TOWN OF WARWICK

OPEN SPACE AND RECREATION PLAN

JUNE 2002

Prepared by the
WARWICK OPEN SPACE PLANNING COMMITTEE
Edwin Cady, Jr., Chair,
and the
FRANKLIN REGIONAL COUNCIL OF GOVERNMENTS
PLANNING DEPARTMENT

This project was funded by the Massachusetts Executive Office of Environmental Affairs through the Millers Watershed Basin Team

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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 towards the identification, prioritization, conservation and protection of Warwick's natural, recreational, and historical resources in the face of new residential development. Its purpose is to provide a framework for decisions dealing with land uses that may impact valuable natural resources and the lands that contain unique historical, recreational, and scenic values.

The 2002 Warwick Open Space and Recreation Plan (OSRP) embodies the understanding of Warwick residents of the interdependence of contiguous forests, streams, swamps, and wetlands, agricultural fields, scenic views, and significant historical structures and landscapes with the Town's rural character. The OSRP illustrates the role that all undeveloped open spaces have in providing wildlife habitat, in ensuring that residents have access to forests and fields to walk, view nature and recreate, and that the Town's rural characteristics including the quality of its air and drinking water are maintained or, in the case of stream and lake quality, improved over time.

The Five-Year Action Plan gives concrete substance to the goals and objectives, which were developed from the results of the 2001 Open Space and Recreation Survey and from community members' understanding of their Town's vast yet vulnerable natural resource base. The 2002 Warwick Open Space and Recreation Plan prioritizes actions that will:

- Form an Open Space Committee;
- Adopt a cell tower bylaw;
- Ensure the inventory of ecological, historical, and recreational resources is complete;
- Develop a rapport with local land trusts;
- Form a Committee representing all Town Boards that will create a plan for benign disposition of the Warwick Prison Camp;
- Explore zoning revisions or adoption of measures that would encourage small business development without detracting from Warwick's rural character;
- Study the feasibility of transferring authority of Town-owned open space to the Conservation Commission;
- Appoint a Liaison to the North Quabbin Regional Landscape Partnership;
- 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);
- Develop a Master Calendar for (community) events;

- ❖ Identify parcels of land in need of protection (from development);
- ❖ Develop a Trail Map for Warwick;
- ❖ Assess specific facilities and programming needs of Warwick seniors.

SECTION 2

INTRODUCTION

In 1987, the Warwick Open Space Committee prepared the Town's Open Space Plan. Much of the environmental inventory and analysis information relating to Warwick's special recreational, ecological, and historical sites, which are documented in the 1987 Plan, have been incorporated into the 2002 Open Space and Recreation Plan (OSRP). The 2002 Open Space and Recreation Survey, used as the backbone of the current planning effort, as well as the deliberations of the current Open Space Planning Committee and the prioritization of the five-year action plan all reflect a significant portion of the vision for Warwick's future that is described in the 1987 Plan's Introduction:

- Maintain the rural mixed agricultural/residential character;
- Keep town expenses low to encourage agricultural and other traditional, but often low income, occupations;
- Discourage industrial development; allow some commercial development to improve the tax base and provide local employment without harming the rural character;
- Ensure adequate safeguards to guarantee potable on-site water supplies and safe on-site sewage disposal.
- Ensure that town officials are prepared to meet the challenges of minimizing the adverse impacts of increasing development pressure. It is particularly important that town officials be equipped to deal effectively with experienced developers.

The land and all it contains continues to capture the hearts and minds of Warwick residents. The search for effective tools and action steps that deal with the impacts of growth on Warwick's rural character may be receiving more attention now than fifteen years ago. There appears to be a greater level of consensus on the multiple values of undeveloped land including its fiscal value.

In 1999, the Massachusetts Executive Office of Environmental Affairs (EOEA), Millers River Basin Team secured funding for a regional growth management project to be developed by the Franklin Regional Council of Governments (FRCOG) Planning Department that included open space planning for the towns in the western portion of the Millers River Watershed: Orange, Wendell, Warwick, and Erving. Warwick was the first town to take advantage of the available funding to develop an OSRP, which could also serve to support the analysis of economic development issues, usually reserved for a master planning process.

A. 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. This plan brings together and builds upon the planning efforts of the past fifteen years including the 2001 Open Space and Recreation Survey, as well as the survey results of the 1987 planning effort. This OSRP represents a year of consensus building on the most important community and natural resource needs in Town and the best solutions for addressing them. The Five-Year step-by-step Action plan, when carried out by an Open Space Committee and other town boards and commissions, will successfully implement the Town's open space and recreation goals and objectives.

B. PLANNING PROCESS AND PUBLIC PARTICIPATION

Although the 2002 Warwick Open Space and Recreation Plan (OSRP) officially began with the first public meeting on October 17, 2001, the Open Space Committee, led by Ted Cady, met many times prior to that date to develop an open space and recreation survey and review its results. By the end of June 2002, the Warwick Open Space Planning Committee will have met approximately seventeen times over a one year period. Prior to that evening meeting on October 17, an Open Space and Recreation Survey had been developed and sent to all residents; its results were compiled and a report of the results was sent with a preliminary draft of Section 8, Goals and Objectives, to sixty residents representing the following Town boards and commissions:

- Conservation Commission,
- Fire Department,
- Select Board
- Planning Board,
- Assessors,
- Historical Society, and the
- Town Forest Committee.

Including the Public Forum, which was held on June 13, 2002, there have been ten public meetings of the Warwick Open Space Planning Committee and at least seven working group meetings. Meetings held from October 2001 through May 2002 were spent refining the draft Sections 1 through 9 of the Open Space and Recreation Plan. These sections, containing the inventories, issues, needs, objectives, and action steps, were prepared in advance of the meetings by FRCOG planners with the assistance of the Open Space Planning Committee members. This form of work review was a significant and consistent vehicle for public participation in the development of the Open Space and Recreation Plan. Approximately two drafts of Sections 3-9 were mailed to all of the people on the mailing list for review and input was encouraged through discussions at each of the meetings.

Meetings 7 and 8 focused completely on Section 9, the Five-Year Action Plan, and on planning the public forum. Draft copies of the 2002 Warwick Open Space and Recreation Plan were on display prior to the public forum at the Town Offices, the Warwick Free Public Library, the Metcalf Chapel and the Community School.

Any comments expressed at the public forum were recorded on flip chart paper and included in Section 10 – Public Comments. Any ideas, comments, and corrections pertaining to different sections of the plan and the action steps have also been included in the final version of the Warwick Open Space and Recreation Plan, after a determination by the Open Space Planning Committee.

SECTION 3

COMMUNITY SETTING

The Town of Warwick contains rural landscapes that have been developed and affected by its residents over the past several hundred years. Planning for open space in Warwick must account for the complex relationships between people, the open spaces, and the natural resources upon which they depend. Unplanned growth without consideration of its impact on the Town's rural character and the natural resources that need to be protected, such as wildlife habitat will reduce the quality of life for current and future generations.

The information provided in this section, Community Setting, inventories and assesses the human and land use components of the landscape, moving from the present, to the past, and then to the potential future, based on current development trends. The Regional Context gives a snapshot of Warwick today, and identifies the ways in which the location of the Town within the region has affected its growth, its quality of open space, and its recreational resources. History of the Community looks back at the manner in which the human inhabitants settled and developed the landscape. Next, using statistical information and analysis, Population Characteristics describes the people of Warwick and how population and economic trends may affect the Town in the future. Finally, Growth and Development Patterns describes specifically how the Town of Warwick has developed over time and the potential future impacts that the current zoning may have on open space, drinking water supplies, and municipal services in the future.

A. REGIONAL CONTEXT

Regional Context concentrates on the location of Warwick relative to natural and socio-economic resources and conditions shared by communities in the region. It describes the significant influence that physical location can have on Warwick's community characteristics. These characteristics include the quality and quantity of open space in the Town as well as its recreational resources. Regional Context also considers the impact that different land uses, located within the Town of Warwick and in surrounding communities, have on regional open space and recreational resources. Finally, potential regional strategies for environmental and open space protection are offered.

The Town of Warwick is located in north central Massachusetts, in the eastern part of Franklin County. The Town's 32.6 square miles makes it the largest among Franklin County towns. It is bordered by Royalston on the east, by Orange on the south and southeast, by 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, a major axis of transportation in Franklin County via State Route 2A in West Orange.

Warwick's location in the North Quabbin region has impacted its development since its establishment in the 1760's. Its remote and steep, forested hills and fast running streams provided waterpower to all types of mills, but especially those that worked with the vast wood fiber resources. Its distance from commercial centers in the Connecticut River Valley resulted in less expensive land prices, which made the Town more attractive to entrepreneurs interested in establishing saw, box, glass, and brick mills and tanneries. Later, in 1835, its remote and mountainous terrain proved too much for the railroad, which sought more level routes along the narrow Millers River flood plain. This resulted in a swift decline in population that continued well into the late twentieth century. Given the rapid population growth rate over the last ten years, it appears that its rural hill town characteristics are attracting people once again to move to, and settle in, Warwick.

A.1. Natural Resources Context

In order to plan for the protection of open spaces and natural resources in Warwick, residents should consider the role these resources play across the region. Two regional landscape-level features important to Warwick and surrounding communities are abundant and contiguous forestland and watersheds (Millers, Ashuelot, and Connecticut Rivers). The presence and relatedness of these significant resources presents both opportunities and challenges to open space and recreation planning.

A.1.1. Large Blocks of Contiguous Forestland

Forests constitute the most abundant and one of the most important natural resources in Warwick and the region. According to the Massachusetts Geographic Information System (MassGIS) 1997 land use data, 91 percent of Warwick is covered in forest. In Warwick, these forests are made of 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 of Massachusetts owns 58 percent of the forestland in Warwick, which is overseen by the Department of Environmental Management (DEM). This land area includes Mount Grace State Forest and Warwick State Forest, which are each 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 on 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 itself rises 1,625 feet to make it 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 Trail.

Warwick State Forest, with a number of parcels scattered throughout Town, totals 9,097 acres. Within Warwick State Forest lies Sheomet Lake, a thirty-one (31) acre impoundment that is stocked with trout by the Division of Fisheries and Wildlife. In an effort by DEM and Mount Grace Conservation Land Trust (MGCLT) to link several parcels of Warwick State Forest with other protected lands in Warwick, 492 acres of open space was acquired in 1995. These parcels linked a large tract of Warwick State Forest with MGCLT land, known as the Arthur Iversen Conservation Area, and include Gale Pond, portions of Hodge and Rum Brooks as well as their substantial associated wetland systems, a black spruce bog, several vernal pools and a cascade known as Devil's Washbowl. The current uses of this land include trail activities, hunting, and forestry. Also within Warwick State Forest is the Richards Reservoir, a thirty-five (35) acre impoundment situated on Black Brook. The reservoir's primary recreational use is for fishing.

Large blocks of contiguous forestland are important regional resources for several reasons. First they represent an area with a low degree of fragmentation. Wildlife species that require a certain amount of deep forest cover separate from people's daily activities tend to migrate out of fragmenting landscapes. New frontage lots and subdivisions can often result in a widening of human activity, an increase in the populations of plants and animals that thrive alongside humans (i.e. raccoons and squirrels) and a reduction in the species that have larger home ranges and unique habitat needs.

When these large blocks of forest are protected from development they help to 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 a sense of its roots, what it looked like in the early years of its settlement. When the blocks are connected across the region, unique opportunities exist for recreational trail development, for wildlife, and for conserving water quality.

Warwick's open space lands are part of a regional forested landscape that stretches from the Quabbin Reservoir, west to the Connecticut River and north into New Hampshire. The North Quabbin Region has statewide importance due to the fact that a significant portion of its land area is comprised of vast tracts of permanently protected forest. Clearly, the contiguous protected forests in Warwick are part of the bridge, the connection of open space across the regional landscape.

The North Quabbin Region is currently receiving the attention of the Massachusetts Executive Office of Environmental Affairs (EOEA). EOEA views the North Quabbin Region, and some places in particular, like the Tully Mountain area in Orange and Royalston, as priorities for protection because they represent large blocks of contiguous undeveloped forest that could support a desired level of biodiversity within the Commonwealth. Because of the attention paid to the region by EOEA, state agencies like DFW and DEM are more likely to invest available land protection monies in Warwick than in a town in another region. Regional land trusts like Mount Grace Land Conservation Trust (MGLCT) and the New England Forestry Foundation (NEFF) and statewide conservation non-profits like Massachusetts Audubon Society, Inc. (MAS) and The Trustees of Reservations (TTOR) are also more likely to assist in providing

administration and technical support to land protection projects when there is a greater chance that one of these state agencies will purchase the land in fee or pay for a conservation restriction. Warwick residents interested in protecting more open space and in so doing, decrease the gaps between protected lands, could take advantage of this finite attention of the state and non-profit agencies, by informing interested landowners of their conservation options and linking them with the regional land trusts.

A.1.2. Watersheds

Watersheds are the areas of land that drain to a single point along a stream or river. Subwatersheds contain first and second order stream tributaries. These are the most extensive component of any watershed. They are also the most sensitive to land use, both the negative impacts of runoff and the positive effects of forest cover. Two of the most important things that result from protecting forestland are maintaining the long-term integrity of wildlife habitats and water quality within the watershed's surface and ground waters.

Warwick's lands drain into the Millers River Watershed to the south and east, the Connecticut River Watershed to the northwest, and into the Ashuelot River Watershed 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 Town, 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's confluence with the Millers in West Orange is less than a mile upstream from Moss Brook's. In eastern Warwick, Tully Brook carries drainage from the Warwick State Forest among other lands to Sheomet Lake, the outflow from which is the West Branch of the Tully River. Both the West and East Branches of the Tully Brook join up on the Orange Athol Town Line.

Some of Warwick is located in the western 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 east by the Nashua River watershed, on the west by the Connecticut River Watershed, and on the south by the Chicopee River watershed. From its tributaries of origin in New Hampshire, the Millers River flows south, then gradually west, ultimately flowing into the Connecticut River. The Millers River drains a regional 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. This feature made the Millers River and its main tributaries a magnet for manufacturing and hydroelectric power generation, which provided the impetus for initiation of industrial activities in neighboring towns in the late 1700s.

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

In northern Warwick, three brooks start in Warwick and then drain into the Ashuelot River in New Hampshire. Mountain and Kidder Brooks flow together to become Mirey Brook, which like Lovers Retreat Brook, drains into the Ashuelot River, which is located in southwestern New Hampshire. The river begins in Washington, New Hampshire and flows south and west to the town of Hinsdale where it enters the Connecticut River. The Ashuelot River flows for a total of 64 river miles prior to entering the Connecticut River. The Ashuelot River Watershed encompasses 420 square miles and is home to the federally endangered dwarf wedge mussel. The U.S. Fish and Wildlife Service has identified the Ashuelot River as one of the four most important refuges for this mussel. The Ashuelot River is currently included in the Connecticut River Anadromous Fish (fish that live in saltwater but return to freshwater to spawn) Restoration Program for smelt rearing and fry release. However, the program is not anticipated to start in the Ashuelot River for approximately five years.

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

In northwest Warwick, Mill Brook drains directly into the Connecticut River Watershed, which is the largest river ecosystem in New England. It encompasses approximately 11,000 square miles and has its headwaters at Fourth Connecticut Lake at the Canadian border. It then flows through Vermont and New Hampshire and enters Massachusetts in the Town of Northfield. Flowing across central Massachusetts and Connecticut, it eventually empties into Long Island Sound at Old Saybrook, Connecticut.

The Connecticut River Watershed was designated the "Silvio O. Conte National Fish and Wildlife Refuge" by an act of Congress in 1991, the first refuge of its kind, encompassing an entire watershed ecosystem. The Connecticut River also received special attention in 1998 when it became one of only fourteen rivers in the U.S. designated as a National Heritage River. The

Massachusetts Executive Office of Environmental Affairs has outlined watershed priorities for the Connecticut River which include: promoting and/or creation of 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.

The degree of forest continuity, pattern of residential development, and the purity of the water in all three watersheds are beyond the control of any one community. Warwick could promote the conservation of all its significant open space and natural resources, but if surrounding towns fail to protect land, plan growth, or continue to monitor and participate in the cleanup of brooks and rivers, their level of impact on the resources that disregard political boundaries (water, wildlife populations, scenic views, trails, etc.) will be insignificant. Warwick needs to take an active role in the conservation of regionally important natural resources, whether they occur in Town or not.

A.2. Socio-Economic Context

Farming, logging, and manufacturing each contributed to the growth and development of the small rural hill town of Warwick. Initially, residents of neighboring towns moved to Warwick due to the area's abundant and inexpensive land. In the late 1700s, residents provided for their own needs by developing and working in farms, gristmills, sawmills, brick manufacturers, cloth making operations and the like. A system of roads and turnpikes developed in the region during this period and manufacturing continued to flourish. Warwick residents began to sell their products outside the immediate community.

Warwick's population reached its height in 1820. In the mid-nineteenth century, rail lines began to reach central Massachusetts. Due to the steepness of the terrain, however, the rail lines bypassed the Town of Warwick. Businesses began to move out of Warwick to the more prosperous communities with rail access and soon residents followed as the population began a long period of decline. During the late 1800s, the local economy was dominated by lumbering and wood products industries. A brief surge in Warwick's population coincided with an increase in timber cutting in Town during this period. As the timber became exhausted, however, the population once again declined. One exception was a boot manufacturing plant, which accounted for 57 percent of Warwick's total product value during this period. The early 1900s brought no new industry and in 1918, the last manufacturing facility, a box-making factory, closed. By 1920, the Town of Warwick's population reached its lowest point. By the 1930s, the automobile allowed residents to travel to other towns in the region to earn their livelihoods. Warwick's population began to slowly increase as people chose to live in a rural town and commute to neighboring communities for work. This trend continues today with the majority of residents commuting to Athol, Orange, Greenfield and Winchester, New Hampshire for work.

Although many of the communities in the western and eastern edges of Franklin County have not experienced the same level of residential development in comparison to communities along the Interstate 91 corridor, Warwick has grown significantly within the past thirty years. Warwick's remote rural character, good elementary school, and relatively inexpensive land prices have been

attracting new residents each year. Thus Warwick may need to protect natural resources, open space, and recreation resources in advance of the next surge in development. Currently, due to the lower property values relative to other areas in the region, development rights may be purchased at much lower rates than would be possible if the Town or local land trusts were to wait for the need for land protection to become more apparent.

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

A parcel of land that is permanently protected from development can create real value for a community by being a potential site for recreational activities, by conserving habitat for wildlife and fisheries, and by protecting the integrity of water resources within a watershed. If the parcel of land is located within the recharge areas of a public water supply it can also contribute to protecting wells from contamination by point and non-point source pollution. When abutting parcels of land are permanently protected over time, based on a plan, the result can be a network of open spaces that can cover thousands of acres. When land is protected to link the open spaces of each community, together this can create a regional greenway.

As was mentioned earlier, Warwick is part of just such a regional greenway. There 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 (11) 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, of which Warwick residents may take advantage, include the Metacomet-Monadnock (M&M) Hiking Trail, which passes through Warwick and Mount Grace State Forests. Laurel Lake, in southwestern Warwick and eastern Erving, as well as the Quabbin Reservoir, Lake Wyola, Lake Mattawa, Tully Lake, and the Northfield Mountain Recreation Area are other regional attractions used by outdoor enthusiasts throughout the region and the State. Clearly, there are many critical natural and recreational resources that can only be conserved for current and future generations by the permanent protection of land encompassing resource networks that cross town boundaries. In addition, because of the presence of this potential greenway, there may be more opportunities for the Town of Warwick to protect key parcels that add to this regional resource.

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

Affecting the quality of open space, natural, and recreational resources in Warwick and surrounding communities must take place at different political levels. At stake is the future of the region's wildlife, fisheries, recreational, and scenic resources and all the values associated with them. Regional efforts are needed because regional land trusts, watershed/landscape planning groups and planning agencies together can attract political and funding resources of which individual towns may not be capable. Towns on the other hand have the power to implement changes in land use patterns directly through zoning and open space protection.

The main regional resources and issues identified in this first part of Section 3, Regional Context include: 1) the land protection opportunities presented by the combination of regional forested greenbelts of statewide importance, and less expensive land prices; and, 2) the need for addressing the potential negative impacts of local and regional development patterns on the open space, natural, and recreational resources in Warwick and surrounding communities.

Land protection opportunities currently exist within Warwick and the region as a whole because of three factors: low property values, interest in land protection among landowners, and the presence of large blocks and corridors of protected open space. Regional groups like the North Quabbin Regional Landscape Partnership (NQRLP) have the attention of state conservation agencies like DEM. This is because the NQRLP represents many local constituencies and the region currently is one of the last areas in the State with large contiguous forested blocks with significant biodiversity. According to the Mount Grace Land Conservation Trust, the Nature Conservancy has recently identified the North Quabbin as one of the two areas in Massachusetts most suitable for designation as a large-scale priority region within which land protection at the landscape scale could be accomplished. The Town of Warwick should work with this group and others to identify and sponsor land protection efforts that conserve regional open space and recreation resources in Town.

Clean up of the Millers River is currently being addressed by the Millers River Watershed Team and the Department of Environmental Protection. The Watershed Team model provides access to the planning resources by interested parties. The Town of Warwick should be represented on this team. In addition, Warwick could also consider changes to its zoning that would help to protect the quality of the water in tributaries that drain into the Millers River. Ideally, surrounding communities in the watershed would also make similar efforts to protect water quality.

The Franklin County Regional Open Space Project is another conservation planning effort that the Town of Warwick could utilize. Between 1999 and 2000 the Franklin Regional Council of Governments (FRCOG) Planning Department developed new open space data layers for each town in the County for the purpose of providing an accurate depiction of the lands that were permanently protected in the region. In the near future a Regional Open Space Plan will be developed to identify natural and open space resources that occur in regional patterns like greenways.

One strategy for prioritizing land areas to permanently protect from development would be to use the Massachusetts Natural Heritage and Endangered Species Program Biomap, which identifies areas which are critical for preserving the biodiversity of the state. Warwick has 2,591 hectares of core habitat identified and mapped *(See Section 4 Environmental Inventory and Analysis).*

Finally, planning for the protection of critical natural resource systems requires both regional and local planning. Local planning and conservation boards and commissions must be willing to champion changes to zoning and targeted open space protection that would ensure the long-term protection of vulnerable natural, open space, and recreational resources.

B. HISTORY OF THE COMMUNITY

The Town of Warwick was originally granted as Roxbury and Gardner's Canada in 1735 to veterans of the Canadian Expedition of 1690. The original Warwick Township was six (6) square miles in size and laid out in sixty-three (63) equal shares for the first settled minister, the ministry, school and sixty (60) 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 Moore's 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 Squakheag's, 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 (6) homes, however, much of Warwick's early settlement did not occur until the early 1760s. During the early 1760s development took place in the vicinity of the present village 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, Reverand 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 (11) 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 Mass. 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 Hodge House, a double interior chimney house dated between 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 (8) sawmills and three (3) 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 Rte. 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 (12) sawmills, two (2) mills manufacturing shingles and clapboards, four (4) gristmills, two (2) tanneries, two (2) cabinet shops, three (3) blacksmith shops, two (2) shops manufacturing cutting tools, one (1) potash plant, and two (2) 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 as well as the opening of the West to emigration were felt 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 (30) 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 (5) 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) with a corner block entrance surround containing a blind fanlight, 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 (8) 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 (40) 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 (8) and produced fifty (50) 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 type for cottages was the traditional center entrance, five bay plan type 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 (2) 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. The 1890s saw a surge in timber cutting and thus many families moved into Warwick to work in the sawmills. 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 Moore's 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 1930's 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 (3) 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 (3) 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 Camp was 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 (5) 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	CURRENT OWNER	HISTORIC NAME	COMMON NAME	YEAR
44	Hotel Rd	Lisa Vanderstelt	Warwick Inn - Shlomet House - Putnam's Hotel	Mount Grace Inn	1828
5	Athol Rd	Elizabeth Wallace	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 House	Synes, James - Taylor, Dr. Amos House	1812
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

MHC #	STREET NAME	CURRENT OWNER	HISTORIC NAME	COMMON NAME	YEAR
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.

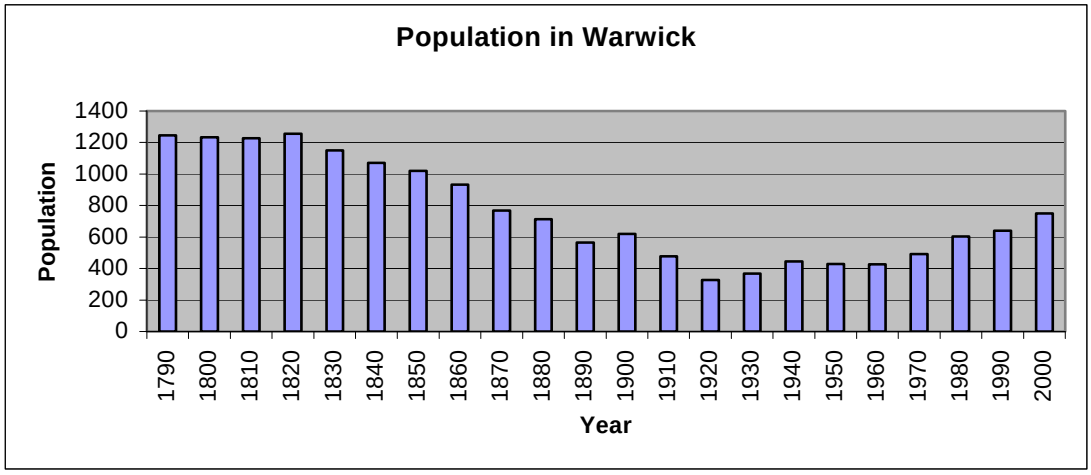
C. POPULATION CHARACTERISTICS

In this section, Population Characteristics, Warwick's needs for open space and recreational resources are assessed based upon an analysis of demographic and employment statistics. The demographic information includes changes in total population, in the relative importance of different age groups in Warwick, and in development patterns. In small towns like Warwick, the traditional sources of employment figures rarely provide an accurate description of the economic base and labor force. However, these sources 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 was completed with 191 inhabitants recorded. Thereafter, Warwick's population began to increase dramatically. Land was inexpensive in Warwick and residents of surrounding towns wishing to purchase a homestead, open a business, or to ply their trades in a new location turned to Warwick. By 1776, when the next census was conducted, Warwick boasted 766 inhabitants. With new roads continuing to be built outwards from the Center, Warwick's population continued to rise as the outlying areas now became accessible. By 1820, the population of the Town of Warwick peaked at 1,256 and thereafter began a slow decline. By 1920, the population

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



Source: US Census and Massachusetts Census, various years.

plummeted to its lowest point, at 327. Poor farming conditions, emigration West, poor business decisions causing bankruptcy, and lack of modern modes of transportation such as a rail line, were all factors thought to contribute 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, according to the U.S. Census, the decade 1990-2000 saw an increase of only ten (10) residents or 1.4 percent. This rate is much lower than the actual increase in population due to the fact that in 1990, a state prison in Town counted its inmates as residents of Warwick. According to residents there were approximately 100 inmates in 1990. Because the prison was closed in the early 1990's, the 2000 population figure accurately describes the number of Warwick residents. Therefore, the actual growth rate for Warwick between 1990 and 2000 was 17.2 percent. Franklin County's growth as a whole, from 1990-2000, was only 2.1 percent, while the Commonwealth grew by 5.5 percent. Warwick's rate of population growth, between 1990-2000, is therefore extremely high as compared to the rest of Franklin County and the Commonwealth (see Table 3-2).

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

Location	1990 Census*	2000 Census	% Change
Warwick	640	750	17.2%
Franklin County	70,092	71,535	2.10%
Massachusetts	6,016,425	6,349,097	5.50%

Source: U.S. Census 2000 Population 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

Cohort	1990	2000
0-4 years	44	46
5-19 years	143	149
20-44 years	*242	259
45-64 years	118	213
65-84 years	85	79
85+ years	8	4
Total	640	750

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

*Note: Because the 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.

Based on this analysis alone, Warwick can be said to be a rapidly growing community with a population that is similar in composition to that of the County and State as a whole. 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, 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, the survey results show that much of the treasured recreational activities may already be available to Warwick adults. The four (4) most popular recreational activities (walking, gardening, hiking and picnicking) are already available on the many parcels of open space. The mentioning of gardening as a recreational activity probably refers to the work residents do on their own grounds. It may be prudent for fast growing communities like Warwick to set aside a few parcels of land for sports fields and other facilities.

Identifying the best location for the development of new recreation resources should consider where population growth would occur. As will be seen in the fourth part of Section 3, Growth and Development Patterns, future growth depends in large part on zoning, soil and groundwater related constraints, and on which lands are permanently protected from development. Town officials could identify key parcels that might be future parks and walking/hiking trails that are close to concentrations of development and/or areas that would be later developed for residential uses. 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 3-4 are from the 1990 census, as those for Census 2000 have not yet been released. Although dated, these figures are still useful for comparison purposes.

Table 3-4: 1990 Median Household Income Statistics for Warwick, Franklin County, Massachusetts and the U.S.

Geography	1989 Median Household Income
Warwick	$31,731
Franklin County	$30,350
Massachusetts	$36,952
United States	$30,056

Source: 1990 U.S. Census of Population

In 1989, Warwick's median household income was $31,731 (U.S. Census Bureau –1990 Census). Based on this figure alone (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 can these services and facilities be created in an inexpensive manner for both the Town and the 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 today are clearly both its people and its landscapes. Both make Warwick what it is today and the Town's economic well being is affected by an interdependent relationship that exists between the two. The costs of the community services provided to residents are paid for with the tax revenues generated by different kinds of property,

both developed and undeveloped. Some developed uses like housing are often considered a loss because the school costs alone of one household are rarely made up by the revenues generated by that same property. One reason that towns encourage economic development is to have some other type of property to share the tax burden. Protected open space on the other hand costs very little, provides a meager amount 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 2000, had a labor force of 309 with 293 residents employed and sixteen (16) unemployed. This was a five percent (5.2%) unemployment rate for Warwick, whereas both Franklin County and the Commonwealth of Massachusetts had a rate of roughly three percent (2.6%) (Commonwealth of Mass. Division of Employment and Training (DET)). During the 1990's, the unemployment rate in Warwick was consistently higher than that of Commonwealth, with the exception of 1990, 1996 and 1995. In both 1990 and 1996, Warwick's rate was approximately 1 percent lower than that of the Commonwealth and in 1995 it was equal to that of the Commonwealth.

According to the Commonwealth of 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 (94) employees. The top five (5) destinations of Warwick's labor force in 1990 are identified in Table 3-5. 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 3-5: 1990 Warwick Journey to Work Data by Town

Rank of Worker Destination	Destination	Number of Workers	Percent of Total Workers
1	Warwick	65	19.8%
2	Athol	49	14.9%
3	Orange	48	14.6%
4	Greenfield	39	11.9%
5	Winchester, NH	17	5.2%

Source: U.S. Census Bureau -1990 Census of Population and Housing.

Interviews with Town officials found that there are few businesses left in Warwick. Among them is Michael Humphries Woodworking, which employs twelve (12), four (4) of whom reside in Warwick. This woodworking shop creates high-end furniture, custom cabinetry, and architectural millwork. It has recently opened a storefront in the Town of Northfield. 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 (32) 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 production, Chase Hill Farm also

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 (32), ten (10) of whom live in Warwick. The Town itself employs four (4) individuals.

Table 3-6: 1990 Warwick Journey to Work Data by County

Worker Destination	Franklin County	Hampshire County	Hampden County	Berkshire County	Worcester County	Other MA Counties	VT/NH	CT/RI/ ME	Other States
# of Workers	192	10	1	0	90	6	29	0	0
% of Workers	58.53%	3.05%	0.30%	0%	27.44%	1.83%	8.84%	0%	0%

Source: U.S. Census Bureau - 1990 Census of Population and Housing.

The community survey suggests that seventeen (17) respondents derive income from open space – most from forest products or farms. However, available information may suggest that farms or wood producers may be engaged in work that may represent 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.

Based on the above data, it appears that Warwick is a rural bedroom community where 80 percent of working residents earn their living outside of Town. The lack of a small business community outside of home-based businesses in Warwick means that expenses incurred in the delivery of services to residents, must be paid for with revenues generated from taxing residential uses and open space.

The community survey suggests an interest in supporting both the provision of better phone and Internet service and the development of cottage industries. Currently, there is a regional effort by Franklin Hampshire Connect, which has been successful at demonstrating demand for increased voice and data service technologies. The organization has attracted bids for the delivery of these services to a certain tier of medium to large sized businesses. Access to these services by cottage industries would depend on the acquisition of a high-speed line by a larger business that would in turn sell portions of its line to a number of smaller users. In any event, improved telecommunications services may be available to Warwick residents in the not too distant future, which might support home-based business development. Although an increase in cottage industries does not translate directly into tax revenues it might allow more residents to work in Town. Some residents believe that community members will have a greater quality of life if people had the opportunity to work in Town. Are there types of small businesses that could fit in with Warwick's sense of itself, a small rural community?

One type of small business that is receiving support in the North Quabbin region is recreational-based eco-tourism. A task force organized by the New England Forestry Foundation (NEFF), has been studying the potential for encouraging the growth of the eco-tourism industry as a means of improving the regional economy through the development of natural resource-based businesses. Recreational eco-tourism businesses would be dependent on access to open space, surface water, and remote forestland. There are thousands of contiguous and protected forested acres that stretch north between the Quabbin Reservation and vast tracts of open land in

Petersham, New Salem, Orange, Warwick, and Royalston. This may be a type of cottage industry that Warwick could support.

Another method for producing revenues, which could supplement the Town's annual budget, is the periodic harvesting of timber from Town forestlands. Currently, Warwick owns approximately 164 acres of land that is identified as Town Forest. The Town could purchase or otherwise acquire more forestland and manage the lands primarily for growing timber, though 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 with a history of cyclical population changes over the past 200 years dominated by a steady decline from its peak in 1820 and an influx of new residents rise during the past thirty (30) years. Historic development patterns included early agricultural and manufacturing activities and the construction of Warwick's first European built roadways. In the past fifty (50) years, residential development continues and expands upon earlier patterns.

Early development patterns that are still present today are both abutting uses and those that are spread apart. Sparse development patterns were most likely influenced by the necessary separation of farm operations while the aggregating of uses was caused in part by early roadways, the presence of farmland, and civic and industrial activities. This same pattern of farmhouses spread across the landscapes is seen in many rural Franklin County communities. The concentration of houses along communities' early roadways is also common and understandable given the role that roadways played in agriculture. In Warwick, these roadways included Old Winchester, Rum Brook, Richmond, Athol, and Wendell Roads. The main concentrations of residential and past commercial development occurred in the village centers originating from a clustering of civic and industrial activities.

Historic development patterns appear to have been impacted by changes in population influenced for the most part by expansion of forest and farm-based employment, regional land use changes, and the evolution in the modes and routes of transportation. Early settlement patterns of the 1760's saw most development happen near the village center. During the next fifteen (15) years, settlement occurred around Warwick Center, northwest and southeast following the industries of the time: lumbering and livestock. The mills set up in the years following exploited products from the forest and farm and the relatively low land prices encouraged additional entrepreneurs to move to and set up shop in Warwick.

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 (50) saw the community

transformed into a manufacturing center with no fewer than 1,256 residents and thirty (30) mills producing lumber, leather, shingles, cloth, boxes, flour, and bricks.

The population began a 100-year decline when the railroad established a route along the Millers River to the south in 1835. The only increase in population during that time period took place in 1900 when there was timber to be harvested in Warwick's forests. Interestingly enough the exhaustion of the timber supply that occurred around the turn of the century resulted both in a rise and fall in population and a land protection movement, which would result in helping 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 (10) years of that thirty-year period, Warwick grew by more than 15 percent, while in each of the next two (2) decades the population grew by roughly 23 percent. Where these new residents have chosen to settle can be seen using Massachusetts Geographic Information Systems (GIS) data. Using 1971 and 1997 land use data, the predominant land use change in the Town of Warwick has been the conversion of forest to residential uses of ½ acre or larger.

Viewing the 1971 MassGIS land use coverage for Warwick several development patterns are visible. 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 (3) largest patches of cropland were located north of the intersection of Winchester and Flower Roads near the NH 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 Rte. 78 within Warwick center, off Hastings Road, and around Moore's Pond. Residential uses in general were located around the Town Center and scattered on all major routes.

According to the County Building Inspector, between 1999 and 2001, twelve (12) new homes were built on the following roads:

- Echo Park Lane: 1
- Wendell Road: 3
- Hastings Pond Road: 2
- Richmond Road: 2
- Chestnut Hill Road: 1
- Shepardson Road: 1
- Old Winchester Road: 1
- Robbins Road: 1

Most of this development is considered to be large lot residential development and occurred as approval-not-required lots. The phrase, 'approval-not-required' describes lots developers can create, which have the required minimum lot size and frontage on an existing public way. These lots do not need to comply with subdivision regulations. This is the only type of residential development that has been, and is, occurring in Warwick and the region.

There is one zoning district in Warwick that requires a minimum lot size of two (2) acres. One of the main reasons that the two-acre lot size is required is that a minimum distance is needed between private wells and septic systems. Since neither of these is provided as a public service, clean drinking water is dependent on being able to locate the septic field in soils that would clean the wastewater effectively before it found its way into the groundwater. Unfortunately, this lot size has one drawback. By being the only pattern available it may be encouraging a sprawling pattern of development that is currently the most common way towns are being developed across the Commonwealth.

Although the 85 years and older age group has been declining over the past ten years, it may be possible in the future that there will be residents in Warwick who would like to stay even as they get older. In the subsection C. Population Characteristics, it is shown that Warwick's populations as whole is older than it was roughly a decade ago. One way that Warwick could provide seniors an opportunity to stay in Town, is by encouraging the use of the conservation development bylaw if and when subdividing land becomes as common as the approval-not-required lot. The conservation development bylaw would encourage smaller lot sizes, shorter distance between homes, use of neighborhood wastewater treatment facilities, and the protection of open space.

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 Warwick. It intersects with State Route 2A at its southern terminus and Route 2A then connects to State Route 2 just west of this intersection and its northern terminus is Rte. 10 in Winchester, NH. Also passing through Warwick Center is the east-west route of Northfield Road/Athol Road/ Gale and 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 in the Town is located at the Town Common and connects the old elementary school with the Town library.

There are also no public transportation systems in the Town of 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. The majority of residences rely on deep wells, with approximately one third to one quarter relying on shallow wells and a small number relying on springs. The exception is 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

All sewage disposal in Warwick is by private systems. The effectiveness of these 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, are shallow to bedrock, or are coarse and stony which provide very little filtration to septic leachate since water passes through coarse 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 the soils and their ability to pass percolation tests.

In many communities across the region, development follows infrastructure improvements. However, 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 were to remain static, as it may in the near future, development may be limited to those areas that are already developed. As population increases and the land most accessible to 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 beyond consideration.

D.3. Long Term Development Patterns

Long-term development patterns will likely be based 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 work a relatively long distance away from home. The amount of available land for housing or other built uses is that which is not currently 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 (3) 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. However, the Town's Zoning Map (*See Zoning Map at the end of this section*) shows four separate colored districts: RA1, RA2, RA3, RA4. These districts were established to administer a set number of building permits according to a phased growth bylaw that has since expired.

There are prohibited uses and uses allowed by special permit in the Residential - Agricultural district. It is assumed by the Warwick's Planning Board that future development will be essentially residential. Table 3-7 lists the dimensional requirements for single- and two-family houses. In the summer of 2000, according to the Warwick Assessor's Clerk, there were 320 single-family housing units and three (3), two-family homes.

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

Dimensional Requirement	Single-Family House	Two-Family House
Min. Lot Area	87,120 sq. ft. (2 acres)	174,240 sq. ft. (4 acres)
Min. Lot Frontage	300 feet	300 feet
Min. Front Yard	35 feet	35feet

Source: Town of Warwick Zoning By-Law; October 12, 1989.

Having one (1) zoning district potentially produces both positive and negative impacts on the conservation of Warwick's natural resources. First, a two-acre minimum lot size may be considered too small given the soil, ledge, and high water characteristics that currently constrain development in many areas of Town. On the other hand, having as a minimum a two-acre lot size does help to restrict development and conserve private drinking water supplies. However, a minimum lot size of two (2) acres also encourages a greater footprint for the community. As Warwick's population grows, the remaining unprotected open space may be converted at a faster rate than if there were allowable higher density areas.

Board of Health Regulations

According to the Town of Warwick's Board of Health Private Well Regulations all wells must be located a particular distance from these potential contamination sources that relate to residential development: 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). In addition, the regulations state that the well needs 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. These minimum requirements could, when combined with Title 5 requirements, 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, "a single and/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 may occur as either a standard subdivision or as lots being created on an existing way." The minimum area for a conservation development is ten (10) acres if the project does not have the necessary frontage or six (6) acres if the parcel is on an existing public way. The development would cluster the same number of houses that would be typically allowed in a standard subdivision of the same gross acreage. The intended result is the protection of open space. Often conservation development provides too many hurdles and costs to the developer for this land use control to be of value.

D.3.2. Build Out Analysis

To illustrate the long-term effects of current zoning, results of a build-out study are included here. This aforementioned study is part of a State wide effort funded by the Executive Office of Environmental Affairs. The methodology and results of the build-out study and associated GIS mapping are explained below.

The purpose of the build-out analysis is to determine potentially developable land areas for residential development. The process starts with identifying development that already exists based on 1997 MacConnell Land Use data. Already developed areas are subtracted from the Town's total acreage and the remaining area is classified as undeveloped. Undeveloped areas are 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 is removed from consideration, but only those areas that are permanently protected, such as farmland in the Agricultural Preservation Restriction Program. Interestingly, some areas which you would expect to be screened, such as those held by water districts to protect public water supplies, may not be if a conservation restriction or some other legal mechanism is not placed on the deed to permanently protect the land as open space. Slopes between 15 and 25 percent are considered a partial constraint, since certain types of land use typically do not occur on relatively steep slopes. However, it was assumed that large lot residential zoning could occur on slopes of 15 and 25 percent given greater flexibility to grade and site structures. The areas that remain after the screening process are considered potentially developable.

The zoning district is applied to the potentially developable areas and a "build factor" is calculated. The build factor is 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 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 current zoning will not protect the community's rural character or natural resource base. Open Space Planning is a necessary first step needed to identify key resources to protect and the areas most suitable for development. Once completed, Open Space and later, Master Plans could be translated into zoning revisions and land protection programs in order to realize the balance desired by a community between natural resource protection and development.

Although it is not possible to determine exactly when build-out might occur, this may not even be necessary. Before the last acre was developed, Warwick's residents may experience water shortages. In addition, with 2,140 new school children at build-out, Town Officials would have to build several new elementary schools. New subdivisions could result in the need for 119 new miles of roads that would have to be built and maintained. Fire and police services would have to expand to protect the increased population. 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 first and second order streams, lower air quality, and lower 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 in the future 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. For instance, 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 (3) 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 (11) 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 (11) 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 encouraged local entrepreneurship and modest business expansion, concentrated residential development where possible, and protected forests, remaining farmland, and the most significant scenic, ecological, and historic resources.

SECTION 4

ENVIRONMENTAL INVENTORY AND ANALYSIS

Warwick's residents appreciate natural, undeveloped environments; it is what has attracted many of them to settle here. By developing and using this Open Space and Recreation Plan in their decision-making, Warwick seeks to conserve its cherished aspects in the face of increased development pressures while at the same time understanding that people need places to live, learn and recreate, water to drink, etc. These needs require some level of infrastructure: homes, roads, power, private and public drinking water supplies, wastewater systems, etc. Some of this support infrastructure depends on critical natural systems like the water cycle. For example, drinking water supplies, whether public or private, rely on the water cycle. Inappropriate land uses can impair the quantity and quality of this resource and ultimately may impact drinking water safety and availability.

An ecosystem is part of the environment and can be considered at different scales. A large forest can be an ecosystem and so can an old decayed tree trunk. The integrity of ecosystems, which provide services like air and water purification, genetic biodiversity, and soil nutrients are vulnerable to human uses of the land. One ecosystem, a *wetland* can be fed by *groundwater* that in turn feeds a *shallow, bedrock well*. The link between all three is water. A poorly maintained septic system could release contaminated leachate into the groundwater. Warwick residents understand that certain actions and some land uses can negatively impact the environment and their quality of life.

The information provided in this section, Environmental Inventory and Analysis inventories the quantity and quality of Warwick's natural resources. Topography, Geology, and Soils provides a general understanding of the ways different soil characteristics can impact land use values. Landscape Character provides a gross scenic context within which the following resources play important roles. Water Resources describes all of the water bodies in Town, above and below ground, including their recreational value, public access, and any current or potential quality or quantity issues. Warwick's forest, farmland and wetland vegetation types are documented including rare, threatened, and endangered species. In the Fisheries and Wildlife section, wildlife, their habitats, special corridors, and rare, threatened, and endangered species are discussed. Warwick's Scenic Resources and Unique Environments are identified and described. In addition, Environmental Challenges address current or potential problems, which may influence open space or recreation planning.

A. TOPOGRAPHY, GEOLOGY, AND SOILS

Decisions about land use must take into consideration the inherent suitability of a site for different kinds of development. Environmental factors such as geology, soils, and topography are essential to understanding the spatial relationships of land based natural resources for determining potential sites for future residential, commercial and industrial development or for 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 (2) of these valleys are broad and quite flat, and have much of the best agricultural land in the Town of Warwick. The first of these 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 three (3) major watersheds, the Millers River, Ashuelot River, and the Connecticut River Watersheds. The southern half of Warwick as well as the northeastern quadrant drain into the Millers River. The two (2) principal watercourses in the Town that flow into the Millers are Moss Brook and Orcutt Brook. Other streams flowing to the Millers River include Rum Brook, Gales Brook, Darling Brook, East Branch Darling Brook, Hodge Brook and Tully Brook. The northwestern quadrant drains into the Connecticut River via Mill Brook. Mountain Brook flows north into New Hampshire where it is called Mirey Brook. Mirey Brook is a tributary of the Ashuelot River, which flows into the Connecticut River just north of the Massachusetts-New Hampshire border.

There are fourteen (14) lakes and ponds, which are in part of or totally within the Town of Warwick.

A.2 Geology

The Town of Warwick, as we know it today, is the result of millions of years of geologic history: the great upheavals of the earth's crust and volcanics, and the sculpting power of moving water, ice, and wind. This distinctive physical base has determined the distribution of the Town's water bodies, its soils and vegetation, and its settlement patterns, both prior to and since colonial times.

A.2.1. Mountain Building: 700 Million Years to 190 Million Years Ago

The earth's crust is actually a system of plates whose movements and collisions shape the surface. As the plates collide, the earth’s crust is compressed and forced upward to form great

mountain ranges. In the area of the northeastern United States, the plates move in an east-west direction, thus the mountains formed by their collisions run north to south. Both the Taconic Mountains and the Appalachians were formed in this way.

The pressure of mountain building folded the earth, created faults, and produced the layers of metamorphosed rock typically found in New England today. Collision stress also melted large areas of rock, which cooled and hardened into the granites that are found in some of the hill towns in Massachusetts today. Preceding the collisions, lines of volcanoes sometimes formed, and Franklin County shows evidence of this in bands of dark schist rock metamorphosed from lava flows and volcanic ash.

A.2.2. Earthquakes and Dinosaurs: 190 Million to 65 Million Years Ago

A great continent known as Pangaea formed through the plate collisions, but it began to break apart almost 200 million years ago (and continues today). This caused earthquakes and formed large rift valleys, the largest of which became the Atlantic Ocean. The Connecticut Valley was one of many smaller rifts to develop, and streams flowing into it from higher areas to the east brought alluvium including gravels, sand and silt. The Dinosaur era had begun, and their footprints are still visible in the sedimentary rock formed from these materials on the valley floor.

By the close of the Dinosaur age, 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. Such mountaintops are named for Mt. Monadnock in New Hampshire; Mt. Wachusett and Mt. Greylock are other nearby examples.

As the peneplain eroded, the less resistant rock eroded to form low-lying areas, while bands of schist remained to form upland ridges. By this time, the Connecticut Valley had been filled with sediment, while streams that would become the Westfield, Deerfield, and Farmington Rivers continued to meander eastward. The Miller's River and other westward-flowing streams would become more significant later on.

A.2.3. Cenozoic Era and the Ice Age, to the Present: 65 Million Years Ago to Today

A long period of relative quiet followed the Dinosaur era. Then, as the Rocky Mountains were forming in the west eight million years ago, the eastern peneplain shifted upward a thousand feet. As a result of the new steep topography, stream flow accelerated, carving deep valleys into the plain. The plain rose one more time, and the Millers River, once a slowly meandering westward stream, now carved its course through the sediment and bedrock. Today, the visible remnants of the peneplain are actually the area's schist-bearing hilltops, all at about the same one thousand (1000) foot elevation.

Mountain building, flowing water, and wind had roughly shaped the land; now the great glacial advances would shape the remaining peneplain into its current topography. The earth's climate cooled until a point about two million years ago, when accumulated snow and ice in the far north began advancing under its own weight. A series of glaciations followed, eroding mountains and displacing huge amounts of rock and sediment. The final advance, known as the Wisconsin Glacial Period, completely covered New England before it began to recede about 13,000 years ago. It scoured and polished the land into its final form, leaving a layer of glacial debris and landforms that are still distinguishable.

While the Miller's River probably first formed prior to the glacial period, most of Warwick's hydrological system is a remnant of that time. 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 glacier 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. Both are formed by glacial melt waters.

A.3 Soils

A discussion of soils in an Open Space and Recreation Plan is important for at least four (4) reasons that are reflected in the questions below. All soils have 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, certain soil related questions arise: 1) Which soils constrain development given current technologies?; 2) Which soils are particularly suited for recreational opportunities and wildlife habitat?; 3) Which soils and substrate impact current and future drinking water supplies?; and, 4) Which soils are best for agriculture? The answers to these questions can help lay a foundation for open space and recreation planning in Warwick. The following sub-section will provide a description of the soils in Warwick based on their impact on agriculture, drinking water issues, wastewater issues, recreation opportunities, erosion, and wildlife habitat.

Which soils constrain 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 upland 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 are shallow to the water table.

Which soils are particularly 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 mountain 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, those soils that may best support a variety of wildlife habitats may prove to be those that provide the most constraints to 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 the 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 would provide a diverse array of species habitats. In addition, protecting any remaining high slope areas along ridge tops would also provide for the protection of habitats for large mammals as well as scenic views.

Which soils and substrate impact current and future drinking water supplies?
Soils of the Hinckley and Gloucester associations generally have high filtration rates and low runoff potential. The more easily drained Hinckley association forms in valleys on stratified drift. The Gloucester association forms on gently sloping and steep upland areas on sandy till. Both of these associations provide high amounts of recharge to aquifers.

High filtration 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 potential aquifers if care is not taken to protect them.

Which are the best soils for agriculture?
Although Warwick is not a strong agricultural community, it does contain a valuable resource, i.e., prime farmland soils. Prime farmland soils produce the highest yields with minimal energy and economic resources, and farming it 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. It would behoove residents interested in conserving these remaining lands to 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 Route 78; at and south of the village; 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.

The more common soils, which constitute Warwick's prime or potentially prime agricultural land include: Agawam, Essex, Charlton, Gloucester, Merrimac, Scituate, Shapleigh, Sudbury, Hinckley and Windsor soils.

A.4 Analysis

A discussion of topography, geology, and soils in an open space and recreation plan helps to clarify what makes Warwick special. A common set of conditions and processes helped to form the bedrock, soils, and landscape shapes in a unique way. Overall, a discussion of open space and recreation planning will always revolve around human use of the land, development, and the impacts of that development on the systems that are at the base: soil nutrients, water purity, biodiversity, etc. The bedrock may be moving, but humans tend to change the landscape at a much faster rate. Which soil, geologic, and topographical characteristics should be considered when planning for open space and recreation resources? Warwick residents understand that the same topographical and soil characteristics that have impacted the Town's development in the past still thwarts developers because of depth to bedrock and water table. Unfortunately, the future may include new on-site septic technologies that could overcome the hurdles presented by Title 5. In addition, areas with deep sand and gravel deposits are the most likely sites for aquifers. Potential aquifers are vulnerable to contamination from surrounding septic systems and land uses. Although it may be some time (or never) before any of these aquifers are explored as potential public drinking water supplies, residents may want to determine the recharge areas for these aquifers towards ensuring their long-term protection from contamination. According to DEP staff, an engineer can delineate the conceptual Zone II recharge area without needing to carryout expensive pump tests.

B. LANDSCAPE CHARACTER

Warwick is in the 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 Devonian age with Mt. Grace at its center, is the central geologic feature of the town.

One of the main landscape features that separates Warwick from surrounding communities is the fact that many of the town's 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 Shepardson Road. Mount Monadnock may be viewed from 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 Rte. 78, on top of Barber Hill, and north from Flower Hill Road are quite 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. As part of the Nature Conservancies ecoregional planning program the best remaining matrix forest blocks in the Eastern Region have been identified and mapped. The Warwick Matrix Forest Block covers the entire town and received the highest possible ranking.

The Massachusetts Natural Heritage and Endangered Species Program has recently (2001) completed its' Biomap Initiative, an attempt to identify and map areas which are critical for preserving the biodiversity of the state. Warwick has 2,591 hectares of core habitat identified and mapped *(See Open Space Map).*

C. WATER RESOURCES

C.1 Watersheds

Warwick contains portions of three basins, the Millers River Watershed to the south, the Connecticut River Watershed to the northwest, and the Ashuelot Watershed to the north.

C.1.1. Millers River Watershed

Warwick is located in the western 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. In Massachusetts, it is bordered on the east by the Nashua River Watershed, on the west by the Connecticut River Watershed, and on the south by the Chicopee River Watershed and in the north by the Ashuelot. From its tributaries of origin in New Hampshire, the Millers River flows

south, then gradually west, ultimately flowing into the Connecticut River. The Millers River drains a regional landscape that is 392 square miles in size, 320 of which are in Massachusetts (Massachusetts Department of Environmental Protection; 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. This feature made the Millers River and its main tributaries a magnet for manufacturing and hydroelectric power generation, which provided the impetus for initiation of industrial activities in neighboring towns in the late 1700s.

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

The "top five" watershed priorities for the Millers River Watershed according to the Executive Office of Environmental Affairs include: continuing support for the Polychlorinated Biphenyl (PCB) study currently being done by the U.S. Geological Survey, which will characterize the occurrence and transfer of PCB's in the watershed; performing hydrologic assessment and water supply forecasts to identify flow and yields throughout the watershed and stressed sub-watersheds; developing a non-point source assessment to comprehensively assess both existing and potential sources of water quality problems; creating a Coordinator position for North Quabbin Regional Landscape Partnership (NQRLP) to assist in biodiversity and open space protection; and developing and implementing a water quality sampling program to characterize the current state/condition of the watershed. For 2001, The Millers River Watershed Team also will be implementing a SMART (Strategic Monitoring and Assessment for River Basin Teams) monitoring program in conjunction with the Dept. of Environmental Protection, the Division of Watershed Management and the Wall Experiment Station. This program will provide important information on long-term on-going water quality trends in the watershed. Volunteer monitoring teams will be formed to collect data and information in the watershed.

C.1.2. Connecticut River Watershed

The northwestern section of Warwick is located in the Connecticut River Watershed. The Connecticut River Watershed is the largest river ecosystem in New England. It encompasses approximately 11,000 square miles and travels from its headwaters at Fourth Connecticut Lake at the Canadian border and on through four (4) New England states: Vermont, New Hampshire,

Massachusetts and Connecticut. The River enters Massachusetts through the Town of Northfield and drains all or part of forty-five (45) municipalities before entering the State of Connecticut where it eventually empties into Long Island Sound at Old Saybrook, Connecticut. The watershed is 80 percent forested, 12 percent agricultural, 3 percent developed and 5 percent wetlands and water.

The Connecticut River Watershed is home to many species including fifty-nine (59) species of mammals, 250 species of birds, twenty-two (22) species of reptiles, twenty-three (23) species of amphibians, 142 species of fish, 1,500 species of invertebrates and 3,000 species of plants. Ten federally listed endangered or threatened species occur within the watershed. These include bald eagle, peregrine falcon, piping plover, shortnose sturgeon, dwarf wedge mussel, puritan tiger beetle, Jesup's milk-vetch, Robbin's cinquefoil, small whorled pogonia, and northern bullrush.

Forty years ago the Connecticut River was described as "the best landscaped sewer in the Nation." However, today it is classified as swimmable and fishable (Class B) and in some areas drinkable (Class A). This is a result of the Federal Clean Water Act and the investment of more than $600 million in wastewater treatment.

In 1998, President Clinton designated the Connecticut River an American Heritage River, one of only fourteen in the Nation. As an American Heritage River, the Connecticut can receive special attention from federal agencies for the cultural, economic and environmental values of the river. The Connecticut River Watershed was designated the "Silvio O. Conte National Fish and Wildlife Refuge" by an act of Congress in 1991. This refuge is the first of its kind, encompassing an entire watershed ecosystem and is a benchmark in environmental conservation.

The Massachusetts Executive Office of Environmental Affairs (EOEA) has outlined watershed priorities for this watershed which include: continuing to promote the protection and/or creation of riparian buffer zones along the waterways within the watershed; working to eliminate Combined Sewage Overflow problems in the Springfield and Holyoke areas along the river; restoring the river community by removing barriers to fish and eel passages within the tributaries to the Connecticut; reducing the negative effects of non-point source pollution, primarily storm runoff; and improving upon the limited amount of water quality data available within the watershed.

C.1.3. Ashuelot River Watershed

The Ashuelot River Watershed is located in northwestern Warwick and is a subwatershed of the Connecticut River Watershed. In northern Warwick, three (3) 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, drains into the Ashuelot River, which is located in southwestern New Hampshire. The river begins in Washington, New Hampshire and flows south and west to the town of Hinsdale where it enters the Connecticut River. The Ashuelot River flows for a total of 64 river miles prior to entering the Connecticut River. The Ashuelot River Watershed encompasses 420 square miles and is home to the federally endangered dwarf wedge mussel. The U.S. Fish and Wildlife Service has identified the

Ashuelot River as one of the four most important refuges for this mussel. The Ashuelot River is currently included in the Connecticut River Anadromous Fish (fish that live in saltwater but return to freshwater to spawn) Restoration Program for smelt rearing and fry release. However, the program is not anticipated to start in the Ashuelot River for approximately five (5) years.

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

The Rivers Management and Protection Act (RSA Chapter 483) lists nine (9) river values and characteristics, which may qualify a river for designation into the program. The Ashuelot River supports many of these natural, managed, cultural, and recreational resource values and characteristics at a level of either statewide or local significance. The resource values which qualify the Ashuelot River for designation include geological resources; wildlife, fish and plant resources; water quality; open space, scenic values; water withdrawals; wastewater discharges; historic and archaeological resources; community resources; and recreational resources.

The headwaters of the Ashuelot River begin in Pillsbury State Park at an elevation of 1,600 feet. From here the river flows thirty (30) miles, dropping at a rate of thirty-seven (37) feet per mile and creating a steep gorge in Gilsum. It is here that numerous waterfalls are located. A number of potholes, including Devil's Chair, are also located in this reach of the river. Rapids and a waterfall are also located at Shaw's Corner. Throughout the river corridor you can find remnants of glacial activity such as carved clay deposits, deltas, drumlins and glacial Lake Ashuelot. Also of interest are the many quarries in the area producing sand, gravel, semi-precious stones and the high potential aquifers found in the river corridor.

The Ashuelot River corridor supports a variety of diverse habitats that are home to a wide array of plant and animal species, including several endangered species. Important river habitats include rocky ledges, mixed deciduous coniferous and hardwood forests, wetlands and pasture. Of particular note are several great blue heron rookeries in the watershed; a total of eight (8) colonies comprise 7.5 percent of the statewide total for heron colonies. Fourteen deer yards have also been mapped within the river corridor. Due to the river's general north-south orientation, the Ashuelot is naturally used as a migratory path for raptors, waterfowl, and songbirds.

A number of species of plants and animals which occur along the Ashuelot River corridor are considered to be endangered or threatened species. The river corridor provides feeding areas for the federally endangered bald eagle. The northern harrier, a state threatened species, has been observed in marshy areas along the river. The blue-gray gnatcatcher, common loon, and the common nighthawk, all state threatened species, have been seen nesting and feeding along the Ashuelot River. The state endangered wild sensitive senna and spiked needlegrass, as well as several other state threatened vegetative species, have been observed along the Ashuelot River. The river corridor supports two ecologically significant natural communities: the Northern New England seepage marsh and the Southern New England circumneutral talus forest/woodland, in Marlow and Surry, respectively.

The Ashuelot River is both a cold and warm water fishery that provides habitat for approximately fifteen (15) resident species, including eastern brook trout, large and small mouth bass, and walleye. The river also contains a catadromous species of fish (fish that live in freshwater but return to saltwater to spawn), the American eel. The Ashuelot River is also home to the federally endangered dwarf wedge mussel. The U.S. Fish and Wildlife Service has identified the Ashuelot River as one of the four most important refuges for this mussel. The Ashuelot River is currently included in the Connecticut River Anadromous Fish (fish that live in saltwater but return to freshwater to spawn) Restoration Program for smelt rearing and fry release.

C.2 Surface Water

The Town of Warwick has approximately 331 acres of open water found in ponds and reservoirs. There are twelve (12) ponds, which are partially or totally within the Town of Warwick. Numerous small streams can also be found throughout Town.

Warwick has only three (3) natural ponds: Moores Pond (Moores Pond's water- level is augmented by a dam), Hastings Pond and Bent Pond (partially within NH). Laurel Lake, which is partly in Warwick is also natural with an augmented water level. All the remaining ponds in Warwick are artificial. Dams were built throughout the 19th Century to store water for mills. Warwick's small headwater streams typically experience periods of zero-flow in the summer, so to store enough water for summer operation, 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 impoundments (e.g. Stevens Swamp, Bass Swamp, Moores Pond).

The following inventory describes Warwick's rivers, streams, brooks, and ponds focusing on the extent of public access, recreational value, and any water quality issues. The 1998 Massachusetts Section 303(d) List of Waters prepared by the Division of Watershed Management, Department of Environmental Protection (DEP) is used as a source document for all listed surface waters within the Town of Warwick. Section 303(d) is part of the Federal Clean Water Act requirements. The State is required by the United States Environmental Protection Agency to identify those 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 303(d) list only includes the results of evaluations upon which DEP has performed some measure of quality control. Two common pollutants that stress Warwick water bodies include noxious aquatic plants and turbidity. Aquatic plants are considered to be noxious when native and non-native species are in such abundance as to inhibit the other uses of the water body. Turbidity is a term that relates to the amount of suspended solids in the water, of an organic and mineral substance, which could inhibit the passage of sunlight.

Mountain Brook

Originating on the eastern side of Mt. Grace, Mountain Brook flows a distance of 3.3 miles from Warwick Center north to the New Hampshire line. In New Hampshire, Mountain Brook is known as Mirey Brook, which flows through Sunny Valley in Winchester, NH for several miles, where it then merges with the Ashuelot River in downtown Winchester.

Darling Brook

Originating at Moores Pond 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 "biodiversity core habitat area" as identified by the Massachusetts Heritage Program. Extensive flats border the brook and support a diverse mosaic of wetland and upland habitats. The area supports an apparently healthy population of wood turtles (state listed endangered species). 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.

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 "biodiversity core habitat area" as identified by the Massachusetts 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 wood turtle. Fishing access is good via Wendell Road and Quarry Road.

Rum Brook

Located east of the Warwick Center, Rum Brook flows into Gales Pond and eventually converges with Black and Hodge Brooks to create Gales Brook. Rum Brook consists of a twenty-four (24) acre swamp and seventy-two (72) acres of wetland below Athol Road. Rum Brook has some wet meadow habitat 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. Continued management to keep the wetland open should be encouraged.

Black Brook

Located northeast of Warwick Center, Black Brook flows out of 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 contains a scenic gorge and one of the Town's geologic scenic sites, the Devil's Washbowl.

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. Access is an issue; the woods road off Gales Road is claimed to be private (Fournier). Getting to the site requires walking cross-country from Beech Hill to skirt the Fournier property.

Orcutt Brook
Orcutt Brook is a perennial stream originating in Warwick State Forest in the vicinity of the former Camp Warwick. In its headwaters it is known as Black Brook where it flows south out of Richards Reservoir into Richards Mill Pond. It then continues south to Gales Brook and only after it reaches Brush Valley is it called Orcutt Brook. Orcutt Brook enters the Millers River in West Orange. It supports native brook trout as well as blacknose dace, creek chub, common shiner, and common white sucker.

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.

Mill Brook
Originating in northwestern Warwick, Mill Brook includes the drainage from Steven's and Bass Swamps and follows along Northfield Road making its way through the Town of Northfield on its way to the Connecticut River. Mill Brook, though not on the Massachusetts 303d List, is compromised by its proximity to Northfield Road, which contributes to the brooks bank erosion and siltation problems.

Bent Pond
Located in the northwestern corner of Warwick, Bent Pond is a small waterbody partially located in New Hampshire. It is a naturally occurring warm water, eutrophic waterbody 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.

Hubbards Pond
Hubbards Pond is a five (5) acre warm water, eutrophic waterbody formed by the impoundment of 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 (6) feet.

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 (7) acre impoundment, Richards Mill Pond is a shallow, warm water, eutrophic waterbody 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 both Rum Brook and Robbins Roads.

Lily Pond

Located off Garage Road near Warwick Center, Lily Pond is a five (5) acre pond of glacial origin and is termed a "kettlehole". A kettlehole is formed by a large glacial block of ice 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. This may be one of the sites the Division of Fisheries and Wildlife noted were Kettlehole Level Bogs. Harvard Forest researchers have taken sediment cores for pollen analysis as part of a project to document post-glacial vegetation history of New England.

Hastings Pond

Located along the west side of Hastings Road, southeast of Warwick Center, Hastings Pond is Warwick's only completely natural or great pond and is approximately twenty (20) acres in area. Hastings Pond is classified as being a stratified, mesotrophic waterbody capable of sustaining both warm and cold-water fish. Although access to the pond is good along Hastings Road, no public access right of way is available and much of the shoreline is developed. It is on the 1998 Massachusetts Section 303D List of Waters due to noxious aquatic plants.

Gales Pond

Located along the east side of Gale Road in east-central Warwick, Gales Pond is approximately twelve (12) acres in size. It is an artificial, warm water, eutrophic waterbody. Gales Pond is privately owned but has public access off Gales Road. It is on the 1998 Massachusetts Section 303D List of Waters due to turbidity.

Wheelers Pond

Located on Orcutt Brook along the west side of Route 78 in the southern section of Warwick, Wheelers Pond is an enhanced pond of twenty-two (22) acres. It is considered a warm water, eutrophic waterbody with dark, tannin water. Access to the pond is informal at this time. Wheelers Pond is listed on the 1998 Massachusetts Section 303D List of Waters due to noxious aquatic plants.

Moores Pond

Located near the junction of Wendell and Holden Roads, Moores Pond is a Great Pond enhanced by a dam and spillway. It is a stratified, mesotrophic waterbody of thirty-two (32) acres and capable of sustaining both coldwater and warm water species of fish. It is stocked with trout. Moores Pond is developed on both its southern and western shores. Public access is provided

along the western shore near Sheppardson Road. The pond is considered to be the site of the unofficial Town swimming beach. There is an unimproved public boat launch on Wendell Road. It is popular for fishing and paddling. The north end of the pond supports a nice pond-shore bog with classic bog vegetation. Moores Pond is listed on the 1998 Massachusetts Section 303D List of Waters due to noxious aquatic plants.

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 (30) acre impoundment. With a maximum depth of eight (8) 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 Reservoir is listed on the 1998 Massachusetts Section 303D List of Waters due to noxious aquatic plants.

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 (33) acre enhanced pond considered to be stratified and mesotrophic. The west branch of the Tully River and two (2) unnamed streams feeds Sheomet Lake, known locally as Clubhouse Pond. 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. A swimming beach is located along the lake's southeast corner.

Laurel Lake

Fifteen (15) of Laurel Lake's fifty-one (51) acres lie within the Town of Warwick in its southwestern corner. It is managed by DEM as part of Erving State Forest. Laurel Lake is an enhanced natural lake, which is stratified and mesotrophic, capable of sustaining both coldwater and warm water fish. The lake is stocked annually with trout. Laurel Lake has a public boat access ramp in Erving and a public swimming beach. The Lake is listed on the 1998 Massachusetts Section 303D List of Waters due to organic enrichment/low dissolved oxygen and noxious aquatic plants. The state has limed the lake to control acidification.

C.3 Class A Waters

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

C.4 Flood Hazard Areas

There are no known flood hazard areas in Warwick.

C.5 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.

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 383 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 larger 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 include in the Core Biodiversity Areas defined by the Massachusetts Heritage Program and probably supports wood turtle habitat (a state listed species). 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 White Road, Bass Swamp is approximately fifty-seven (57) acres in size. The swamp is formed by a small dam located at its northern end. About fifteen (15) acres of the swamp consists of open, fresh water less than five feet deep, twenty (20) acres consists of deep fresh water and eleven (11) 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. 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 (92) acres in size. This wetland is formed by a small dam at its eastern end. About fifty (50) acres of this wetland consists of open, fresh water less than six (6) feet deep. Stevens Swamp is probably as fine an example of a pond-shore peatland as exists anywhere in Massachusetts. It has elements of both bog and poor-fen vegetation and supports an impressive diversity of peatland species. It is included in a Core Biodiversity Area 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 breeds huge numbers of wood frogs and spring peepers every year.

C.6 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 (6) 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.7 Surface Water Reservoirs

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

C.8 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 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.

C.9 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 rainwater runoff containing salts, herbicides and petro-chemical deposits as well as failing septic systems.

D. VEGETATION

Warwick is situated in north central Massachusetts, which is in the Transition Hardwoods-White Pine Forest Region (USDA; 1992). Northern hardwoods including yellow and paper birches, American beech, and sugar and red maple, are the major species, while northern red oak are found on the warmer and drier sites. Eastern hemlock is found on the cooler sites while white pine is characteristic of the well-drained sandy sites. Red maple can be found on the poorly drained sites. 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 1997, according to MassGIS, forests comprised 91 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 *Betula papyrifera*), beech (*Fagus grandifolia*), and sugar and red maple (*Acer saccharum* and *Acer 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, Warwick Town Forest 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 (15) years; 60 percent own less than fifty (50) 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.

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, east of Hastings Pond, north and west of Harris Swamp, east and north of Wheelers Pond, Mayo's Corner area, 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. 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 sp*.), and winterberry (*Ilex verticillata*). Herbaceous vegetation such as sedges (*Carex spp*.), ferns, false hellebore (*Veratrum viride*) and skunk cabbage (*Symphiocarpus*) are also found. (USDA; 1992)

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 Kettlehole 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.

Kettlehole Level Bogs occur in ice block depressions (kettle holes) in sandy glacial outwash. They are typically small, round, and they lack inlets and outlets. They have vegetation in a ringed zonation pattern. Often, the outer wet moat is dominated by a mixture of highbush blueberry (*Vaccinium corymbosum*) and swamp azalea (*Rhododendron viscosum*) bordered to the interior by a ring of rhodora (*Rhododendron canadense*). The peat mat has a mixture of tall and short shrubs that are predominantly ericaceous (members of the Heath family). Leatherleaf (*Chamaedaphne calyculata*) is dominant. Other typical ericaceous shrubs include rhodora, sheep laurel (*Kalmia angustifolia*), bog laurel (*Kalmia polifolia*) bog rosemary (*Andromeda polifolia var.glaucophylla*), Labrador tea (*Ledum groenlandicum*), and low-growing large and small cranberry (*Vaccinium macrocarpon* and *V.oxycoccus*) occur throughout. Scattered, stunted coniferous trees, primarily tamarack (*Larix laricina*) and black spruce (*Picea mariana*) occur throughout. A mixture of specialized bog plants grow on the hummocky sphagnum surface, including carnivorous pitcher plants (*Sarracenia purpurea*) and sundews (*Drosera rotundifolia* and *D. intermedia*) (Classification of Mass. Palustrine Natural Communities; 2000).

Acidic Graminoid Fens most often occur along pond margins, slow-moving streams, and along the outlet streams of stream headwater peatlands. They are considered the most species-rich of acidic peatland 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

(*Peltandra virginica*) and rose pogonis (*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 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 (*Acer rubrum*). Under the tree canopy, in the shrub layer, Black Gum Swamps usually have winterberry (*Ilex verticillata or I. laevigata*), 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 Plant Species

The Natural Heritage and Endangered Species Program, a program of the Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement, identified 241 native plant species as rare in the Commonwealth. As of February 2000, the Massachusetts Natural Heritage and Endangered Species Program has documented one rare plant - Giant St. John's Wort - in the Town of Warwick as threatened.

Giant St. John's Wort (*Hypericum ascryon L.*), a member of the St. John's Wort family, is an erect, herbaceous perennial with large, showy, yellow flowers. The plant can range from two to six feet, although in Massachusetts it is generally from two to four feet tall. Giant St. John's Wort flowers from early July to early August and fruits from early September to early October. In general, Giant St. John's Wort prefers wet meadows and moist thickets near streams or rivers as habitats. The Forest Seep Communities and Shallow Emergent Marshes of Warwick may provide suitable habitat for this species. Species associated with Giant St. John's Wort include red maple (*Acer rubrum*), speckled alder (*Alnus rugosa*), eastern hemlock (*Tsuga canadensis*), yellow birch (*Betula alleghaniensis*) and various willows (*Salix spp*.)

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 feeding surfaces, for herbivores, omnivores, and carnivores.

Fields, a maintained stage of human-caused vegetation, are rare in Warwick and thus valued. Forests on the other hand are plentiful and may appear as common. However, everything that is discussed in this Open Space and Recreation Plan points to the importance of forests: 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 and as such, should not be taken for granted.

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 edge species (those species that require this transitional zone for daily activities.)

The following species of wildlife have been observed in Warwick at least once as members of migrating, wintering, or breeding populations. The lists were based on information presented in New England Wildlife: Management of Forested Habitats by R.M. DeGraaf et. al., published in 1992, which correlates wildlife with the major forest type in the area. The species are listed by category (amphibians, reptiles, birds, or mammals), then by type of habitat, and then by size of home range. This method has been augmented with information provided by members of the Warwick Open Space Planning Committee. It is by no means a complete inventory of all species that may be found in Warwick.

E.1.1. Amphibians

These species are found in forest, wetland, and open upland habitats and require a home range 1-10 acres in size:

Red-spotted Newt, Four-toed Salamander, Jefferson Salamander, Eastern American Toad, Northern Spring Peeper, Bullfrog, Green Frog, Wood Frog, Gray Tree Frog, Northern Leopard Frog, and Pickerel Frog.

This species is found in forest habitats and requires a home range 11-50 acres in size:

Spotted Salamander

E.1.2. Reptiles

These species are found in forest, wetland, and open upland habitats and require a home range 1-10 acres in size:

Wood Turtle, Spotted Turtle, Eastern Painted Turtle, Eastern Box Turtle, Eastern Garter Snake

This species is found in forest, wetland, and open upland habitats and requires a home range 11-50 acres in size:

Common Snapping Turtle (Bass Swamp, Moores Pond)

This species is found in forest, wetland, and open upland habitats and requires a home range >50 acres in size:

Eastern Milk Snake

E.1.3. Birds

These species are found in forest /nonforested habitats and require a home range 1-10 acres in size:

Common Goldeneye, Hooded Merganser, Common Merganser, Ruby-throated Hummingbird, Yellow-bellied Sapsucker, Downy Woodpecker, Hairy Woodpecker, Northern Flicker, Eastern Wood-Pewee, Yellow-bellied Flycatcher, Alder Flycatcher, Willow Flycatcher, Least Flycatcher, Eastern Phoebe, Black-capped Chickadee, Boreal Chickadee, Tufted Titmouse, House Wren, Carolina Wren, Winter Wren, Golden Crowned Kinglet, Ruby Crowned Kinglet, Blue-gray Gnatcatcher, Eastern Bluebird, Bobolink, Veery, Hermit Thrush, Wood Thrush, American Robin, Brown Thrasher, Cedar Waxwing, Solitary Vireo, Yellow-throated Vireo, Warbling Vireo, Philadelphia Vireo, Red-eyed Vireo, Blue-winged Warbler, Tennessee Warbler, Nashville Warbler, Northern Parula, Yellow Warbler, Chestnut-sided Warbler, Black-throated Blue Warbler, Yellow-rumped Warbler, Black-throated Green Warbler, Blackburnian Warbler, Prairie Warbler, Blackpoll Warbler, Black-and-White Warbler, American Redstart, Worm-eating Warbler, Ovenbird, Northern Waterthrush, Song Sparrow, Lincoln Sparrow, White-throated Sparrow, Dark-eyed Junco, Common Grackle, Brown-headed Cowbird, Northern Oriole, Rufous-sided Towhee, Purple Finch, Scarlet Tanager, Northern Cardinal, Rose-breasted Grosbeak, Indigo Bunting, Great Crested Flycatcher, Eastern Kingbird, Tree Swallow, Blue Jay, Mourning Warbler, Common Yellowthroat, Wilson's Warbler, Canada Warbler, Chipping Sparrow, Field Sparrow, Grasshopper Sparrow, Henslow's Sparrow, American Goldfinch, Gray Catbird, Great Blue Heron, Green-backed Heron, Wood Duck, American Black Duck, Green-winged Teal, Mallard, Northern Pintail, Blue-winged Teal, American Wigeon, Canvasback, Ring-necked Duck, American Goldfinch, Evening Grosbeak, American Redstart, Red Crossbill, European Starling, Sora, Killdeer, Spotted Sandpiper, Common Snipe, Northern Mockingbird, Pied-billed Grebe, American Bittern, Eastern Pheoebe, Mourning Dove, Pine Siskin, Northern Waterthrush, Virginia Rail, Eastern Kingbird.

These species are found in forest/nonforested habitats and require a home range 11-50 acres in size:

Ring-necked Pheasant, Ruffed Grouse, Upland Sandpiper, Black-billed Cuckoo, Yellow-billed Cuckoo, Common Nighthawk, Whip-poor-will, Northern Rough-winged Swallow, Bank Swallow, Barn Swallow, Red-breasted Nuthatch, White-breasted Nuthatch, Brown Creeper, Swainson's Thrush, American Woodcock, Pine Grosbeak, Horned Lark.

These species are found in forest/nonforested habitats and require a home range >50 acres in size:

Turkey Vulture, Bald Eagle, Sharp-shinned Hawk, Cooper's Hawk, Northern Goshawk, Red-shouldered Hawk, Broad-winged Hawk, Red-tailed Hawk, American Kestral, Peregrine Falcon, Wild Turkey, Great Horned Owl, Barred Owl, Long-eared Owl, Northern Saw-whet Owl, Pileated Woodpecker, American Crow, Common Raven, Chimney Swift, Belted Kingfisher, Northern Harrier.

These species are found in forest/nonforested habitats with unknown home ranges:

American Tree Sparrow, Bohemian Waxwing, Northern Shrike, Common Redpoll.

E.1.4. Mammals

These species are found in forest habitats and require a home range 1-10 acres in size:

Eastern Cottontail, Snowshoe Hare, Eastern Chipmunk, Gray Squirrel, Red Squirrel, Beaver, Deer Mouse, White-footed Mouse, Meadow Vole, Star-nosed mole, Eastern mole, Muskrat.

These species are found in forest habitats and require a home range 11-50 acres in size:

Virginia Opossum, Porcupine, Ermine, Long-tailed Weasel.

These species are found in forest habitats and require a home range >50 acres in size:

Woodchuck, Coyote, Red Fox, Black Bear, Raccoon, Fisher, Mink, Striped Skunk, River Otter, White-tailed Deer, Moose.

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 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. Efforts are currently underway to certify them. According to the NHESP, the central and northern sections of Town also have many Potential Vernal Pools. Reliance on the official certification program for the protection of these important habitats means that it is crucial to obtain certification for these sites.

E.3 Corridors for Wildlife Migration

Many species of wildlife in Warwick have home ranges greater than fifty (50) acres in size. Even those species with smaller home ranges move across the landscape between sources of shelter, water, food and mating areas. Animals like white tailed deer and black bear seek both interior forest habitats and wetland edges where food sources may be more abundant. Wildlife benefit from having land to move within, which is also separate from human uses. Conservation planning that recognizes this need often focuses on the development of wildlife corridors. The value of a permanently protected wildlife corridor is most apparent in a landscape that is experiencing development pressures to the extent that wildlife are forced to move within the only vegetated land not currently developed for housing, roads, and other infrastructure.

Although there may not be research that points to specific areas and corridors used by wildlife in Warwick, the Natural Heritage & Endangered Species Program's BioMap Project has identified areas throughout the state that are critical to supporting the maximum number of terrestrial and wetland plant and animal species and natural communities. The BioMap includes core habitat areas and supporting natural landscapes. Core Habitat Areas are the sum total of viable rare plant habitat, viable rare animal habitat, and viable exemplary natural communities.
The Supporting Natural Landscapes include areas that are considered to be buffers to, and connections between, the core habitats, and large undeveloped areas that are more resilient to the impacts of ecological processes like fire, insect infestations, and ice storms, than are fragmented areas.

In Warwick the BioMap identifies both discreet patches of core habitats, namely Bass and Stevens Swamps, and linear core habitats surrounding the main stream systems draining into the Millers River: Moss, Darling, and many of the brooks that drain into Orcutt Brook *(See Open Space Map)*. Warwick could view both the BioMap-derived, core habitat areas around brooks and the lands already protected from development as potential wildlife corridors. When the core habitat areas are combined with the supporting landscapes and compared with land already protected from development, the main gaps are apparent. These occur in the area of Warwick that lies between the northeastern block of Warwick State Forest near Richards Mill Pond southwest along Black and Rum Brooks to the Iverson Property, then further along Gales Brook to Wheelers Pond. A third main gap exists just south of Chestnut Hill Road surrounding Wilson Brook and extends south along Darling Brook to the boundary of the Warwick State Forest.

E.4 Rare, Threatened and Endangered Species

There are five (5) Priority Habitats of Rare Species and Estimated Habitats of Rare Wildlife in the Town of Warwick, which are important to the conservation of a variety of common and rare species. These habitats are located in the following areas: within an approximate half mile radius of Warwick Center; beginning just south of the southern end of Moores Pond capturing the area all along Darling Brook as well as along Hockanum Road to the northern end of Wheeler Pond; the entire length of Moss Brook from the headwaters to just north of the intersection of Wendell and Quarry Roads; Orcutt Brook south of Wheeler's Pond to the Town Line; and Bass Swamp.

According to the Mass. 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 spotted turtle, wood turtle, Jefferson salamander, four-toed salamander and squawfoot. The spotted turtle, wood turtle and Jefferson salamander also use adjacent uplands for much of their lives including foraging for food.

The spotted turtle *(Clemmys guttata)*, known to occur in Warwick, was once considered one of the most common turtles in Massachusetts. It is now classified as a Species of Special Concern. The spotted turtle is a member of the largest turtle family, *(Emydidae)*. It is a relatively small turtle (three to five inches), which gets its name from the bright yellow circular spots that dot its smooth , black carapace (upper shell). Spotted turtles inhabit a variety of wetland habitats in Massachusetts, including forested and non-forested types. They dwell in marshy meadows, bogs, small ponds and brooks, ditches, and other shallow unpolluted bodies of water. They are also found in red maple and Atlantic cedar swamps and woodland vernal pools. The greatest threat to the spotted turtle is development and habitat fragmentation. Increased residential development, construction of new roads, alteration of wetlands, and destruction of upland habitats all severely impact the spotted turtle. Protecting wetland, upland corridors between wetlands, and potential nesting areas are vital to the continued existence of this reptile.

The wood turtle *(Clemmys insculpta)* is one of the most terrestrial of North American turtles. It is classified as a Species of Special Concern. The wood turtle is medium sized and the largest member of its genus, ranging from five to nine inches in length. It gets its name from the roundish segments of its upper shell (carapace), which resemble a wood-grained cross-section of a branch complete with growth rings. The preferred habitat of the wood turtle is riparian areas. Slower moving streams are favored, with sandy bottoms and heavily vegetated stream banks.

The four-toed salamander *(Hemidactylium scutatum)* is known to occur in Warwick. It is also a Species of Special Concern. The four-toed salamander is the smallest salamander found in Massachusetts and is easily identified by three distinctive characteristics. As its name implies, this salamander has only four toes on the hind feet. It also has a very distinct constriction at the base of its tail and its belly resembles bright white enamel speckled with black. The females range in size from 2.8 to 3.5 inches in length whereas the males are slightly smaller (2-3 inches). The breeding habitat of the four-toed salamander in Massachusetts is in bogs, swamps dominated by red maple and Atlantic white cedar, vernal pools and other perennial wetlands with sphagnum mosses. The distribution of the four-toed salamander is limited to regions that provide both breeding and upland habitats. Kettlehole Level Bogs and Acidic Graminoid Fens, two acidic peatland natural communities found in Warwick may provide good breeding habitats for four-toed salamander. As a result of their preference for wetlands dominated by sphagnum, they are quite tolerant of acidic conditions. The greatest threat to the four-toed salamander is habitat destruction resulting from road construction, development, and timber harvesting in and around boggy wetlands, peatlands, and forested wetlands. Given its preference for nesting sites in bogs with sphagnum moss, every effort must be made to protect the natural state of the bog areas throughout the state.

The Jefferson salamander *(Ambystoma jeffersonianum)* is a species of Special Concern found in Warwick. It is a moderately large and slender salamander with very long toes and a wide snout.

The Jefferson salamander prefers to reside most of the year in well-drained upland deciduous or mixed forest near small vernal pools or ponds commonly surrounded by alder, red maple, buttonbush and dogwood.

The squawfoot *(Strophitus undulatus)*, a Species of Special Concern, was last observed in Warwick in 1997. The shell of this freshwater mussel is elliptical to oval, thin to relatively thick, green, dark brown, or black, with pronounced beak sculpture and poorly developed hinge teeth. The length of the squawfoot can reach four inches. It is found in small to medium-sized streams and occasionally large rivers in mud, sand, or gravel.

Table 4-1: Rare Wildlife Species Found in the Town of Warwick

Scientific Name	Common Name	Taxonomic Group	State Status
Clemmys gutttata	Spotted Turtle	Reptile	Special Concern
Clemmys insculpta	Wood Turtle	Reptile	Special Concern
Hemidactylium scutatum	Four-toed Salamander	Amphibian	Special Concern
Ambystoma jeffersonianum	Jefferson Salamander	Amphibian	Special Concern
Strophitus undulatus	Squawfoot	Invertebrate	Special Concern

Source: Division of Fisheries and Wildlife; 2001.

E.5 Analysis

All of these animals require food, water, space, mates, and shelter. Some species require areas of forest, or open areas, or wetlands that are less than ten (10) acres in size. Does this mean that the fragmentation of the landscape, which is commonly the result of development and road building, should be looked upon as favorable to sustaining wildlife populations? On the contrary, a home range is not equal to the extent of the habitat but the amount required by that one individual. Accordingly, this information does not represent the needs of the population, the total number of individuals of that species within a particular geographic area. An individual wood frog may require a portion of a wetland or wooded habitat one to ten acres in size, but what of the other members in its population? A sustained population of wood frogs would require areas of wetland and of forestland much larger than one acre. The point is that the acreage figures are presented only as a range of habitat block size required by each individual of a species. These ranges also suggest that all sizes of open space greater than an acre provide habitat value; but, to support the breadth of native species populations, it is important to include a diversity of larger forest, wetland, and upland open areas.

The Town of Warwick is fortunate for having permanently protected open space areas much greater than fifty (50) 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)*.

The Massachusetts Executive Office of Environmental Affairs has selected the landscapes surrounding the Tully Mountain as a priority area for purchasing conservation restrictions from willing landowners. Many landowners in Warwick have been invited to sell the development rights on some portion of their property. This may be an opportunity for Warwick to encourage land protection projects that most benefit or parallel Town open space goals. Warwick may also want 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.

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, use its resources, and enjoy 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 provides 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. 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 County Commission (now 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 including 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).

Table 4-2 lists scenic landscapes and describes their ecological/geological, recreational, and historical values and their level of protection from development. The Scenic Resources and Unique Environments Map shows the overlap of these ecological and cultural values where different hatching patterns are layered. The numbers in Table 4- 2 correlate with the map showing the location of each scenic landscape feature in Warwick. The text that follows the table addresses the common themes associated with the greatest concentration of values as displayed in both the map and the table.

In some cases, the landscapes are described as being a Historical *Agricultural* Landscape. When the word *agricultural* is in italics, it means that this landscape has been documented as a significant historical landscape based on the National Park Service standards, which are different than those applied by the Warwick Open Space Committee.

In the far right column of Table 4-2 , 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. 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 Ch. 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.

Table 4-2: Significant Scenic/Ecological/ Recreational/and Historic Landscapes/Environments in Warwick

MAP #	SCENIC RESOURCE	ECOLOGICAL/ GEOLOGICAL RESOURCE	RECREATIONAL VALUE	HISTORICAL VALUE	PROTECTION STATUS
	Stream Corridors				
1	**Mountain Brook**	Wildlife Habitat Low Due to proximity to Rte. 78 and siltation problems	High		Mostly protected within Mt. Grace State Forest
2	**Darling Brook**	BioMap Core Wildlife Habitat			½ Protected within Warwick State Forest (WSF)
3	**Moss Brook**	BioMap Core Wildlife Habitat	High		Protected by WSF
4	**Rum Brook**	BioMap Core Wildlife Habitat			Unprotected

MAP #	SCENIC RESOURCE	ECOLOGICAL/ GEOLOGICAL RESOURCE	RECREATIONAL VALUE	HISTORICAL VALUE	PROTECTION STATUS
5	**Black Brook**	BioMap Core Wildlife Habitat		Sites of Warwick's First mill (Ayer's Mill, 1765)	½ Protected by Iverson MGCLT and WSF
6	**Gales Brook**	BioMap Core Wildlife Habitat		Sites of Gales Mill	Unprotected
7	**Orcutt Brook**	BioMap Core Wildlife Habitat	High		Unprotected
8	**Tully Brook**	Wildlife Habitat	High/Great Trout Stream		Mostly Protected by WSF
9	**Mill Brook**	Wildlife Habitat High: large wetland system includes Stevens Swamp, has/ native brook trout & is stocked w/ Atlantic salmon	High/Great Trout Stream		Protected in part by WSF
10	**Hodge Brook**	BioMap Core Wildlife Habitat	Site of Scenic Devil's Washbowl/Hiking Trail		Protected within Iverson and WSF
11	**Kidder Brook**	Wildlife Habitat	Very Scenic Kidder Falls and good access		Mostly unprotected
12	**Mirey Brook**	Wildlife Habitat	Medium		Mostly Unprotected
	Ponds and Lakes				
13	**Bent Pond**	Wildlife Habitat			Unprotected
14	**Hubbards Pond**	BioMap Core Wildlife Habitat	No easy access	Historical Impound. /Near an *Significant Historical Conservation/Recreation Landscape*	Unprotected
15	**Richards Mill Pond**	Wildlife Habitat/ Kettle Hole Pond	Fair	Historical Impoundment/ Sites of Warwick's First mill (Ayer's Mill, 1765)	Protected by WSF
16	**Lily Pond**	Wildlife Habitat			Unprotected
17	**Hastings Pond**	Wildlife Habitat/ Warwick's only Natural Pond			Unprotected
18	**Gales Pond**	BioMap Core Wildlife Habitat	Public Access	Historical Impoundment	Protected by WSF
19	**Wheeler's Pond**	BioMap Core Wildlife Habitat			Unprotected
20	**Moores Pond**	Wildlife Habitat	Informal Town Beach	Historical Impoundment	Unprotected
21	**Richards Reservoir**	Wildlife Habitat	High	Historical Impoundment	Protected by WSF
22	**Sheomet Lake**	Wildlife Habitat	High		Protected by WSF
23	**Laurel Lake**	Wildlife Habitat	High	*Significant Historical Conservation/Recreation Landscape*	Protected by WSF
	Wetlands				
24	**Harris Swamp**	BioMap Core Wildlife Habitat		Historical Impoundment	Partially protected by WSF
25	**Bass Swamp**	Wildlife Habitat		Historical Impoundment	Protected by WSF
26	**Stevens Swamp**	Wildlife Habitat		Historical Impoundment	Protected by WSF
27	**Black Swamp**	BioMap Core Wildlife Habitat			Protected by WSF
28	**Cranberry Bog**	Wildlife Habitat			
	Recreation Areas				
29	**Warwick Town Forest**	BioMap Core Wildlife Habitat	High: Equestrian & Snowmobiling		Unprotected
30	**Warwick State Forest**	Wildlife Habitat	Fair	*Significant Historical Recreation/Conservation Landscape*	Protected

MAP #	SCENIC RESOURCE	ECOLOGICAL/ GEOLOGICAL RESOURCE	RECREATIONAL VALUE	HISTORICAL VALUE	PROTECTION STATUS
31	**Mount Grace State Forest**	Wildlife Habitat	High Potential	*Significant Historical Recreation Landscape*	Protected
32	**Laurel Lake, Erving State Forest**	Wildlife Habitat	High	*Significant Historical Recreation/Conservation Landscape*	Partially Protected
	Historical Areas				
33	**Warwick Town Center**			*Significant Historical Agricultural/Community Development Landscape*	Unprotected
34	**Warwick Center Cemetery**			Historical Site	Protected
35	**Grist Mill Stones**			Historical Objects	Unprotected
36	**Ohlson Field**		High		Protected
37	**Wawbeek Rock**			Historical Recreation Site	Unprotected
38	**Granite Quarry**			Historical Industrial Site	Protected by WSF
39	**CCC Camp off White Road**			Historical Site	Possibly Protected by WSF
40	**Keith Property, Chestnut Hill Road**			*Significant Historical Agricultural Landscape*	Unprotected
41	**H. Grout, State Road**			*Significant Historical Agricultural Landscape*	Unprotected
42	**C.W. Bass, Rte. 78**			*Significant Historical Agricultural Landscape*	Unprotected
	Unusual Geologic Features				
43	**Indian Kettles**			Historical/Cultural Site	Unprotected
44	**Caves**				Protected by WSF
45	**Devil's Washbowl**				Probably Protected by Iverson Property
	Scenic Views				
46	**Mount Grace**				Protected
47	**Kidder Brook Falls**				Unprotected
48	**Lover's Retreat**				Unprotected
49	**Of the Quabbin Reservoir from Shephardson Rd.**				Unprotected
50	**Of Mt. Monadnock From Hasting Heights, Old Winchester , and Chase Hill Rds.**				Most Likely Unprotected
51	**Of Tully River Valley and Beyond to the Eastern horizon from Chase Hill Road**				Although the Chase Hill Farm is protected, the view is not.
52	**Of Mount Grace from Open Fields including those on Hasting Heights Road**				Although the Bowers Farm fields are protected, the view is not.
	Unusual Natural Communities				
*****	**Black Gum Swamp**	Unusual Natural Community		Unknown	Unknown
*****	**Kettlehole Level Bog**	Unusual Natural Community			Unknown
*****	**Acidic Graminoid Fens**	Unusual Natural Community			Unknown

Source: Natural Resources Program Inventory of Sites with Natural Resource Potentials, 1974; Franklin County Rural Landscape Preservation Plan Report, Franklin County Commission, 1992. Note*: The Massachusetts Division of Fisheries and Wildlife would not identify the locations of these unique natural communities.

The following text includes information regarding scenic resources and unique environments not yet included in this section.

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. Although Warwick has many small streams and brooks, those that follow along the many town roads are considered the most scenic. These streams 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 (10) of its fifty-one (51) 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 CCC. The improvements includes road improvements, a beach, trails, vistas, picnic areas, campground, parking area, new dam at the outlet, and forestry work.

Moores Pond

Located on Wendell Road at the intersection of Shephardson Road, Moores 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 impoundment was 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.

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 shrunken 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 Moore's 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 Mass. 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 Spotted Turtle, Wood Turtle, Jefferson Salamander, Four-toed Salamander and Squawfoot.

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 partial protection from land uses that may have a negative impact on the long-term viability of flora and fauna in wetlands. 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 (3) 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 1700's 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 is 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 1930's 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.

Laurel Lake

Located in the north central part of Erving State Forest, Laurel Lake has approximately ten (10) of its fifty-one (51) 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 (90) 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 (8) feet by twelve (12) feet with a front overhang.

Wawbeek Rock

Located along the west side of Hastings Pond, Wawbeek Rock is a granite boulder about sixteen (16) feet high and twenty (20) feet wide. It was, however, believed to be originally thirty (30) feet high, but was split for possible use as a building stone. The Athol YMCA, in 1916, had a boys' summer camp in this area. 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 (1) 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.

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 (4) 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 protected the land from development. The Fellows Farm on Chase Hill Rd. and Bowers Farm at 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 Winchester Road just north of Rum Brook Road. These were supposedly used by Native Americans to cook food. Similar potholes are also located 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 (13) 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.

Devil's Washbowl

Devil's Washbowl is located at an old mill site at the headwaters of Hodge Brook, approximately 0.4 miles south of Clark's Sawmill on Athol Road. Immediately below the mill site is a waterfall about fifteen (15) feet high. At the base of the waterfall is a large pothole, 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 pothole in the bedrock. This depression is what is known as the Devil's Washbowl.

F.7 Significant Scenic Views

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 Robbins Road and then seventy-five (75) feet north to the brook. The stream drops about fifty (50) 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 and then crossing the state line into New Hampshire, it 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 peatlands. They are considered the most species-rich of

acidic peatland 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 peatlands like the Kettlehole 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 peatlands as part of their habitat, then move on when conditions are unfavorable. Moose and white-tailed deer use acidic peatlands for browsing and grazing. Many bird species use peatlands for part of the year as nesting or foraging habitats. Massachusetts birds can be found in acidic peatlands include 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 peatlands, 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

There are five (5) main environmental problems in Warwick:

1. Polluted run-off from winter sanding, dirt roads, all-terrain vehicle (ATV) use on trails, and poorly seeded logging landings and woods roads have resulted in annual silt loading to streams and ponds;
2. A lack of maintenance is apparent among state-owned dirt roads, state forest facilities, and picnic areas;
3. Institutional expansion of the state prison camp;
4. The negative impacts of beaver-related flooding; and,
5. The general environmental impacts that occur with residential development but especially the loss of remaining pasture land.

Run-off describes the movement of water across impermeable surfaces during or after a storm event. Storm water runoff on dirt roads that have been sanded and salted during the winter season can result in the deposition of materials within roadside streams and wetlands. The resulting siltation can reduce the movement of water between streams and wetlands, increase the velocity of the waterway, and decrease the biodiversity of first and second order streams. New driveway construction can have similar results if proper soil erosion control measures are not applied. Dirt roads can increase siltation within roadside streams and vernal pools. In addition, ATVs, and a failure to seed logging roads can produce conditions that make areas more vulnerable to erosion and result in siltation.

Residents are concerned about the loss of recreational opportunities relating to Warwick State Forest. In general, residents would like the state to manage its land to provide for the following activities: hiking/equestrian, swimming, fishing, camping and recreational games.

Warwick residents shared their views on institutional expansion in the community survey as part of the Open Space and Recreation Plan. By a two to one margin, respondents felt that the prison camp poses a threat to open space quality and the Town's rural character. Currently, the site is a liability to the state, as many of the boarded-up buildings are accessible and have been vandalized. Warwick residents could propose the development of an advisory board similar in scope to the group that has been organized around the management of Lake Wyola and Ruggles Pond (Wendell State Forest).

Beaver activity along streams in Warwick has caused the impoundment of significant amounts of water, resulting in the erosion of roadways and bridges, and hardship for residents, as well as killing stands of maple, birch and pine. An excellent example of this has occurred throughout the 1990's along the three miles of an unnamed tributary of the Mill River in northwestern Warwick. This tributary originates at Stevens Swamp near the Northfield border. In the early 1990s beavers created a dam at the outlet of the Swamp, which caused it to flood and form into a large lake. Several hundred feet downstream from the outlet, another beaver dam was built and by 1997, the marsh had become a significant body of water which overflowed into surrounding woodland, causing the demise of 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. Two other beaver impoundments along the tributary, one beyond White Road headed north and one on the north side of Northfield Road, resulted in the creation of marsh and the death of large stands of red maple. Beaver activity on the north side of Bass Swamp, has also caused several floodings of White Road. To alleviate this problem, the Town installed a wire device in a culvert to discourage the beavers and keep the tributary open. The level of open water in this area, however, continues to remain higher than it had been in 1990.

While beaver activity causes destruction and hardship for the human population, it creates an abundance of habitat for wildlife. As reported by Warwick resident, Lonsdale G. Hickler, the above-described scenario, has resulted in increased use of the area by migrating and resident birds and waterfowl, including herons. Additionally, river otters appeared approximately six (6) years ago and remain year round as they have ample fish on which to feed. Wood, snapping and painted turtles as well as six varieties of frogs and toads have been found as well.

Although, new residential development in Warwick may appear attractive to some because additional property tax revenues would be generated, it is included here as one of Warwick's environmental problems. It may be that for Warwick, incoming school-aged children today would be using excess capacity within the school. However, there is much evidence that suggests that with each new house built in Warwick, the expense of providing all of the municipal services including transportation, public safety, solid waste disposal, and education rises incrementally *(See Section 3 Community Setting: Growth and Development Patterns).* The expense of one incoming student would likely surpass the taxes generated by one newly constructed home.

Despite soil limitations, new residential development appears to be inevitable in Warwick and in most communities in the region. Warwick's population grew by over 17 percent between 1990 and 2000, a trend that residents believe will continue for the foreseeable future. Other than

increases in property taxes, new residential development could result in more traffic, road runoff, and impervious surfaces; less contiguous forest acres, open fields, and wildlife habitat; diminished rural character; and compromised scenic views and historic agricultural landscapes. If there was consensus among residents and Town officials that new residential development should be controlled, there are several tools the Town could adopt: the minimum lot size and frontage could be increased; Conservation Development might be modified to make it more attractive to developers; and residents could permanently protect developable acres that included the most important historical, ecological, recreational, and scenic areas in Warwick. This is one strategy that would help to direct growth away from the areas that everyone could agree were precious and worth conserving.

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 and or management, and by level of protection: permanent, limited, and temporary *(See Table 5-1).*

Table 5-1: Summary Areas of Protected Farmland and Forested Open Space by Ownership and Level of Protection from Development

PRIVATELY OWNED PROTECTED OPEN SPACE	Area in Acres	Percentage of Warwick's Total Land Area
FARMLAND		
Permanently Protected by Agricultural Preservation Restriction	266	1.10%
Temporarily Protected under Ch. 61A	361	1.50%
TOTAL PRIVATELY OWNED PROTECTED FARMLAND	**627**	2.60%
FORESTLAND		
Permanently Protected by Conservation Restriction	382	1.58%
Temporarily Protected under Ch. 61	4,997	20.73%
Temporarily Protected under Ch. 61B	77	0.32%
TOTAL PRIVATELY OWNED PROTECTED FORESTLAND	**5,456**	22.64%
TOTAL PRIVATELY OWNED PROTECTED OPEN SPACE	**6,153**	25.53%
PUBLICLY OWNED AND NON-PROFIT PROTECTED OPEN SPACE		
FORESTLAND		
Permanently Protected by State Conservation Agencies	**11,278**	46.79%
State Department of Environmental Management	11,087	46.00%
State Division of Fisheries and Wildlife	191	0.79%
Land with Limited Protection by Town of Warwick	**204**	0.85%
Permanently Protected by Conservation Land Trusts	**740**	3.07%
Mount Grace Land Conservation Trust	568	2.36%
New England Forestry Foundation	85	0.35%
Norcross Wildlife Foundation	87	0.36%
TOTAL PUBLICLY OWNED AND NON-PROFIT PROTECTED OPEN SPACE	**12,222**	50.71%
TOTAL PROTECTED OPEN SPACE	**18,375**	76.24%

Source: Warwick Assessors Records and Maps, 2001 and MassGIS Open Space data, 1997.

The parcels that are considered permanently protected are owned by the Commonwealth of Massachusetts and under the management of state conservation agencies: Department of Environmental Management (DEM) and the Division of Fisheries and Wildlife (DFW). Permanently protected parcels also include those that are owned by private conservation land trusts like Mount Grace Land Conservation Trust (MGLCT) and private citizens that have sold or donated their development rights to the MGLCT. 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 be of limited protection includes any Town 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 and pay back taxes due at any time. 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 one hundred and twenty (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 Food and Agriculture (DFA) 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 DFA 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 main farms in the APR program: Chase Hill Farm and the Crossroads Farm on Hasting Heights Road.

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 constrained from selling and/or developing his or her land, only 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 DEM, 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 DEM 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 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 be of limited protection from development.

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 DEM, DFW, NEFF, and MGLCT given their continued interest in protecting large greenways between the North Quabbin Region and the Connecticut River Valley. The Warwick Select Board or Planning Board could appoint a board member or resident to be a special liaison to these groups.

One way the liaison could network with all these groups quite efficiently is by being part of the North Quabbin Regional Landscape Partnership (NQRLP). The North Quabbin Regional Landscape Partnership is an informal working group of forty 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. An Official Liaison of the Town would be able to solicit aid from the NQRLP and its members to assist in land protection projects.

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 34 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, whether the land is protected or not. Many landowners have taken advantage of the Chapter 61 programs as is evidenced by the fact that there are 6,153 acres of open space in the 61 and 61A Programs combined. As is mentioned

earlier, the Ch.61 Programs offer the Town of Warwick an opportunity to purchase any Ch.61 or 61A 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, with the assessors map, lot, 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 266 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 Food and Agriculture (DFA), which is the main source for farmland preservation funds in eastern Franklin County. The DFA normally requires the land to be actively farmed and to contain prime farmland soils.

All of the parcels in Table 5-2 below, 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 DFA. The zoning of the parcels is Rural-Agricultural. All of the parcels have a high recreation value because of the presence of a trail easement, which connects the Iverson Conservation Area with the Warwick State Forest via both farmland areas (Chase Hill Farm and Crossroads Farm (formerly known as Bowers Farm)).

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

Owner	Holder of the Conservation Easement	Map	Lot	Acres	Recreational /Other Public Benefit
Fellows, M. & J.	Department of Food & Agriculture (DFA)	404	6	23.55	High-MGCLT trail easement
Fellows, M. & J.	DFA	404	10	15.00	High-MGCLT trail easement
Fellows, M. & J.	DFA	404	19	8.70	High-MGCLT trail easement
Fellows, M. & J.	DFA	404	35.1	151.00	High-MGCLT trail easement
Fellows, M. & J.	DFA	404	35.2	15.00	High-MGCLT trail easement
Fellows, M. & J.	DFA	409	18	30.00	High-MGCLT trail easement
Fellows, M. & J.	DFA	409	34	23.00	High-MGCLT trail easement
Total				266.25	

Source: Warwick Assessor's Records and Maps, 2001 and MassGIS Open Space Data, 1997.

There are approximately 361 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 including 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 a tax break yearly. The zoning of the parcels is Rural-Agricultural.

Table 5-3: Agricultural Land with Temporary Protection from Development Enrolled in the Ch. 61A Land Classification and Taxation Program

Owner	Map	Lot	Acres
Doane, Thomas J.	402	31.1	29.00
Doane, Thomas J.	402	31.B	8.90
Doane, Thomas J.	402	42.1	4.58
Doane, Thomas J.	402	42.2	114.00
Taney, P., Kimball, K., Kimball, J.	409	19.1	5.83
Taney, P., Kimball, K., Kimball, J.	409	19.2	6.18
Shaw, Charles L.	411	4.1	192.00
Total			**360.49**

Source: Warwick Assessor's Records and Maps, 2001 and MassGIS Open Space data, 1997.

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, which 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 they 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 only five 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, MGLCT, DEM and DFW are also considered to be the manager of the easement. There are no public grants awarded, though the owner may have received payment for the easement, which came from a public source. The zoning of the parcels is Rural-Agricultural.

Several of these parcels were protected recently through an initiative by the Massachusetts Executive Office of Environmental Affairs (EOEA). The conservation restrictions purchased from

private landowners in this initiative often 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	Holder of the Conservation Easement	Map	Lot	Acres	Recreational /Other Public Benefit
Song, M. & K.	DEM	401	22	83.00	Provides access to Black Brook
Joyce, C. & Vogt, M.	MGLCT	403	14.2	123.91	Connects DFW land to Richmond Road
Davis, F. & B.	DFW	405	1	12.82	Protects Black Brook
Gagnon, R.	DEM	406	12	92.67	Links two blocks of WSF
Doubleday, J.	DEM	410	3	70.00	Extends WSF
Total				**382.40**	

Source: Mount Grace Conservation Land Trust records, 2002; Warwick Assessor's Records and Maps, 2001; MassGIS Open Space Data, 1997.

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 21 percent of the total land area of Warwick and 27 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 represent the glue that binds the state forest blocks together in Warwick from the Northfield Town line to Royalston, and in the region from the New Hampshire border to the Quabbin Reservation. Ch.61 lands contain prime farmland soils, significant historical agricultural landscapes, core habitat areas; they 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 Enrolled in the Ch. 61 Forestland Classification and Taxation Program

Owner	Map	Lot	Acres
Peck Realty, LLP	401	1.0	24.00
Cutting, A.	401	4.0	45.00
Cowls, W.D., Inc.	401	8.0	46.00
Cutting, A.	401	9.0	760.00
Coleman, W. & R.	401	11.0	47.00
Cutting, L.	401	13.0	20.07
Wirth, H. & I, P.	401	17.0	29.00
Neiman, M. & M.	401	23.0	46.00
Wirth, H. & I, P.	401	26.0	69.00
Jay, R.	402	11.0	17.00
Neiman, M. & M.	402	18.0	10.00
Jay, R. & H.D.	402	20.0	85.00
Gerry, P.A.	402	22.0	69.08
Morgan, A.C.	402	25.0	19.00
Morgan, A.C.	402	26.0	11.80
Julian, J. & P.L.	402	28.0	50.00
Whipple, R. F.	402	46.0	185.00
Kimball-Smith, P.	403	3.0	24.40
Miniuks, A. & A.B.	403	6.0	10.60
S & M Forest Trust	403	7.0	45.00
S & M Forest Trust	403	8.0	9.30
Morse, C.A., Jr.	403	10.0	59.00
Miniuks, A. & C.A.	403	11.0	12.40
Joyce, C. & Vogt, M.	403	14.2	123.91
Manring, L.	404	16.0	36.00
Felton, M.I.	404	18.0	86.00
Whiting, R. & B.J.	405	53.0	33.00
Morse, C.A., Jr.& R.J.	405	67.0	17.00
Stevens Heirs	405	70.0	125.00
Morse, C.A., Jr. & R.J.	405	71.0	65.00
Manring, L.	405	86.0	22.00
King, T.M. & R.A.	406	1.0	52.88
Abbondanza, A.J.	406	2.0	46.81
Cowls, W.D., Inc.	406	4.0	25.30
Duerring, C.L.	406	10.0	35.58
Gagnon, R.E.	406	12.0	92.67
Wyatt, T.S.	406	17.0	31.93
Crosby, D.C.	406	23.0	12.00
Crosby, D., Stevens, R.,& Niedzialkoski	406	24.0	72.00
Shepardson, D. & B.E.	407	2.0	118.00
Shepardson, R. & P.	407	2.A	2.40
Shepardson, D. & B.E.	407	3.0	21.00

Owner	Map	Lot	Acres
Farley, W. D.III & B.E.	407	4.0	39.00
Jacobson, R.	407	5.2	13.20
Radinsky, L.	408	4.0	12.70
Goldsbury, J. Estate	408	10.0	45.00
Alden, A.P., Jr.	408	11.2	28.27
Radinsky, L., Jr.	408	42.0	131.60
Shepardson, R. & P.	408	54.0	29.00
Thompson, C.M.	408	55.0	8.30
Thompson, C.M.	408	56.0	41.00
Thompson, C.M.	408	56.01	18.00
Thompson, C.M.	408	61.0	66.00
Shepardson, R. & P.	408	62.0	17.00
Shepardson, R. & P.	408	63.0	5.50
Londahl, M.J.	408	70.0	38.00
Cadwell, B.&D.	408	96.0	78.00
Cadwell, B.&D.	408	96.1	78.00
Cadwell, J. & Frost, K.	408	96.2	12.00
Goldsbury, J. Estate	408	113.0	48.00
Alden, A.P.	408	125.0	30.00
Fitzmaurice, L.	408	132.0	48.70
Hastings, D.B., Jr.	409	9.0	26.36
MGLCT	409	12.0	44.00
MGLCT	409	13.0	24.00
MGLCT	409	15.1	26.15
Matilainen, M. & L.K.	409	15.2	11.97
Matilainen, M. & L.K.	409	15.5	2.20
Kowacki, P.	409	28.0	5.80
Heyes, F.	409	32.0	140.00
Matilainen, M. & L.K.	409	35.2	36.63
Heyes, F.L.	409	43.0	29.00
Heyes, F.L.	409	45.0	19.00
Berman, A.R.	410	1.0	41.00
Freitag, L.E.	410	6.0	83.00
Coffin, R..N. & L.M.	410	8.0	81.00
Freitag, L. &L.	410	9.0	41.00
Bendekgey, B.A.	410	13.0	52.00
Peck Realty, LLP	411	83.0	90.00
Stell, R.J.	411	128.0	238.00
Radinsky, L.	414	15.0	9.40
Radinsky, L.	414	16.0	36.00
Radinsky, L.	414	17.0	48.00
Shaw, V.L.	414	45.0	97.00
Radinsky, L.	414	50.0	63.00
Radinsky, L.	414	51.0	26.00
Radinsky, L.	414	54.0	22.00

Owner	Map	Lot	Acres
Radinsky, L.	414	56.0	9.40
Radinsky, L.	414	56.A	52.00
Barger, C.B., Trustee	414	58.0	12.40
Barger, C.B., Trustee	414	59.0	74.00
Total			**4,996.71**

Source: Warwick Assessor's Records and Maps, 2001 and MassGIS Open Space data, 1997.

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 Enrolled in the Ch. 61B Recreational Open Space Lands Classification and Taxation Program

Owner	Map	Lot	Acres
Woodburn, S.B.	405	74.0	68.00
Wilanson, P.R., Jr. & L.	411	5.2	3.20
Wilanson, P.R., Jr. & L.	411	12.0	5.40
Total			**76.60**

Source: Warwick's Assessor's Records and Maps, 2001 and MassGIS Open Space data, 1997.

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. Only the Town owned parcels have a low level of protection because they are not under the authority of the Warwick Conservation Commission. The following inventory includes those parcels that are owned by the Commonwealth of Massachusetts and the Town as well as by Mount Grace Land Conservation Trust, the New England Forestry Foundation, and the Norcross Wildlife 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 Environmental Management (DEM) and the Division of Fisheries and Wildlife (DFW).

DEM'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 extreme western and northeastern Warwick. Mount Grace State Forest is roughly bounded by Flower Hill Rd., Northfield Rd. and Old Winchester Rd. 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, and picnic at the Mount Grace Picnic Area on Route 78. Located in Warwick State Forest are Laurel Lake and Sheomet Lake. 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. All of the forested acres in Warwick contain wetlands, stream corridors, and ponds.

DFW lands are located in the eastern half of Warwick. The northernmost parcel is surrounded by Warwick State Forest and MGLCT lands, located to the east of Richmond Road. It 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 the Department of Environmental Management (DEM), or by the Division of Fisheries and Wildlife (DFW).

Table 5-7: Permanently Protected Public Parcels in Warwick Owned by State Conservation Agencies

Property Manager	Site Name	Area	Map	Lot	Current Use	Condition	Recreation Value	Public Access
DEM	Warwick State Forest	234	401	19	Hunting	Good	High	Via Flower Hill Road
DEM	Warwick State Forest	71	401	24	Hunting	Good	High	Via Flower Hill Road
DEM	Sliva Land	17.00	402	3	Hunting	Good	High	Via Winchester Rd.
DEM	Mt. Grace State Forest	225.00	402	4	Hunting, Hiking, Snowmobiling, XC Skiing	Good	High	Via Winchester Rd.

Property Manager	Site Name	Area	Map	Lot	Current Use	Condition	Recreation Value	Public Access
DEM	Mt. Grace State Forest	1,146.00	402	5	Hunting, Hiking, Snowmobiling, XC Skiing	Good	High	Via Winchester Rd.
DEM	Sliva Land	3.00	402	6	Hunting	Good	High	Via Winchester Rd.
DEM	Warwick State Forest	524	403	1	Hunting	Good	High	Via Richmond Rd.
DEM	Warwick State Forest	78	403	9	Hunting	Good	High	Via Smith Rd.
DFW		74	403	19	Hunting	Good	High	Difficult, Through WSF off Smith Rd.
DEM	Warwick State Forest	553	404	15	Hunting	Good	High	Via Richmond Rd.
DEM	Felton Land	86.00	404	18	Hunting	Good	High	Via Richmond Rd.
DEM	Warwick State Forest	70	404	20	Hunting	Good	High	Via Royalston Rd.
DEM	Warwick State Forest	736.1	404	26	Hunting	Good	High	Via Royalston Rd.
DEM	Warwick State Forest	270	404	29	Hunting	Good	High	Via Athol Rd.
DEM	Mt. Grace State Forest	0.01	405	25	Hunting, Hiking, Snowmobiling, XC Skiing	Good	High	Off Mt. Grace Ave.
DEM	Warwick State Forest	3033	406	7	Hunting	Good	High	Via Northfield & White Roads
DEM	Warwick State Forest	541	407	6	Hunting	Good	High	Via White Rd.
DEM	Warwick State Forest	57	408	5	Hunting	Good	High	Via Orange Rd.
DEM	Warwick State Forest	127	408	76	Hunting	Good	High	Via Northfield Road
DEM	Warwick State Forest	414	409	1	Hunting	Good	High	Via Gale Road
DEM	Warwick State Forest	34.53	409	3.1	Wildlife Viewing, Hunting	Good	High	Via Gale Road
DEM	Warwick State Forest	73.87	409	5.2	Wildlife Viewing, Hunting	Good	High	Via Gale Road
DEM	Warwick State Forest	171	409	7	Hunting	Good	High	Via Gale Road
DEM	Warwick State Forest	63	409	23	Hunting	Good	High	Via Athol Rd.
DEM	Warwick State Forest	4	409	24	Hunting	Good	High	Via Athol Rd.
DEM	Warwick State Forest (Sheomet Lake)	496	409	25	Swimming, Fishing, Picknicking, Wildlife Viewing	Good	High	Via Tully Brook & Athol Rds.
DEM	Warwick State Forest	74	409	30	Hunting	Good	High	Via Athol Rd.
DEM	Warwick State Forest	0.76	409	37	Hunting	Good	High	Via Bliss Hill Rd.
DEM	Dubeau Land	22	410	10.01	Hunting	Good	High	Via Gale Road
DEM	Warwick State Forest	108	410	11	Hunting	Good	High	Via Beech Hill Rd.
DFW		117	410	14	Hunting	Good	High	Via Brush Valley Rd.
DEM	Warwick State Forest	2.49	411	44	Hunting	Good	High	Via Wendell Rd.
DEM	Warwick State Forest	406	411	102	Hunting	Good	High	Via Wendell Rd.
DEM	Warwick State Forest	39	412	4	Wildlife Viewing, Hunting	Good	High	Via Quarry Rd.
DEM	Warwick State Forest	52	412	5	Hunting	Good	High	Via Quarry Rd.
DEM	Warwick State Forest (Laurel Lake)	846	413	1	Fishing, Picnicking, Swimming, Boating, Ice Skating, Camping	Good	High	Via Quarry & Wendell Roads

Property Manager	Site Name	Area	Map	Lot	Current Use	Condition	Recreation Value	Public Access
DEM	Warwick State Forest	456	414	18	Hunting	Good	High	Via Hockanum Rd.
DEM	Warwick State Forest	26	414	23	Hunting	Good	High	Off Wendell Rd.
DEM	Warwick State Forest	4.3	414	30	Hunting	Good	High	Via Wendell Rd.
DEM	Warwick State Forest	45	415	2	Hunting	Good	Fair	Difficult
Total		**11,278**						

Source: Warwick Assessor's Records and Maps, 2001 and MassGIS Open Space Data 1997.

The Town of Warwick owns approximately 204 acres of open space. 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 5-8: Town-Owned Open Space with Limited Protection from Development

Property Manager	Site Name	Area	Map	Lot	Current Use	Condition	Recreation Value	Public Access
Town of Warwick	Warwick Town Hall Common	0.42	405	16	Common	Good	Very High, used for Town gatherings	Via Winchester & Athol Rds.
Town of Warwick	Town Barn site	0.23	405	22	Vacant field	NA	Low	Via Northfield Rd.
Highway Dept./Board of Health/Town Forest Committee	Allen Lot: Town Garage/ Town Dump Site/Forest	53.00	405	33	Garage, Dump, and managed Forest	Good	Medium, snowmobilers have trail on land	Via Winchester Rd.
Town of Warwick	Community School	25.57	405	38.2	Woods/Fields/School	Good	High, playgrounds	Via Winchester Rd.
Town of Warwick	Unitarian Church/ Town Common	8.40	408	86	Church, Fire Station	Good	High, basketball courts	Via Orange Rd.

Property Manager	Site Name	Area	Map	Lot	Current Use	Condition	Recreation Value	Public Access
Town of Warwick	Center School	3.90	408	90	Abandoned School, Police Station	Poor	Low	Via Orange Rd.
Town of Warwick	Sarah Heyes Lot	7.90	409	26	Forest	Good	Low	Via Athol Rd.
Town of Warwick	Sarah Heyes Lot	14.40	409	29	Forest	Good	Low	Via Athol Rd.
Town of Warwick	Gravel Pit	1.30	411	101	Abandoned Stump dump	Low	Low	Via Wendell Rd.
Town of Warwick	Warwick Town Forest	16.50	414	20	Wildlife Observation/ Forest Management	Good	High	Via Wendell Rd.
Town of Warwick	Warwick Town Forest	72.50	415	1	Wildlife Observation/ Forest Management	Good	High	Via Hockanum Rd. & Wendell Rd.
Total		**204.12**						

Source: Warwick Assessor's Records and Maps, 2001 and MassGIS Open Space Data, 1997.

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 rights to develop 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. Mt. Grace also works with landowners interested in protecting their land from development. Mt. Grace facilitated the preservation of Warwick's remaining active farmland 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.

In Table 5-9, 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 Public Non-Profit Agencies

Fee Owner	Site Name	Area	Map	Lot	Current Use	Recreation Value	Public Access
MGLCT		57.00	401	7	Forest	High, well used	Via Tower Rd.
NEFF		85.00	401	10	Forest	High	Via Tower Rd.
MGLCT	Earle Land	97.00	408	93	Forest	High	Via Hastings Pond Rd.
MGLCT	Earle Land	143.00	408	129	Forest	High	Via Gale Rd.
MGLCT	Iverson Conservation Area (Iverson)	9.82	408	130	Forest	High	Via Gale Rd.
MGLCT	Iverson	23.93	408	131	Forest	High	Via Gale Rd.
MGLCT	Earle Land	83.90	409	3.1	Forest	High	Via Gale Rd.
MGLCT	Iverson	59.00	409	5.1	Forest	High	Via Gale Rd.
MGLCT	Iverson	44.00	409	12	Forest	High	Via Gale Rd.
MGLCT	Iverson	24.00	409	13	Forest	High	Via Gale Rd.
MGLCT	Iverson	26.15	409	15.1	Forest	High	Via Gale Rd.
Norcross Wildlife Foundation	Norcross Wildlife Foundation	87.00	411	5.1	Forest	High	Via Wendell Rd.
Total		**739.80**					

Source: Warwick Assessor's Records and Maps, 2001 and MassGIS Open Space data, 1997.

SECTION 6

COMMUNITY GOALS

A. DESCRIPTION OF PROCESS

The Town of Warwick's open space and recreation goals were developed through the following planning process:

- In April of 2001, an Open Space and Recreation Survey was developed by the Warwick Open Space Planning Committee and sent to 253 households. Of these, 70 surveys were returned, which represented a 29.6% return rate (See Appendix C).

- From November 2001 to June 2002, the Open Space Planning Committee and the Franklin Regional Council of Governments Planning Department developed this Open Space and Recreation Plan using several methods for involving public participation:
    - The Open Space and Recreation Survey results, which were used as the basis for the development of Section 8 – Goals and Objectives as well as the overall open space and recreation vision, were mailed out to every resident in Warwick.
    - Seventeen public meetings were held by a volunteer Open Space Planning Committee.
    - One to two drafts of each section of the plan were mailed to sixty-five people representing key town boards, community groups, and non-profit organizations.
    - Three updates on the progress of the Warwick Open Space and Recreation Plan were included in the Town newsletter.
    - Four copies of the Final Draft Open Space and Recreation Plan were placed at the Free Public Library, Town Hall, the Metcalf Chapel, and the Community School. All comments were incorporated into the Plan.
    - Twenty-one residents attended a public forum held on June 18, 2002, where people reviewed and discussed the inventory, analysis, community goals, objectives, and the five-year action plan priorities. All public comments were recorded and have been incorporated into the plan.

B. STATEMENT OF OPEN SPACE AND RECREATIONAL GOALS

People live in Warwick because they like its rural, small town character. On the whole, Warwick residents value clean drinking water and air, wildlife habitat, the area's rural character and open fields. According to the 2001 Open Space and Recreation Survey, respondents felt that these aspects as well as wilderness, woods roads, trails, farmland, scenic views, the Town Center and Commons, and stone walls were all important and worth conserving.

According to the Open Space and Recreation Survey and the Open Space Planning Committee, the ideal Warwick is safe and quiet with a small town character. Residents continue to conserve the majority of the Town's uninterrupted forests by accepting land donations and supporting the protection of lands by state agencies and land trusts. These conservation efforts ensure the presence of open fields and pasturelands, scenic views, diverse wildlife habitats, dirt roads, the purity of its water and air, and the use of an accessible trail system connecting a diverse set of State Forest recreational facilities, Town Forests, and privately owned open space. Even though the majority of residents live far apart they gather through the seasons at popular recreation sites around town. Olson Field, Mt. Grace Picnic Area, Moores Pond, the Community School and Town Hall, and Laurel Lake Beach continue to be places where residents catch up on the goings on. 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 the following 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, the recreation and open space needs of the residents are identified, using the 2001 Open Space and Recreation 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

Warwick residents value clean streams, ponds, and lakes; open fields; quiet; large forested areas; Mount Grace; and, the fact that the Town is sparsely populated. Unfortunately, the quality of these resources and community characteristics can be threatened by the ways humans use the landscape. New development, 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 conserve clean drinking water and clean air; wildlife habitat and wilderness; the area's rural character; open fields and farmland; dirt roads, stonewalls, and trails; and, the Town Center, Commons and scenic views. Even though much of the Town is in State Forest or other wise 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 state agencies and local land trusts.

Warwick is in a unique situation among other communities in the region due to the fact that much of its land is already permanently protected from development and there is also a relatively high degree of connectivity between 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 animals 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. Warwick Officials may want to establish working relationships with regional land trusts for the purpose of assigning the Town's right-of-first refusal in the event that a 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 their own. By being prepared, Warwick may be more likely to see the preservation of choice parcels of forest containing 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, which 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 pasturelands 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 excessive maintenance of dirt roads, 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 U.S. Census, Warwick grew by approximately 17 percent in the past decade. Warwick needs to find a means for bringing opportunities for learning about these and other issues to residents. A cost of community services analysis may be one way of doing this, which would include a means of measuring and comparing the costs associated with different types of development and open space.

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, picnicking, swimming, and bird watching. 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 when a slight majority of respondents felt that the Town's sense of community has gotten worse over time. Respondents offered potential ways of creating a stronger sense of community including a store, café, and a sports program for young people.

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.

Finally, Warwick residents need to participate in deliberations regarding future uses of the State Prison property, the presence of which is considered to be a liability and a threat to the rural character of the community.

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, Department of Environmental Management, Division of Fisheries and Wildlife, Metropolitan District Commission, the Department of Food and Agriculture, 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 could be 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. By providing these services to residents, more people may be able 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 may also 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 preliminary draft goals and objectives were formulated from the results of the 2001 Warwick Open Space and Recreation Planning Survey and were reviewed and modified through the public meetings of the Open Space Planning Committee, 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.
   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.

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, cultural, and architectural resources.
   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 including the Devil's Washbowl and the Indian Caves.
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. Consider hiring the American Farmlands Trust to prepare a Cost of Community Services (COCS) study for the Town of Warwick.
9. Develop a plan for benign disposition of the Warwick Prison Camp, while aggressively intervening to prevent inappropriate uses.

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 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 comments to the 2001 Open Space Survey.
   3. Encourage the Department of Environmental Management (DEM) to develop recreational facilities on state forestlands to support public use of this resource for hiking, swimming, equestrian use, and fishing. Assist DEM in developing protocols for more controversial uses such as motorized recreation and mountain biking.
   4. Develop recreational facilities and programming on town 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 map for Warwick to link public holdings followed by a plan to acquire trail easements through gifts and by state and private grants.

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. Promote improved telecommunications, while preventing adverse impacts, by adopting a cell phone tower zoning bylaw, and working with regional groups (such as Franklin Hampshire Connect) for better telephone and internet service.

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.

SECTION 9

FIVE – YEAR ACTION PLAN

The Five-Year Action Plan fulfills the Open Space and Recreation Plan objectives. The objectives address open space, natural resources, recreation, and community development goals because the quantity and quality of accessible open space relates directly to the state of the air we breathe, our drinking water, and the level of biodiversity in Warwick; the Town's recreational opportunities; and, the type, level, pattern, and location of development in Warwick.

The objectives are listed in the far left column of Table 9-1 in the same order as they appear in Section 8 and are followed in the same row by recommended actions, responsible board or group, and start date. By implementing the recommended actions, each objective will begin to be realized.

Implementing the Open Space and Recreation Plan requires appointing an official Open Space Committee and a Recreation Committee. However, as is shown in the third column in Table 9-1, the Select Board, Planning Board, Board of Health, Conservation Commission, the Historical Society, and others are all necessary participants in the successful implementation of an 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 agencies, and foundations are potential sources of funding. In addition, these sources are more likely to invest in land protection projects that have a broad base of community support.

A successful Open Space and Recreation Program, under the primary stewardship of an Open Space Committee, can achieve all of the action steps listed below over time. However, it will be important to establish priorities for the first five years. The Open Space Planning Committee has identified two tiers of action steps representing an initial effort at prioritization. These action steps are represented graphically (where possible) on the Five-Year Action Plan Map and are outlined in greater detail in Table 9-1. The first tier includes the six most important action steps:

- Form an Open Space Committee.
- Adopt a cell tower bylaw.
- Ensure the inventory of ecological, historical, and recreational resources is complete.
- Develop a rapport with local land trusts.

- ❖ Form a Committee representing all Town Boards that will create a plan for benign disposition of the Warwick Prison Camp.
- ❖ Explore zoning revisions or adoption of measures that would encourage small business development without detracting from Warwick's rural character.

The second tier of action steps identified by the Open Space Planning Committee seem no less important for realizing the overall vision of Warwick residents for their community:

- ❖ Study the feasibility of transferring authority of Town-owned open space to the Conservation Commission.
- ❖ Appoint a Liaison to the North Quabbin Regional Landscape Partnership.
- ❖ 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).
- ❖ Develop a Master Calendar for (community) events.
- ❖ Identify parcels of land in need of protection.
- ❖ Develop a Trail Map for Warwick.
- ❖ Assess specific facilities and programming needs of Warwick seniors.

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

OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE
A1. Support the continued development of festivals and events to provide residents with opportunities to get to know their own community.	Develop a Master Calendar for events.	Women's Guild	2002
	Continue to support the activities of the Trinitarian Congregational Church.	All residents	2002-2007
A2. Ensure that Town-owned open space is not used for institutional or commercial development, low income housing, or leased for private development or for private recreation.	Study the feasibility of transferring authority of Town-owned open space to the Conservation Commission.	Conservation Commission and Town Forest Committee	2003
	Determine if the Conservation Commission is willing to take responsibility for managing property.	Conservation Commission	2003
	Explore putting in the bylaws a provision for placing restrictions on Town-owned land so as to not allow its use for commercial development.	Planning Board	2003
A3. 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	2002

OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE
	Seek grants to support the development of fire ponds and dry hydrants.	Town Coordinator	2003
A4. Encourage the Warwick Historical Society to inventory, protect and, where appropriate, make more accessible, significant historical, geological, and archaeological sites. Consider the creation of a Historic District for the center of Town.	Consider the value of adopting a National Historic District for Warwick Center.	Planning Board	2004
	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.	Historical Society	2005
A5. 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	2002
B1. Prioritize Town sponsored land protection projects and consider zoning changes that conserve open fields, farmland, forestland, streams, ponds, wetland, woods roads and trails, scenic vistas, and Town center.	Form an Open Space Committee.	Select Board	2002
	Identify parcels of land in need of protection.	Open Space Committee	2003
	Study potential zoning alternatives.	Planning Board	2005
B2. Accept land and easement donations and facilitate the activities of land trusts in the region.	Appoint a Liaison to the North Quabbin Regional Landscape Partnership.	Select Board	2002
	Develop criteria for evaluating offers of land or easements.	Select Board, Conservation Commission, and Open Space Committee	2003
B3. 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.	Develop a rapport with local land trusts.	Select Board and Open Space Committee	2002-2007
	Determine best process for assigning the Town's right-of-first-refusal.	Select Board and Open Space Committee	2002

OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE
B4. Develop a Land Protection Education program 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.	Open Space Committee	2003
	Develop educational programs for landowners and use the newsletter as a vehicle for notification.	Open Space Committee	2003
	Collect and submit publications to the Warwick Free Library that would help residents learn about conservation topics and land protection alternatives.	Open Space Committee	2003
B5. 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 B4.	Open Space Committee	2003
B6. Inventory and work to develop the best methods for protecting special ecological, historical, and recreational resources in Warwick including the Devil's Washbowl and the Indian Caves.	Ensure the inventory of ecological, historical, and recreational resources is complete.	Open Space Committee, Conservation Commission, and the Historical Society	2002-2005
	Participate in Biodiversity Days.	Open Space Committee	2002-2007
	Certify vernal pools.	Conservation Commission	2002-2007
B7. Consider changes to bylaws and Board of Health regulations to 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	2005
B8. Consider hiring the American Farmlands Trust to prepare a Cost of Community Services (COCS) study for the Town of Warwick.	Explore the Massachusetts Executive Office of Environmental Affairs Fiscal Impact Analysis Tools.	Open Space Planning Committee and Planning Board	2002-2003
B9. Develop a plan for benign disposition of the Warwick Prison Camp, while aggressively intervening to prevent inappropriate uses.	Form a Committee representing all Town Boards that will create a plan for benign disposition of the Warwick Prison Camp.	Select Board	2003

OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE
C1. Assess the pros and cons of purchasing particular open space areas (e.g. beachfront property on 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	2004
C2. Consider the development of recreational resources for seniors as requested by them in comments to the 2001 Open Space Survey.	Assess specific facilities and programming needs of Warwick seniors and others with potential mobility impairments.	Council on Aging and the Trinitarian Church	2003
C3. Encourage the Department of Environmental Management (DEM) to develop recreational facilities on state forestlands to support public use of this resource for hiking, swimming, equestrian use, and fishing. Assist DEM in developing protocols for more controversial uses such as motorized recreation and mountain biking.	Work in cooperation with the Millers River Basin Team to address concerns relating to need for better access to recreational opportunities on DEM lands.	Open Space Committee	2002
	Work with DEM to educate State Forest users about appropriate uses of the State Forest lands.	Open Space Committee	2003
C4. Develop recreational facilities and programming on town 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.	Appoint a Recreation Committee.	Select Board	2003
	Inventory and assess the potential recreational uses for each parcel of Town open space.	Recreation Committee and Open Space Committee	2003
C5. Develop a trail map for Warwick to link public holdings followed by a plan to acquire trail easements through gifts and by state and private grants.	Develop a trail map for Warwick.	Open Space Committee	2002
	Identify parcels needing trail easements and seek assistance in acquiring them.	Recreation Committee and the Mt. Grace Snow Streakers	2004
D1. Encourage cottage industries and locally based economic activities, such as the Farmers' Market, with zoning and non-zoning techniques.	Explore zoning revisions or adoption of measures that would encourage small business development without detracting from Warwick's rural character.	Planning Board	2004

OBJECTIVE	ACTION	RESPONSIBLE BOARD/GROUP	START DATE
D2. Promote improved telecommunications, while preventing adverse impacts, by adopting a cell phone tower zoning bylaw, and working with regional groups (such as Franklin Hampshire Connect) for better telephone and internet service.	Adopt a cell tower bylaw.	Planning Board	2003-2007
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	2006
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	2006

SECTION 10

PUBLIC COMMENT

Public feedback, sought throughout the entire open space and recreation planning process, is difficult to document due to the fact that the draft plans constantly incorporated these changes and enhancements. A more direct request for feedback was presented in the public forum, which was held on June 13, 2002. In addition, final draft copies of the plan were available for review by the general public at the Town Hall, Warwick Free Library, Metcalf Chapel, and the Community School. Comments received during both the public forum and the review period prior to the forum have all been incorporated into the Plan.

Copies of the final version of the Warwick Open Space and Recreation Plan were also sent to the Massachusetts Division of Conservation Services (DCS), the Warwick Select and Planning Boards and the Conservation Commission, Mount Grace Land Conservation Trust, and the Millers River Watershed Basin Team for comment. Their comment letters are inserted into the plan at the end of this section. The letters of support reflect the broad base of support that the Warwick Open Space Planning Committee has earned over the past year.

The following comments were recorded during the feedback session at the Warwick Open Space and Recreation Plan Public Forum held on June 13, 2002, at the Town Hall from 6:30 p.m. to approximately 9:00 p.m. Twenty-one residents attended the forum. Several of the comments led to discussions that confirmed action plan steps that defined needs: for an official process for determining whether to assign the Town's right-of-first-refusal with Chapter 61 lands to a land trust; for an Advisory Committee for the State Prison Camp; for a determination of which lands might be placed under the authority of the Conservation Commission; and, for fiber optics infrastructure to support small business development in Warwick.

Public Comments recorded at the Public Forum on June 13, 2002:

- As to the trail map discussion, do the Snow Streakers have maps?
- When asked who might be members of a new Open Space Committee, Keith Ross and Janice Starmer volunteered.
- "What is meant by protection?"
- The Planning Board is already working on Cell Tower bylaws.
- What do you do with the inventory? Work with the Conservation Commission and the Historical Commission to make sure the inventory is complete.

- Spell out exactly what the Town's right-of-first-refusal means by developing a process, way for more people to be involved.
- In dealing with the prison camp, is there a policy in place? We should get involved to not be surprised by State's plans.
- Small business? Fiber optics? Select board is interested in supporting changing the zoning bylaws to support small businesses.
- Authority of Town-owned land? Protected under Conservation Commission but not under the Town Forest Committee.
- To work on the Master Calendar: Women's Guild president will be enrolled. L. Hawes (electronic) to help?
- The Metcalf Chapel and the Council on Aging would be good partners for seniors.
- Town owned open space to conservation commission step: add Town Forest Committee to Responsible Board.
- If the Open Space Committee came to the Select Board for appointment to the North Quabbin Regional Landscape Partnership, the Select Board would support it.

June 26, 2002

Jennifer Jillson Soper
Regional Planner
Division of Conservation Services
251 Causeway Street, Suite 900
Boston, MA 02114

Dear Ms. Soper:

I am writing on behalf of the Warwick Open Space Planning Committee, which requests a letter from the Massachusetts Division of Conservation Services supporting the Warwick Open Space and Recreation Plan.

Ted Cady and all the other volunteers on the Warwick Open Space Planning Committee have worked very hard over the past fifteen months to inventory, assess, document, and prioritize all of the natural and cultural resources that Warwick residents have come to treasure about their town. Most importantly, they have begun to address some of the issues that concern residents and town boards most including the need for an Open Space Committee, a cell tower bylaw, measures to support small businesses without detracting from the Town's rural character, a protocol for dealing with the right-of-first-refusal offered by the intention to sell Chapter 61 lands, and the need for being proactive concerning future uses of the Warwick Prison Camp.

The Open Space and Recreation Plan has been submitted to the Warwick Select Board, Planning Board, and Conservation Commission for public comment. In addition, copies of the plan have been sent to the Mount Grace Land Conservation Trust and the Millers River Basin Team for comment. Given that residents are already organizing an official Open Space Committee at this time, I would greatly appreciate a return a letter of support to my office prior to the end of July.

Thank you for taking the time to review the Warwick Open Space and Recreation Plan. Please do not hesitate to call if you have any questions.

Sincerely,

Bill Labich
Senior Land Use Planner

cc: Ted Cady, Chair of the Warwick Open Space Planning Committee.

June 26, 2002

Elizabeth Lincoln, Chair
Warwick Planning Board
Warwick Town Offices
12 Athol Road
Warwick, MA 01378

Dear Ms. Lincoln:

I am writing on behalf of the Warwick Open Space Planning Committee, which requests a letter from the Planning Board supporting the Open Space and Recreation Plan.

Ted Cady and all the other volunteers on the Warwick Open Space Planning Committee have worked very hard over the past fifteen months to inventory, assess, document, and prioritize all of the natural and cultural resources that Warwick residents have come to treasure about their town. Most importantly, they have begun to address some of the issues that concern residents and town boards most including the need for an Open Space Committee, a cell tower bylaw, measures to support small businesses without detracting from the Town's rural character, a protocol for dealing with the right-of-first-refusal offered by the intention to sell Chapter 61 lands, and the need for being proactive concerning future uses of the Warwick Prison Camp.

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Sincerely,

Bill Labich
Senior Land Use Planner

cc: Ted Cady, Chair of the Warwick Open Space Planning Committee.

June 26, 2002

David Koester, Chair
Warwick Conservation Commission
Warwick Town Offices
12 Athol Road
Warwick, MA 01378

Dear Mr. Koester:

I am writing on behalf of the Warwick Open Space Planning Committee, which requests a letter from the Conservation Commission supporting the Open Space and Recreation Plan.

Ted Cady and all the other volunteers on the Warwick Open Space Planning Committee have worked very hard over the past fifteen months to inventory, assess, document, and prioritize all of the natural and cultural resources that Warwick residents have come to treasure about their town. Most importantly, they have begun to address some of the issues that concern residents and town boards most including the need for an Open Space Committee, a cell tower bylaw, measures to support small businesses without detracting from the Town's rural character, a protocol for dealing with the right-of-first-refusal offered by the intention to sell Chapter 61 lands, and the need for being proactive concerning future uses of the Warwick Prison Camp.

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Thank you for taking the time to review the Warwick Open Space and Recreation Plan. Please do not hesitate to call if you have any questions.

Sincerely,

Bill Labich
Senior Land Use Planner

cc: Ted Cady, Chair of the Warwick Open Space Planning Committee.

June 26, 2002

Stephen Pontz, Chair
Warwick Select Board
Warwick Town Offices
12 Athol Road
Warwick, MA 01378

Dear Mr. Pontz:

I am writing on behalf of the Warwick Open Space Planning Committee, which requests a letter from the Select Board supporting the Open Space and Recreation Plan.

Ted Cady and all the other volunteers on the Warwick Open Space Planning Committee have worked very hard over the past fifteen months to inventory, assess, document, and prioritize all of the natural and cultural resources that Warwick residents have come to treasure about their town. Most importantly, they have begun to address some of the issues that concern residents and town boards most including the need for an Open Space Committee, a cell tower bylaw, measures to support small businesses without detracting from the Town's rural character, a protocol for dealing with the right-of-first-refusal offered by the intention to sell Chapter 61 lands, and the need for being proactive concerning future uses of the Warwick Prison Camp.

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Thank you for taking the time to review the Warwick Open Space and Recreation Plan. Please do not hesitate to call if you have any questions.

Sincerely,

Bill Labich
Senior Land Use Planner

cc: Ted Cady, Chair of the Warwick Open Space Planning Committee.

June 26, 2002

Ms. Alice Rojko
Millers River Watershed Team Leader
180 Beaman Street
West Boylston, MA 01583

Dear Ms. Rojko:

I am writing on behalf of the Warwick Open Space Planning Committee, which requests a letter of comment from the Millers River Watershed Team supporting the Warwick Open Space and Recreation Plan.

Ted Cady and all the other volunteers on the Warwick Open Space Planning Committee have worked very hard over the past fifteen months to inventory, assess, document, and prioritize all of the natural and cultural resources that Warwick residents have come to treasure about their town. Most importantly, they have begun to address some of the issues that concern residents and town boards most including the need for an Open Space Committee, a cell tower bylaw, measures to support small businesses without detracting from the Town's rural character, a protocol for dealing with the right-of-first-refusal offered by the intention to sell Chapter 61 lands, and the need for being proactive concerning future uses of the Warwick Prison Camp.

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Thank you for taking the time to review the Warwick Open Space and Recreation Plan. Please do not hesitate to call if you have any questions.

Sincerely,

Bill Labich
Senior Land Use Planner

cc: Ted Cady, Chair of the Warwick Open Space Planning Committee.

June 26, 2002

Ms. Leigh Youngblood
Mount Grace Land Conservation Trust
1461 Old Keene Road
Athol, MA 01331

Dear Ms. Youngblood:

I am writing on behalf of the Warwick Open Space Planning Committee, which requests a letter of comment from the Mount Grace Land Conservation Trust supporting the Warwick Open Space and Recreation Plan.

Ted Cady and all the other volunteers on the Warwick Open Space Planning Committee have worked very hard over the past fifteen months to inventory, assess, document, and prioritize all of the natural and cultural resources that Warwick residents have come to treasure about their town. Most importantly, they have begun to address some of the issues that concern residents and town boards most including the need for an Open Space Committee, a cell tower bylaw, measures to support small businesses without detracting from the Town's rural character, a protocol for dealing with the right-of-first-refusal offered by the intention to sell Chapter 61 lands, and the need for being proactive concerning future uses of the Warwick Prison Camp.

The Open Space and Recreation Plan has been submitted to the Massachusetts Division of Conservation Services, and the Warwick Select Board, Planning Board and Conservation Commission for public comment. In addition, copies of the plan have been sent to the Millers River Basin Team for comment. Given that residents are already organizing an official Open Space Committee at this time, I would greatly appreciate a return a letter of support to my office prior to the end of July.

Thank you for taking the time to review the Warwick Open Space and Recreation Plan. Please do not hesitate to call if you have any questions.

Sincerely,

Bill Labich
Senior Land Use Planner

cc: Ted Cady, Chair of the Warwick Open Space Planning Committee.

SECTION 11

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APPENDIX A

TOWN OF WARWICK
ADA INVENTORY OF TOWN RECREATIONAL FACILITIES AND COMMON

The following inventory briefly describes two Town-owned recreational facilities and one Common area and includes each site's resources, accessibility needs, and recommendations for modifications. A recommendation for modification is intended to help in providing access for mobility-disabled individuals. The standards by which the park facilities are judged are used by the Massachusetts Division of Conservation Services and are based on state and federal guidelines.

WARWICK COMMUNITY SCHOOL PLAYGROUNDS

The Warwick Community School is town-owned and was built in the mid-1990s. There are two separate playground areas on the grounds of the elementary school: one for young children and one for older students. The playground for young children is located on the eastern side of the school. There is a handicapped accessible parking space on the west side of the school and a paved sidewalk leads to a fully paved basketball court located southeast of the school. Another paved sidewalk wraps around the front of the school to the eastern side entrance of the school. A lawn area surrounds the playground area. The playground contains one play structure, eight accessible swings, three sets of monkey bars, two spring rocking horses surrounded by a deep wood chipped surface.

It is not possible for someone in a wheelchair to access the playground. Once in the playground area, the wood chip surface, a safety feature employed to protect children from falling, is a second hurdle for anyone using a wheelchair, or having mobility disabilities. It is therefore recommended that the Town of Warwick construct and maintain a stone dust path at least 36 inches wide, between the paved sidewalk at the eastern school entrance and the children's playground. It is also recommended that this stone dust path be designed to provide access to one side of the playground area where a jungle gym could be located that provides a similar experience for children with mobility disabilities.

The second playground area for older students is located approximately 100 feet south of the paved basketball court and is surrounded by lawn. There are three jungle gyms and one large play structure. Some of the structures could provide equal access, if students with mobility disabilities were able to reach the play area. It is recommended that the Town of Warwick construct a second path of stone dust at least 36 inches wide, which would run from the paved basketball court to one side of the play area and the larger play structure. The path would have to be designed to ensure that a maximum slopes of 5 percent, maximum cross pitch of 2 percent, and a common surface up to the play structure with no changes in level greater than ½ inch.

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TOWN COMMON

The Warwick Town Common is a National Historic District. It is a grass covered common fenced with granite posts and wood stringers. An accessible parking space provides access to the eastern side of the first floor Town Offices, which also acts as the Senior Center. It is recommended that the Town of Warwick construct and maintain a stone dust path at least 36 inches wide from the edge of the paved area to a portion of the grass area and an accessible picnic table.

APPENDIX B

APPENDIX C

APPENDIX D