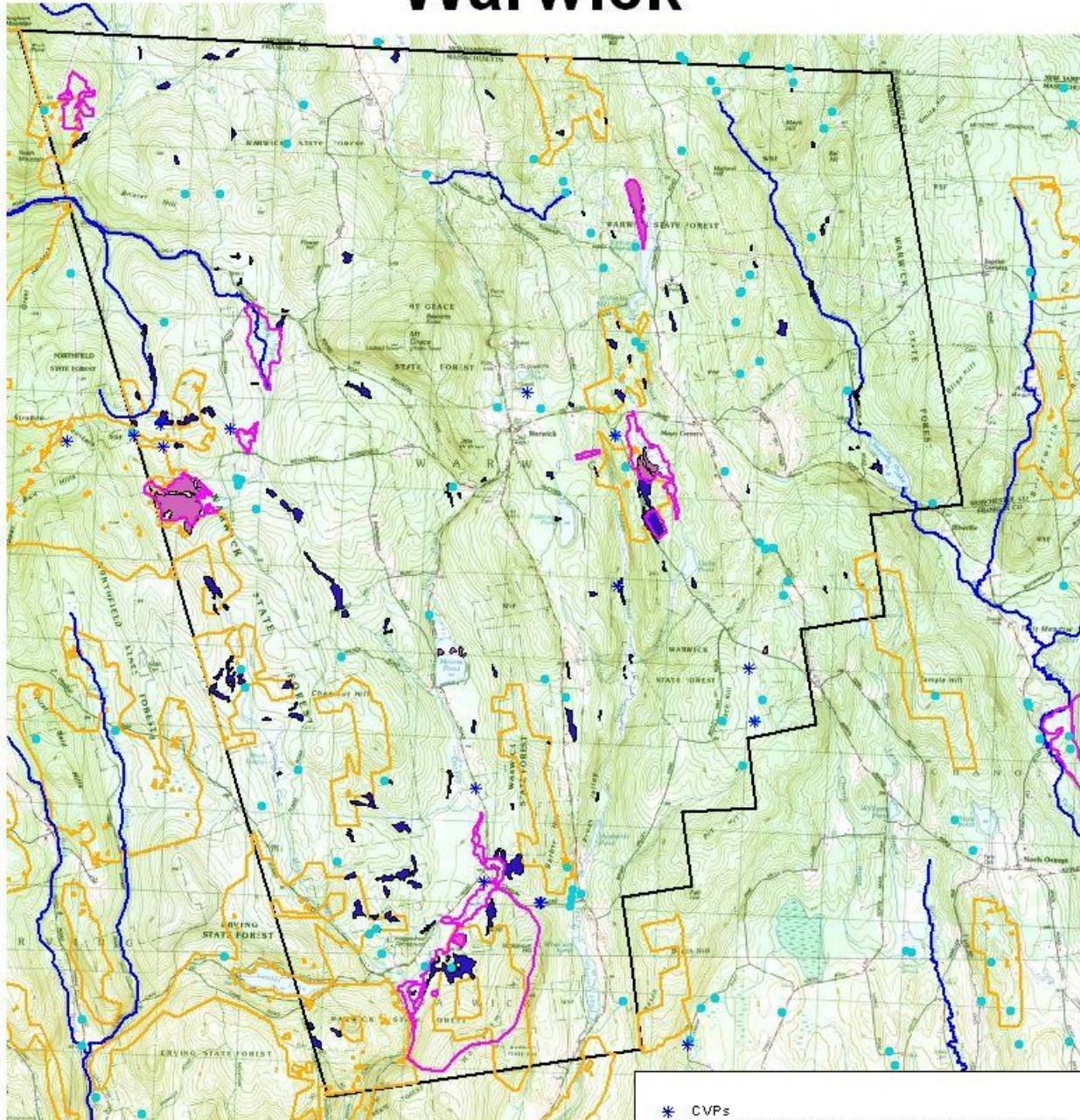
Data Sources: MassGIS and NHSP

Living Waters Habitat: Created by NHESP 2003.

BioMap Core Habitat: Created by NHESP 2001.

Background: MassGIS USGS topo map. Map printed: May 11, 2009

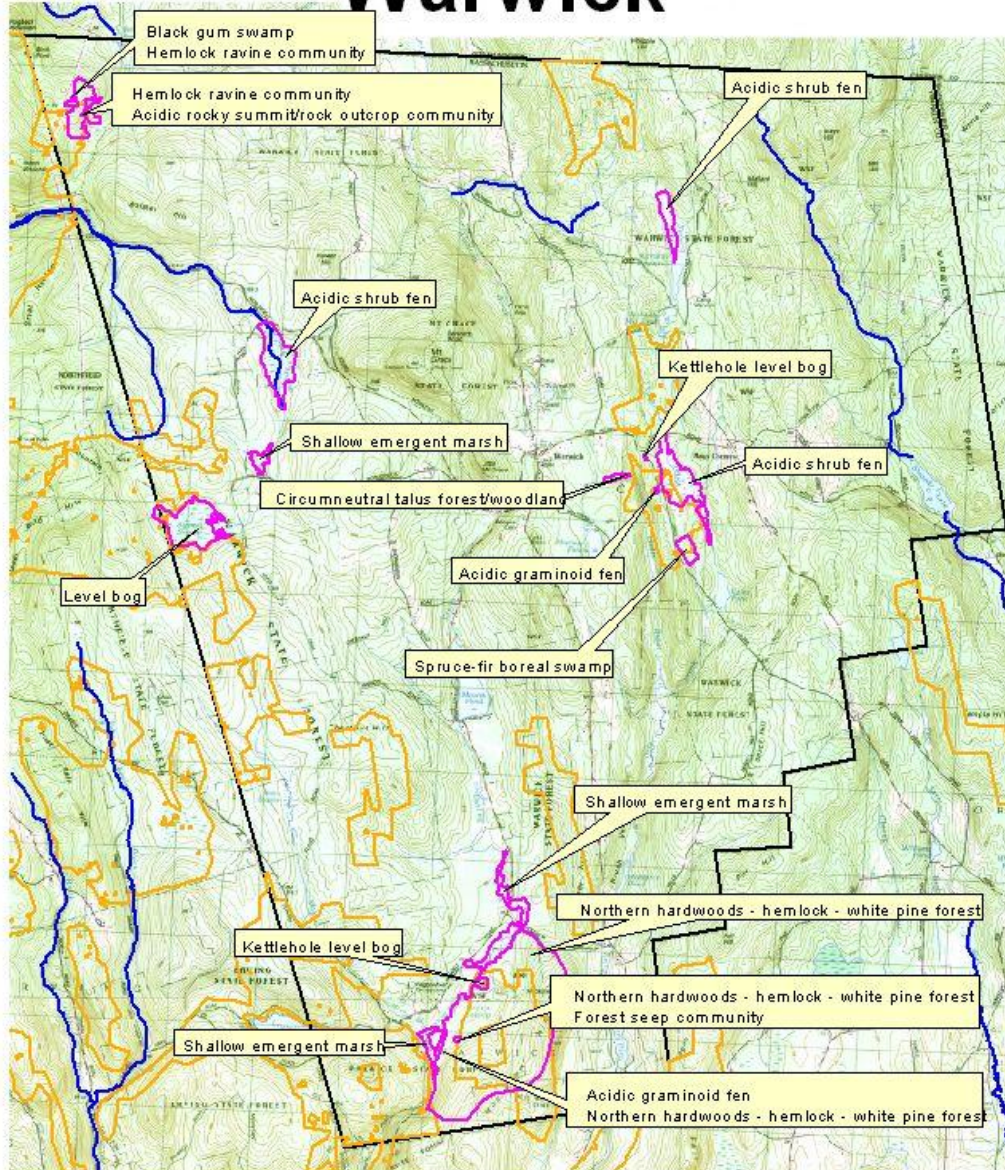
Areas of Biodiversity Indicators Warwick



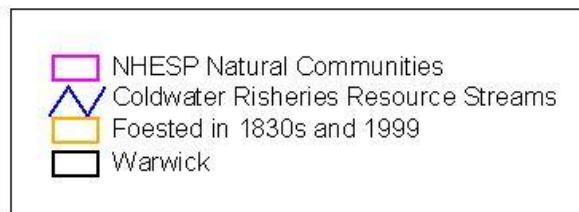
Data source: NHESP, Harvard Forest, MassGIS
Map created: May 8, 2009

- * CVPs
- PVP - Potential Vernal Pools from aerial interpretation
- NHESP Natural Communities
- DEP Conifer Swamps
- DEP Bogs
- Coldwater Fisheries Resource Streams
- Forested in 1830s and 1999
- Warwick

NHESP Natural Communities Warwick



Data source: NHESP, DFW, MassGIS
Map created: May 11, 2009



D.5 Analysis

Plants and animals are components of the ecosystems in Warwick. Plants convert solar energy into food. This food supports all animal life. Plants cycle energy through the ecosystem by decaying, by removing carbon, and by shedding oxygen. Plants help moderate temperatures. Plants act as shelter and as food for herbivores, omnivores, and carnivores.

Fields, a maintained stage of human-caused vegetation, are rare in Warwick and thus valuable. Forests on the other hand are plentiful and therefore may appear common. However, they should not be taken for granted because of what forests do: they protect aquifers, first and second order streams, and edge and interior habitats; they clean the air and cleanse the water; and, they can provide us with materials, food, and medicines to support our human community. Forested wetlands are unique sites where the greatest level of biodiversity occurs. In summary, all of Warwick's vegetation within its fields, forests, and wetlands together can be considered part of an extensive life support system for the diversity of life.

E. FISHERIES AND WILDLIFE

E.1 General Description and Inventory of Wildlife and Wildlife Habitats

Warwick contains a large amount of upland and bottomland wildlife habitat. The forests of the Town consist of large unbroken tracts of dense forest that allow for good species movement within Warwick and the surrounding region. The Town still has a number of maintained fields and pasture areas, which provide an important ecological function for the maintenance of open land and edge species (those species that require this transitional zone for daily activities.)

E.1.1. Amphibians and Reptiles

Warwick's northern location and relatively high elevation puts it beyond the range of a number of the state's amphibians and reptiles. Our streams, wetlands, and forests coupled with low levels of development and traffic support healthy populations of several species. The current list of amphibians and reptiles observed in Warwick stands at seven species of frogs, six salamanders, five snakes, and five turtles (see Appendix at the end of this section). Warwick likely has about 30 species of amphibians and reptiles; hopefully this list will be filled out in the future.

E.1.3. Birds

The varied habitat of Warwick supports a great diversity of bird species, both summer residents and migrants as well as winter birds. At this writing the total bird list for the town stands at 95 species. However, compilation has been recent and partial; many additions are expected over the next several years. A town with abundant forest of various types, several substantial wetlands, many brooks, a dozen ponds both natural and man-made, and open pasture providing edge

habitat can be expected to support ultimately a list nearing 160 species. The current bird list as of the report date can be seen in the Appendix at the end of this section. Additions and information for changes of species status are encouraged and solicited.

E.1.4. Mammals

The town of Warwick is within the range of, or has appropriate habitat to support, approximately 52 species of mammals. Of these, the 25 species listed in the Appendix were reported. It is certain that more reports from experienced observers would greatly increase the number of species found in the town. The full list of species known as of the publication of this open space plan is located in the Appendix at the end of this section.

E.2 Vernal Pools

Vernal pools are temporary bodies of freshwater that provide critical habitat for many vertebrate and invertebrate wildlife species. Vernal pools are found across the landscape; anywhere that small woodland depressions, swales or kettle holes collect spring runoff or intercept seasonally high groundwater tables. Certified Vernal Pools, those that meet the criteria established by the Natural Heritage and Endangered Species Program, are protected to some extent by the Massachusetts Wetlands Protection Act and also are protected by additional state and federal regulations. The Town of Warwick has an undetermined number of vernal pools. Warwick currently has 20 Certified Vernal Pools, and efforts are currently underway to certify others. According to the NHESP, Warwick also has 71 Potential Vernal Pools.

E.5 Analysis

The Town of Warwick is fortunate for having permanently protected open space areas much greater than fifty acres in size. State conservation agencies and private land trusts have been focusing attention on a large regional corridor of protected open space that already encompasses portions of Warwick. This regional greenway is made up of state forests and privately owned lands from the New Hampshire border through Warwick to Erving and further south. One branch of the greenway skirts along the western flank of Orange to New Salem to arrive at the MDC lands of the Quabbin. The western branch moves south through Erving to Wendell, then to Montague and finally connects to the Connecticut River Greenway (*please refer to the Open Space Map*).

Warwick will continue to focus land protection efforts on the gaps between large protected forested patches and the BioMap Core Habitat Areas to conserve wildlife habitat and opportunities for recreational activities (like hunting and backpacking) that require vast undeveloped landscapes. Protection of open fields and agricultural land, as well as the Quabbin to Cardigan (Q2C) land protection initiative are also important to the town residents. See the discussion on *Criteria for Acquisition of Open Space* in Section 5.

F. SCENIC RESOURCES AND UNIQUE ENVIRONMENTS

The characteristics that allow a stranger to distinguish Warwick from other towns in the region may be different than the unique qualities and special places that only residents can really know. This section identifies the scenic resources and unique environments that most Warwick residents would agree represent the essence of Warwick's character.

In many ways the history of Warwick – how people came to settle the land, used its resources, and enjoyed its forests, streams, and lakes – can be seen in the landscapes that have retained a sense of the past. Often the most scenic views include old farm buildings, fields cleared long ago, and undeveloped hillsides and mountains. Historic homes, meeting halls and churches provide us with a sense of our culture and the work of our ancestors.

The unique environments in Warwick play a very important role in providing residents with a sense of place that is different than surrounding towns. Brooks, mountains, wetlands, and the Town center provide markers on the landscape within which we navigate our lives.

There are many examples in Warwick where a scenic landscape is also important because of its location relative to other landscape features. The purpose for inventorying the scenic resources and unique natural environments in Warwick is to provide a basis for prioritizing resource protection efforts. For this reason the following section includes information about the different values associated with each scenic resource and natural environment and also demonstrates the areas where there are multiple values represented in one landscape. Those landscapes that contain, for example, scenic, wildlife, and cultural values may be seen as having a higher priority for protection than a landscape that contains only one value. These documented resources include historic landscapes and special places.¹³

Table 4-1 is a partial listing of scenic resources and unique environments in Warwick. This table also includes information on the ecological/geological, recreational, and historical values of these resources and their level of protection from development. In the far right column of Table 4-1, the landscape's protection status is estimated. For the purposes of this Open Space and Recreation Plan, a landscape is defined as a land area with a particular land use pattern (farmland), or a physiological landform (monadnock) distinguishable from adjoining areas.

¹³ This inventory is based on a formal landscape survey done in 1992. The 1992 Franklin County Rural Historic Landscape Preservation Plan Report was created by the Franklin Regional Council of Governments. It describes the status of historic landscapes in the region, the historic context that was used in its determination, and the methodology used in rural historic landscape reconnaissance. It distinguishes between the types of landscapes assessed (*agricultural, community development, recreational, conservation, industrial, transportation, scientific, religious, and engineering*), identifies in general terms the locations of rural historic landscapes in each town, and provides examples of direct and indirect preservation strategies. This methodology for identifying significant historical landscapes was based on the National Park Service criteria that included the area of significance, period of significance, and historical integrity. The National Park Service classifies landscapes into four different categories: landscapes that reflect major patterns of a region's history (e.g. agricultural landscapes), landscapes that are associated with historically significant individuals (e.g. institutional grounds and buildings), landscapes that are important due to their design or physical characteristics (e.g. an 18th Century Colonial Period Connecticut Valley rural farm), and landscapes that yield or have the potential of yielding significant information on pre-history or history (e.g. a native American encampment site).

Often ownership patterns do not coincide with the boundaries of a landscape. A ridgeline may have portions of it protected while the rest is unprotected. Landscapes that contain parcels in the Chapter 61, 61A, or 61B programs are important because the Town has the right of first refusal to purchase these properties for 120 days from the point at which the owner has received a purchase and sale agreement. This right may be passed onto a third party, such as a conservation land trust.

The resources listed in Table 4-1 are shown on the Scenic Resources and Unique Environments map along with over 50 new resource areas (Ponds and Lakes; Wetlands; Recreation Areas; and Historical Areas), which were added to the map.¹⁴ The text that follows the table addresses some of the common themes associated with the greatest concentration of values as displayed in both the map and the table.

Table 4-1: Significant Scenic/Ecological/ Recreational/and Historic Landscapes/Environments in Warwick

MAP #	SCENIC RESOURCE	ECOLOGICAL/ GEOLOGICAL RESOURCE	RECREATIONAL VALUE	HISTORICAL VALUE	PROTECTION STATUS
	<i>Stream Corridors</i>				
	Mountain Brook	Wildlife Habitat Low Due to proximity to Route 78 and siltation problems	Formerly high now LOW now due to logging	Cellar hole near stream	Mostly protected within Mt. Grace State Forest Working with the State to restore site picnic area
	Darling Brook	BioMap Core Wildlife Habitat	LOW/MED fishing	Mill Sites	½ Protected within Warwick State Forest (WSF)
	Moss Brook	BioMap Core Wildlife Habitat	HIGH fishing	Mill Dam	Protected by WSF
	Rum Brook	BioMap Core Wildlife Habitat	Trail Access for fishing and cross country skiing MED	Mill/Dam Sites	Unprotected
	Black Brook	BioMap Core Wildlife Habitat	HIGH	Sites of Warwick’s First mill and dams (Ayer’s Mill, 1765)	½ Protected by Iverson MGLCT and WSF
	Gales Brook	BioMap Core Wildlife Habitat	LOW Access is problem Potentially HIGH – Beautiful	Site of Gales Grist Mill, Saw Mill, Electric Generation,	1/2 MGLT & WSF
	Orcutt Brook	BioMap Core Wildlife Habitat	HIGH Stocked	Multiple mill dams	Unprotected
	Tully Brook, West Branch	Wildlife Habitat	HIGH Great Trout Stream	Mill dam site	Mostly Protected by WSF
	Mill Brook	Wildlife Habitat High: large wetland system includes Stevens Swamp, has/ native brook trout & is stocked w/ Atlantic salmon	HIGH Great Trout Stream	Several Mill Sites	Protected in part by WSF

¹⁴ Dave Shepardson, a member of the Open Space Plan Update Committee, spent an incredible amount of time updating the 2002 Scenic Resources and Unique Environments Map from Warwick’s OSRP. Due to lack of funding and time constraints, Table 4-1 could not be completely updated with detailed information for each resource that Dave identified, but the resources are listed and shown on the map. Table 4-1 was partially updated and work will continue on this table as well as the map.

MAP #	SCENIC RESOURCE	ECOLOGICAL/ GEOLOGICAL RESOURCE	RECREATIONAL VALUE	HISTORICAL VALUE	PROTECTION STATUS
	Hodge Brook	BioMap Core Wildlife Habitat	HIGH Site of Scenic Devil's Washbowl/Hiking Trail	Saw Mill site	Protected within Iverson and WSF
	Kidder Brook	Wildlife Habitat	Very Scenic Kidder Falls and good access	Posted No Trespassing	Private Owner
	Mirey Brook	Wildlife Habitat	MEDIUM Good Fishing	Mill Dam Sites	Mostly Unprotected
	Lovers Retreat Brook	Wildlife Habitat	MEDIUM Good Hiking Good Access	Mill Dam Site	Unprotected
	<i>Ponds and Lakes</i>				
1	Bent Pond	Wildlife Habitat	LOW	LOW	Unprotected
9	Hubbards Pond	BioMap Core Wildlife Habitat	No easy access	Historical Impound. Near a Significant Historical Conservation/Recreation Landscape	Unprotected
4	Richards Mill Pond	Wildlife Habitat/	HIGH Hiking and Skating	Historical Impoundment/ Sites of Warwick's First mill (Ayer's Mill, 1765)	Protected by WSF
2	Lily Pond	Wildlife Habitat Kettle hole Bog	LOW		Unprotected
6	Hastings Pond	Wildlife Habitat Living Waters Core Habitat	LOW No Access	Great Pond Investigating access options	Unprotected
7	Gales Pond	BioMap Core Wildlife Habitat	MED Public Access Scenic	Historical Impoundment	Protected by WSF
11	Wheeler's Pond	BioMap Core Wildlife Habitat	LOW No Access	Historical Impoundment (private)	Unprotected
8	Moore's Pond	Wildlife Habitat	HIGH Informal Town Beach Skating Trout Ice Fishing	Historical Impoundment dam enhanced Great Pond	Protected Great Pond Status with boat ramp
3	Richards Reservoir	Wildlife Habitat	HIGH MMM Trail runs along west shore	Historical Impoundment	Protected by WSF
5	Sheomet Lake	Wildlife Habitat	HIGH Fishing Blueberry Picking Skating	Historical Impoundment, mill site and Fishing Camp	Protected by WSF
10	Laurel Lake	Wildlife Habitat Living Waters Core Habitat	HIGH Public Access State Park Beach and Camping Programs	Significant Historical Conservation/Recreation Landscape Great Pond	Protected & Managed by DCR
	<i>Wetlands</i>				
16	Harris Swamp	BioMap Core Wildlife Habitat	LOW Difficult Access	Historical Impoundment In 1850s Harris Pond was the biggest water body in Town	Partially protected by WSF (infested with Buckthorn)
13	Bass Swamp	Wildlife Habitat	HIGH Bird and Moose Watching	Historical Impoundment	Protected by WSF
15	Stevens Swamp	Wildlife Habitat	HIGH Kayaking, Canoeing, Hiking Scenic Trail	Historical Impoundment Indian Caves	Protected by WSF
17	Black Swamp	BioMap Core Wildlife Habitat	LOW	Below Black Swamp are Mill Sites	Protected by WSF
14	Cranberry Bog	Wildlife Habitat	Cranberry picking	Unknown	Unprotected
	<i>Recreation Areas</i>				
21	Warwick Town Forest	BioMap Core Wildlife Habitat	HIGH: Hiking, Equestrian &	Red Pine planted by CCC	Unprotected

MAP #	SCENIC RESOURCE	ECOLOGICAL/ GEOLOGICAL RESOURCE	RECREATIONAL VALUE	HISTORICAL VALUE	PROTECTION STATUS
			Snowmobiling		
19	Warwick State Forest	Wildlife Habitat	HIGH Hiking Horse back riding XC skiing Snowmobiling Hunting MMM Trail	Significant Historical Recreation/Conservation Landscape	Protected
20	Mount Grace State Forest	Wildlife Habitat	HIGH MMM Trail Horseback Riding Snowmobiling	Significant Historical Recreation Landscape Abandoned Observation Tower	Protected
22	Laurel Lake State Park, Erving State Forest	Wildlife Habitat	HIGH	Significant Historical Recreation/Conservation Landscape	Partially Protected
24	Hockanum Hill Conservation Area	Wildlife Habitat	HIGH parking area for overlook, hiking trails, geo-caching sites	Unknown	Protected
<i>Historical Areas</i>					
	Warwick Town Center	Common	HIGH Basketball Events Library	Significant Historical Agricultural/Community Development Landscape	Unprotected
32	Warwick Center Cemetery		LOW	Historical Site	Protected
30	Ohlson Field		HIGH		Protected
33	Wawbeek Rock	Glacial Erratic	LOW	Historical Recreation Site	Unprotected
40	Granite Quarry	Former	LOW	Historical Industrial Site	Protected by WSF
29	CCC Camp off White Road		LOW (no access)	Historical Site	Unprotected
<i>Unusual Geologic Features</i>					
84	Indian Kettles (3)	Glacial Features	LOW/MEDIUM	Historical/Cultural Site	Unprotected
83	Indian Caves (2)		HIGH Off MMM Trail		Protected by WSF
86	Devil's Washbowl	Glacial Feature Waterfall with scour hole	HIGH		Protected by Iversen MGLCT
<i>Scenic Views</i>					
89	Mount Grace	Monadnock	HIGH Panoramic, tri-state views	Fire Tower	Protected
92	Kidder Brook Falls	Scenic	LOW No Access High potential	Mill site	Unprotected Private Property
93	From Shepardson Rd.		HIGH Roadside Vista across a hay field Easter Sunrise Service		Unprotected
90	Of Mt. Monadnock north from Chase Hill Roads; of Tully River Valley and Beyond to the Eastern horizon southeast from Chase Hill Road		HIGH Roadside Vista		Although the Chase Hill Farm is protected, the view is not.
	Of Mount Grace from Open Fields including those on Hasting Heights Road		HIGH Roadside Vistas		Although the Bowers Farm fields are protected, the view is not.
91	Of Mount Pisgah from top of Flower Hill Road		HIGH Northerly View		Not Protected
	Hockanum Hill overlook trail and		MEDIUM		Protected

MAP #	SCENIC RESOURCE	ECOLOGICAL/ GEOLOGICAL RESOURCE	RECREATIONAL VALUE	HISTORICAL VALUE	PROTECTION STATUS
	view				
	View North and East across Moore's Pond from South Holden and Wendell Road		HIGH Roadside Vista		

Sources: Natural Resources Program Inventory of Sites with Natural Resource Potentials, 1974; Franklin County Rural Landscape Preservation Plan Report, Franklin County Commission, 1992; Warwick Open Space Plan Committee, 2009.

F.1 Stream Corridors

Stream corridors include the combination of the water body, streambed, banks and surrounding vegetation, which is significantly different from the surrounding uplands. Stream corridors provide wildlife habitat, scenic views, and recreational opportunities for the residents of Warwick. Warwick has many small streams and brooks that can be seen from the roads that follow them. These include Mountain (Mirey) Brook along Route 78 and Mill Brook along Northfield Road, both in northern Warwick. In the southern section of Warwick, Moss Brook follows along Flagg and Quarry Roads; Darling Brook is located in the vicinity of Wendell Road; and the lower reaches of Orcutt Brook are located in the vicinity of Route 78.

F.2 Ponds and Lakes

Laurel Lake

Located in the north central part of Erving State Forest, Laurel Lake (originally Long Pond) has approximately ten of its fifty-one acres in the Town of Warwick. Erving State Forest was established in 1920 under the State Forest Act. Heavily used, improvements to Laurel Lake were necessary over time and these improvements were subsequently made by the Civilian Conservation Corps (CCC). The improvements include road improvements, a beach, trails, vistas, picnic areas, campground, parking area, new dam at the outlet, and forestry work.

Moore's Pond

Located on Wendell Road at the intersection of Shepardson Road, Moore's Pond was the site of a sawmill originally owned by Ebenezer Locke and was then called Lockes Pond. The sawmill changed hands over the years. Ebenezer Locke was succeeded by Jeduthan Morse who died in 1760, however the impoundment was then called Morse Pond. Subsequent to Morse, the sawmill was owned by Deacon George Moore and operated it until 1880. Since Moore's ownership, the pond has been called Moore's Pond.

Richard's Mill Pond and Richard's Reservoir

Located in the northeast section of Warwick, both Pond and Reservoir were the sites of a sawmill belonging to Samuel Scott and a gristmill belonging to David Ayres. These were set up under the direction of the Proprietors of Gardner's Canada.

Hastings Pond

Hastings pond was used by town residents as a local ice pond. The house at the northern end was originally a storage house/store for the ice.

Impoundments

Old impoundments in the Town of Warwick were built in the 18th and 19th Centuries for use by the many water-powered mills. These impoundments include Hubbard's Pond, Richards Mill Pond, Gales Pond, Richard's Reservoir and Moores Pond. Several impoundments have shrunk in size and have returned to the status of swamps after floods washed away many of the dams. These include Harris Swamp, which was the Root and Lesure Company's Pond; Stevens Swamp, which was the N.G. Stevens Pond; and Bass Swamp, which was Fay and Moores Pond.

F.3 Wetlands

Wetlands like black gum swamps, kettle hole level bogs and acidic graminoid fens usually contain a greater diversity of plant and animal life than surrounding landforms. They are also often connected to extensive watercourse networks both above and below ground. Wetlands provide basic ecosystem services such as water retention, and water purification, and flood water control. Wetlands often provide rare species habitat. According to the MA Division of Fisheries and Wildlife, most of the known rare species in the Town of Warwick are wetland species and their presence reflects the existence of intact wetland systems found in the Town. These species include the Wood Turtle, Jefferson Salamander, and Squawfoot. Some of the rare species now include dragonflies, which are also wetland based species.

Warwick residents consider all of the wetlands as being particularly scenic. For all these reasons wetlands should be valued in Warwick. The Rivers Protection Act provides additional protection from land uses that may have a negative impact on the long-term viability of flora and fauna along the perennial streams and rivers. However, since wetlands are often in low lying areas of the landscape, their normal water flows and the quality of the water can be greatly influenced by the use of nearby lands. Winter salt and sand use on Warwick's roadways can, over time, kill trees and vegetation that depend on the maintenance of specific growing conditions, which can be affected by salts and oils originating from road surfaces.

F.4 Resources Associated with Large Blocks of Protected Contiguous Forest

The presence of large blocks of contiguous forest, which are permanently protected from development, has ensured that for the near future Warwick residents will live in a rural community. These blocks of contiguous forest include Mount Grace State Forest, Warwick State Forest, and the Iverson Conservation Area. As more and more landowners protect their forestlands with conservation restrictions, the gaps between permanently protected forest blocks will lessen. Because so much of the community's forests are protected, clean and ample surface and groundwater supplies, wildlife habitat, and public access to traditional recreational/sports activities such as hunting and hiking are made possible. Contiguous forests also provide residents with the day to day scenery that comes with living in a forested community that has

drawn many of the town's residents. Contiguous blocks of forest also provide opportunities for efficient management of the timber resources whether on public or private land.

F.5 Significant Historic Sites and Landscapes

Warwick Town Center

Located in the geographic center of Warwick, the Town Center is identified by residents of Warwick as being of cultural and historic value as well as serving as the focal point of town activity. Warwick Town Center is considered to be a typical New England cross-roads village center. The Town Center combines scenery, historic land use patterns, historic structures and a cemetery within a landscape that has ecological and scenic values of its own. The Town Center offers Warwick residents access to historical resources including the homogeneity of three architectural styles. These styles include late 18th Century with the primary influence of the Federal Period; 19th Century Victorian; and Greek Revival seen in the churches in the Center.

Warwick Center Cemetery

Warwick Cemetery is located on Route 78 approximately 0.6 miles south of Warwick Center. The first section of the cemetery was given to the town by Moses Leonard. By 1818, it was apparent that additional land would be needed and one and one half acres were added by purchase from Bunyan Penniman. Subsequent sections were added by donation of land by Town residents. Many prominent citizens have their graves in Warwick Cemetery. The oldest section of the cemetery contains slate tombstones dating back to the late 1700s with several interesting epitaphs. The newest section has polished granite stones and a large war memorial with a second memorial for a man killed while erecting the monument.

Grist Mill Stones

Located at the corner of Hotel Road and Winchester Roads in Warwick Center, these mill stones, placed one atop the other as in original use, are from the first grist mill in the Town of Warwick. They are considered to be protected because they are on town-owned land in front of the library, as is the old horse trough, which provides drinking water from an old gravity fed system originating on Mount Grace.

Warwick Town Forest

In 1925, the Town of Warwick acquired and established a Town Forest located in the vicinity of the intersection of Hockanum Road and Wendell Road. The area consists of 72.5 acres located west of Wendell Road and 16.5 acres located south of Hockanum Road and east of Wendell Road. The property is bordered on the east by shrub swamp wetland along Darling Brook. There is also a shallow marsh along Darling Brook in the interior portion of the forest west of Wendell Road. The diversity of plants and wildlife give the area a high potential for nature study and wildlife observation.

Mount Grace State Forest

Mount Grace was proposed as a state forest in 1916, but no action was taken until 1920 when the forest was officially established with the purchase of 1,400 acres. This was one of the few early state forests where land was acquired for more than \$5.00 per acre, which was justified by the

extensive growth of high quality white pine. Civilian Conservation Corp Camp members worked extensively at Mount Grace in 1935 and 1936. Most of their projects had a recreational focus. Work included construction of parking lots, ski trails and a 4.7 mile snowshoe trail. They also built an Adirondack shelter and council ring at Ohlson Field, as well as a rustic shelter at the mountain. The two major recreation areas are Gulf Brook Picnic Area and Ohlson Field.

The Gulf Brook Picnic area in Mount Grace State Forest was a particularly scenic area located on the west side of Route 78 north of Warwick Center in a grove of small pines. Construction of this area was begun by state workers in the early 1930s and subsequently improved by CCC workers. There is a faint track that serves as an entrance with no defined parking area available. Mountain Brook runs along the western edge of the picnic area. There is a dry-laid fieldstone wall along both sides of the brook for several hundred feet. At the northern, or downstream end, of the picnic area, there is a low concrete dam, which creates a small basin for wading. This area also has several dozen distinctive fire pits, each with a large flat stone at the back and several smaller stones on either side. Unfortunately an ice storm damaged many trees about 15 years ago and an root rot fungus became established which slowly killed the majority of trees. Logging was delayed until falling dead wood become a public hazard (about 5 years ago), and as a result many of the trees were too rotten for any commercial use and were left lying on the ground. Many of the beautiful stone fire pits were destroyed by falling trees or logging equipment. In the 5 years or so since logging mixed regeneration has become established on most of the picnic area, but it is not usable by the public. The wading pool has become filled with sediment and the area behind the dam was washed out during a hurricane and not repaired. Access to the wading pool is difficult because of logging debris on the ground.

Laurel Lake

Located in the north central part of Erving State Forest, Laurel Lake has approximately ten of its fifty-one acres in the Town of Warwick. Erving State Forest was established in 1920 under the State Forest Act. A number of early modern cottages still survive along the banks of the lake for use as seasonal homes.

Ohlson Field

Located on the west side of Route 78, Ohlson Field (once known as Manning Field) consists of a paved parking lot with an adjacent gently sloping grassy field. The area was developed as the terminus of several ski trails built by the CCC. The trails have since become overgrown and are now maintained as snowmobile and hiking trails. The two major remaining CCC features are a ninety-foot diameter council ring, which consists of a low fieldstone retaining wall on the southern side with an area for an open fire in the center. The second CCC feature is a rustic open-front Adirondack shelter located at the southern end of the field. It is a gable end structure, approximately eight feet by twelve feet with a front overhang.

Wawbeek Rock

Located along the west side of Hastings Pond Road, Wawbeek Rock is a granite boulder about sixteen feet high and twenty feet wide. It was, however, believed to be originally thirty feet high, but was split for possible use as a building stone. The Athol YMCA, in 1916, had a boys' summer camp at the end of Hastings Pond Road. The boys adopted the Native American name, Wawbeek, meaning Big Rock, for their camp. A former granite cutter and resident of Warwick,

Fred Bergquist, cut the name "Wawbeek" into the top of the rock. Beneath this name are the words, "In the Beginning God".

Granite Quarry

A Granite Quarry is located along the west side of Quarry Road and was in operation from about 1880 to 1890. A small woods road provides access. The quarry is about one acre in size is partially overgrown. Large blocks of granite are piled and scattered over the area making the quarry difficult to walk through. The granite posts placed around the town park in 1870 came from this quarry. Many houses in Warwick rest on cut granite and it is speculated that these were quarried in this area.

Old Civilian Conservation Corp Camp off White Road

This former site of the CCC Camp off White Road contains the foundation of one of the buildings, a fireplace, and a new building approximately three-fourths completed. The surrounding open field is bordered by a small swamp.

Prison Camp/ Transient Camp on Richmond Road

The former camp became a minimum security prison where country boys "did their time" doing work on the Mt. Grace State Forest and the Warwick State Forest under the supervision of the MA Department of Natural Resources. Later it became a minimum security work release site under the supervision of the Department of Corrections. The facility was abandoned in the late 1980s or early 1990s. More recently it was used as a training site for troops going to Iraq and Afghanistan. A few years ago, following a serious fire at the facility, all buildings were torn down and the site leveled.

F.5.1. Significant Historical Agricultural Landscapes

Warwick values its historic agricultural landscapes not only as scenery but also for their being reminiscent of how the land was first settled. Farming in Warwick began to develop in the mid-18th Century. In Franklin County, the upland farms such as those in Warwick, concentrated on grazing and milk production. The fields and grazing areas followed the natural shape of the terrain resulting in open stony grazing areas bordered by woodlands. In Warwick, there are four specific agricultural landscapes that were identified in the 1992 Franklin County Rural Historic Landscape Preservation Plan: the Town Center, the Keith property on Chestnut Hill Road, the H. Grout (c.1871) property on State Road, and the C.W. Bass (c.1871) property on Route 78. Additionally the document cites multiple properties along Route 78, Wendell Road, and State Road.

Proponents for the protection of agricultural land in Warwick cannot rely on the same interest that has been expressed by state and private conservation agencies for large blocks of contiguous forest that could be part of a regional greenway. Warwick has supported the protection of some of the remaining pasture and cropland by permanently protecting the land from development. The Fellows Farm on Chase Hill Rd. and the former Bowers Farm at Mayo 4 Corners were protected through the Massachusetts Department of Food and Agriculture's Agricultural Preservation Restriction (APR) Program. One way of conserving remaining unprotected farmland would be to prioritize the parcels of those landowners that want their land protected.

Then, by contributing five percent of the cost of the development rights as a match to the funds put up by the APR Program, the Town will be more competitive in gaining access to this state funding.

F.6 Unusual Geological Features

Indian Kettles

The “Indian Kettles” are glacial potholes located east of Old Winchester Road just north of Rum Brook Road, Robbins Road a short distance west of Richards Reservoir and on the old Stevens property east of Winchester Road. Local legend has it that the kettles were used by Native Americans to cook food. Similar potholes have been reported to occur on the west side of Barber Hill off Route 78.

Caves

The Caves are located approximately one half mile west of Flagg Road and one-tenth mile north of Stevens Swamp. The Caves are formed by an immense granite ledge, which has partially broken forming two ledge overhangs. One overhang has created a cave about thirteen feet in diameter and is circular to oval in shape. The second cave is rectangular and about fifteen feet long, six to eight feet wide, and from five to seven feet high. A second cave site is located of Kelton and Royalston Roads.

Devil's Washbowl

Devil's Washbowl is located at an old mill site at the headwaters of Hodge Brook, approximately 0.4 miles west/southwest of Clark's Sawmill on Athol Road. Immediately above the mill site is a waterfall about fifteen feet high. At the base of the waterfall is a large scour hole, which was created by a swirling vortex of water washing small stones and gravel around. In time, the cutting action of the gravel wore a scour hole in the bedrock. This depression is known as the Devil's Washbowl.

F.7 Significant Scenic Views

Overlook Trail from Hockanum Road Parking Area

As part of a “Self-Help” grant awarded to Warwick, the Town installed a convenient trailhead parking area on Hockanum Road at the base of the Hockanum Hill. An existing trail leads to an “Overlook”, which offers views to the southeast including part of Wheeler Reservoir.

Mount Grace

Located in Mount Grace State Forest, the peak of Mount Grace is 1,617 feet above mean sea level and is the highest point in Warwick. At the top of Mount Grace is a forest fire lookout tower, which offers a good view of the surrounding hills and valleys as well as Mount Monadnock in New Hampshire.

Kidder Brook Falls

Kidder Brook Falls are two cascading waterfalls located on private property 300 yards east of Old Winchester Road. These are reached by walking 400 yards east on Old Robbins Road and then seventy-five feet north to the brook. The stream drops about fifty feet in elevation in 150 feet of horizontal distance. In the overall cascade, there are several waterfalls, which drop six to eight feet vertically.

Lover's Retreat

Located in the northwest corner of Warwick, the Lover's Retreat area is considered to be particularly scenic. Here Pauchaug Brook drains a small pond, crosses the state line into New Hampshire, and descends through a rocky gorge.

F.8 Unusual Natural Communities*Black Gum Swamps*

Black Gum Swamps are deciduous swamp forest characterized by black gum and occur on mineral, shallow muck or peat soils that are either seasonally flooded to saturated. These swamps occur below 1000 feet in elevation, have relatively small watersheds, limited drainage and are usually isolated from perennial streams. They occur in depressions where the water seeps from groundwater, rainwater, or seasonal intermittent streams. They are characterized by hummocks and hollows that are seasonally flooded. A co-dominant species occurring with the black gum is the red maple. Under the tree canopy, in the shrub layer, Black Gum Swamps usually have winterberry and highbush blueberry. Cinnamon fern is the most abundant herbaceous species present on the hummocks and sphagnum mosses are found in the hollows.

Kettle Hole Level Bogs

Kettle Hole Level Bogs occur in ice block depressions in sandy glacial outwash. The vegetation in these areas includes high bush blueberry and swamp azalea in the outer areas and rhodora in the interior moat areas. The mat areas of the bog have a mixture of tall and short shrubs that are predominantly ericaceous (members of the Heath family). A mixture of specialized bog plants including pitcher plants and sundews grow on the hummocky sphagnum. Highly acidic standing water in the moats, without fish populations, functions as vernal pool habitat, providing important amphibian breeding habitat sites.

Acidic Graminoid Fens

Acidic Graminoid Fens most often occur along pond margins, slow-moving streams, and along the outlet streams of stream headwater peat lands. They are considered the most species-rich of acidic peat land communities. Graminoid and herbaceous species are the dominant characteristic plant species. Typical graminoids include beaked sedge slender woolly-fruited sedge, white beak-sedge, twig-sedge, and pond shore-rush. Associated herbaceous species are St. John's Wort, pickerel weed and rose pogonis. Large cranberry can also be abundant.

Acidic peat lands like the Kettle Hole Level Bogs and Acidic Graminoid Fens experience extended periods of saturation, lack of nutrients, high acidity and low oxygen making them inhospitable to many animal species. Winged animals and large terrestrial animals can use peat

lands as part of their habitat, and then move on when conditions are unfavorable. Moose and white-tailed deer use acidic peat lands for browsing and grazing. Many bird species use peat lands for part of the year as nesting or foraging habitats including Swamp and White-tailed Sparrows, Common Yellowthroat, Olive-sided and Alder Flycatchers, Red-winged Blackbirds, and Gray Catbirds. Many species of dragonflies and damselflies inhabit acidic peat lands, especially where there is adjacent open water. The acidity and low oxygen content of level bogs makes them poor habitat for most amphibians and reptiles, although some species can breed in shallow pools that form among the sphagnum hummocks.

G. ENVIRONMENTAL PROBLEMS

Several environmental problems were identified by the Open Space Planning Committee during the process to update this Open Space and Recreation Plan. The problems are listed, in descending order of importance, below.

1. ATVs
2. Beavers & flooding
3. Maintenance of fire ponds
4. Trail maintenance
5. Invasive species
6. Eutrophication of ponds
7. Illegal dumping
8. Decline of open fields
9. Houses built in fields
10. Runoff from roads to streams
11. Signage & orientation for new Warwickians

The top 5 significant environmental problems facing Warwick are discussed in more detail in the following paragraphs.

G.1. All terrain vehicles (ATVs)

Warwick has large areas of undeveloped land that is used, often illegally, by off-road vehicles. In addition, many of our smaller back roads are used, also illegally, by ATVs. In the 2009 Warwick Open Space survey, 63% of respondents felt we should discourage ATV use in town (20% felt we should encourage it). ATVs pose several problems: they can cause significant trail erosion in hilly areas, which can be detrimental to water quality (“clean streams and water bodies” were important or very important to 72% of survey respondents) and hamper the use of trails by other lower-impact users. They also make considerable noise, disturbing the tranquility of our rural setting (“quiet” was important or very important to 76% of respondents) and sometimes harassing or killing wildlife in areas otherwise far from most human activity. ATV use on private land often represents trespass (state law requires written permission from landowners), and ATVs are illegal on most State Forests (including those in Warwick) and all

Wildlife Management Areas. Use of ATVs on back roads represents a safety hazard, as many riders travel at much higher speeds than is typical for automobiles on unpaved roads.

G.2. Beavers and Flooding

Beaver activity along streams in Warwick has caused the impoundment of significant amounts of water, resulting in flooding and the erosion of roadways and bridges, including White Road, Bass Road, Northfield Road, and the loss of hay fields on Winchester Road. An example of the flooding damage occurred since 1990 along three miles of Mill Brook in northwestern Warwick. The brook originates at Stevens Swamp near the Northfield border. The beavers created a dam at the outlet (dam) of the swamp, which caused flooding and created a large lake. Several hundred feet downstream from the dam another beaver dam was built and by 1997, the marsh had become a significant body of water which overflowed the surrounding woodland, killing many pine, maple and birch trees. Further downstream, under the White Road Bridge, beavers created a dam causing the bridge to wash out and the water level to rise several feet above road level. Other beaver impoundments along the brook at Bass Road and Northfield Road resulted in the creation of an enlarged marsh and death of large stands of red maple. The activity at Bass Road caused several floodings of Bass Road, limiting access to several homes. To alleviate this problem, the Williamsons (local residents) installed a wire device in a culvert to discourage the beavers and keep the brook open.

Beavers have made repeated efforts to raise dam elevations at Moores Pond, Johnsonian Pond, Stevens Pond, Laurel Lake and Sheomet Pond. At Moores Pond the beavers repeatedly raise the dam level three to six inches which must be removed unless a storm flow is large enough to clear the dam. The multiple dams above Moores Pond have flooded forest duff and released tannins to the pond which reduce the water clarity.

In addition, forest trees and fields have been flooded along Mill River, the area above Moores Pond and Darling Brook between Moores Pond and the new Moss Road Bridge. Several hay fields have been flooded along Winchester Road.

While beaver activity causes problems for the human population in some locations, it creates an abundance of habitat for wildlife. As reported by Warwick resident, Lonsdale G. Hickler, the flooding has resulted in increase use of the area by migrating and resident birds and waterfowl, including herons. River otters now ply these waters and remain year round as they have ample supplies of fish and shellfish on which to feed. Wood, snapping, spotted and painted turtles as well as several varieties of frogs and toads have been found in these areas.

G.3. Maintenance of Fire Ponds

Warwick does not have a public water supply for fire fighting, so a system of water sources for fire fighting is important. The main water source is a 10,000 gallon cistern in the center of town. The primary reserve supply is a fire pond also in the center of town, however over 30 years it had become filled with silt and road sand. In 2006 the Fire Department dredged it and restored its capacity to 60,000 gallons. The 2009 Open Space Survey clearly showed that townspeople have a high interest in seeing fire ponds restored and dry hydrants installed. Fire Chief Lambert has a list of priorities for improving fire fighting water sources.

G.4. Trail Maintenance

Warwick has a unique array of trails. The Metacomet Monadnock Mattabesett (MMM) trail is the only national trail in the area. This hiking trail is maintained by the Berkshire Chapter of the Appalachian Mountain Club. There are many types of trails on state forest lands, but the state no longer has the staff to maintain them. The (ATV) trails on state and private lands are perhaps the best maintained. There is a huge interstate network of snow machine trails, with trails in Warwick serving as a key link. For these trails, soil erosion is not a problem because of the snow cover during times of use, but clearing falling trees and branches takes a lot of work. Equestrians maintain their trails on both state and private land. Often they co-use trails with other groups, which can cause problems. For example, pallets put down by snowmobilers to cross a wet spot present a danger to horses. Often people hike on old woods roads from logging operations or on old, abandoned town roads. This is frequently difficult because all terrain vehicle (ATV) usage has caused extreme erosion.

If trails are not maintained they become impassable, may grow up with understory vegetation and become lost. At the other extreme are unmaintained trails that are heavily used can suffer severe erosion unless they are maintained. While some trails are well maintained, the aging population of Warwick residents, the lack of state support because of severe budget cuts over many years, and the popularity of other types of outdoor recreation, are all factors which make it harder to do the required trail maintenance on state, town and private property.

The Open Space Plan Committee met with teenagers and with students from the Community School and was heartened to find they have a strong interest in the trails. We hope they will form a hiking club and undertake various aspects of trail maintenance suitable for their age group and work as a team with their parents and other adults interested in maintaining the trail system.

G.5. Non-Native Species

As a relatively undeveloped town, Warwick is fortunate in having a limited number of non-native, invasive species. The non-native problem species in Warwick were introduced as ornamental species, medicinal species or are escapees from ship ballast originally from other countries that traveled across the state. Non-native invasive species become a problem when they out-compete our native plants or animals and disrupt our ecosystems. Some non-natives, such as dandelions, have become naturalized and although scattered on our landscape, do not represent a threat to the natural ecosystems.

The following list includes the non-native invasive plant species within our town; all of these species are listed as “prohibited” by the Massachusetts Department of Agriculture. Although some of the listed plants are very pretty, these species have the potential to invade and damage our natural ecosystems. The economic cost nationally is staggering due to costs of control and research and decreases in agricultural output.

Table 4-2: Non-native Plant Species Found in Warwick

Common Name	Latin name
Norway Maple	<i>Acer platanoides</i>
Multiflora Rose	<i>Rosa multiflora</i>
Japanese Barberry	<i>Berberis thunbergii</i>
Asian Bittersweet	<i>Celastrus orbiculatus</i>
Morrow's Honeysuckle	<i>Lonicera morrowii</i>
Japanese Knotweed	<i>Polygonum cuspidatum</i>
Glossy Buckthorn	<i>Frangula alnus</i>
European Buckthorn	<i>Rhamnus cathartica</i>
Reed Canary Grass	<i>Phalaris arundinacea</i>
Common Reed	<i>Phragmites australis</i> var. <i>australis</i>
Winged Euonymus Burning Bush	<i>Euonymus alatus</i>
Autumn Olive	<i>Elaeagnus umbellata</i>
Coltsfoot	<i>Tussilago farfara</i>
Dame's Rocket	<i>Hesperis matronalis</i>
Celandine	<i>Chelidonium majus</i>
Purple Loosestrife	<i>Lythrum salicaria</i>
Creeping Jenny, Moneywort	<i>Lysimachia nummularia</i>
Privet	<i>Ligustrum sp.</i>
Garlic Mustard	<i>Alliaria petiolata</i>
Black swallow-wort	<i>Cynanchum louiseae</i>

All of these species can be troublesome and difficult to control once planted. Norway maples have beautiful foliage, but in some towns in the southwestern portion of the state, they have replaced our native Sugar maples as the dominant forest tree. They are spreading from people's yards into our forests here.

Another problem species, Glossy Buckthorn, was originally grown in town as a medicinal species. Articles from the Greenfield Recorder-Gazette document its presence in Warwick as early as 1932. Recent research has shown that buckthorn species contain a chemical that is not only toxic to other plants (allelopathic), but also is toxic to animals that eat it or otherwise contact it. The only portion of these plants which isn't toxic is the ripe berries, which can be easily spread by birds to other locations. These plants are often found near wetland areas and fallen leaves and branches have been demonstrated to be toxic to salamanders and frogs.

There are several other non-native invasive species in Massachusetts which are not known in Warwick, including aquatic species. Some species occur in towns neighboring ours and thus are likely to occur within Warwick's boundaries in the near future.

Table 4-3: Non-native Plant Species Found in Neighboring Communities

Common Name	<i>Latin name</i>
Pale Swallowwort	<i>Cynanchum rossicum</i>
Black Swallowwort	<i>Cynanchum louiseae</i>
Yellow Flag Iris	<i>Iris pseudacorus</i>
Japanese Stiltgrass	<i>Microstegium vimineum</i>
Goutweed, Bishop’s weed	<i>Aegopodium podagraria</i>
Spotted Knapweed	<i>Centaurea biebersteinii</i>
Wild Chervil	<i>Anthriscus sylvestris</i>
Tree of Heaven	<i>Ailanthus altissima</i>
Plume Grass, Amur silvergrass	<i>Miscanthus sacchariflorus</i>
Giant Hogweed	<i>Heracleum mantegazzianum</i>
Lesser Celandine	<i>Ranunculus ficaria</i>

The best way to control these species escaping into the natural ecosystems is to avoid planting them in our yards. Once established in the natural landscape, small infestations are more easily controlled than larger populations. Measures of control can include hand-pulling, but often herbicides are needed to stop their growth. Most are not easily controlled.

Non-native animals are also a concern. Introduced animals become a problem when they negatively affect the natural ecosystem. Non-native animal species include birds, fish, insects and earthworms.

Warwick has been affected in the past by the Gypsy moth which has denuded and damaged our oak trees, before the population peaked and crashed. Other non-native insects that are not yet known in town include the hemlock woolly adelgid, the elongate hemlock scale, Asian long-horned beetles, emerald ash borer, birch leaf-miner, and maple thrips.

APPENDIX to Section 4¹⁵

Notes on the Amphibian and Reptile Listings

The total list includes both species that have been detected in Warwick, as well as those whose range could fall within an area surrounding the town. In cases where actual detections have yet to be made, the spaces to the right of the species name are blank.

“C” stands for “common”: this species is more likely than not to be detected in the appropriate season and habitat.

“U” stands for “uncommon”: in the appropriate season and habitat, a concerted and/or repeated search may be needed to detect this species.

“R” stands for “rare”: only one to a few records for this species exist.

Locally common species are listed as “common” even though they may be detected in only a small area of the town.

Warwick Cumulative Amphibian and Reptile List 2009

Species	Abundance	Comments
Amphibians		
Bullfrog	C	
Gray treefrog	C	
Green frog	C	
Leopard frog, northern		
Pickerel frog	C	
Spring peeper	C	
Toad, American	C	
Toad, Fowler's		
Wood frog	C	
Blue-spotted salamander		
Dusky salamander, northern		
Four-toed salamander	R	Iverson conservation area
Jefferson salamander	R	Hastings Heights Road
Marbled salamander		unlikely for Warwick
Red-backed salamander, eastern	C	

¹⁵ This appendix was prepared by the Species Space Cadets Subcommittee of the Warwick Open Space Plan Committee.

Species	Abundance	Comments
Red-spotted newt	C	
Spotted salamander	C	
Spring salamander, northern		
Two-lined salamander	C	
Reptiles		
Black racer		
Black rat snake		
Brown snake		
Garter snake, common	C	
Green snake, smooth		
Hognose snake, eastern		
Milk snake, eastern	C	
Red-bellied snake	C	
Ribbon snake, eastern		
Ring-necked snake	C	
Watersnake, northern	C	
Box turtle, eastern		unlikely for Warwick
Musk turtle, eastern	R?	1909 record from Moores Pond, also a record from Orcutt Brook
Painted turtle, eastern	C	
Snapping turtle	C	
Spotted turtle	R	
Wood turtle	U	

Notes on the Bird Listings

The total list includes both birds that have been detected in Warwick, as well as those whose normal range or migration routes include the Warwick area. In cases where actual detections have yet to be made, the spaces to the right of the species name are blank.

“C” stands for “common”: this species is more likely than not to be detected in the appropriate season and habitat.

“U” stands for “uncommon”: in the appropriate season and habitat, a concerted and/or repeated search may be needed to detect this species.

“R” stands for “rare”: only one to a few records for this species exist.

Locally common species are listed as “common” even though they may be detected in only a small area of the town, e.g. purple martins may be found in numbers over a field in which there is a maintained martin house, but nowhere else. Irruptive winter birds such as pine siskins are estimated by their frequency during irruptions even though they may be absent on other years

The categories do not represent the frequency with which any species may be found outside of Warwick.

Summer occurrence does not necessarily assume nesting. Some summer listings may be unmated birds, fly-overs, hunting visitors or accidentals.

Warwick Cumulative Bird List 2009

Species	Summer	Migration only	Winter	Comments
Bittern, American	U			Bass Swamp; Moores Pond
Bittern, least				Moores Pond
Blackbird, red-winged	C			
Blackbird, rusty				
Bluebird, eastern	U			
Bobolink	U			
Bufflehead		U		
Bunting, indigo	U			
Cardinal, northern	C		C	
Catbird, gray	C			
Chickadee, black-capped	C		C	
Cormorant, double-crested		U		
Cowbird, brown-headed	C			
Crane, sandhill		R		1 record: Bass Swamp spring 08
Creepers, brown	C		C	
Crow, American	C		C	
Cuckoo, black-billed				
Cuckoo, yellow-billed	U			
Dove, mourning	C		C	
Dove, rock	C		C	
Duck, American black	U			
Duck, Mallard	C			
Duck, ring-necked				
Duck, wood	C			
Eagle, bald	U			
Falcon, peregrine				
Finch, house	C			
Finch, purple	C			
Flicker, northern	C			
Flycatcher, alder				
Flycatcher, great crested	C			
Flycatcher, least	C			
Flycatcher, olive-sided		U		
Flycatcher, willow				
Gnatcatcher, blue-gray	U			
Goldeneye, common				
Goldfinch, American	C		C	
Goose, Canada	C			

Species	Summer	Migration only	Winter	Comments
Goshawk, northern	U			
Grackle, common	C			
Grebe, pied-billed				
Grosbeak, evening	U		C	Breeds most years at Beech Hill
Grosbeak, pine			U	
Grosbeak, rose-breasted	C		C	
Grouse, ruffed	C		C	
Harrier, northern				
Hawk, broad-winged	C			
Hawk, Cooper's	U			
Hawk, red-shouldered	U			
Hawk, red-tailed	C			
Hawk, sharp-shinned		U		
Heron, great blue	C			
Heron, green				
Hummingbird, ruby-throated	C			
Jay, blue	C		C	
Junco, dark-eyed	U		C	
Kestrel, American	U			
Killdeer				
Kingbird, eastern	C			
Kingfisher, belted	C			
Kinglet, golden-crowned			C	
Kinglet, ruby-crowned		C		
Martin, purple				
Meadowlark, eastern				
Merganser, common		U		
Merganser, hooded	C			
Merlin				
Mockingbird, northern	C		C	
Nighthawk, common		U		
Nuthatch, red-breasted	C			
Nuthatch, white-breasted	C		C	
Oriole, Baltimore	C			
Osprey	U			
Ovenbird	C			
Owl, barred	C		C	
Owl, eastern screech			U	
Owl, great horned			U	
Owl, long-eared				
Owl, northern saw-whet				
Parula, northern		U		
Pewee, eastern wood	C			
Pheasant, ring-necked	U			
Phoebe, eastern	C			
Rail, Virginia				

Species	Summer	Migration only	Winter	Comments
Raven, common	C		C	
Redpoll, common			U	
Redstart, American	C			
Robin, American	C		U	
Sandpiper, solitary				
Sandpiper, spotted	C			
Sapsucker, yellow-bellied	C			
Shrike, northern			U	
Siskin, pine			C	
Snipe, Wilson's				
Sora				
Sparrow, chipping	C			
Sparrow, field				
Sparrow, house	C		C	
Sparrow, savannah				
Sparrow, song	C		C	
Sparrow, swamp				
Sparrow, tree			C	
Sparrow, vesper				
Sparrow, white-throated	U		C	
Starling, European	C		C	
Swallow, bank				
Swallow, barn	C			
Swallow, cliff				
Swallow, rough-winged				
Swallow, tree	C			
Swift, chimney	U			
Tanager, scarlet	C			
Teal, blue-winged				
Teal, green-winged				
Thrasher, brown	U			
Thrush, Bicknell's				
Thrush, gray-cheeked				
Thrush, hermit	C	C		
Thrush, Swainson's				
Thrush, wood	C			
Titmouse, tufted	C		C	
Towhee, eastern	C			
Turkey, wild	C		C	
Veery	C			
Vireo, blue-headed	C			
Vireo, Philadelphia				
Vireo, red-eyed	C			
Vireo, yellow-throated				
Vulture, turkey	C		C	
Warbler, bay-breasted				

Species	Summer	Migration only	Winter	Comments
Warbler, black and white	C			
Warbler, Blackburnian	C			
Warbler, blackpoll				
Warbler, black-throated blue	C			
Warbler, black-throated green	C			
Warbler, blue-winged				
Warbler, Canada	U			
Warbler, Cape May				
Warbler, chestnut-sided	C			
Warbler, magnolia	U			
Warbler, Nashville	U			
Warbler, palm		C		
Warbler, pine	C			
Warbler, prairie				
Warbler, Tennessee				
Warbler, Wilson's				
Warbler, yellow	C			
Warbler, yellow-rumped	C			
Waterthrush, Louisiana	C			
Waxwing, Bohemian			U	
Waxwing, cedar	C		C	
Whip-poor-will	U			
Woodcock, American	U			
Woodpecker, downy	C		C	
Woodpecker, hairy	C		C	
Woodpecker, pileated	C		C	
Woodpecker, red-bellied	U		U	
Wren, Carolina				
Wren, house	C			
Wren, winter	U			
Yellowlegs, greater				
Yellowlegs, lesser				
Yellowthroat, common	C			
Waterthrush, northern	U			
Waxwing, Bohemian			U	

Notes on the Mammal Listings

Species are listed in taxonomic rather than alphabetical order.

Evidence is either “obsv” or “t/s”. “Obsv” means that a direct visual observation was made in light and at a distance/duration for certainty. “t/s” means “tracks/sign”, i.e. some definite evidence of the presence of passage of a mammal was found other than direct observation. A

listing in this category assumed sufficient skill at identification using these means on the part of the reporter.

Warwick Cumulative Mammal List 2009

Species	Evidence
Opossum, Virginia	
Shrew, masked	
Shrew, water	
Shrew, smoky	
Shrew, short-tailed	
Mole, hairy-tailed	obsv
Mole, eastern	obsv
Mole, star-nosed	
Bat, little brown	
Bat, northern (long-eared)	
Bat, Indiana	
Bat, eastern pipistrelle	
Bat, big-brown	
Bat, red	
Bat hoary	
Cottontail, eastern	obsv
Cottontail, New England	
Hare, snowshoe	obsv
Chipmunk, eastern	obsv
Woodchuck	obsv
Squirrel, gray	obsv
Squirrel, red	obsv
Squirrel, southern flying	
Squirrel, northern flying	
Beaver	obsv
Mouse, deer	
Mouse, white-footed	obsv
Vole, southern red-backed	
Vole, meadow	obsv
Vole, woodland	
Muskrat	t/s
Lemming, southern bog	
Rat, Norway	
Mouse, house	
Mouse, meadow jumping	obsv
Mouse, woodland jumping	obsv
Porcupine	obsv
Coyote, eastern	obsv

Species	Evidence
Fox, red	obsv
Fox, gray	obsv
Bear, black	obsv
Raccoon	obsv
Fisher	obsv
Ermine (short-tailed weasel)	obsv
Weasel, long-tailed	obsv
Mink	
Skunk, striped	obsv
Otter, river	obsv
Bobcat	
Deer, white-tailed	obsv
Moose	obsv

SECTION 5

INVENTORY OF LANDS OF CONSERVATION AND RECREATION INTEREST

A. INTRODUCTION

This section of the Warwick Open Space and Recreation Plan identifies parcels of undeveloped land that are individually, or in the aggregate, considered to be of interest because they help conserve wildlife habitat, scenic landscapes, the area's rural character, and current and potential recreational resources for Warwick's residents. Lands of conservation interest are those parcels of land that are considered important because they are already protected from development or because they could be a priority for protection.

Communities across the country have determined that protecting land from development is a means to ensure certain aspects of their landscape are conserved. Consider Warwick's productive forests, wetland systems, remaining farmland and scenic views. These land-based resources have values that could be marred by development.

When land is considered protected there is a legal restriction that does not permit the parcel to be developed for residential, commercial, or industrial uses. Permanently protected land enjoys the highest degree of protection from development. The only way that permanently protected land can be developed is if two thirds of the State legislature was to vote to change the use of the land. In Massachusetts, there are a number of ways in which land can be considered permanently protected from development: a conservation restriction can be attached to the deed, or the land may be owned by a state conservation agency or non-profit conservation organization, a conservation land trust, or a municipal conservation commission.

The inventory accompanied by the Open Space Map shows the location, types, and distribution of conservation lands in Warwick. This inventory is divided into two main sections based on type of ownership: 1) private and 2) public and non-profit. Within each of these major categories, parcels are differentiated by use (farm or forestland), by ownership or management, and by level of protection: permanent, limited, and temporary (*See Table 5-1*).

Table 5-1: Summary of Protected Open Space in Warwick

PROTECTED OPEN SPACE	Area in Acres	Percentage of Warwick's Total Land Area (24,103 acres)
PRIVATELY OWNED FARMLAND		
Permanently Protected	289.37	1.20%
Temporarily Protected under Ch. 61A	203.62	0.84%
Total Privately owned Protected Farmland	492.99	2.05%
PRIVATELY OWNED FORESTLAND		
Permanently Protected by Conservation Restriction	996.94	4.14%
Permanently Protected by Private Nonprofit Organizations	737.38	3.06%
Temporarily Protected under Ch. 61	3,523.63	14.62%
Temporarily Protected under Ch. 61B	178.65	0.74%
Total Private Owned Protected Forestland	5,436.60	22.56%
TOTAL PRIVATELY OWNED PROTECTED OPEN SPACE	5,929.59	24.60%
PUBLICLY OWNED FORESTLAND		
Permanently Protected by State Conservation Agencies	11,677	48.45%
Land Permanently Protected by Warwick Conservation Commission	45	0.19%
Land with Limited Protection by Town of Warwick	279.12	1.16%
TOTAL PUBLICLY OWNED OPEN SPACE	12,001.12	49.79%
TOTAL PROTECTED OPEN SPACE	17,930.71	74.39%

Source: Warwick Assessors Records and Maps, 2009.

The parcels that are considered permanently protected are owned by the Commonwealth of Massachusetts and under the management of two state conservation agencies, the Department of Conservation and Recreation (DCR) and the Division of Fisheries and Wildlife (DFW). Permanently protected parcels also include those that are under the authority of the Warwick Conservation Commission and those owned by private conservation land trusts like Mount Grace Land Conservation Trust (MGLCT). In addition, parcels owned by private citizens who have sold or donated their development rights to the state, a land trust, or other conservation organization also are permanently protected. Land that is permanently protected from development in one of these ways is protected under Article 97, which requires a two-thirds majority vote of the State Legislature to convert the open space to another use. Land considered

to have limited protection includes any Town-owned open space, not under the authority of the Conservation Commission, which could be developed through a decision by the Select Board or by Town Meeting vote.

Forestland in the Ch. 61 Program is managed for forest products under a ten-year management plan and is temporarily protected from development. A landowner may remove land enrolled in the Ch. 61 Program at any time but may have to pay back taxes due. If the landowner receives a formal offer from another party to purchase his/her parcel of land, which is in one of the Ch. 61 Programs (61, 61A, 61B), the Town has 120 days, from the day the offer is made, to exercise its right-of-first-refusal.

Not as bountiful as forests, Warwick's agricultural lands are a unique part of the landscape that contributes significantly to the Town's rural character. Like the Chapter 61 Program, which helps to temporarily keep working forests undeveloped, the 61A Program does the same for agricultural lands. Landowners need to apply every year to enroll their parcels of agricultural land in the Chapter 61A Program. When the property faces a change of use, such as conversion to residential development, a payment of back taxes is required or the right-of-first-refusal applies. Farmland can become permanently protected from development when the landowner sells the development rights for a parcel to a land trust or state agency. The Massachusetts Department of Agricultural Resources (DAR) purchases the development rights of farmland in Franklin County regularly through their Agricultural Preservation Restriction (APR) Program. The APR Program will pay up to \$10,000 per acre for these rights. The DAR favors towns that provide matching funds, which are typically 5 percent of that amount or up to \$500 per acre. In this way the Town of Warwick might be able to leverage 95 percent of the cost of purchasing development rights towards protecting the farmland of willing landowners. Currently there are two Warwick farms in the APR program: Chase Hill Farm and the Crossroads Farm.

The Chapter 61 and 61A lands are considered to have a temporary level of protection from development. A landowner with land enrolled in one of these programs is somewhat constrained from selling and/or developing his or her land by the Town's capacity to act on its right of first refusal. The Town would likely be much more successful in taking advantage of this opportunity if officials partnered with DCR, DFW, New England Forestry Foundation (NEFF), and MGLCT staff. Often private conservation land trusts have the ability to produce creative and successful fundraising campaigns in a short period of time, while DCR and DFW may be interested in purchasing the land in the near future. Often this negotiating process between the land trust, a state conservation agency, and the landowner can be completed in a shorter period of time than if the Town were to bring the decision to purchase the land to a Special Town Meeting. Ideally, the Town would have worked on this relationship ahead of time so that it would be able to assign its right of first refusal to the land trust as soon as the landowner expressed interest in selling the land to a developer.

The Town-owned open space is in the form of forestland, a cemetery, school yards, and the Town Common. Of all the types of Town-owned public open space in Warwick, the cemetery and the Common are by far the best-maintained, park-like environments. All of the Town-owned lands are considered to have limited protection from development with the exception of

two forested parcels recently acquired for conservation and passive recreation purposes that are under the authority of the Warwick Conservation Commission, which are fully protected.

The Open Space Map shows that there are many possible linkages that could be made between existing permanently protected lands. The lands between these large blocks of protected land are likely to be owned by private citizens. Being able to help interested landowners in selling and or protecting parcels that would create links and corridors may be dependent on the Town's ability to work quickly with a number of potential land or conservation easement buyers. It would benefit the Town to formalize working relations with DCR, DFW, NEFF, and MGLCT, given these organizations' continued interest in protecting large greenways between the North Quabbin Region and the Connecticut River Valley. The Open Space Committee has followed up on the 2002 Open Space and Recreation Plan's recommendation that the Town build a working relationship with DCR, DFW, NEFF, MGLCT, and Mass Audubon. These relationships, initiated by the Open Space Committee, have been very helpful in facilitating several successful conservation projects during the past seven years.

One way the Town could network with all these groups quite efficiently is by continuing to be involved with the North Quabbin Regional Landscape Partnership (NQRLP). The North Quabbin Regional Landscape Partnership is an informal working group of fifty different federal, state, municipal, and non-profit, agencies, boards, and organizations that seek to protect the ecological, cultural, and historical resources in the region through collaborative conservation planning. In the fall of 2005, the NQRLP received funding to hire a full-time executive director and also to offer a small grants program. (Warwick's Hockanum Hill Project received a \$4,000 grant from this source in 2006.) Under the leadership of Executive Director Jay Rasku, the Partnership has become increasingly active and effective in facilitating conservation in the North Quabbin Region. Warwick has an excellent liaison with the Partnership because in 2006 the Chair of the Open Space Committee was invited to serve on the NQRLP Executive Committee as a municipal representative.

B. PRIVATELY OWNED PARCELS

Although there is a great amount of open space owned by the state and by conservation organizations, the rest is owned by persons, both residents and non-residents and associations or trusts, which are legal bodies, but not conservation land trusts. Some of the parcels are permanently protected from development due to the fact that the landowners have sold, or donated a portion of their property rights to a land trust, or a non-profit conservation organization. Others are temporarily protected from development through the Massachusetts Ch.61 Programs. The remaining privately owned lands are unprotected. They are discussed in this Open Space and Recreation Plan because most privately owned open space contains wildlife habitat, and some may provide unique recreational opportunities, or provide a potential connection between other permanently protected parcels. In some cases, unprotected parcels may be deemed valuable enough by the community to consider protecting. This would depend on the interest of the landowner and the ability of all parties to negotiate an acceptable price.

These unprotected lands are discussed in general terms because a parcel level analysis of all parcels in Town is beyond the scope of this plan.

Private landowners together control approximately 25 percent of the protected open space in Warwick. Some of this land is in pasture but most is in forest. These open space parcels are still on the tax rolls and generating tax revenue for the town. Many landowners have taken advantage of the Chapter 61 programs as is evidenced by the fact that there are 3,906 acres of open space in the 61, 61A and 61B Programs combined. As is mentioned earlier, the Ch.61 Programs offer the Town of Warwick an opportunity to purchase any Ch.61 property that is put up for sale.

In the following tables, Privately Owned Agricultural and Forest Lands are listed by level of protection from development. The ownership of the land is provided along with the assessors' map and lot number and acreage. The current use is based on the vegetation. Farmland may most likely be pasture in Warwick, while forest is presumed to be used as such, whether it is managed for timber or not. Public access on private land is not guaranteed and subject to change. State conservation agencies often require some level of public access before paying for, or accepting, conservation restrictions. Public access is not a requirement for enrollment in any of the Ch.61 programs including the Ch.61B Recreation Program. Privately owned land that is unprotected may or may not allow public access. It is assumed that given the nature of these open space parcels, access to them by people with disabilities is also not guaranteed or expected.

The recreational potential for all of these privately owned parcels is identified in the "Recreation Value" column of the tables. Parcels that fail to have a significant recreation potential may have another characteristic identified in this column or none at all.

Important characteristics that could motivate the Town to consider acting on their right of first refusal for a Ch.61 parcel, or negotiating with a willing landowner for a fair purchase price, may include the presence of prime farmland soils, pasture, wetlands, a portion of the land that is above an aquifer, or rare or endangered species habitat. In addition, the parcel may be deemed very important as a link in a potential greenway or as a component of a very large block of contiguous forest.

B.1 Privately Owned Agricultural Land

According to the Warwick Assessor's records, there are 289 acres of agricultural land that are permanently protected in Warwick. Most agricultural land that is protected from development in the region becomes so only after being prioritized by the State's Department of Agricultural Resources (DAR), which is the main source for farmland preservation funds in eastern Franklin County. The DAR normally requires the land to be actively farmed and to contain prime farmland soils.

All of the parcels in Table 5-2 are permanently protected from development. The owner noted is also the manager of the parcel with current use of the parcel being agricultural land. The holder of the easement is considered to be the same as the manager of the easement. There are no

public grants awarded, though the owner received payment for the easement, which came from a state agency, the DAR. The zoning of the parcels is Rural-Agricultural. Most of the parcels have a high recreation value because of the presence of a trail easement, which connects the Iversen Conservation Area with the Warwick State Forest via both farmland areas (Chase Hill Farm and Crossroads Farm). These permanently protected agricultural fields also have high scenic value. The open pastures at the south end of Crossroads Farm offer one of the most stunning views of Mt. Grace—particularly at sunset! The pastures at Chase Hill Farm provide handsome views of Mt. Monadnock to the northeast and Mt. Wachusett to the southeast.

Table 5-2: Privately Owned Agricultural Land Permanently Protected from Development

Owner	Map	Lot	Acres		Recreational/ Other Public Benefit
Fellows, Mark O.	404	6	23.55	DAR	High-MGCLT trail easement
Fellows, Mark O.	404	10.2	14.86	DAR	High-MGCLT trail easement
Fellows, Mark O.	404	19	8.7	DAR	High-MGCLT trail easement
Fellows, Mark O.	404	35.1	151	DAR	High-MGCLT trail easement
Fellows, Mark O.	404	35.2	15	DAR	High-MGCLT trail easement
Jones, Emily M.	404	1	15.56	DCR	Low
Jones, Emily M.	404	37	7.7	DCR	Low
Fellows, Mark O.	409	18	30	DAR	High-MGCLT trail easement
Fellows, Mark O.	409	34	23	DAR	High-MGCLT trail easement
TOTAL			289.37		

Source: Warwick Assessor's Records and Maps, 2009.

There are approximately 204 acres of farmland in the Ch.61A Program in Warwick. All of this land is valuable as a potential source of food, as scenery, and as a contributor to the livelihood of Warwick residents. Some of the parcels are especially important because they contain unique values such as stream corridors, prime farmland soils, wetlands, and areas that have been identified as containing key wildlife habitats and plant communities. Other parcels contain recreational streams and are surrounded or abut large blocks of permanently protected forest.

It is important to acknowledge the benefits that are provided to all residents of Warwick by private landowners without being parcel-specific. Some landowners may not appreciate public discussions on how their land is considered to be of value to the Town and others. On the other hand, if the Town has a legitimate interest in protecting a parcel of land that is privately owned, publicizing that interest years in advance may impact the negotiating process between the Town,

the landowner, and other parties. Given these concerns, the descriptions of public benefits associated with all of the privately owned open space described in this section are in general terms.

All parcels in Table 5-3 are in the Ch.61A Program and the degree of protection of these parcels is short term. The owner noted is also the manager of the parcel with current use of the parcel being agriculture. There are no public grants awarded as a result of the Program, however, the owner does receive an annual tax break. The zoning of the parcels is Rural-Agricultural.

Table 5-3: Agricultural Land with Temporary Protection from Development through Enrollment in the Chapter 61A Land Classification and Taxation Program

Owner	Map	Lot	Acres
Jay Revocable Trust, Ralph L.	402	11	16
Doane, Thomas J.	402	31.1	29
Doane, Thomas J.	402	31.6	8.9
Doane, Thomas J.	402	42.2	112
Machado, Michael J.	409	19.1	3.83
Machado, Michael J.	409	19.2	6.19
Spackman, David G.	409	36	12.7
Limoges, Timothy M.	411	115	15
TOTAL			203.62

Source: Warwick Assessor's Records and Maps, 2009.

B.2 Privately Owned Forested Land

Most natural processes do not follow political boundaries but ownership can impact the forest through development and management treatments. Across a regional landscape defined as the North Quabbin, development can impact the forest through fragmentation. Large blocks of contiguous forest form the basis for sustaining biological diversity in the region. Every forested parcel is important, in every town, but even more so in Warwick and surrounding communities in the North Quabbin region. The contiguous forestland in these communities help to provide interior forest habitats that are separate yet potentially connected to the very large interior forest habitats that exist within the Quabbin Reservation.

The following inventory includes privately owned forestland at different levels of protection from development. Permanently protected forestland exists when landowners have donated or sold their development rights to a state conservation organization or a land trust. The landowners retain the other rights of ownership and they continue to pay property taxes, though the taxes will be less due to the reduced value of their land. Forestland that is considered temporarily protected from development includes those lands enrolled in the Ch.61 and 61B Programs.

There are 10 forested parcels in Town (See Table 5-4), which are permanently protected from development and privately owned. The owners noted are also considered to be the managers of

the parcels with their current use being forest. The holder of the easements, DCR, DFW, MGLCT and Mass Audubon are also considered to be the manager of the easement. There were no public grants awarded, though the owner may have received payment for the easement, which came from a public source. One of the easements was donated by the landowner to the easement holder. The zoning of the parcels is Rural-Agricultural.

Several of these parcels were protected through the “Tully Initiative”. This was an historic and unprecedented landscape scale open space conservation project initiated the Massachusetts Executive Office of Environmental Affairs (EOEA) and administered by Mount Grace Land Conservation Trust from 2000 – 2002. Ninety parcels of land were protected through purchasing the fee interest or conservation restrictions at an expenditure of \$9 million. The conservation restrictions purchased from private landowners in this initiative contained public access requirements. In addition, because the focus by EOEA agencies has been to expand the value of existing permanently protected open space, most of the parcels listed in Table 5-4 create links between existing blocks of forestland.

Table 5-4: Privately Owned Forestland Permanently Protected from Development

Owner	Map	Lot	Acres	Holder Of Conservation Restriction
J. David Young	402	32	22	DCR
Whipple Trust	402	46	181	DCR
Joyce, Carol A.	403	14.2	123.91	MGLCT
White Pine Realty Trust	405	82	15	MGLCT
Hull Forestlands LP	406	12	90.67	DCR
Wyatt, Thomas S.	406	17	26.76	DCR
Matilainen, Michael	409	15.2	11.97	MGLCT
Heyes, Fred L.	409	32	140	DCR
Matilainen, Michael	409	35.2	36.63	MGLCT
Arguimbau, Nicolas	411	116	49	MA AUDUBON
Rolih, Kathleen M.	410	3	62	DCR
RJS Holdings, LLC	411	128	238	DCR
TOTAL			996.94	

Source: Warwick Assessor's Records and Maps, 2009.

All of the parcels in Table 5-5 are in the Ch.61 Forestland Classification and Taxation Program and the degree of protection of these parcels is short term. The owner noted is also the manager of the parcel with current use of the parcel being forest. There are no public grants awarded as a result of the Program, however, the owner does receive a property tax break over a ten-year period. The zoning of the parcels is Rural-Agricultural.

The following parcels together comprise 15 percent of the total land area of Warwick and 20 percent of all of the protected open space in Town. Looking at open space as a means for wildlife species to move across the landscape, Ch. 61 lands provide important linkages between

the state forest blocks in Warwick, Northfield and Royalston and across the region from the New Hampshire border to the Quabbin Reservation. Ch.61 lands contain prime farmland soils, significant historical agricultural landscapes, and core habitat areas. These lands also buffer wetlands and historical impoundments and they provide a compelling reason for some landowners to keep their lands in forest – periodic income generated by timber harvests and the satisfaction gained from working the land.

Table 5-5: Forestlands with Temporary Protection from Development through Enrollment in the Chapter 61 Forestland Classification and Taxation Program

Owner	Map	Lot	Acres
Cutting, Abel	401	4	45
WD Cows Inc.	401	8	43
Cutting, Abel	401	9	737.7
Coleman, William	401	11	47
Cutting Estate, Lucius P.	401	13	17.21
Neiman, Myril A.	401	23	43
Wirth, Herman J.	401	26	90
Neiman, Myril A.	402	18	8.8
Jay Revocable Trust, Ralph L.	402	20	62.2
Gerry, Peter A.	402	22	69.09
Morgan, Alan C.	402	25	19
Morgan, Alan C.	402	26	15
Roaf, George M.	402	28	45.5
Kimball-Smith, Pamela A.	403	3	20
Miniuks, Andrew	403	6	10.6
S & M Forest Trust~	403	7	45
S & M Forest Trust~	403	8	9.3
Miniuks, Charles A.	403	11	12.4
Carr, Bruce	404	8	18.37
Manring, Lynne	404	16	30
Kemerer, Terry L.	405	53	33
Morse, Charles A. Jr.	405	67	15
Stevens Heirs	405	70	124
Morse, Charles A. Jr.	405	71	65
Manring, Lynne	405	86	18
King, Tonia M.	406	1	50.89
Abbondanza, Alfred	406	2	46.81
Williamson, John F.	406	3	26
WD Cows Inc.	406	4	25.3
Williamson, John F.	406	6	15
Duerring, Christine L.	406	10	33.59
Torres, Miguel A.	406	16	50.42
Crosby, Dean C.	406	23	10
Stevens, Robert T. Jr.	406	24.1	24.01
Crosby, Dean C.	406	24.2	26.33

Owner	Map	Lot	Acres
Niedzialkoski, Paul	406	24.3	18.3
Shepardson, Richard G.	407	2	103.9
Shepardson, Richard G.	407	2.1	2.4
Shepardson, David E.	407	3	21
Farley, Walter D. III	407	4	33.66
528 Realty Trust	407	5.2	11.2
Radinsky, Leon G. Jr.	408	4	12.7
Goldsbury Estate	408	10	43
Alden, Albert P. Jr.	408	11.2	28.27
Radinsky, Leon G. Jr	408	42	111
Shepardson, Richard G.	408	53.2	0.63
Shepardson, Richard G.	408	53.3	4
Shepardson, Richard G.	408	54	24.2
Shepardson, Clara M.	408	55	4
Shepardson, Clara M.	408	56	39
Shepardson, Clara M.	408	56.1	16
Shepardson, Clara M.	408	61	54.6
Shepardson, Richard G.	408	62	17
Shepardson, Richard G.	408	63	5.5
Londahl, Margaret J.	408	70	30
Cadwell Nominee Trust, Bayard	408	96.1	71.4
Orange Road Realty Trust 2006	408	113	47
Alden, Albert P.	408	125	32
Fitzmaurice, Laurence D.	408	132	46.7
Hastings, Dana B. Jr.	409	9	24.36
Eriksson, Barbara D.	409	31	101.7
Heyes, Fred L.	409	43	29
Heyes, Fred L.	409	45	19
Berman, Alan R.	410	1	22
Freitag, Lorraine E.	410	6	78
Freitag, Lorraine E.	410	9	39
Shaw Estate, Charles L.	411	4.1	174
PB Family Fund LLC	411	83	88
Shaw, Victoria L.	414	45	97
Radinsky, Leon G. Jr.	414	51.1	8.67
Radinsky, Leon G. Jr.	414	56	8.61
Field, Jay	414	56.3	17.12
Goodwin, James C.	414	56.4	18.79
Barger Camp Realty Trust	414	58	10.4
TOTAL			3,523.63

Source: Warwick Assessor's Records and Maps, 2009.

All of the parcels in Table 5-6 are in the Ch.61B Recreational Open Space Lands Classification and Taxation Program and the degree of protection of these parcels is short term. The owner

noted is also the manager of the parcel with current use of the parcel being open space. There are no public grants awarded as a result of the Program, however the owner does receive a tax break over a ten-year period. The zoning for these parcels is Rural-Agricultural. These Ch. 61B parcels contain core habitat areas, historical streams, and abut permanently protected open space. Although MGLCT owns a number of parcels that have been protected in the past under the Ch. 61B Program, these parcels are now listed as having permanent protection from development and are therefore listed in Table 5-9: Permanently Protected Parcels Owned by Public Non-Profit Agencies.

Table 5-6: Forestlands with Temporary Protection from Development through Enrollment in the Chapter 61B Recreational Open Space Lands Classification and Taxation Program

Owner	Map	Lot	Acres
Neville-Wall, Mary	401	2	3.5
Neville-Wall, Mary	401	3	32
Quinnehtuk Company	402	37	38
Woodburn, Stephen B.	405	74	63
Provost, Frederick E.	405	76	6.35
Provost, Frederick E.	408	98	6.8
Grant, Robert P.	414	19	9
Grant, Robert P.	414	50.1	20
TOTAL			178.65

Source: Warwick's Assessor's Records and Maps, 2009.

C. PUBLIC AND NON-PROFIT PARCELS

State conservation agencies, the Town of Warwick, and non-profit land trusts and conservation organizations own a significant portion of Warwick's land. Almost all of this land is permanently protected from development. All but two of the Town owned parcels, however, have a low level of protection because they are not under the authority of the Warwick Conservation Commission. The following inventory includes parcels that are owned by the Commonwealth of Massachusetts and the Town as well as by Mount Grace Land Conservation Trust and the New England Forestry Foundation.

C.1 Publicly Owned Open Space

Publicly owned open space includes lands owned by the State of Massachusetts and the Town of Warwick. There are two agencies that manage the State owned lands: the Department of Conservation and Recreation (DCR) and the Division of Fisheries and Wildlife (DFW).

DCR's lands are spread throughout the Town and are part of the Warwick and Mount Grace State Forests. These lands are used for recreation and timber harvesting. Warwick State Forest encompasses most of the western and northeastern portions of Warwick. Mount Grace State Forest is roughly bounded by Flower Hill Road, Northfield Road and Old Winchester Road and is located in north central Warwick. These lands are open to the public, free of charge and are the most commonly used recreational lands in Warwick. Residents and visitors use the trails in Mount Grace State Forest for hiking and cross country skiing. Formerly, the public also used to enjoy the Mount Grace Picnic Area on Route 78 but due to a combination of lack of staff to maintain the area and the die-off and subsequent removal of the large sheltering pines, the picnic area is no longer an attractive destination and is no longer used. Laurel Lake and Sheomet Lake are located in Warwick State Forest. These areas offer swimming and boating opportunities. Laurel Lake is in the southwestern corner of Warwick and Sheomet Lake is located off Athol and Tully Brook Roads in eastern Warwick. The state forests in Warwick contain wetlands, stream corridors, and ponds.

DFW lands are located in the eastern half of Warwick. The northernmost parcel located to the east of Richmond Road is surrounded by Warwick State Forest and MGLCT lands. This parcel has a portion of Tully Brook running through it. The parcel in southeastern Warwick is located off Brush Valley Road and has a tributary of Orcutt Brook running through it. DFW lands are open to the public though normally the level of recreation facilities management is low. DFW lands are managed for multiple uses but hunting and fishing enthusiasts are more likely to utilize those sites with the least amount of established trails and facilities.

Table 5-7 lists permanently protected public parcels of land owned by the Commonwealth of Massachusetts. The listed parcels are managed either by DCR or by DFW.

Table 5-7: Permanently Protected Land in Warwick by State Conservation Agencies

Property Manager	Site Name	Map	Lot	Area	Current Use	Condition	Recreation Value	Public Access
DCR	Warwick State Forest	401	1	24	Hunting, Hiking	Good	High	Via Northfield Road and Tower Road
DCR	Warwick State Forest	401	19	234	Hunting	Good	High	Via Flower Hill Road
DCR	Warwick State Forest	401	24	71	Hunting	Good	High	Via Flower Hill Road
DCR	Sliva Land	402	3	17	Hunting	Good	High	Via Winchester Road
DCR	Mt. Grace State Forest	402	4	225	Hunting, Hiking, Snowmobiling, XC Skiing	Good	High	Via Winchester Road

Property Manager	Site Name	Map	Lot	Area	Current Use	Condition	Recreation Value	Public Access
DCR	Mt. Grace State Forest	402	5	1,146	Hunting, Hiking, Snowmobiling, XC Skiing	Good	High	Via Winchester Road
DCR	Sliva Land	402	6	3	Hunting	Good	High	Via Winchester Road
DCR	Warwick State Forest	403	1	524	Hunting	Good	High	Via Richmond Road
DCR	Warwick State Forest	403	4	75	Hunting	Good	High	Via Smith Road
DCR	Warwick State Forest	403	9	78	Hunting	Good	High	Via Smith Road
DCR	Warwick State Forest	403	10	77.88	Hunting	Good	High	Via Smith Road
DFW	Warwick State Forest	403	19	77	Hunting	Good	High	Difficult, Through WSF off Smith Road
DCR	Warwick State Forest	404	15	553	Hunting	Good	High	Via Richmond Road
DCR	Warwick State Forest	404	18.2	36.04	Hunting	Good	High	Via Richmond Road
DCR	Warwick State Forest	404	18.5	27.67	Hunting, Hiking, XC Skiing, Snowmobiling	Good	High	Via The Ridge Road
DCR	Warwick State Forest	404	20	70	Hunting	Good	High	Via Royalston Road
DCR	Warwick State Forest	404	26	736.1	Hunting	Good	High	Via Royalston Road
DCR	Warwick State Forest	404	29	270	Hunting	Good	High	Via Athol Road
DCR	Mt. Grace State Forest	405	25	0.01	Hunting, Hiking, Snowmobiling, XC Skiing	Good	High	Off Mt. Grace Ave.
DCR	Warwick State Forest	406	7	3043	Hunting	Good	High	Via Northfield & White Roads
DCR	Warwick State Forest	407	6	541	Hunting	Good	High	Via White Road

Property Manager	Site Name	Map	Lot	Area	Current Use	Condition	Recreation Value	Public Access
DCR	Warwick State Forest	408	5	57	Hunting	Good	High	Via Orange Road
DCR	Warwick State Forest	408	76	127	Hunting	Good	High	Via Northfield Road
DCR	Warwick State Forest	409	1	419	Hunting	Good	High	Via Gale Road
DCR	Warwick State Forest	409	3.1	34.54	Wildlife Viewing, Hunting	Good	High	Via Gale Road
DCR	Warwick State Forest	409	5.2	73.87	Wildlife Viewing, Hunting	Good	High	Via Gale Road
DCR	Warwick State Forest	409	7	171	Hunting	Good	High	Via Gale Road
DCR	Warwick State Forest	409	23	63	Hunting	Good	High	Via Athol Road
DCR	Warwick State Forest	409	24	2.3	Hunting	Good	High	Via Athol Road
DCR	Warwick State Forest (Sheomet Lake)	409	25	496	Swimming, Fishing, Picnicking, Wildlife Viewing	Good	High	Via Tully Brook & Athol Roads.
DCR	Warwick State Forest	409	27	0.76	Recreation	Good	High	Via Bliss Hill Road
DCR	Warwick State Forest	409	28	5.8	Recreation	Good	High	Via Bliss Hill Road
DCR	Warwick State Forest	409	30	74	Hunting	Good	High	Via Athol Road
DCR	Warwick State Forest	410	5	26	Hunting	Good	High	Via Beech Hill Road
DCR	Dubeau Land	410	10.01	30	Hunting	Good	High	Via Gale Road
DCR	Warwick State Forest	410	11	108	Hunting	Good	High	Via Beech Hill Road
DCR	Warwick State Forest	410	12	22	Hunting	Good	High	Via Beech Hill Road
DCR	Warwick State Forest	410	13	52	Hunting	Good	High	Via Beech Hill Road
DFW	Warwick State Forest	410	14	112	Hunting	Good	High	Via Beech Hill Road
DFW	Warwick State Forest	411	5.1	95.6	Hunting	Good	High	Via Wilson Road and Wendell Road

Property Manager	Site Name	Map	Lot	Area	Current Use	Condition	Recreation Value	Public Access
DFW	Warwick State Forest	411	12	10.8	Hunting	Good	High	Via Wilson Road
DCR	Warwick State Forest	411	44	2.49	Hunting	Good	High	Via Wendell Road
DCR	Warwick State Forest	411	102	397	Hunting	Good	High	Via Wendell Road
DCR	Warwick State Forest	412	4	39	Wildlife Viewing, Hunting	Good	High	Via Quarry Road
DCR	Warwick State Forest	412	5	52	Hunting	Good	High	Via Quarry Road
DCR	Warwick State Forest (Laurel Lake)	413	1	846	Fishing, Picnicking, Swimming, Boating, Ice Skating, Camping	Good	High	Via Quarry & Wendell Roads
DCR	Warwick State Forest	414	18	456	Hunting	Good	High	Via Hockanum Road
DCR	Warwick State Forest	414	23	26	Hunting	Good	High	Off Wendell Road
DCR	Warwick State Forest	414	30	4.3	Hunting	Good	High	Via Wendell Road
DCR	Warwick State Forest	415	2	45	Hunting	Good	Fair	Difficult
Total				11,677.16				

Source: Warwick Assessors' Records and Maps, 2009.

C.1.1 Land Owned by the Town of Warwick

The Town of Warwick owns 44.6 acres of permanently protected open space. This land consists of forested parcels acquired through the initiative of the Warwick Open Space Committee (WOSC). The WOSC was established in 2002 to fulfill one of the action steps recommended by the Town's 2002 Open Space and Recreation Plan.

Hockanum Hill Conservation Area

The first parcel was purchased in 2004 with the assistance of a "Self-Help" grant provided by the State's Division of Conservation Services. The 36-acre property is located in south Warwick on Hockanum Road at the north end of Hockanum Hill. The purpose of the project was to permanently protect public access to the existing trail leading to an "Overlook", and also to preserve the undeveloped character of the Barber Hill and Hockanum Hill ridgeline. This green corridor comprised mostly of large, permanently protected tracts of Warwick and Orange State Forest, runs for six miles north-to-south from Warwick Center to Route 2A in West Orange. As

part of the “Self-Help” grant requirements, the Town installed a convenient trailhead parking area on Hockanum Road at the base of the Hill.

In addition to its public recreation value, the Hockanum Hill parcel also benefits the Town by providing additional timberland. The standing timber has good value because the prior owner enrolled the forest in Chapter 61 and the timber stand was well-managed by a professional forester. A further advantage of the parcel for timber management is that it is located very near a 72-acre tract of Town Forest further west on Hockanum Road. This will make it convenient for the Town Forest Committee to plan forest management and timber harvests on both parcels at the same time.

The wildlife habitat value of the parcel is very high based on the Wildlife Inventory prepared by a professional wildlife biologist hired by the WOSC as preparation for applying for the “Self-Help” grant. The Hockanum Hill parcel also abuts the Warwick State Forest on two sides. It augments the permanent protection provided by the State-owned land from west to east, and it also functions as an important link in connecting large tracts of DCR land from north to south.

Black Gum Swamp Conservation Area

This 8.6 acre parcel was acquired by the Town in November 2007. Unlike the Hockanum Hill Conservation Area that includes many feet of frontage on a Town-maintained road (and an easily accessible roadside parking area with a short family-friendly hike to a scenic overlook), the Black Gum parcel consists of forested backland deep in the midst of Warwick State Forest at the west edge of Town. The parcel is located just north of a beautiful forest trail that runs through the State Forest from Wendell Road west to Flagg Road. There is good trailhead parking at both ends of this through-trail.

The parcel includes a large vernal pool, interesting rock outcroppings, and a number of Black Gum trees (Tupelos) growing at the edge of a small forest swamp. Black Gum groves are listed by the State’s Natural Heritage and Endangered Species Program as “threatened” plant communities. These groves are quite rare in Warwick. Since there are also several larger Black Gum swamp groves nearby on State Forest land, this section of Warwick has an unusual abundance of the species, probably because the area is so remote and difficult to access for timber harvesting that the trees have not been cut for many years.

The parcel was acquired for the purpose of creating an interesting side loop trail off the main through-trail, and for protecting the Black Gum grove and the unusually deep vernal pool. The WOSC raised funds through private donations to pay for the land so that it could be given as a gift to the Town. Town Meeting voted to accept the gift in October 2007.

Table 5-8: Town-Owned Open Space with Permanent Protection from Development

Property Manager	Site Name	Area	Map	Lot	Current Use	Condition	Recreation Value	Public Access
Open Space Committee and Conservation Commission	Hockanum Hill Conservation Area	36.00	414	17.1, 17.2, 17.3	passive recreation, trailhead parking, scenic view, hunting, wildlife habitat protection, linkage with State Forest greenway ridge corridor, link in Town-wide and regional trail system	Excellent	High, used for hiking, horseback riding, snowshoeing, cross country skiing, snowmobiling, hunting	via Hockanum Road
Open Space Committee and Conservation Commission	Black Gum Swamp Conservation Area	8.60	413	21	hiking, vernal pool and rare tree protection	Medium	side loop trail, wildlife education	via trail connecting Wendell and Flagg Roads.
Total		44.6						

Source: Warwick Assessor's Records and Maps, 2009.

The Town of Warwick owns approximately 279 acres of open space that are not permanently protected. All of these parcels are under the authority of the Select Board and are therefore considered to have limited protection from development. If residents wanted to convert the Town Forest to sports fields, a Town Meeting vote could provide the authority. If the land was held by the Conservation Commission it would take a two-thirds vote of the Massachusetts State Legislature to convert open space to another non-conservation use. Many of these open spaces currently help protect wetlands and tributaries, provide public access to other large blocks of protected lands, and together help to extend the habitat and recreation value of the state lands.

It is not unusual for a community to set aside land for future expansion of schools, sports fields, police and fire stations, and drinking water supplies. Land planned for these purposes might be used as open space today and placed under the authority of the Select Board. It may also make sense to place Town-owned land, which clearly contains special wildlife habitats or aquifer recharge areas, under the authority and protection of the Conservation Commission.

Table 5-9: Town-Owned Open Space with Limited Protection from Development

Property Manager	Site Name	Map	Lot	Area	Current Use	Condition	Recreation Value	Public Access
Town of Warwick	Warwick Center Town Hall	405	16	0.42	Meetings, Recreational and Social Gatherings	Good	Very High, used for Town gatherings	Via Winchester & Athol Roads
Town of Warwick	Town Barn site	405	22	0.23	Vacant field	NA	Low	Via Northfield Road
Highway Dept./Board of Health/Town Forest Committee	Allen Lot: Town Garage/ Town Dump Site/Forest	405	33	53.00	Garage, Dump, and managed Forest	Good	Medium, snowmobiles have trail on land	Via Winchester Road
Town of Warwick	Community School	405	38.2	25.57	Woods/Fields/ School	Good	High, playgrounds	Via Winchester Road
Town of Warwick	Unitarian Church	408	86	8.40	Church, Fire Station	Good	High, basketball courts	Via Orange Road
Town of Warwick	Center School/ Town Common	408	90	3.90	Abandoned School, Police Station, Ball fields	Poor	Low	Via Orange Road
Town of Warwick	Sarah Heyes Lot	409	26	7.90	Forest	Good	Low	Via Athol Road
Town of Warwick	Sarah Heyes Lot	409	29	14.40	Forest	Good	Low	Via Athol Road
Town of Warwick	Gravel Pit	411	101	1.30	Abandoned Stump dump	Low	Low	Via Wendell Road
Town of Warwick	Warwick Town Forest	414	20	16.50	Wildlife Observation/ Forest Management	Good	High	Via Wendell Road
Town of Warwick	Town Forest	414	43	72.5	Hiking, horseback riding, wildlife observation	Excellent	High	Via Wendell Road
Town of Warwick	Wilbur Lot	415	1	75	Wildlife Observation/ Forest Management	Good	High	Via Hockanum Road & Wendell Road
Total				279.12				

Source: Warwick Assessors' Records and Maps, 2009.

C.2 Non-Profit Owned Open Space

Non-profit conservation land trusts and conservation organizations that also protect land as part of their mission are responsible for protecting much more land than what they actually own themselves. Mount Grace Land Conservation Trust (MGLCT) owns open space in-fee. It also protects land by purchasing the development rights to land from willing landowners. By holding these conservation restrictions, it keeps the land from being developed even though the parcels remain the property of the landowners. MGLCT also works with landowners interested in protecting their land from development. MGLCT facilitated the preservation of two Warwick farms (Chase Hill and Crossroads Farm) by working with the landowners and the state agencies interested in their protection. A land trust can and often does negotiate with state agencies to find a potential buyer of the development rights. If the landowner is interested in selling their land in-fee, the land trust can often bring funding from many different sources, both public and private, to help in providing an acceptable price. Land trusts also can assist towns by pre-acquiring land and holding it long enough for the town to find funding to purchase the land. Towns are limited in their ability to respond quickly when important open space parcels come on the open market (and also in Chapter 61 right of first refusal situations) because the town usually lacks an immediate source of funds and because it may be necessary to wait several months before the next Town Meeting at which residents can vote to approve the project. It requires many months and much hard work on the part of the Open Space Committee or Conservation Commission to apply for and receive the necessary grants to cover the cost of Town conservation land. Warwick's successful Hockanum Hill Project was possible only because MGLCT pre-acquired the 36 acres on behalf of the Town to allow time to apply for a "Self-Help" grant, several other grants, and also to do local private fundraising.

In Table 5-10, the parcels noted have not received any type of public grant. They are all zoned Residential-Agricultural and are protected under Article 97, which requires two-thirds majority vote of the State Legislature to convert open space to another use.

Table 5-9: Permanently Protected Parcels Owned by Private Non-Profit Agencies

Fee Owner	Site Name	Map	Lot	Area	Current Use	Recreation Value	Public Access
MGLCT	Charles Moor Memorial Forest	401	7	57	Forest	High, well used	Via Tower Road
NEFF	Wallace Forest	401	10	85	Forest	High	Via Tower Road
MGLCT	Song Land	401	22	81	Forest	Low	Via Flower Hill Road
MGLCT	Earle Land	408	93	94	Forest	High	Via Hastings Pond Road
MGLCT	Iversen Conservation Area (Iversen)	408	129	143	Forest	High	Via Gale Road
MGLCT	Iversen	408	130	9.82	Forest	High	Via Gale Road
MGLCT	Iversen	408	131	23.93	Forest	High	Via Gale Road
MGLCT	Blackbird parcel	408	126	6.6	Wildlife habitat	Low	Via Gale Road
MGLCT	Earle Land	409	3.1	83.90	Forest	High	Via Gale Road
MGLCT	Iversen	409	5.1	59	Forest	High	Via Gale Road
MGLCT	Iversen	409	12	44	Forest	High	Via Gale Road
MGLCT	Iversen	409	13	24	Forest	High	Via Gale Road
MGLCT	Iversen	409	15.1	26.13	Forest	High	Via Gale Road
Total				737.38			

Source: Warwick Assessors' Records and Maps, 2009.

D. OPPORTUNITIES FOR FUNDING OPEN SPACE AND CONSERVATION PROJECTS IN WARWICK

The opportunities for the Town of Warwick to procure funding for open space projects can be a challenge. While the town has many unique conservation values, such as nearly half the town owned by the MA DCR as state forest and additional acres conserved by private owners through conservation restrictions and non-profit ownership, only the private land subject to conservation restrictions is truly protected. This has been illustrated by the state developing state forest land into a prison camp in Warwick.

Warwick is a small village (with a population of approximately 750 persons) with very limited financial resources available for funding open space projects. The Town is zoned entirely agricultural/residential and has no industrial and virtually no commercial tax base. In addition, since 50% of Warwick is owned by the State, the tax revenue derived from half the Town is limited to the State's PILOT (Payment In Lieu of Taxes) program, whose modest contribution varies from year to year. This puts Warwick in the position of being unable to set the tax rate on 50% of its acreage. Also, since the State-owned land cannot be developed, 50% of the Town will never supply the higher tax revenue generated by high-end taxable residences. (It is important to acknowledge, however, that the absence of residences in over 50% of the Town spares Warwick the significant increase in the cost of Town Services that accompanies a major increase in residential development.)

Because Warwick has so few residents, there is an unusually small pool of donors from whom to request contributions for open space projects. (But residents truly care about the Town and are prepared to be generous for the sake of a good project, as was shown with the Hockanum Hill.) The following paragraphs provide a brief description of some of available resources for funding open space and conservation projects.

D.1 LAND grant program (formerly the Self-Help grant program)

The Commonwealth of Massachusetts offers a grant program through the Executive Office of Energy and Environmental Affairs, Division of Conservation Services, to assist municipalities with open space projects. This program was formerly known as the “Self Help” grant program and is now entitled the LAND grant program (Land Acquisition for Natural Diversity). As the Town experienced with its 2003 Hockanum Hill “Self-Help” project, the 66% (\$82,000) grant supplied by the program made an enormous difference, but it was still a big burden for the Town to raise the remaining \$49,000 match portion of the total project cost. Local residents were very generous and the Town voted to contribute some funds, but in order for the project to succeed, it was essential to receive grants from outside sources. Warwick applied for a total of seven grants and was very fortunate to receive five—two from the State (including “Self-Help”), two from private foundations, and one from the North Quabbin Regional Landscape Partnership. But in today’s economy, these essential additional grants will be even harder to obtain because the competition for limited conservation funding has greatly increased.

D.2 Department of Conservation and Recreation Funding

DCR has a limited budget for funding land protection state-wide through fee purchases or buying Conservation Restrictions. To make their expenditures as effective as possible, DCR is focusing on expanding existing large blocks of state-owned land. DCR has designated areas throughout the state that have priority for funding. Because Warwick contains so many large tracts of State Forest and because there is such strong potential for linkage between them, Warwick forestland has high conservation value according to DCR’s criterion of expanding existing large blocks of forest. Unfortunately, Warwick does not fall within one of DCR’s current highest priority areas, and so the Town does not feel hopeful about obtaining funding from DCR for Warwick projects.

D.3 Mount Grace Land Conservation Trust

Although Mount Grace Land Conservation Trust (MGLCT) stands ready to help the Town of Warwick in any way it can, it does not have funds of its own available to donate to the Town for protecting open space. MGLCT, like other land trusts, must be creative in searching for funding for projects; and since Warwick is only one of 23 towns in MGLCT’s service region, and since MGLCT has many of its own projects underway at any given time (for which it is raising funds), the land trust staff has little time available to raise funds on behalf of a Warwick project. MGLCT can be most helpful by serving Warwick on a consultant basis and by recommending

funding sources for which the Town can apply on its own (as it did with the Hockanum Hill Project). Also, when it is necessary, MGLCT can further assist the Town by pre-acquiring an open space parcel and holding it on behalf of the Town to allow time for Warwick to take out a loan and apply for grants to pay for it.

D.4 Regional and Statewide Land Conservation Trusts

In addition to MGLCT, several other regional and statewide conservation organizations have completed conservation projects in Warwick and continue to be available for partnership conservation projects. The New England Forestry Foundation (NEFF) owns land in Warwick. NEFF's focus is conserving managed forest lands. Massachusetts Audubon Society (MAS) holds conservation restrictions in Warwick, and their focus is protecting the diversity of Massachusetts. Valley Land Fund has participated in pre-acquisitions of land for state agencies in Warwick in the past and continues to be an important conservation option for private landowners. Additional organizations include the Trustees of Reservations and the Nature Conservancy. Each of the conservation organizations identified above have access to no interest or low interest loan funds to assist in the conservation of significant natural resources through the Norcross Wildlife Foundation's loan program and the Open Space Institute's Western Mass Loan Fund.

D.5 North Quabbin Regional Landscape Partnership (NQRLP)

This local regional landscape partnership was formed to facilitate open space conservation in the North Quabbin Region. For two years, the NQRLP received sufficient funding to offer a "small grants" program (with a maximum award of \$4,000). Unfortunately, this grant program has now been discontinued due to lack of funding. While it was available, it did assist Warwick's Hockanum Hill Project with a \$4,000 reimbursement grant. Many towns in our region are hoping that the grant program will be re-instated because it was particularly helpful in providing seed money (for appraisals and other start-up costs) to get new open space projects underway.

D.6 Conservation Partnership Program

This is a state grant program that is designed to help land trusts and other non-profit conservation organizations receive a 50% reimbursement for open space projects (fee or CR). This is a resource that could be helpful to Warwick because there are so many parcels in Town with very high conservation value that organizations such as MGLCT and Mass Audubon would be highly interested in working with the Town to conserve them. The problem, however, is that no matter how worthy a project in Warwick may be, the non-profit conservation organization will not be interested in applying for these funds unless the Town can supply the other 50% or unless it has access to a special source of funds that will supply half of the funding. Both of these scenarios are unlikely.

D.7 Forest Legacy Program

This is a federal grant program administered for the purpose of conserving forestland nationwide. MGLCT has been very successful in applying for Forest Legacy funds for projects in the North Quabbin Region. In the spring of 2009, MGLCT was awarded a Forest Legacy grant in the amount of \$1.4 million for protecting 919 acres of forest along the Metacomet-Monadnock-Mattabesett Trail (now designated the New England National Scenic Trail) and in the trail viewshed. A small parcel of land in Warwick was included in the grant proposal.

As a national program, Forest Legacy funding is very competitive and also uncertain for the future due to the current economy. There is the problem that it can take up to three or four years for landowners to receive payment for selling the fee or CR once they agree to participate in one of the grant applications. This may be a longer time than some landowners can afford to wait to receive compensation.

D.8 Aggregation Project Funding

In June 2009, the New England Forestry Foundation (NEFF) agreed to serve as the official financial representative for the pilot round of a new multi-landowner aggregated conservation project. As part of the Woodlands and Wildlands Conservation Initiative, eight land trusts have pooled together 77 parcels in eleven towns for a total of 12,600 acres. The objective in assembling such a large group of parcels in Western Massachusetts is to gain access to major sources of private foundation funding that have never been available before. One parcel in Warwick has been included in the grant application. If this pilot aggregation proposal is funded, the intent is to assemble successive rounds in future years. This would be a very helpful resource for funding Warwick projects.

The one problem with the “Aggregation Project” approach, however, is that in order to make the grant application as compelling as possible to large private foundations, every landowner is asked to agree to a 25% bargain sale for the Conservation Restriction. Not every landowner can afford to give away one quarter of the value of their land, but they may be eligible for a tax deduction for doing so.

D.9 Quabbin to Cardigan (Q2C) Landscape Corridor Funding

Recently there has been hope in Warwick, and in the North Quabbin Region in general, that federal funds will be made available to support this recent New Hampshire - Massachusetts interstate conservation initiative. It is designed to protect forests in the 100-mile, largely unfragmented corridor that runs from the Quabbin Reservoir north to the southern edge of the White Mountains. Warwick’s geographic location (at the MA/NH border), its large blocks of intact forest, and its pristine wildlife habitat make it a strong candidate for Q2C funding. Several years have been devoted to preparing maps by which conservation value layers were combined to show the highest priority areas within the Q2C corridor. Warwick includes some of these high

priority areas. Unfortunately it does not seem likely that Q2C will receive funding in the near future. In FY 2009, the Society for the Preservation of New Hampshire Forests received \$500,000 for Q2C, but Massachusetts has not received any funding. An inter-state initiative of this scale will require major federal funding in order to be successful.

D.10 Community Preservation Act

The Community Preservation Act is legislation that allows cities and towns to exercise control over local planning decisions. The Community Preservation Act (CPA) provides new funding sources which can be used to address three core community concerns:

- Acquisition and preservation of open space
- Creation and support of affordable housing
- Acquisition and preservation of historic buildings and landscapes

The CPA allows communities to create a local Community Preservation Fund to raise money through a surcharge of up to 3% of the real estate tax levy on real property for open space protection, historic preservation and the provision of affordable housing. The act also creates a significant state matching fund, which serves as an incentive to communities to pass the CPA. (Distributions from 2002 to 2007 were at a match rate of 100%). Municipalities must adopt the Act by ballot referendum.

A minimum of 10% of the annual revenues of the fund must be used for each of the three core community concerns, and up to 5% may be used for administrative expenses of the Community Preservation Committee. The remaining funds can be allocated for any combination of the allowed uses, or for land for recreational use. This gives each community the opportunity to determine its priorities, plan for its future, and have the funds to make those plans happen. If residents don't feel the CPA is working as they expected, they can repeal it or change the surcharge amount.

E. CRITERIA FOR OPEN SPACE PROTECTION

Warwick contains much land with high open space and recreation value based on objective, statewide standards. This generally high conservation value derives from the following factors:

- Over 50% of the town's land has already been permanently protected so most of the land's original conservation values remain intact;
- Warwick has distinctive topography that generates excellent wildlife habitat, scenic views, and good recreational potential;

- Warwick’s relatively remote, rural location has resulted in much of the privately-owned land remaining unfragmented and un-subdivided (partly due to the tax incentive provided by the Chapter 61 Forestry program); and
- With 50% of the land permanently protected, an unusually high percentage of other parcels abut currently protected open space, which confers an extra degree of conservation value upon them.

Warwick is fortunate to have such a strong foundation of previously conserved open space. In fact, some of what would be clearly the highest priority areas to target for permanent protection have already been conserved through State Forest ownership, namely Mt. Grace itself, Stevens Swamp, Sheomet Pond, Richards Reservoir, and the south shore of Laurel Lake.

There are other high priority open space and recreation areas in Town that are partially protected currently by State agencies, land trusts (or Town ownership) that include the Barber Hill/Hockanum Hill ridge corridor, the Black Brook/Hodge Brook/Gale Brook stream corridor, and Bass Swamp. Often backland areas such as these have high scenic, wildlife habitat and recreational value, and because they lack road frontage they are not suitable for development and therefore make ideal candidates for open space and recreation conservation.

There is a third category of high value open space areas in Warwick that currently have no protection. This category is comprised mostly of unprotected farm land, and includes the agricultural land in North Warwick, the remaining unprotected hay fields on Chase Hill Road, the fields on Shepardson Road, the fields near the historic village center, and other smaller fields associated with historic farmsteads scattered throughout Town. The undeveloped shoreline of Moore’s Pond is also in this category of high-value open space that currently lacks protection.

E. 1 Basis for Generating Criteria

Since half of Warwick’s land is already permanently protected, current residents have the opportunity to plan for future development in the context of a town that already contains an exceptional amount of conserved open space and passive recreational opportunities. In order to develop “Criteria” in this rare municipal scenario, the focus will be on:

What parcels possess such exceptional open space and recreational values that they are worth conserving even in the face of the Town already being 50% permanently protected open space?

To generate an answer, the following should be reviewed:

1. *Statewide Value:* Are there unprotected open spaces in Warwick that are so exceptional statewide that the Town is very fortunate to possess them within its boundaries; and therefore Warwick has the incentive to preserve these open space “treasures” for the benefit of its own residents as well as for the citizens of the Commonwealth. Newly discovered rare wildlife habitat is a likely example in this category.

2. *Town-wide Value:* Are there unprotected parcels that are particularly critical for preserving Warwick’s culture, historic landscapes, scenic views, rural economy, ecology or recreational resources. Such parcels would be beloved and meaningful to a large number of Warwick residents.
3. *Neighborhood Value:* Are there parcels that are exceptionally significant to and highly used by residents of a particular section of Town (as well as by residents from other parts of Warwick) that if lost to unplanned development would clearly diminish the quality of life in that neighborhood and in the Town as a whole?
4. *Future Development Value:* Is there a parcel in Town that is particularly well suited for future residential or small scale commercial development that Warwick would consider purchasing so that it can plan its own development (such as senior housing); and if so, are there also accompanying open space, recreational and green corridor amenities that the Town would also like to secure to fulfill that vision of a well-planned development.

E. 2 Simultaneous Highest Priorities and Open Space Protection Opportunities

Currently and in the foreseeable future, Warwick includes parcels of land that are very high priority for open space protection in several different categories simultaneously. In this scenario, it is the availability of opportunities that will control which projects are undertaken. Open space protection can move forward only when a landowner is interested in conserving their land or when funding is available to pay full market value when critical parcels come on the open market.

E. 3 Preferred Type of Open Space Protection for Warwick – To Retain Private Ownership

Given how much land in Warwick is State-owned, and given concerns about keeping land on the tax rolls, the ideal form of open space protection for the future is the purchase of Conservation Restrictions and trail easements. In this way, the land itself remains in private ownership and stays on the tax rolls. An open space and recreation budget stretches further when it is possible to purchase just a CR or trail easement, rather than having to pay for the entire parcel.

E.4 Open Space Criteria

As explained above, the six open space criteria categories listed below are not necessarily listed in priority order because Warwick has high priorities in different open space categories *simultaneously*. However, within each category, examples of situations that might occur in Town for each of the categories are prioritized, with the highest priority scenario listed first. For example, under the Open Fields category, land with “prime” agricultural soils currently in active use would be a higher priority than fields in Town that are being used for crops, hay or pasture, or just being faithfully mowed and maintained. The highest priorities represent projects of such high value that the Town may want to raise funds in order to accomplish them; whereas with

lower priority projects, the Town might not be willing to expend funds but would consider accepting the gift of a Conservation Restriction or trail easement if it were donated by the landowner.

E.4.1. Open Fields

- a. with “prime” agricultural soils currently in active use.
- b. any fields with soils designated “prime” agricultural or “state important”.
- c. fields that are adjacent to farmland preserved with an Agricultural Preservation Restriction (APR) that are currently being used by the APR farmer or could potentially be used by that farmer.
- d. fields that have particular scenic, historic or cultural value (including fields visible from the historic village center).
- e. any fields in Town that are being used for crops, hay or pasture, or just being faithfully mowed and maintained.

E.4.2. Unfragmented Forest Blocks

- a. “in-holdings” in large blocks of forest.
- b. forestland adjacent to or near to Warwick Town Forest—to add to the timberland to be managed by the Warwick Town Forest Committee to generate income from timber sales for the Town.
- c. forest parcels that connect existing permanently protected forested parcels for the sake of the integrity of wildlife and trail corridors.

E.4.3. Wildlife Habitat

- a. stream corridors--these are high in wildlife value, and many in Warwick are particularly pristine because they are distant from development.
- b. ridge-line corridors – Warwick has several undeveloped ridge lines; ridge tops are known to be used by large mammals with extensive territories.
- c. vernal pools – Warwick has many vernal pools, on land held in both State and private ownership.
- d. endangered species – parcels that is known to host rare and endangered species.

E.4.4. Recreation Resources

- a. trail corridors – acquire parcels that secure existing trail corridors, or provide for new ones by filling missing links.
[With recreational trail corridors, it will be necessary to work out potential issues of disagreement between different trail user groups.]
- b. scenic views – preserve outstanding views by fee purchase or conservation easements.
- c. trailhead parking – evaluate the potential for safe and suitable trailhead parking, which is an important recreational amenity for both Warwick residents and for visitors from out of town.
- d. access to water for swimming – although swimming is a very popular form of recreation, there are two obstacles to pursuing this objective: 1.) it is very expensive to acquire waterfront property, and 2) the Warwick Select Board has expressed its reluctance to undertake the liability of having a public swimming beach. (For this reason this recreational criterion is listed last.)

E.4.5. Scenic Resources

- a. Views Across Fields – roadside views across fields are an important scenic amenity in a Town as heavily forested as Warwick; their scenic value reinforces the importance of protecting agricultural fields adjacent to Town roadsides.
- b. Hilltop Views (Views from Hilltops) – many of Warwick’s hilltops are heavily forested, therefore the scenic views made possible by the Town’s few open hilltops provide an important scenic resource, particularly on Flower Hill and Shepardson Road.
- c. Ridgeline Views (Views of Ridgelines) – Warwick has several undeveloped ridgelines that are an important part of the Town’s rural scenery. Maintaining undeveloped ridgelines benefits both the scenic value of the Town and the quality of the wildlife habitat (see 3 b. above).
- d. Views Across Ponds – large ponds, like large open fields, provide the potential for exceptional views. When a major, heavily-traveled town road passes by a large pond such as Moore’s Pond, many residents have the opportunity to enjoy the view. Preserving the view of undeveloped shoreline on the opposite shore of the pond accomplishes several open space goals: 1) preserving a scenic resource for future generations, 2) preserving valuable wildlife habitat, 3) protecting water quality for swimming, and 4) protecting water quality for any shallow wells in the

vicinity.

E.4.6. Historic and Cultural Resources

- a. Historic Village Center District – Warwick has an exceptionally homogeneous historic center. Helping it to remain undiluted by incongruously modern construction will preserve the Towns historic heritage.
- b. Historic Farmsteads – Warwick still contains many historic farmsteads where the original farmhouse, barns and outbuildings, stonewalls, and fields are still intact. Each of these is an historic artifact worthy of preserving through the use of conservation easements.
- c. Historic Foundation Artifacts – Warwick has a remarkable number of historic foundations. Of particular note are the cluster of building foundations and other types of structures associated with historic mill sites. Parcels that contain exceptional historic artifacts should be considered for conservation.

SECTION 6

COMMUNITY GOALS

A. DESCRIPTION OF PROCESS

The Town of Warwick's open space and recreation goals from its 2002 Open Space and Recreation Plan were reviewed by the members of the Open Space Plan Committee and reaffirmed through a thoughtful and comprehensive public outreach and planning process that included the following:

- The current Warwick Open Space Committee (WOSC) Chairman, Mary Williamson, invited WOSC members to participate in the creation of the Warwick Open Space Plan Committee in December of 2008. Members of local boards, Warwick citizens and Selectmen were also encouraged to participate.
- In May of 2009, an Open Space and Recreation Survey developed by the Warwick Open Space Plan Committee was mailed to the 325 recipients of the Warwick Newsletter and was posted to the Warwick chat room called the Warwick L, which means it went to both residents and non-residents. If a resident received their Warwick Newsletter electronically, they were given the option to complete the survey online. Additional copies of the survey were also made available at the Library. Fifty-four responses were received for a response rate of 17 percent. (See Appendix B).
- Between March 2009 to December 2009, the Open Space Plan Committee and the Franklin Regional Council of Governments Planning Department developed this Open Space and Recreation Plan using several methods for involving public participation, including:
 - A summary of the Open Space and Recreation Survey results was compiled and used as the basis for the development of Section 8 – Goals and Objectives as well as the overall open space and recreation vision.
 - The Open Space Plan Committee held 22 public meetings to discuss the various sections of the plan and maps, which does not include the work of subcommittees.
 - Three updates on the progress of the Warwick Open Space and Recreation Plan were included in the Town newsletter.
 - Meetings were held with senior citizens, the Women's Guild, Community School youths, and teens.

- A number of ad hoc subcommittees were formed including the Open Space and Recreation Survey Design Subcommittee, The Open Space Survey Compilation Subcommittee, the Equestrian Caucus, The Species Space Cadets, and others which did their work mostly by email and using Microsoft Track Changes on drafts or other information that was circulated electronically.
- Copies of the Open Space and Recreation Plan maps and the Seven Year Action Plan were placed at the Warwick Library. All comments that were received were reviewed by the Open Space Plan Committee and, if appropriate, were incorporated into the Plan.
- Prior to the Public Forum a mailing was made to all Warwick residents which included the Public Forum Flyer and a four page Summary of the Warwick Open Space and Recreation Survey (see Appendices B and C).
- A public meeting notice describing the public forum was sent to the Athol Daily News and the Greenfield Recorder.
- Over 50 residents attended a public forum held at the Town Hall on October 14, 2009, where people reviewed and discussed the inventory, analysis, community goals, objectives, draft maps and the Seven Year Action Plan priorities. All public comments were recorded and have been incorporated into the plan, where appropriate.

B. STATEMENT OF OPEN SPACE AND RECREATIONAL GOALS

People live in Warwick because they like its rural, small town character. According to the 2009 Open Space and Recreation Survey, respondents also highly value the peace and quiet of the town, open fields, forests and trails, high quality of the air and water, my/our perception of town values, and safety from crime and vandalism. There was a near universal consensus among survey respondents that it was very important or important to conserve forests, maintain the rural character of the town, and protect its clean drinking water, trails and scenic views. An overwhelming majority of respondents believe historic and archeological sites should be identified and protected, and by a 3 to 1 margin, respondents felt the sites should be made more accessible.

Warwick residents have a deep appreciation of the town's historic buildings, forests, agricultural lands, and breathtaking scenery. Warwick's landscape - its working farms, extensive forests, Town Center and the Common - gives the town its unique character and charm.

Residents who responded to the Open Space and Recreation Survey and participated in the process of developing this Open Space and Recreation Plan have a shared vision for the future of Warwick's natural, historical, and recreational resources.

Our vision for the Town of Warwick is to preserve our valued agricultural landscapes and working farms, to protect the beauty and unique rural

character of our community, to protect our water resources and drinking water supplies, to preserve contiguous tracts of forested land, and to support sustainable economic development that protects our natural, historic, and cultural resources, strengthens the tax base, provides services, and provides a diverse mix of housing opportunities for residents. We envision a proactive planning process that encourages land uses that sustain the health of our waters, forests, wildlife and working farms, preserves historic resources, and helps the Town to permanently protect its most valued open spaces.

We envision a process in which the Town actively assists landowners and developers in designing projects that sustain and enhance our community's shared assets and character. This Open Space and Recreation Plan is a vital component of a proactive, sustainable land planning and development process which will strive to effectively and equitably manage the growth pressures facing Warwick while preserving natural resources and wildlife habitat, historic features, scenic roads and vistas, and recreational opportunities for current and future residents of our town.

As described in the Vision Statement, Warwick's large blocks of forested land and farmland will be protected as a result of cooperative efforts between private landowners, and local and state agencies and private non-profit organizations. These lands will remain under private ownership and control, continuing to provide income to the town via property taxes. The town's rivers and streams will be clean enough for fishing and swimming. Residents will continue to enjoy clean drinking water from aquifers that have been protected from contamination.

In an ideal Warwick, there will be a diverse local economy, anchored by businesses and agricultural operations. Residents will speak proudly of their successful efforts to maintain and restore historic buildings throughout Town. The Town will continue to be supportive of local farmers and the value they offer to the town. A result of supporting local agricultural and forestry businesses will be access to fresh vegetables, dairy products, fruit and meat produced close to home, as well as the opportunity to buy forest products raised by neighbors. Promoting these agricultural enterprises will help farms stay viable and maintain open space.

The Town and other public agencies will acquire land and/or trail easements so that residents of all ages and abilities will enjoy a system of well-maintained trails in Warwick that offer opportunities for bird watching, wildlife viewing, hiking, cross-country skiing, and snowmobiling. In addition, the town will have been successful at attracting state and federal grants towards the development of recreational programs for youth and adults that support residents' respect and appreciation for their heritage and the natural world.

Even though the majority of residents live far apart they gather through the seasons at popular recreation sites around town such as Ohlson Field, Mt. Grace Picnic Area, Moores Pond, the Community School, Town Hall, and Laurel Lake Beach. These places provide opportunities for residents to mingle, and share news and events and resources. Warwick encourages local entrepreneurship simply by providing a rural setting, access to advanced telecommunications infrastructure, and a strong sense of community that attracts and nurtures home businesses through the natural interactions between people who want to spend time in the Town and in the environment of their choice.

SECTION 7

ANALYSIS OF NEEDS

The Warwick Open Space and Recreation Plan incorporates the inventory of the natural, scenic, and land based recreational resources that are available in Town (Section 4), identifies the most important parcels of land that contain these resources (Section 5), and based on the community's general goals (Section 6), makes comparisons between the current status of the resource inventory compared to the desires of the community (Section 7). In this subsection, a Summary of Natural Resource Protection Needs, the environmental values that have already been addressed in Sections 3, 4 and 5 are summarized. In the Summary of Community's Needs subsection, residents' recreation and open space needs are identified, using the 2009 Open Space and Recreation Survey, comparisons with the 2001 Survey, and specific elements of Section 3, Community Setting. Finally, in the Management Needs subsection, the obstacles to the effective resolution of these needs are addressed including organizational barriers and the most significant land use conflicts concerning open space and natural resource use.

A. SUMMARY OF NATURAL RESOURCE PROTECTION NEEDS

The most important reason for Warwick residents' decision to live here was the rural or small town character, while other reasons in descending order were peace and quiet; open fields; forests and trails; good air and water quality, and safety from crime and vandalism. The most important natural or scenic resources to protect are, starting with the most important, are forests, clean drinking water, trails and scenic views.

These results are similar to the Zoning Task Force Survey Results of 2006. The following is a quote from the summary. "Although "newcomers" now outnumber "old families," everyone shares the same strong desire to maintain the rural character. Comments clearly showed that "old families" stayed because they like the rural character of Warwick, and that is the reason that "newcomers" have moved to Warwick. People were united in wanting to protect Warwick's unique "old fashioned," "unspoiled" rural character and its: "neighborliness," "lack of traffic lights," "wildlife," "low crime," "close knit," "well plowed roads," and "no malls or fast food," to name a few."

A meeting was held for students of the Warwick Community School. The special things in Warwick for this group of elementary students was Mt Grace (climb it, pretty leaves, change of seasons), Sheomet Lake, the town fountain, Moores Pond (ice skating, swimming, kayaking, ice fishing), the Town Common, the woods and trails for hiking and walking, the Copper Angel Bakery, the school and gym, space to keep animals, fields for snowmobiling and sports, the school playgrounds and vernal pools to study.

A Saturday meeting for teens (with pizza) was organized. Their special places were a bit wider ranging than for the younger group, but included many of the shared priorities of all age groups (from most important) Mt. Grace, the Indian Caves, the Devil's Washbowl, Stevens Swamp, Moores Pond, the library, the Copper Angel Bakery, and the numerous unnamed trails for hiking and biking and skiing.

Although they are expressed in different ways, the shared values of adults, teens and pre-teens is remarkable. For example, adults listed safety from crime as important as well as forests and trails. Young people also listed hiking and walking in the woods as some of their favorite things to do, but if crime were a problem probably parents would not let their children wander the trails and woods. Unfortunately, the quality of these resources and community characteristics can be threatened by the ways humans use the landscape. New and disproportionate development and rapidly increased population, for example, could have a negative impact on both the quality and quantity of these resources. One argument for developing an Open Space and Recreation Plan is to help determine the land-based natural and cultural resources most in need of protection and or enhancement.

According to the Open Space Survey, residents feel that it is important to protect natural or scenic resources in the following priority order: rural character, forests, clean drinking water, clean air, trails and scenic views. Even though much of the Town is in State Forest or otherwise permanently protected from development (over 50% of the town), and current development constraints due to local soils prohibit construction in many areas, it may be wise to identify potential focus or priority areas to target the protection of resources by utilizing conservation restrictions or with the assistance of state agencies and local land trusts.

Warwick is in a unique situation among other communities in the region due to the fact that about 50% of its land is already permanently protected from development and there is also a relatively high degree of connectivity among protected areas. Connectivity relates to the manner in which open space parcels abut each other and are thus connected over a large area. This high degree of connectivity makes it easier for wildlife to move across the landscape without contacting people. It also provides residents of Warwick opportunities for developing a network of trails for recreational purposes. Gaps that exist between the protected state forestlands are often parcels of land enrolled in the Ch. 61 program, which are considered to be temporarily protected from development. Temporary and permanently protected land is almost 75% of Warwick's land area. Warwick Officials may want to focus on continuing the good working relationships with regional land trusts for the purpose of assigning the Town's right-of-first refusal in the event that a key Chapter 61 parcel is put up for sale. Often land trusts are able to bring together sources of income and potential buyers of land and development rights in a shorter time frame than if the Town were to attempt it on its own. By being prepared, Warwick may be more likely to see the preservation of choice parcels of forest containing unique habitat, historic resources, scenic views, and trail systems. Other gaps in Warwick's protected lands include pastures and other open fields.

Although Warwick's one active farm, Chase Hill Farm, now has its farmland protected under the Agricultural Preservation Restriction (APR) Program, there are many other unprotected agricultural lands in Warwick. The fields most at risk are rarely the ones protected. Usually, it is the marginal field, or the one too close to other houses that farmers choose to sell to developers, while the APR Program typically works with active farms and requires the presence of prime farmland soils. Farmers sometimes use frontage lots as a means of funding operations during slow years. Many of these fields have prime farmland soils, even if they are not actively farmed.

Focus or target areas can also relate to issues or objectives of the Town. For example, a potential focus area, identified throughout other sections of this Plan, is the siltation of local waterways, which can greatly diminish the biodiversity within streams, wetlands, and other surface waters. Members of the Open Space Planning Committee suggest that this siltation is caused by erosion of dirt roads (sometimes from lack of cobbling gutter, sometimes from poorly maintained bleeds and sometimes from lack of a culvert or bleeder), illegal all-terrain- vehicle use on state, town, and private lands, and excessive winter sanding. Warwick boards and commissions might want to focus on exploring the causes of, and realistic solutions to, this environmental problem.

One focus area that is discussed throughout the Plan is the need to understand and address the short and long term fiscal impacts of residential development in Warwick. According to the 2000 U.S. Census, Warwick grew by approximately 17 percent in the previous decade (1990 – 2000). Warwick needs to find a means for bringing opportunities for learning about these and other issues to residents. A zoning survey done in 2006 found the town united in wanting to protect the rural character and united in the ways to do it. A cost of community services analysis may be one way of continuing to focus on the impact to the town by measuring and comparing the costs associated with different types of development and open space.

Warwick does not have a public water supply for fighting fires. Eighty-five percent of respondents to the Open Space Survey wanted more fire ponds and dry hydrants.

B. SUMMARY OF COMMUNITY'S NEEDS

Planning for Warwick's open space and recreation needs must work to satisfy the present population's desires for enhanced recreation and open space resources while at the same time keeping to stated limitations. There is little interest among respondents of the Open Space Survey, to pay higher taxes to support recreational activities.

As one member of the Open Space Planning Committee mentioned during a meeting, Warwick should start thinking of ways to increase revenues without taxing property. The method mentioned at the time was to increase the amount of managed forestlands under Town-ownership. Well-managed forestland can provide periodic income earned from selling sawlogs, firewood, and other forest products. This revenue in turn could be used

to acquire more Town forestland or provide for other needs as expressed in the Open Space Survey.

Warwick residents’ favorite recreational activities, according to the survey results, are (ranked by popularity): walking, gardening, hiking, bird watching, swimming, and snow shoeing. Many of these activities are already provided for at the areas in town most often used for recreational activities: Laurel Lake Beach, Sheomet Pond, Moores Pond, Mt. Grace trails and Ohlson Field. Open Space Committee members have noted that walking, hiking, and equestrian opportunities could be improved if the dirt roads and trails on State Forest lands were better maintained.

In the survey, Warwick residents identified a need for creating opportunities for people to meet and recreate together. This need was identified in the Open Space Survey even though respondents felt that the town’s sense of community has remained the same (note: this is an improvement from the last survey where a slight majority felt it had declined). The need for a place to gather to talk and recreate cuts across all age classes from the youngest students to the elderly, and was identified in the 2001 Open Space Survey as well as this one. Teens rated it their number 1 priority, while pre-teens rated a “small grocery store” as their number 5 priority. Respondents offered potential ways of creating a stronger sense of community including a store, café, and a sports program for young people.

The Teens List of Open Space and Recreation Ideas from the Teen Meeting (same rank indicates a tie vote):

1. Teen gathering spot (store, Olson Field), Swimming place, Internet and cell phone service
2. Tennis courts, Basketball court
3. Zipline
4. Rock-climbing wall and Trail map/book –showing GPS coordinates and noting access for fishing and canoeing
5. Fix Fire tower on Mt. Grace for viewing, Dirt bike (mountain bike) park
6. Trailhead journals, Zen peace garden, Camping area (Olson field, other)

The Warwick Community School students prepared Their Wish List:

Four-wheeling trails	Covered pavilion w/picnic tables at school
Butterfly museum	Trail journal at the top of Mt. Grace
Basketball court at old school	Access trail/board walk to Lily Pond
Playhouse/cabin at the school	Animal abandonment prevention
More fields for games	Animal natural habitat
	reserve/museum/mini-zoo
Hospital	Small aquarium or petting zoo
Dirt bike track	Picnic tables on Mt. Grace
Skateboard park	Tennis courts at old school site
Letterboxes, geo-caching on trails	Telescope atop Mt. Grace

Food Pantry
Trash collection sites on trails, fields
Natures Classroom

Trail guides and maps
Historical sites and Common maps

The Open Space Committee brainstormed a list of needs and problems and then voted to determine which were most important. The top five vote getters (from most votes to least) are as follows:

1. ATVs
2. Beavers and Flooding
3. Maintenance of Fire Ponds
4. Trail Maintenance
5. Funding for Conservation

These have been elucidated in Section 4 and Funding for Conservation was moved to Section 5 and expanded into Funding Opportunities for Conservation. Invasive species was then added to the list.

There is overwhelming support in this survey and the last for passive recreation on town lands and strong opposition to leasing for private development or for institutional or industrial development. There was support for use of town land for community buildings, active recreation (soft ball, tennis, etc), but opposition to using town land for low income housing, or leasing for private recreation.

On state land there was support for hiking, equestrian trail riding, fishing, and swimming. Respondents were about evenly divided concerning the Commonwealth developing camping and skiing. Given the large number of blank or unsure responses, respondents seemed to have concerns about developing volleyball courts, tennis/badminton courts, and softball/baseball diamonds. Respondents were opposed to the Commonwealth developing mountain biking, boating, snowmobiling, four wheeling (off-road vehicles), dirt biking and commercial institutions. Since the last survey the perceived need for Commonwealth to develop camping, skiing and boating has declined significantly.

In both this Open Space Survey and the last one the overwhelming majority felt there was a need to identify and protect archeological and historic sites. Support for making the sites more accessible has increased from a 2 to 1 margin in the last survey to a 3 to 1 margin in this survey, but 41% left the question blank, which suggests the need to make sites more accessible requires sensitive handling.

Survey respondents felt there was a need for Warwick to try to obtain trail rights through private property. In the last survey opinion was about evenly divided on the issue while in this survey the margin in support was 2 to 1, but 27% were unsure, which suggests weaker support. In both this survey and the last respondents felt there was no need for tax funded trail maintenance, but there was significantly less opposition than in the last survey.

Although economic development issues are typically addressed in Master Plans, Warwick Open Space survey respondents were very clear about the need to support cottage industries with better telecommunications and other methods without encouraging separate industrial and commercial zoning districts.

C. MANAGEMENT NEEDS

Warwick is fortunate to have a great number of organizations interested in the environment in the region. There are a number of state and regional environmental organizations sponsoring land and natural resource protection projects including the New England Forestry Foundation, Mount Grace Conservation Land Trust, the Trustees of Reservations, Massachusetts Audubon Society, Division of Fisheries and Wildlife, the Department of Agricultural Resources, Harvard University, the U.S. Army Corps of Engineers, the Millers River Greenway Committee, and the Millers River Watershed Council. There may be a need for the Town to have the ability to facilitate and coordinate the activities that occur within Warwick so that their conservation efforts benefit local residents as much as possible. An appointed Open Space Committee has been given the responsibility to act as the liaison to these organizations reporting back to Town Officials as necessary. Similarly, if Town Officials were kept abreast of these local and regional efforts, there would be more opportunities for cooperation with adjoining towns.

One issue is the use of Town-owned lands. A majority of Open Space survey respondents feel that Town land should be used for recreation and open space uses. Others may want the Town forests to be managed more intensively. Creating a management plan for each Town-owned parcel via committee, which addresses different uses, may be a good first step.

Another issue addressed in the Open Space Survey is the question of whether to adopt potential changes in the zoning bylaw to protect the Town's rural character and encourage or discourage different uses and lot sizes. For example, survey respondents expressed interest in encouraging cottage industries and possibly improving the level of telecommunications available to home businesses. These services could make it possible for more people to work from home, which would create a more vibrant community. A community filled with people working at home could support a local store/café/post office. On the other hand, creating this level of service might attract new residents; people who want to live and work at home in a very rural town with cell phone coverage and high speed Internet access. A study of potential zoning amendments and their impacts on the Town's rural character may be useful. Carrying out such a study, and discussing its results in regards to potential zoning amendments or changes, may be a way to build consensus on the most appropriate tools for conserving Warwick's rural character while facing increases in population.

Gaining consensus among people with strong positions and feelings can take time, resources, and the commitment of each participant in the group. Gaining consensus requires good leadership, communication, and an understanding that tradeoffs on both

sides are required to resolve conflict. Although it may seem to be a daunting task, the effort a community invests in reaching consensus on a course of action will help to ensure broad support for the most appropriate action step to a well understood and defined objective.

SECTION 8

GOALS AND OBJECTIVES

The following goals and objectives were formulated from the results of the 2009 Warwick Open Space and Recreation Planning Survey and were reviewed and modified through the public meetings of the Open Space Plan Committee, meetings of the Teen Subcommittee and the Warwick Community School students, the public forum process, and associated public comment.

- A. Ensure that the Town of Warwick retains its rural, safe and quiet, small town character and sense of community, and its agricultural, cultural, historic and architectural resources.
 - 1. Support the continued development of festivals and events to provide residents with opportunities to get to know their own community.
 - 2. Ensure that open space owned by the Town of Warwick is not used for institutional or commercial development, low income housing, or leased for private development or for private recreation.
 - 3. Construct an appropriate number of fire ponds and dry hydrants throughout the town.
 - 4. Work with the Warwick Historical Society to inventory, protect and, where appropriate, make more accessible, significant historical and archaeological sites. Consider the creation of a Historic District for the center of Town.
 - 5. Explore options for creating space that would serve as a meeting place for residents.
 - 6. Develop a self-guided walking tour map that shows the cultural resources of the historic center of Warwick.
 - 7. Develop an Agricultural Commission.
 - 8. Develop a Right-to-Farm bylaw.
 - 9. Permanently protect farmland through conservation restrictions or the Agricultural Preservation Restriction (APR) program.

- B. Ensure that the Town of Warwick maintains or improves the quality of its air and water, and the diversity and integrity of native fauna and flora through the conservation of locally important natural, open space.
 - 1. Prioritize town sponsored land protection projects and consider zoning changes that conserve open fields, farmland, forest land, streams, ponds, wetland, woods roads and trails, scenic vistas, and the town center.
 - 2. Accept land and easement donations and facilitate the activities of land trusts in the region.

3. Take advantage of, or assign to a local land trust, the Town's right-of-first refusal with high priority for protection of Chapter 61 lands.
 4. Develop a Land Protection Education program for townspeople to include estate planning, land protection options, and presentations by regional land trusts.
 5. Promote state and private investment in the protection of local and regional forested landscapes to conserve unique habitats of statewide importance, the value of which would be reduced significantly by development within the region.
 6. Inventory and work to develop the best methods for protecting special ecological, historical, and recreational resources in Warwick.
 7. Consider changes to Zoning bylaws and Board of Health regulations to better protect the public health by reducing the possibility of failed septic systems.
 8. Prepare a Cost of Community Services (COCS) study for the Town of Warwick.
 9. Protect wildlife corridor highway crossings.
 10. Eliminate ATV damage to woods roads and trails on state and town land and cooperate with private land owners to limit damage on their land.
 11. Minimize the negative impact of invasive species.
 12. Minimize beaver damage to high value capital resources and where public health or convenience is threatened.
- C. Ensure that the Town of Warwick maintains or improves the current quality, quantity, and accessibility of its recreational resources.
1. Assess the pros and cons of purchasing particular open space areas (e.g. beachfront property on Moores Pond and Hastings Pond), which could potentially provide public access to a valued recreational resource.
 2. Consider the development of recreational resources for seniors as requested by them in a public comment session at the senior meal site in 2009 and in comments to the 2001 Open Space Survey.
 3. Encourage the Department of Conservation and Recreation (DCR) to develop recreational facilities on state forestlands to support public use of this resource for hiking, swimming, equestrian use, and fishing.
 4. Develop recreational facilities and programming on town owned lands to support hiking, equestrian use, camping, and recreational sports, while recognizing the need to develop a regional recreational plan for services which Warwick cannot provide.
 5. Develop a trail system and trail map for Warwick to link public holdings followed by a plan to acquire trail easements through gifts and by state and private grants.
 6. Mark boundaries of town owned land with plastic boundary markers with aluminum nails and blazed trees. We assume that some of the boundaries need to be surveyed.

- D. Ensure the economic stability of the community by developing supportive infrastructure and encouraging economic activity compatible with the rural character of the town.
1. Encourage cottage industries and other locally based economic activities, such as the Farmers' Market, through the use of both zoning and non-zoning techniques.
 2. Encourage big and small farming.
 3. Explore changes to zoning to protect homes and farms from adverse impacts on land use patterns by institutional or industrial development.
 4. Provide to townspeople through the newsletter and other methods, an educational program on the costs and benefits of housing, commercial, and industrial development.
 5. Consider acquiring more Town Forest land to provide income from timber harvests and carbon sequestration.
- E. Engage youths in developing and implementing the OSRP.
1. Solicit and encourage the participation of Warwick teens and elementary-aged children, as appropriate, in the implementation of the following Goals and Objectives: A.4., A.5., A.6., B.6., C.4., C.5., and C.6.
 - A.4. Work with the Warwick Historical Society to inventory, protect and, where appropriate, make more accessible, significant historical and archaeological sites. Consider the creation of a Historic District for the center of Town.
 - A.5. Explore options for creating space that would serve as a meeting place for residents. {This was the number 1 ranked idea/need provided by the Teen Subcommittee}.
 - A.6. Develop a self-guided walking tour map that shows the cultural resources of the historic center of Warwick.
 - B.6. Inventory and work to develop the best methods for protecting special ecological, historical, and recreational resources in Warwick.
 - C.4. Develop recreational facilities and programming on town owned lands to support hiking, equestrian use, camping, and recreational sports, while recognizing the need to develop a regional recreational plan for services which Warwick cannot provide.
 - C.5. Develop a trail system and trail map for Warwick to link public holdings followed by a plan to acquire trail easements through gifts and by state and private grants.
 - C.6. Mark boundaries of town owned land with plastic boundary markers with aluminum nails and blazed trees. This includes that some of the boundaries need to be surveyed.
 2. Examine the feasibility of building tennis courts and a basketball court at the site of the old Warwick elementary school. {This was the number 2 ranked idea/need provided by the Teen Subcommittee and on the Wish List of the Warwick Community School students}.

SECTION 9

SEVEN YEAR ACTION PLAN

The Seven Year Action Plan proposes specific activities that can be implemented by a variety of town boards, committees and state agencies to enable the town to achieve its open space and recreation goals and objectives, which have been identified in Section 8 and elsewhere in this Plan. Table 9-1 lists the objectives in the same order as they appear in Section 8 and are followed by recommended actions, responsible board or group, and start date. As shown in the fourth column in Table 9-1, the Open Space Committee, Select Board, Planning Board, Board of Health, Conservation Commission, the Historical Society, and others are all necessary participants in the successful implementation of Warwick's Open Space and Recreation Plan.

Most of these actions may be constrained by a lack of volunteer time, rather than funding. Where money is required, such as to permanently protect open space, it does not have to be provided by the Town alone. State and federal governmental agencies, private non-profit conservation organizations, and foundations are potential sources of funding, as described in Section 5. In addition, these sources are more likely to invest in land protection projects that have a broad base of community support.

Under the primary stewardship of the Open Space Committee, all of the action steps listed below could be achieved over time. However, it is important to establish priorities for the first seven years. The Open Space Plan Committee has identified the ten most important action steps, which are represented graphically on the Seven Year Action Plan Map, and are outlined in greater detail in Table 9-1. The ten most important action steps are:

- ❖ Utilize teens and other volunteers to GPS and where appropriate make more accessible significant archaeological, geologic and historic sites.
- ❖ Explore options for creating a meeting place for residents, especially teens and seniors.
- ❖ Continue the inventory of ecological resources including certifying vernal pools.
- ❖ Develop a trail map of Warwick utilizing GPS and GIS with assistance from youths and other volunteers and establish a hiking club at the Community School.
- ❖ Eliminate ATV damage to natural resources and trails.
- ❖ Minimize the impact of invasive species
- ❖ Minimize the impact of beavers
- ❖ Mark the boundaries of town owned land
- ❖ Encourage big and small farming and adopt a Right-to-Farm bylaw.
- ❖ Construct dry hydrants and rehabilitate or build new fire ponds throughout town.

Table 9-1: Recommended Actions of the Open Space and Recreation Plan

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
<p>A. Ensure that the Town of Warwick retains its rural, safe and quiet, small town character and sense of community, and its agricultural, cultural, historic and architectural resources.</p>				
	<p>A.1. Support the continued development of festivals and events to provide residents with opportunities to get to know their own community.</p>	<p>Participate with other town organizations and committees to develop festivals and events.</p> <p>Promote the work of the Open Space Committee, where appropriate.</p>	<p>Open Space Committee</p>	<p>2010-2017</p> <p>2010-2017</p>
	<p>A.2. Ensure that Town-owned open space is not used for institutional or commercial development, low income housing, or leased for private</p>	<p>Study the feasibility of transferring authority of Town-owned open space to the Conservation Commission.</p>	<p>Conservation Commission and Town Forest Committee</p>	<p>2011</p>

¹ For action items that are considered to be ongoing efforts, the start date is given as 2010-2017. For other action items, a start date is given but no end date is set because the implementation of the action items is a fluid process. Many of the action items can be worked on simultaneously. Also, the start date for a given action item is not set in stone. The Responsible Board/Group could change the start date for a specific action item, as it deems appropriate, after consultation with the Open Space Committee.

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	development or for private recreation.			
		Determine if the Conservation Commission is willing to take responsibility for managing property.	Conservation Commission	2012
		Explore amending the town’s bylaws with a provision that restricts Town-owned land for commercial development.	Planning Board	2013
	A.3. Construct an appropriate number of fire ponds and dry hydrants throughout the town.	Review needs for fire ponds and dry hydrants.	Fire Department and Town Coordinator; Conservation Commission	2011
		Seek grants to support the development of fire ponds and dry hydrants.	Town Coordinator	2012
	A.4. Work with the Warwick Historical Society to inventory, protect and, where appropriate, make more accessible, significant historical and archaeological sites.	Seek out volunteers in Town who could assist in the creation and publishing of a map showing the locations of these historical, geological, and archaeological sites. Utilize teens and other	Planning Board, Warwick Historical Society, Open Space Committee	2010

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
		volunteers to GPS sites.		
		Consider the creation of a Historic District for the center of Town.	Planning Board; Warwick Historical Society; Select Board	2013
	A.5. Explore options for creating space that would serve as a meeting place for residents.	Set up a Committee to define meeting place needs and options.	Select Board	2010
	A.6. Develop a self-guided walking tour map that shows the cultural resources of the historic center of Warwick.	Utilize teens and other volunteers to GPS sites.	Open Space Committee; Warwick Historical Society	2014
	A.7. Develop an Agricultural Commission.	Ask the Select Board to convene an Agricultural Commission.	Open Space Committee; Select Board	2010
	A.8. Develop a Right-to-Farm Bylaw.	Review available model Right-to-Farm Bylaws and develop a bylaw for Warwick. Bring to Town Meeting for a vote.	Planning Board and newly formed Agricultural Commission	2011
	A.9. Permanently protect farmland through conservation restrictions or	Work with the staff of the Farmland Conservation Program at MGLCT to	Open Space Committee; Conservation Commission; newly	2010

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	the Agricultural Preservation Restriction Program (APR).	facilitate conservation restrictions on Warwick farmland; and if the soils are eligible, request MGLCT's assistance with applications to the APR program.	formed Agricultural Commission	
B. Ensure that the Town of Warwick maintains or improves the quality of its air and water, and the diversity and integrity of native fauna and flora through the conservation of locally important natural, open space.				
	B.1. Prioritize town sponsored land protection projects and consider zoning changes that conserve open fields, farmland, forest land, streams, ponds, wetland, woods roads and trails, scenic vistas, and the town center.	Maintain Open Space Committee	Select Board	2010-2017
		Identify parcels of land in need of protection.	Open Space Committee	2011
		Work with the Franklin Regional Council of	Planning Board; Open Space Committee;	2010-2017

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
		Governments to identify and adopt innovative zoning techniques to achieve the town's goals for land protection.	Franklin Regional Council of Governments	
	B.2. Accept land and easement donations and facilitate the activities of land trusts in the region.	Maintain liaison with local land trusts and the North Quabbin Landscape Partnership.	Select Board, Conservation Commission, Open Space Committee	2010-2017
		Develop criteria for evaluating offers of land or easements, identify and secure funding sources for open space acquisition.	Select Board, Conservation Commission, and Open Space Committee	2010-2017
		Update Criteria for Acquisition of Unprotected Land (Section 5) as new information becomes available but at least every 3 years.	Open Space Committee	2013, 2016
	B. 3. Take advantage of, or assign to a local land trust,	Adopt a protocol for Chapter 61 right of first refusal.	Select Board; Open Space Committee;	2012

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	the Town's right-of-first refusal with protection of high priority Chap. 61 lands.		Conservation Commission	
	B. 4. Develop a Land Protection Education program for townspeople to include estate planning, land protection options, and presentations by regional land trusts.	Insert available literature and brochures on land protection alternatives in the Warwick Community Newsletter.	Open Space Committee	2010-2017
		Collect and submit publications to the Warwick Free Library that would help residents learn about conservation topics and land protection alternatives.	Open Space Committee	2010-2017
		Develop educational programs for landowners and use the newsletter as a vehicle for notification.	Open Space Committee	2010-2017

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	B. 5. Promote state and private investment in the protection of local and regional forested landscapes to conserve unique habitats of statewide importance, the value of which would be reduced significantly by development within the region.	Coordinate promotion of state and private land protection efforts through the action steps of B.4.	Open Space Committee	
		Seek endorsement from the North Quabbin Regional Landscape Partnership (NQRLP) for Warwick projects, and request project assistance from NQRLP staff.	Open Space Committee	2010-2017
	B.6. Inventory and work to develop the best methods for protecting special ecological, historical, and recreational resources in Warwick.	Ensure the inventory of ecological, historical, and recreational resources is complete.	Open Space Committee, Conservation Commission, and the Historical Society	2011
		Participate in Biodiversity Days.	Open Space Committee	2010-2017
		Certify vernal pools.	Conservation Commission	2010-2017

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
		Prioritize high quality biological resources for protection and initiate partnerships with a suitable land trust or state agency to facilitate permanent protection of the resources.	Open Space Committee	2013
	B. 7. Consider changes to Zoning bylaws and Board of Health regulations to better protect the public health by reducing the possibility of failed septic systems.	Review the health threats of on-site sewer to private wells and the public health in general.	Board of Health and Planning Board	2010
	B.8. Prepare a Cost of Community Services (COCS) study for the Town of Warwick.	Consider hiring the American Farmlands Trust to prepare the COCS.	Open Space Planning Committee and Planning Board	2015
	B.9. Protect wildlife corridor highway crossings	Install “Turtle Crossing” signs each season.	Highway Department; Conservation Commission	2010-2017
		Inventory culverts that need to be upgraded.	Highway Department Conservation Commission	2010-2017

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
		Prioritize migration hotspots across roads; evaluate the need for more “wildlife crossing” signs.	Highway Department Conservation Commission	2010-2017
	B.10. Eliminate ATV damage to woods roads and trails on state and town land and cooperate with private land owners to limit damage on their land.	Inventory sections of woods roads and trails where damage is occurring. Request enforcement from DCR on State land. Post Town Land and, where appropriate, block ATV access. Organize volunteer work crews to repair damaged areas.	DCR Open Space Committee Conservation Commission Trail Committee	2010 2011 2010-2017 2010-2017
	B.11. Minimize the impacts of invasive species.	Inventory and prioritize species threats and develop control options; Organize volunteer crews to implement control options.	Conservation Commission	2011 2012

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
		Educate the public about the species and their threats	Conservation Commission	2010-2017
	B. 12. Minimize beaver damage to high value capital resources and where public health or convenience is threatened.	Inventory beaver damage locations. Evaluate areas of impacts and discuss mitigation options with Massachusetts Fish and Game.	Board of Health Conservation Commission Warwick Highway Department MA Fish & Game	2011 2012
C. Ensure that the Town of Warwick maintains or improves the current quality, quantity, and accessibility of its recreational resources.				
	C.1. Assess the pros and cons of purchasing particular open space areas (e.g. beachfront property on Moores Pond and Hastings Pond), which could potentially provide public access to a valued recreational resource.	Inventory and assess the pros and cons of acquiring open space in Warwick for Town recreational use.	Conservation Commission; Recreation Committee; Open Space Committee	2011

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	C. 2. Consider the development of recreational resources for seniors as requested by them in a public comment session at the senior meal site in 2009 and in comments to the 2001 Open Space Survey.	Assess specific facilities and programming needs of Warwick seniors and youths.	Council on Aging, Trinitarian Church, Recreation Committee	2010
	C.3. Encourage the Department of Conservation & Recreation (DCR) to develop recreational facilities on state forestlands to support public use of this resource for picnicking, hiking, swimming, equestrian use, and fishing.	Support public use of these resources for picnicking hiking, swimming, equestrian use, and fishing.	Open Space Committee; Recreation Committee	2010-2017
		Assist DCR in developing protocols for more controversial uses such as motorized recreation and mountain biking.	Open Space Committee; Recreation Committee; SelectBoard	2014

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	C4. Develop recreational facilities and programming on town owned lands to support hiking, equestrian use, camping, and recreational sports, while recognizing the need to develop a regional recreational plan for services which Warwick cannot provide.	Form a focus group to evaluate the suitability of various recreation activities on town owned land and investigate recreation opportunities available in neighboring towns.	Recreation Committee	2011
	C. 5. Plan a trail system and trail map for Warwick to link public holdings followed by a plan to acquire trail easements through gifts and by state and private grants.	Establish a trail committee.	Open Space Committee, Recreation Committee; the Mt. Grace Snow Streakers; Warwick Community School; Town Forest Committee; DCR	2011
		Use GPS and GIS techniques with youth and others assisting to map trails.	Trail Committee	2010-2017
		Identify parcels needing trail easements and seek assistance in acquiring them.	Trail Committee	2010-2017

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
		<p>Establish hiking club at the Community School</p> <p>Coordinate efforts with equestrian interests and snowmobilers.</p>	Trail Committee; Recreation Committee	<p>2011</p> <p>2010-2017</p>
	C.6. Mark boundaries of town owned land with plastic boundary markers with aluminum nails and blazed trees. We assume that some of the boundaries need to be surveyed.	<p>Begin delineating boundaries of town parcels (Target: at least 3 parcels) with possible assistance of youths.</p> <p>Install boundary markers.</p>	Open Space Committee; Town Forest Committee	<p>2010</p> <p>2010-2017</p>
D. Ensure the economic stability of the community by developing supportive infrastructure and encouraging economic activity compatible with the rural character of the town.				
	D1. Encourage cottage industries and locally based economic activities with zoning and non-zoning	Explore zoning revisions or adoption of measures that would encourage small business development	Planning Board	2010-2017

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	techniques.	without detracting from Warwick’s rural character.		
	D2. Encourage big and small farming	Establish an Agricultural Commission and propose to Town Meeting a Right to Farm Bylaw.	Planning Board	2010-2017
	D3. Explore changes to zoning to protect homes and farms from adverse impacts on land use patterns by institutional or industrial development.	Work with the Regional Planning Agency to explore and develop alternative zoning measures appropriate to Warwick.	Planning Board	2010-2017
	D4. Provide to townspeople through the newsletter and other methods, an educational program on the costs and benefits of housing, commercial, and industrial development.	Develop articles for the Town newsletter based on the costs of community services analyses and the results of similar studies.	Open Space Committee and Planning Board	2015 or as soon as a COCS study has been completed
	D.5. Consider acquiring more Town Forest land to provide income from timber harvests and carbon sequestration.	Determine which are the most suitable parcels and write a letter to current landowners informing them of the Town’s potential long-term interest.	Open Space Committee; Town Forest Committee	2012

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
		Seek assistance from conservation non-profits and state agencies to maximize outside funding sources in order to minimize the cost to Warwick residents of Town forest land acquisition.	Open Space Committee; Town Forest Committee	2013
E. Engage youths in developing and implementing the OSRP				
	E.1. Solicit and encourage the participation of Warwick teens and elementary-aged children, as appropriate, in the implementation of the following Objectives: A.4., A.5., A.6., B.6., C.4., C.5., and C.6.		Open Space Committee	2010-2017
	A.4 Work with the Warwick Historical Society to inventory, protect and, where appropriate, make more accessible, significant historical and archaeological sites. Consider the creation of a Historic District for the center of Town.	Utilize teens to help other volunteers with inventorying the sites using GPS.	Warwick Historical Society, Open Space Committee; Trail Committee	2010-2017

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	A.5. Explore options for creating space that would serve as a meeting place for residents. {This was the number 1 ranked idea/need provided by the Teen Subcommittee}.	Encourage teens and support their participation in a Committee that will work to define meeting place needs and options. (See A.5.)	Open Space Committee; Recreation Committee	2010-2017
	A.6. Develop a self-guided walking tour map that shows the cultural resources of the historic center of Warwick.	Coordinate the efforts of teens to GPS the cultural resources of Warwick Center; consider using teens and elementary children to help design and illustrate the tour map.	Open Space Committee; Warwick Historical Society; Recreation Committee	2015
	B.6. Inventory and work to develop the best methods for protecting special ecological, historical, and recreational resources in Warwick.	Encourage Warwick Community School students and teens to participate in Biodiversity Days.	Open Space Committee; Conservation Commission	2010-2017
		Enlist the help of teens and Warwick Community School students to certify vernal pools.	Conservation Commission	2010-2017
	C.4. Develop facilities and programming on town owned lands to support hiking,	Encourage teens to join the focus group to evaluate the suitability of various	Recreation Committee	2011

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	equestrian use, camping, and sports, while recognizing the need to develop a regional recreational plan for services which Warwick cannot provide.	recreation activities on town owned land and investigate recreation opportunities available in neighboring towns. Publicize through the town website and newsletter.		
	C.5. Plan a trail system and trail map for Warwick to link public holdings followed by a plan to acquire trail easements through gifts and by state and private grants.	Encourage youth to participate in the trail committee. (See C.5 above).	Open Space Committee Recreation Committee Mt. Grace Snow Streakers Warwick Community School Town Forest Committee	2010-2017
		Encourage the participation of youth and use GPS and GIS techniques to map the trail system and develop map.	Open Space Committee	2010-2017
		Establish hiking club at the Community School	Warwick Community School Recreation Committee	2010
	C.6. Mark boundaries of town owned land with plastic boundary markers with aluminum nails and blazed trees. We assume that some	Encourage teens to participate in the delineation of the boundaries of town parcels (Target: at least 3 parcels) and help with the	Open Space Committee; Forest Committee	2010-2017

GOAL	OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE ¹
	of the boundaries need to be surveyed.	installation of boundary markers		
	E.2. Examine the feasibility of building tennis courts and a basketball court at the site of the old Warwick elementary school. {This was the number 2 ranked idea/need provided by the Teen Subcommittee and on the Wish List of the Warwick Community School students}.	Convene a working group that includes a youth and a teen representative to evaluate the feasibility of the project at the old Warwick elementary school site and explore funding options.	Open Space Committee; Recreation Committee; Town Coordinator	2011

**SECTION
10****PUBLIC COMMENT**

Public feedback was sought throughout the entire open space and recreation planning process. The text and maps included in the Plan reflect these enhancements. A more direct request for feedback on the maps and Five Year Action Plan was made at the Public Forum held at the Warwick Town Hall on October 14, 2009. The committee had hoped to have 20 people attend, but over 50 came. This is a remarkable turnout, better than at some special town meetings, and constitutes over 6% of the town's population. Participants were encouraged to review the draft maps and note any additions or changes directly on the maps or on the 8 ½ inch by 11 inch white lined tablet beside each map. A lively question and answer session followed the PowerPoint presentation delivered by several members of the Open Space Plan Committee. Comments from the forum participants were recorded by staff from the Franklin Regional Council of Governments and a Committee member.

The consensus of both Open Space Plan Committee members and forum participants was that the forum was remarkable both for the high interest of attendees and the strong sense of community. Participants praised the high quality of the PowerPoint slides, the multiple speakers, and the obvious amounts of hard work and committee pride. Positive feedback was also received on the maps and the involvement of Warwick's youth and teens in the process to update the Plan. The fact that over half the people stayed after the meeting to discuss things informally was unusual and indicative of the attendees' interest in the presentation. Following the forum, draft copies of the maps and Seven Year Action Plan were also made available for review by the general public at the Warwick Free Library for approximately 2 weeks. Comments received during forum and the review period after the forum have been incorporated into the Plan.

Copies of the final version of the Warwick Open Space and Recreation Plan were sent to the following boards and organizations for review and comment:

- Massachusetts Division of Conservation Services (DCS)
- Warwick Select Board
- Warwick Planning Board
- Warwick Conservation Commission
- Warwick Recreation Committee
- Mount Grace Land Conservation Trust

Letters of comment are inserted into the plan at the end of this section. The letters reflect the broad base of support the Warwick Open Space Plan Committee has earned over the past 10 months of hard and diligent work on the Open Space and Recreation Plan.

The following comments were recorded during the Question and Answer session at the October 14, 2009 Public Forum. Several of the comments led to discussions that confirmed two of the priority actions listed in the Seven Year Action Plan, including: eliminating all terrain vehicle (ATV) damage to natural resources and trails; and minimize the impact of invasive species.

Question: How do you define native versus non-native species?

Answer: A list has been developed by the Massachusetts Department of Agricultural Resources. The plants on the list have been deemed not healthy for native flora and fauna. Most invasive species thrive in disturbed areas and along man-made corridors.

Comment: A point was made that there are forest management plans for town lands.

Response: That is correct. Specifically, there are no management plans for lands under the control of the Conservation Commission.

Comment: We should recognize the monetary and environmental value of Warwick’s forests for carbon sequestration. The town should document ways to generate income from our commitment to keep our forests – carbon offsets, credits, certificates both on private land and on the 48% of land in town owned by the state. If the state gets money for carbon sequestration on its lands in Warwick, then the Town of Warwick should get 8%. Note: a paragraph has been added below on carbon sequestration and a 4 page appendix has been added.

Comment: With respect to monetizing the value of our forests, the goals and tasks listed in the Open Space and Recreation Plan mesh well with the Economic Development Goals listed in the Franklin County Economic Development Plan: wood products and processing; renewable energy; niche agricultural businesses; internet-based businesses; and tourism. All of these recommendations preserve and improve and enliven our local economy.

Question: Do we have any say over how state lands are used?

Answer: Yes. Getting more involved in the decision-making process for state lands is an objective in the 5-Year Action Plan. Pat Lemon tried to get a Friends of Warwick State Forest group going but we need more participants for a successful public/private/municipal partnership.

Comment: It would be nice to roads that are safer and more accessible to foot traffic, since many people use the roads for recreational walking. Especially along

Route 78, the shoulder of the road is overrun with Japanese Knotweed and poison ivy.

Comment: Regarding the teens interest in having a climbing wall, it was volunteered that there is a natural rock climbing wall on the south side of Mt. Grace which was commonly used many years ago by youth. There is a nice view from there too.

Question: I was walking my dog at Ohlson Field and noticed damage from ATVs and other vehicles. Who do I report it to?

Answer: Report damage to town police and Erving State Forest headquarters. It is illegal to operate ATVs on state land, unless the ATV is used in specially designated areas.

Question: Do we want to be a recreational destination? Put information on the town's website?

Answer: There is a delicate balance to be maintained, especially with respect to private ownership issues. *Put information on the town's website?* The group said NO. Put information at the Library and Town Hall. Limit access – move slowly. It was noted that Northfield has a good Trail Committee and an excellent trail system that extends to Stevens Swamp.

Comment: Concerned about the amount of trash I see on the trails. People need to be reminded to carry out what they bring in. It was suggested that signs be posted, "Carry out more than you carry in."

Question: What about a camping area at Sheomet Pond?

Comment: Sheomet Pond is state forest land. One commenter noted that many years ago there was a state proposal to open the area for camping, and the matter was brought to town meeting which voted to not support the proposal. There are no plans by the state to open it as a camping area, however, it does again stress the importance of close coordination with the state regarding activities on the Mt. Grace and Warwick State Forests.

An email comment was received: "Offer teenagers the opportunity to volunteer to assist in GPS work, including inventory of historical, geologic, archaeological sites, and trail mapping." And, "include teenagers in committee to define meeting space and needs." "Looking at C5 and feel we are not constraining ourselves regarding trail maintenance."

At the October 28, 2009 meeting of the Open Space Plan Committee, the members discussed a comment made at the Public Forum about carbon sequestration and having the town receive money from the state if the state gets money for sequestering carbon in state forests. The members agreed to follow-up on this comment and prepared the following information.

Carbon Sequestration Opportunities

The increasing recognition for the role forests have in mitigation of climate change is important to the citizens of Warwick. Most of Warwick is forested and the opportunities for the sale of carbon credits from these forests may provide opportunities for income to landowners who choose to keep those lands in forest. The sale of carbon credits works for land that is sustainably managed for forest products as well as for lands managed as wilderness where no harvesting is allowed. A more in depth discussion of forests and the role they play in the global climate can be found in an article entitled, “The Importance of Forest Carbon in Climate Change Policy” prepared by Environment Northeast, which is included at the end of this section.

Comments Received on the Draft Open Space and Recreation Plan Maps

The Draft Open Space and Recreation Plan maps were made available for public review and comment during the Public Forum and for approximately two weeks after the Public Forum. The following comments on the draft maps were collected and reviewed by the Committee. The final maps reflect many of the changes suggested in the collected comments.

Water Resources Map:

1. Label Hodge Brook; Gale Meadow; and Williams Meadow.

Open Space Map:

1. WOW! It’s very exciting to see core habitat zones identified. It’s great to see this, a very valuable service for Warwickians. Thanks!
2. Include both BioMap Core and Supporting and Living Waters Core and Supporting Habitats – Natural Communities from NHESP.

Scenic Resources and Unique Environments Map:

1. Limestone Rock off Hastings Heights Road. CCC Camp Richmond Road? Transient Camp.
2. #91 – view from Flower Hill Road is mislabeled? 91 is next to 88. Chase Hill Farm, Chase Hill Road – not Flower Hill Road.
3. #61 Aryer Mill, the site of the timber mill set up before the founding of Warwick to cut house and meetinghouse timber for the coming settlers.
4. Add? Old Turnpike from Gale Road to Old School via Devil’s Washbowl trail to Hedge Brook to Old School ballfield (SE corner).

Prime Farmland and Development Constraints:

1. What does it mean protected water? Can farm animals use this water? Fencing?

APPENDIX A

Agendas and Sign-In Sheets for the Warwick Open Space Plan Committee

APPENDIX B

2009 Open Space and Recreation Plan Survey
Summary of 2009 Survey Results

APPENDIX C

Flyer for October 14, 2009 Public Forum
Sign-In Sheet for Public Forum
PowerPoint Presentation for the Public Forum

APPENDIX D
ADA Self-Evaluation Report

APPENDIX E
Letters of Support