6-2007

Newmarket Open Space Conservation Plan

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Prepared for the Town of Newmarket

by

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June 2007

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This project was funded by a grant from the New Hampshire Estuaries Project, as authorized by the U.S. Environmental Protection Agency's National Estuary Program

NewHampshire EstuariesProject

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Acknowledgements

I begin by thanking Diane Hardy, Newmarket Town Planner, for helping to guide the development of this Plan through the Planning Board, for researching information, and providing comments and edits on several drafts. Robert Pruyne deserves special thanks for preparing the series of GIS maps included in the Open Space Plan. These maps provide a much needed update to our understanding of the existing network of conservation lands and other open spaces, the location of critical drinking water supplies in relation to the conserved lands network, the location of all the zoning overlays that are important in protecting critical resources such as drinking water, floodplains, wetlands, and wildlife habitat, and location of ecologically significant areas in Newmarket.

The Conservation Commission, Open Space Commission, and Planning Board members all deserve thanks for creating the opportunity to prepare an Open Space Conservation Plan through their joint application to the New Hampshire Estuaries Project (NHEP) Technical Assistance Program. And thanks to Jodi Castallo at NHEP for managing the project and providing the funding to Newmarket for this effort.

Several Town of Newmarket staff assisted with gathering information or provided data on town resources. I especially thank the following staff for their help: Sue Jordan, Kathy Castle, George Laney, Jim Hilton, Becky Benvenuti, Don Parnell, Diane Hardy, and Andy Blais. The Town Administrator's office provided access to reports and copying.

I received input from several resource professionals that I want to thank. Joanne Glode, Duane Hyde, and Mark Zankel of The Nature Conservancy provided important information on ecologically important areas and conservation lands in Newmarket and gave permission to use some of their maps and data in this Plan. Joanne Glode and Duane Hyde also provided excellent edits to the draft plan. Phil Auger, UNH Cooperative Extension, and Bill Doucet, Doucet Survey, Inc. provided comments on open space developments. Doug Grout of NH Fish and Game provided data on fish in the Lamprey River. Clay Mitchell of MG Planning Consultants, and the former Newmarket Town Planner, initiated the idea for an Open Space Plan and provided a draft plan as a template.

This Open Space Conservation Plan contains the most up-to-date information about the open spaces and natural resources of Newmarket. It is based on known and available information. Given the complexity of some of the resources and the lack of historical documentation, readers may find information that is missing or in error. Information contained on the maps should be used as a guide as new information is continually becoming available. It is hoped that these items will be noted and changes incorporated in future versions of the Open Space Plan as new information comes to light.

---Ellen Snyder

Chapter 1 Introduction and Purpose

Introduction

Open spaces – forests, fields, wetlands, floodplains, salt marshes, rivers and streams – are integral to our community. These lands and waters that thread through our neighborhoods are a scenic reminder of our history, when people made their living by working the land. Yet we still depend on these open spaces for our health and our wellbeing. These places provide many "services" such as clean air, flood control, filtering pollutants and purifying drinking water, natural pest control, plant pollination, cooler summer temperatures, and areas for relaxing, exercising and recreating. Collectively these can be thought of as a "natural services network" – a minimum framework or backbone of open spaces that offer these services to all of us regardless of age, income, or points of view.

New Hampshire is transforming from a largely rural state to a mostly urban and suburban one. This trend will continue at a rapid pace as the State is expected to grow by 358,000 people (or more than 28%) from 2000 to 2025. Most of this growth will occur in the four southeastern counties, with the Town of Newmarket in the heart of this growth area. The major land use trends include loss of unfragmented forestland, lack of protected lands around public water supplies and aquifers, and loss of intact wetlands and wildlife habitat (SPNHF 2005).

Many communities, including the residents of Newmarket, have acknowledged these changes and the need to conserve special places and ecosystems by supporting land use planning tools, natural resource inventories, conservation funds, and stewardship of lands. Since 2001, 83 New Hampshire towns have passed open space bond issues or appropriated funds for land acquisition worth more than $135 million (NH Center for Land Conservation Assistance). In 2002, Newmarket residents overwhelmingly passed a $2 million land acquisition bond. Landowners in our community have generously donated interest in land or easements to ensure that conservation values are protected in perpetuity. This support for land and water conservation that benefits all of us is a tribute to the community land ethic in our region.

The Town of Newmarket boasts a rich diversity of natural habitats and associated plants and animals. The Lamprey and Piscassic Rivers, Great Bay Estuary, and Tuttle Swamp, to name just a few, all contribute to the sense of place and allure of the town (Map 1). Balancing the preservation of open space with responsible development, long maintained as a priority by Newmarket citizens, business owners and town officials, is necessary, as growth and all its requisite accompaniments present increasing challenges. Recent concerns about the availability of drinking water for Newmarket residents and businesses as well as the floods of 2006 reflect these challenges. As Newmarket continues to grow, so will concern over loss of natural areas, recreational opportunities, and the quality of life that residents have long enjoyed.

Maintaining a network of rivers and wetlands, forests and fields throughout Newmarket for the health of the land and people requires vision, support, and action. In 1991, the Town of Newmarket hired the Smart Associates to prepare a Natural Resource Inventory and Conservation Plan. This was the beginning of efforts by the Conservation Commission to conserve important lands identified in the "Smart Report."

In the fifteen years that have elapsed since the Smart Report, Newmarket has undergone many changes, highlighting the need to revisit the current state of natural resources within the community. The Open Space Commission and Conservation Commission have led recent efforts to identify and protect conservation and recreation areas. The Planning Board and staff have led in creating effective land use planning tools that conserve open spaces while allowing orderly and thoughtful development. Together,

these boards applied for a grant from the NH Estuaries Project (NHEP) Technical Assistance Program in 2006 to develop an Open Space Plan. The NHEP awarded the grant of $6,200 to Ibis Wildlife Consulting to work with the Town of Newmarket to prepare this Plan.

Purpose of the Open Space Plan

The Open Space Plan was prepared to guide the protection and management of Newmarket's significant open spaces, in the belief that a network of open spaces is fundamental to maintaining and enhancing the character of the community as it grows. The purposes of this Open Space Plan (OSP) are to:

- Provide input for the Town Master Plan;
- Update the inventory of natural resources and conservation lands and other open spaces;
- Encourage and guide land protection by individuals, the Town, and by conservation partners such as the Great Bay Resource Protection Partnership, Southeast Land Trust of New Hampshire, Lamprey River Advisory Committee, and The Nature Conservancy;
- Encourage regional cooperation by working with neighboring towns and other regional groups to pursue joint conservation interests;
- Ensure thoughtful expenditure of public funds, such as the Conservation Fund, Land Acquisition Bond, and other funding programs and guide the work of the Newmarket Conservation Commission and Open Space Commission;
- Provide the basis for regulatory changes that work hand-in-hand with voluntary measures to conserve Newmarket's natural resources and open spaces; and
- Coordinate open space conservation planning with the implementation of the recently completed Newmarket Recreation Master Plan.

Definitions

The 2001 Newmarket Master Plan defined open space as "any environmentally sensitive land or water area that has ecological, recreational, or aesthetic value" (Town of Newmarket 2001). Such areas may contain one or more of the following: forests, fields, farms, floodplains, wetlands, rivers, drinking water sources, rare plants and animals, wildlife corridors, or steep slopes. In the Master Plan, recreational facilities are defined as "any major public or private facility that provides public access to active recreational areas (e.g., ballfields) or equipment." Since the Recreation Master Plan focused on recreational facilities, this Open Space Plan does not include these types of public lands.

Open space lands typically have no buildings or other human-made structures in current service. The lands are usually maintained in their natural state to serve important environmental functions with portions often used for farming, forestry, wildlife management, or outdoor recreation depending on how or why they were protected. Size is not always a limiting factor for open space. Newmarket has several small in-town parks that are immediately accessible to people in Newmarket's densest population center, providing some of the same benefits – clean air, cool temperatures, natural beauty – as large conservation areas. However, large, unfragmented lands provide many more ecosystem services and community

benefits and loss of such areas greatly diminishes the natural heritage of a region. Maintaining connectivity between larger areas of protected open space is a critical concept in any open space plan and underscores the need for neighboring communities to work together on regional conservation goals.

Open spaces may be in public or private ownership. Town-owned open spaces in Newmarket offer public access for one or more recreational pursuits in addition to conserving important natural resources. The New Hampshire Fish and Game Department owns several parcels in Newmarket that protect wildlife habitat and offer hunting and wildlife watching. Many areas in town were protected by the actions of private landowners who've either placed conservation easements on their property or sold or donated their property to a private conservation group, particularly The Nature Conservancy (acting on behalf of the Great Bay Resource Protection Partnership). Since these are private lands, they have varying degrees of public access, but almost all of these private conservation lands allow at least walking through all or part of their properties or easements.

The most effective way to protect open space values is through permanent public or private land conservation. This can occur through voluntary transactions between a landowner and a town, agency or land trust by purchase or donation. It can also occur through regulatory measures such as the use of the open space development option in the town's zoning and subdivision requirements. Other ways that open space values are conserved are through zoning regulations (such as shoreland setbacks) or through education and voluntary efforts (such as limiting lawns and retaining more natural vegetation in our yards). All of these tools (described in Chapter 7) are important in a comprehensive Open Space Conservation Plan.

Protection of open spaces in the public interest often requires public access to these lands. However, in some places public access might be incompatible with the purpose for protection or current land use practices and therefore is restricted. This is often the case for lands that protect drinking water supplies, lands in active agriculture, fragile plant or wetland communities, or highly erodible areas such as shorelines.

Open spaces may have historic structures, or have supported former uses, that are important elements of Newmarket's heritage, such as old cellar holes or foundations. The existing pattern of open spaces between structures and between settlements, developed over time, is a key element in defining and retaining the rural character of Newmarket.

Key Components of the Plan

This Open Space Plan has the following chapters:

- Introduction and Purpose
- The Benefits of Open Space
- Community Support for Open Space
- Natural Resource Inventory
- Conservation Lands and Other Open Space
- Priority Areas for Conservation
- Tools for Open Space Conservation
- Recommendations

Chapter 2 The Benefits of Open Space

The decisions that we make today will affect the character of our town for generations to come. Our community strives to address the need for continued economic development, affordable housing, and improvements to roads, schools, water supplies and other infrastructure. We also care about protecting the environment and maintaining the natural character of Newmarket. These are all goals in the Town's Master Plan. Sometimes open space conservation is viewed as a luxury and a financial burden that affects the tax burden of property owners. However, there are many benefits to the community of conserving open space as described below; one of those is the economic benefit.

The Economics of Open Space

An analysis of tax rates in 1995 indicated that New Hampshire towns raised 87 percent of their own-source revenue from property taxes, while the national average was 47 percent. This highlights why New Hampshire taxpayers are sensitive to changes in the tax base since property tax is not based on an ability to pay and is more burdensome to lower-income households. Given the reliance on property taxes, the Trust for Public Land (TPL) released a study in 2005 entitled, *Managing Growth: The Impact of Conservation and Development on Property Taxes in New Hampshire* (Brighton 2005). TPL is a national, nonprofit, land conservation organization (www.tpl.org).

The TPL study examined the short and long-term impacts of land conservation on the municipal tax base using four sample towns (one was Newfields). Conserving land is an investment in the community, like building a school or fire station, that provides many public benefits, yet there can be a short-term loss in tax revenue. This short-term loss however, depends on the type of land conservation project. There are two basic types of land conservation: fee simple acquisition and acquisition of a conservation easement. A fee simple acquisition involves buying a property outright. If the Town or NH Fish and Game Department acquire the property in fee simple then the value of the property is removed from the Town tax rolls. If another tax-exempt organization buys the property then it may be removed from the tax rolls. However, some organizations, such as The Nature Conservancy, continue to pay current use tax on lands that they own in Newmarket.

A conservation easement involves the actual extinguishment of only some of the property rights (e.g., development rights) and conservation-based limitations on some of the other property rights (e.g., forestry and agriculture). Entities that acquire, hold, and monitor easements include land trusts, towns, state agencies, and federal agencies. The landowner continues to own and manage the land in accordance with the provisions of the conservation easement and to pay taxes on the land. An easement could lead to lower tax revenue for the town, unless the land was already in current use in which case there is no change in assessed value. Most landowners in Newmarket who've conserved their land through an easement had their land already in current use so there's been no change in tax revenues to the town. Many studies have shown a tax benefit to towns from land conservation by removing the potential for residential development and the cost of community services that comes with homes (e.g., schools, police, fire) (Taylor 2000).

The Trust for Public Land also looked at the relationship between development and higher and lower taxes to assess the long-term impacts of land conservation. Although many people believe that development will lead to lower taxes, the reverse is true. The TPL study made the following findings for New Hampshire:

- Property tax bills are not higher in the towns that have the most permanently protected land regardless of the method and ownership used to conserve the land. In fact, the towns that have the most permanently protected land have generally lower tax bills.

- A town's taxes are likely to be lower if its tax base has a high proportion of nonresidential property to help offset the costs of residents.

- Patterns of growth have an effect on both the livability and affordability of a town. Land conservation can be used as a tool in both protecting resources that contribute to quality of life (from drinking water protection to scenic beauty and recreation), as well as to help guide the path and location of municipal growth to those areas that are most appropriate and that are most cost-effective for towns to service.

- Conservation often enables the continuing viability of working farms and forests which maintains the rural community, contributes to the town's economy and employment, and may help to stabilize tax rates that threaten affordability of home ownership for the average family.

- While permanent land conservation may not lower tax bills it is likely to help control property tax increases by conserving rural areas and directing development to a more efficient municipal service area.

Economic activities that are based on open space – agriculture, forestry-related industry, tourism and recreation, and vacation homes – contributed $8.2 billion per year to the New Hampshire economy in 1996-97. This accounted for 25% of the non-governmental jobs in the State (SPNHF 1999). Globally, researchers are just beginning to estimate the enormous, but difficult to measure, economic value of services provided by nature. For example, the value of a forest is not only in the lumber that it provides, which is included in the $8.2 billion, but also in purifying air and water. One measurement is to establish the cost of replacing those services with human technology; such as replacing clean drinking sources (i.e., groundwater wells) with water treatment plants that treat surface waters (SPNHF 1999). These natural or ecosystem services don't translate easily into economic terms of jobs, wages, and taxes, yet they provide huge economic benefits. Some of these services provided by open space are described in more detail in the following sections.

Drinking Water

The first public water supply in Newmarket, going back to the early 1900s, was water pumped from Follet's Brook. A sand filter system in the bed of the brook provided pre-treatment before entering a pumping station created from an old mill along Packers Falls Road where it crosses the Piscassic River. The Water Treatment Plant received a $2.3 million upgrade in 1990, but was shutdown 13 months later in 1991 because of the cost to operate the plant and other operating difficulties. During the upgrade of the treatment plant the sand bed in Follet's Brook may have been compromised as it ceased to function as a filtration system. Plant operators tried unsuccessfully to pump sufficient water from the Piscassic River. The surface water in the Piscassic, Lamprey, and Follet's Brook have varying levels of manganese and high color, both of which are difficult to treat in the existing plant. The water treatment plant is shut down until a decision is made whether to upgrade the plant, which could cost more than $15 to $20 million.

The Town operates two gravel-packed wells, which are currently the only source of public drinking water. The Bennett and Sewall wells draw from what is known as the Newmarket Plains Aquifer. Water

demand in Newmarket has increased dramatically since the 1980s and there are more stringent water quality regulations that must be met. The high water demand and drought conditions several years in a row lowered the aquifer. This, combined with problems with the water treatment plant spurred the Town to begin pursuing other water sources and to implement a water management program to encourage water conservation. Water levels in the wells are higher now with the heavy rains last year. However, an alternative water supply is still needed given the fluctuations in the aquifer.

The NH Department of Environmental Services stated in a November 29, 2001 letter to Newmarket "…the nature of the problems the town is facing with combined ground and surface water sources are among the most severe in the state." In addition, extensive sand and gravel mining has possibly reduced the storage and filtering capacity of the Newmarket Plains Aquifer, and its ability to attenuate contaminants (November 17, 1998 letter from Doug Heath, U.S. EPA to Al Dixon, Newmarket Town Administrator).

In 2006, the Town engaged consultants (Comprehensive Environmental Incorporated) to delineate the Wellhead Protection Area (WHPA), to identify potential new ground water sources, and to provide recommendations on how to increase protection of the WHPA. The consultants submitted their final reports to the Town on October 3, 2006 (see Map 2 for the WHPA delineation).

Given the financial investments by Newmarket in past, present, and future endeavors to develop, treat, and maintain public drinking water sources, it is important that any viable sources are not jeopardized by land uses that might compromise the water quality or increase the cost of treating the water. The NH Department of Environmental Services (DES) suggests that the surest way to prevent contamination of drinking water is to control the land through land acquisition or by obtaining conservation easements that prevent the landowner from developing or otherwise using the land in a way that might threaten surface or groundwater. This guidance comes from the NH DES Water Supply Engineering Bureau (http://www.des.state.nh.us/dwspp/acqui.htm). Since the 1800s, water suppliers in New Hampshire have purchased land to protect surface water supply reservoirs and more recently to protect groundwater. NH DES recommends land conservation for the most sensitive resource areas as the first step in a hierarchical approach to preventing drinking water contamination.

Newmarket has used the land conservation approach as far back as 1915 when the Town acquired lands along Follet's Brook, the source of the Town's drinking water more many decades (prior to 1980s). From 1999-2001 Newmarket residents supported a tax increase to establish a drinking water protection fund. A portion of the $2 million land acquisition bond passed in 2002 was leveraged by many grants including two grants from the NH DES Water Supply Land Grant Program. Given the uncertainty of future drinking water sources and the lack of protection still around existing ground and surface water sources, Newmarket should continue to pursue land conservation as a strategy for protecting current and future public drinking water supplies.

Flood Control and Storage

The potential impacts associated with the expansion of developed land, and specifically with increasing amounts of impervious surfaces – rooftops, sidewalks, roads, and parking lots - may include significant changes in water quantity, degradation in water quality, and habitat loss. Because asphalt, concrete, stone, and other impenetrable materials effectively seal the ground surface, water is repelled and is prevented from infiltrating soils. Instead, stormwater runoff flows directly into our surface waters, depositing metals, excess nutrients, organics, and other pollutants into the receiving bodies. Impervious surfaces

combined with drainage systems such as curbs, gutters and storm drain pipes alter the natural hydrology in a watershed by increasing the volume and rate of stormwater runoff being discharged from the site, as well as by reducing the amount of precipitation that infiltrates into the ground and recharges the groundwater and aquifers. The increase in runoff also exacerbates downstream impacts, sedimentation, and erosion.

Studies conducted in other regions of the country have reported that levels of impervious surface in excess of 10 percent in a watershed can affect water quality. When impervious surfaces are 10 to 25 percent, storm-fed flows cause noticeable erosion and greater than 25 percent impermeable surface can lead to severe physical and ecological damage to streams in a watershed (RPC 2005). Newmarket has reached the 10% threshold of impervious surface. The amount of impervious surface is increasing in the Lower Lamprey River watershed (6.8% in 2005; 4.3% in 1990) and even faster in the Piscassic watershed (8.1% in 2005; 3.9% in 1990) (Justice and Rubin 2006).

The best ways to promote groundwater recharge in developing areas are to minimize the amount of impervious area and to maximize the opportunities for naturally treated stormwater to infiltrate into the ground. This was evident during the severe flooding of May 2006. The most severe flooding and damage occurred in downtown Newmarket over Moonlight Brook, which has been paved over and restricted into culverts that were overwhelmed during the extreme rain event. Yet, higher up in the Piscassic River watershed high water remained within broad undeveloped floodplains causing little damage to structures since the natural stream channel and floodplain vegetation were intact.

Several of the recent land conservation projects in Newmarket protected significant river frontage and floodplain that is critical to flood control. These projects include the Piscassic River-Loiselle Conservation Area (1,900 feet of frontage on the Piscassic River), Silverman-Schneer Conservation Easements (1,200 feet of frontage on the Piscassic River), and large portions of the Tuttle Swamp ecosystem, which has a huge capacity to absorb floodwaters.

Forests and Farmlands

New Hampshire is the most heavily forested state after Maine. These forests are often harvested in a sustainable way to provide local products including lumber, firewood, and pulp for paper and other products. Forests also offer habitat for many of our native wildlife species including deer and turkey that offer hunting opportunities as well as wildlife watching for all. Forested areas offer shade and cooler temperatures in the heat of summer and those with trails provide quiet areas for hiking. Forests are important as carbon sinks, critical in efforts to confront global warming.

Farming is part of New Hampshire’s scenic landscape and cultural heritage. For more than 300 years New Hampshire’s agricultural community has adapted to changing landscape conditions and markets. The agricultural sector in the State remains vibrant and diverse and shows growth in small scale farms based on retail markets.

Farmland and forestland provide watershed protection by purifying air and water and preventing erosion, and support wildlife habitat and open spaces that maintain scenic views and offer outdoor recreation. To retain these values and contributions to our local and state economies, these lands need to remain as open space.

In 2006, a local farming family worked with the Town of Newmarket and the Great Bay Resource Protection Partnership to protect their land through a conservation easement and enabled a young couple to continue farming the land and establish a Community Supported Agriculture (CSA) farm where people purchase shares in return for a weekly supply of produce from the farm. Similarly, several land conservation projects in Newmarket have protected important forestland including two Tree Farms.

Recreation and Health

Some of the most popular recreational activities in the state (walking, wildlife watching, and hiking) identified as part of a recreation needs assessment for the Statewide Comprehensive Outdoor Recreation Plan are highly dependent on open space. According to this needs assessment, about 50% of all outdoor recreation activities take place within 10 miles of home (NH Office of State Planning 2003).

The Ten Year Recreation Master Plan for Newmarket completed in 2005, supports and builds on this interest among residents in having open spaces with walking trails (LandFutures et al. 2005). The Recreation Master Plan recommends steps to enhance recreational trails on existing conservation lands as well as increasing visibility among Newmarket residents of existing trails and conservation areas.

Newmarket open spaces and associated trails offer opportunities for outdoor physical activity that can lead to healthy living.

Fish and Wildlife Habitats and Natural Plant Communities

Newmarket lies within the 990 square mile coastal watershed with most of the town within the Lamprey River drainage. Despite the rapid population growth and development pressures in this region, many areas of ecological significance remain within our community. Since plants and animals and watercourses don't follow political boundaries, some of these habitats fall within several towns.

The Land Conservation Plan for New Hampshire Coastal Watersheds (Zankel et al. 2006) identified several areas of ecological importance for maintaining diverse wildlife habitat, abundant wetlands, clean water, productive forests, and recreational opportunities (Map 3). Several of these "focus areas" are in Newmarket including Piscassic River, Great Bay Estuary, and Lubberland Creek. The freshwater and saltmarsh habitats support several rare plants. Uncommon and excellent examples of several natural plant communities are found in these areas including rich Appalachian oak rocky woods.

The New Hampshire Wildlife Action Plan, completed by NH Fish and Game Department, identified parts of Newmarket as having some of the highest quality wildlife habitat in the State (NHFG 2006) (Map 3). These significant wildlife habitats include floodplain forests, fresh and saltwater marshes, and grasslands, and are found along the Lamprey River, Piscassic River, Great Bay Estuary and in the Tuttle Swamp watershed. Rare animals documented here include Blanding's, spotted, and wood turtles, osprey, least bittern, sora (rail), saltmarsh sharp-tailed sparrow, golden-winged warbler, and rare dragonflies and butterflies.

Many of these focus areas and high quality wildlife habitats identified in the Coastal Plan and Wildlife Action Plan are already partly protected through land conservation efforts by the Town and other partners

(e.g., Great Bay Resource Protection Partnership). These include the Wiggin Farm-Tuttle Swamp Conservation Area, Silverman-Schneer and Hilton Conservation Easements, and Lubberland Creek Preserve (the latter owned by The Nature Conservancy).

New Hampshire's coastal rivers, including the Lamprey River, once supported abundant runs of anadromous fish including river herring (alewife and blueback herring) and American shad. These fish were denied access to historical, freshwater, spawning habitat with the construction of dams during the 19th century textile boom. NH Fish and Game began restoring fish populations by constructing fish passages in the late 1960s and early 1970s on the coastal rivers including at the McCallen Dam in Newmarket. In 2005, more than 40,000 spawning adult river herring and 12 American shad passed through the Lamprey River fish ladder (Grout et al. 2006). A Great Bay Estuary Restoration Compendium (Odell et al. 2006) provides more information and guidance on restoration of important estuarine resources including saltmarsh, eelgrass beds, oyster reefs, and migratory fish.

Chapter 3 Community Support for Open Space

Newmarket residents have repeatedly expressed strong support for the conservation of important natural resources within the community. This is reflected in the passage of the $2 million bond in 2002, approval three years in a row (1999-2001) for a 25-cent increase in property taxes to fund an aquifer protection fund, the vision of the Town Master Plan, and the decisions by several landowners to protect their lands through conservation easements.

Some of these decisions and desires of community members are described in more detail below.

Town Master Plan

The Vision Statement in the 2001 Town of Newmarket Master Plan clearly indicates community commitment to open space values. The following are excerpts from the Vision:

- The natural beauty, ecological integrity, and recreational areas are preserved and promoted, creating a place for residents and visitors to enjoy
- Natural assets, such as the downtown waterfront, Great Bay, Lamprey River, and open rural areas and woodlands, are maintained through responsible development balanced with wise preservation and protection of these vital natural resources
- Support quality, thoughtful development that preserves our natural resources and enhances the aesthetics of Newmarket while creating a long-term tax base

Many recommendations in the Master Plan relate to preserving the town's rural character and ecological values. One recommendation specifically promotes a comprehensive approach to open space protection and development of a separate Open Space Plan.

The entire 2001 Newmarket Master Plan is accessible at
http://www.newmarketnh.gov/town_departments/planning/PlanningBoardMasterPlan.htm

Newmarket Zoning Ordinance

The Newmarket Zoning Ordinance guides the character of growth, development and change to provide for the public health, safety, and general welfare. The ordinance includes several overlay districts (aquifer, shoreline, wetland, watershed, floodplain, steep slopes) that apply to sensitive natural resources and impose additional requirements and restrictions to those of the underlying district (Map 4). The Zoning Ordinance also includes a section for encouraging residential open space design developments rather than conventional designs that consume more open space. The full language of the Zoning Ordinance including full details of each overlay district can be viewed at http://www.newmarketnh.gov/town_departments/planning/documents/ZoningOrdinance021705.pdf.

A brief description of each overlay district in the zoning ordinance is included here:

5.01 Aquifer Overlay District

To protect, preserve and maintain existing and potential groundwater supplies and related groundwater recharge areas within the Town. The Aquifer Overlay District applies to the following areas of Newmarket:

- The Aquifer Protection District shall include all land identified as stratified drift aquifer (of any kind) in the vicinity of Newmarket Plains (along NH Route 152, Lee Hook Road, Langs Lane, and Ash Swamp Road) on Plate 6 of the report entitled *Geohydrology and Water Quality of Stratified Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern New Hampshire* (USGS, Water Resources Investigations Report 88-4128, 1990 revised).

- The Wellhead Protection Area is designated by the map: Wellhead Protection Area – Plains Aquifer in Figure 4-11 of the report entitled: Delineation of Wellhead Protection Area: Newmarket Plains Aquifer, December – 1999 (Dufresne-Henry) incorporated herein by reference.

5.02 Shoreline Protection Overlay District

The waters of Great Bay, the Lamprey River, and other surface waters contribute greatly to the heritage and unique qualities of the Town of Newmarket, especially in the downtown waterfront area. It is the Town's intent to conserve these resources, and to ensure that adjacent land uses compliment the water resources. This shall serve to prevent degradation of the water resources, protect ecological integrity, reduce pollution, protect the quality of life, protect and enhance natural beauty, and foster tourism.

The Shoreline Protection Overlay District includes all land within 125' of Great Bay, the Lamprey River, the Piscassic River and Follet's Brook.

The State Shoreland Protection Act (RSA 483-B) applies to the land areas within 250' of public waters. In Newmarket, public waters are covered by this Act include all tidal waters and the non-tidal portion of the Lamprey River.

5.03 Wetland Protection Overlay District

Wetlands are a critical natural resource that affect water quality, flooding, wildlife, recreation, and aesthetics, and their protection is a goal of the Master Plan.

The Wetlands Protection Overlay District includes all areas of land that meet the criteria of the NH DES wetlands bureau rules for determination of wetlands, poorly drained and very poorly drained soils (as amended), prime wetlands, as delineated by the Newmarket Conservation Commission and approved in accordance with RSA 482-A:15 (as amended) and associated buffers, as defined in this ordinance.

5.04 Class A Watershed Protection Overlay District

Requires that any new septic system be setback a minimum of 125 feet from Class A water, which includes the Piscassic River and Follet's Brook.

5.05 Steep Slope Protection Overlay District

The ability of land to accommodate development is related to its slope, among other factors. Steeper slopes are more fragile than flatter slopes, and are far more susceptible to erosion and

runoff problems once the earth is disturbed. The Master Plan calls for control of development based on slope, and in particular calls for greatest care on slopes of 25% or more.

5.06 Floodplain Protection Overlay District

To protect floodplains from development and construction activities which would aggravate flooding; prevent development in locations which would place occupants at risk or which would likely require rescue of occupants by emergency services personnel during floods; protect the floodplains for use as habitat and for the aesthetic qualities; and ensure Town compliance with the National Flood Insurance Program.

This Overlay District includes all areas, which are inundated with water during the 100-year flood (Special Flood Hazard Areas as shown on the Flood Insurance Rate Map; the latest dated May 17, 2005).

Section 6.00 Residential Open Space Design Development

Among the purposes mentioned in the zoning ordinance for promoting open space design include:

- To maintain and preserve rural character of the Town of Newmarket by allowing an alternative residential development option, which preserves large areas of open space, provides for visual buffers from existing roads and residential development, and permits agricultural opportunities on parcels of open space.

- To encourage Open Space Design in highly sensitive areas of Town that are part of an overall plan for the conservation of natural resources and preservation of large contiguous unfragmented parcels of land.

The open space design subdivisions are currently allowed in zoning districts R1, R2, and M-4 and require a special use permit.

Conservation Commission

Conservation Commissions in New Hampshire are guided by RSA 36-A, which enables a town to establish a Commission *for the proper utilization and protection of the natural resources and for the protection of watershed resources of said city or town* (http://www.gencourt.state.nh.us/rsa/html/III/36-A/36-A-mrg.htm). The Newmarket Conservation Commission has been active for many years commenting on wetlands permit applications and development proposals, managing the Conservation Fund (a specific fund authorized by RSA-36 and established by Town vote), identifying prime wetlands, offering educational programs and tours, developing trails and interpretive materials for conservation areas, working with landowners and partners to conserve land and protect water resources, and other conservation efforts.

The Conservation Commission has sole authority to expend the Conservation Fund. The Town Treasurer administers the fund. The Conservation Commission can receive funds from several sources including town appropriations, gifts from private individuals, from the land use change tax collected by the town when property is withdrawn from the Current Use Assessment Program, by allowing the Conservation Commission to retain unexpended funds from its budget appropriation, and other sources. Most of the funding for the Newmarket Conservation Fund has come from the land use change tax, which receives

50% of these funds. The Conservation Fund is non-lapsing, which is particularly important for open space conservation, since projects often require an accumulation of large sums of money.

The Conservation Commission has actively worked with private landowners, conservation groups, and the Open Space Commission (described below) to protect lands and waters in Newmarket. Lands or interest in lands (e.g., conservation easement) acquired through Conservation Commission efforts are held by the Town, while the Conservation Commission is responsible for the stewardship and management of these conservation areas.

In 1999, 2000, and 2001, the Conservation Commission supported the passage of warrant articles at Town Meeting that created an Aquifer Protection Easement Fund. The purpose of the fund was to acquire easements, as proposed by the Conservation Commission, for aquifer protection rights. Voters supported these warrant articles: $60,000 in 1999, $72,500 in 2000, and $54,000 in 2001. In 2003, voters authorized the expansion of the fund to include purchasing of land or conservation easements on properties that are critical to the protection of current or potential future public water supply sources, including wells, aquifers, and the Lamprey and Piscassic Rivers, as recommended by the Conservation Commission and the Open Space Commission, and to rename the expendable general trust fund to be the Public Water Supply Protection Fund.

Open Space Commission

In July 2001, the Newmarket Town Council established the Open Space Task Force (OSTF) to review and make recommendations on all aspects of open space in Town. The OSTF presented its final report to the Town Council on January 15, 2002 (see Appendix B). The OSTF found that Newmarket was projected to add 3,000 residents in the next 20 years and would lose more than 800 acres of open space to development. At the time, less than 10% of Newmarket was permanently conserved and much of the conserved land was not readily accessible to the public.

The Open Space Task Force found that conserving open space helps stabilize the tax base and provides additional non-economic, community benefits. Generally, new residential development costs the town more money in services provided than in tax revenue collected, increasing the tax burden on current residents.

Based on its findings, the OSTF made two immediate recommendations to the Town Council:

- Create an Open Space Commission and charge it with developing criteria for the acquisition of lands and interests in land, identifying priority areas and goals and uses for community open space acquisition, and recommending to the Town Council the acquisition of identified lands from willing sellers.

- Submit a warrant article for consideration at the 2002 town meeting to authorize the Town Council to draw up to $2 million in bonds for the permanent protection and acquisition of lands and interests therein.

The Newmarket Town Council accepted the report of the OSTF on February 6, 2002 and supported the two recommendations noted above. On March 6, 2002 the Town Council passed a resolution establishing an Open Space Commission (OSC). The OSC was charged with the following:

1. To propose criteria for the acquisition of lands and interests in land for the Town of Newmarket.

2. To identify priority areas and goals and uses for community open space acquisition.
3. To recommend to the Town Council the acquisition of identified land from willing sellers.

The Council resolution tasked the Open Space Commission "to quickly and efficiently identify the priority open space needs for the Town of Newmarket and to work to protect these properties before they are developed" (see Appendix C).

The Town Council crafted Warrant Article 3. Bonding Authority for Land Acquisition and placed it on the May 2002 ballot. Newmarket residents approved the warrant article; the vote was 884 yes to 380 no. Article 3 stated the following: "Shall the town raise and appropriate the sum of $2,000,000 for the purpose of purchasing land or other property interests therein, as the Town Council deems appropriate for the following purposes: 1) to protect the town's rural character and natural resources by conserving land; 2) for outdoor recreation including athletic fields; or 3) other public purposes."

During the summer, 2002, the OSC developed a set of criteria for the acquisition of land or interests in land in Newmarket. The criteria were endorsed by the Town Council and by the public at a workshop hosted by the OSC on August 5, 2002. At this workshop the OSC invited Newmarket residents to recommend places in town that they wanted to see conserved. The OSC sought land in Newmarket that served a public benefit, protected the town's rural character and natural resources or provided outdoor recreation, and was consistent with the Town's Master Plan. Public benefits of open space include drinking water protection, outdoor recreation, scenic views, wildlife habitat, active agricultural farms and tree farms, wetlands, and links to already conserved land.

The OSC, in partnership with the Conservation Commission, and with significant support from other agencies and groups, exceeded its original goal of acquiring 400 acres. These collective efforts leveraged $1.6 million of town funds with $1.6 million of funds from federal and state grants. These projects included a mix of new fee-ownership conservation areas and conservation easements on private lands. The conservation easements were particularly exciting as all the landowners sold easements to the Town through bargain sales, donating over $300,000 in value and further helping the Town leverage our land conservation funds. A four-year report by the Open Space Commission is in Appendix C.

Summary of $2 million Land Acquisition Bond

(as of January 2007)

Results: **430 acres permanently conserved**

Finances:

• **Total Project Costs**	**$3,730,020**
• **Town Funds Used**	**$1,667,292**
• **Grant Funds Received**	**$1,605,762**
• **Sale of Two Houses**	**$ 456,965**
• **Funds for School/Athletic fields**	**$ 500,000**
• **Bond Balance (as of Fall 2006)**	**~$ 170,000**

Chapter 4 Natural Resource Inventory

In 1991, the Town of Newmarket hired the Smart Associates to prepare a Natural Resource Inventory and Conservation Plan. The "Smart Report" identified six areas in town worthy of protection given the presence of critical resources such as wetlands, aquifers, wildlife habitat, rare plants, recreational access, prime farmland, and historical resources (The Smart Associates 1991). The Town and the region have changed considerably in the 15 years since that report was completed including growth in population, development pressure, land protection, and environmental interest and awareness.

Newmarket's population in 1990 was 7,157 compared with 9,175 in 2005. In 1987, 59% (4,554 acres) of Newmarket was in current use, but very little was permanently protected as conservation land. By 1998, only 516 acres or 6% of Newmarket was in permanent conservation. In 2006, 42% (3,133 acres) of the land was in current use, while more than 19% of Newmarket was in some form of permanent open space through public and private conservation efforts or through open space subdivisions (Map 5). The University of New Hampshire GRANIT Data Mapper has an excellent interactive website that can be queried for information on land cover, conservation lands, and other natural resource information. It is accessed at http://mapper.granit.unh.edu/viewer.jsp

This Open Space Plan builds on the 1991 Natural Resource Inventory and presents much new information that has emerged since the Smart Report. As recently as 2006 two new reports were released that highlight the ecological significance of Newmarket's lands and waters within the region and the State. These and other reports, which help us understand the critical resources within our community, include the following (See references on page 92 for the full citations of these documents):

- New Hampshire Wildlife Action Plan. 2006
- The Land Conservation Plan for New Hampshire's Coastal Watershed. 2006
- Natural Resource Management Plan for the Tuttle Swamp Watershed. 2006
- Ecological Inventory of the Cocheco River and Follet's Brook Watersheds. 2004
- Freshwater Wetland Mitigation Inventory for Nineteen Coastal Communities. 2003.
- Newmarket Prime Wetlands Designation Study. 2003
- An Assessment of Natural Communities and Significant Wildlife Habitat in Selected Focus Areas in the Piscassic River Watershed. 2002

According to the most recent land cover data (from Complex Systems Research Center 2001 NH Land Cover Assessment; provided by Robert Pruyne) Newmarket can be described in the following way if you were looking down from an airplane (or more accurately a satellite) (Map 6).

Land Cover Type	**Acres**
Forest	4,453
Water	1,231
Hay/Pasture/Crops	601
Wetland	518
Roads, Cleared, Developed	2,277
TOTAL Acres	9,080

Some of the forested acreage listed above also has residential development that can't be observed from above. The Complex Systems Research Center (CSRC) that maintains the online GRANIT data mapper, calculates a total acreage of 9,080 acres for Newmarket. Of this total, 1,043 acres are surface water that includes 967 acres that encompass Great Bay and the tidal portion of the Lamprey River and other open

water bodies within the Town of Newmarket. Since these waters are already "protected" and can't be built upon, CSRC considers the land area of Newmarket as 8,038 acres. This figure is used in the Open Space Plan as the basis for calculating percent of conservation lands.

The remainder of this chapter describes the wetlands, water bodies, groundwater, forests, and fields of Newmarket in more detail.

Waterways and Wetlands

The major surface waters in Newmarket include the (see Map 2):

- Great Bay Estuary
- Lamprey River
- Piscassic River
- Follet's Brook
- Lubberland Creek
- Tuttle Swamp wetland system and other prime wetlands
- Moonlight Brook

Great Bay Estuary

The Great Bay Estuary covers 17 square miles with nearly 150 miles of tidal shoreline. Twice daily the tides force Gulf of Maine saltwater up the Piscataqua River to Little Bay and into Great Bay, mixing with the flow of freshwater from seven major rivers: Lamprey, Oyster, Bellamy, Cocheco, Salmon Falls, Winnicut, Squamscott-Exeter. Great Bay is unusual because of its inland location, more than five miles up the Piscataqua River from the ocean. Many people harvest oysters, clams, and lobsters from these waters or fish for striped bass, bluefish, herring and smelt. Ducks, geese, and bald eagles spend the winter on the Bay's open waters. It is an estuary of national significance and home to several research sites including the Great Bay National Estuarine Research Reserve and the University of New Hampshire's Jackson Estuarine Laboratory (NHEP 2005).

Rivers flowing into Great Bay once supported substantial runs of anadromous fish (species that live in saltwater but spawn in freshwater), such as Atlantic salmon, American shad, alewives and other river herring. Over-harvest, poor water quality, dams that restrict flow, and ditching and draining of salt marsh contributed to declines of many fish species. However, the tide has turned and conditions are improving, yet continued growth and development bring additional threats to water quality, wildlife habitat, and quality of life in Great Bay communities. Impervious surfaces (e.g., pavement, roofs, structures), shoreland development, and sprawl development send more sediment and pollutants into wetlands and waterways and eventually to the Bay (NHEP 2005).

The Coastal Plan (Zankel et al. 2006) identified the area in Newmarket between New Road and Great Bay as one of 75 Conservation Focus Areas within the entire 990 square mile-46 town Coastal Watershed (Figure 1 and Figure 2). These areas are considered to be of exceptional significance for living resources and water quality. This Focus Area extends into Stratham encompassing the Squamscott River and associated floodplain and salt marsh.

Newmarket encompasses 967 acres of Great Bay waters (includes tidal portion of the Lamprey River) and nearly 11.2 miles of estuary shoreline. Not only is Great Bay an important natural resource for

Newmarket, future land use decisions by the Town can help restore and maintain the many benefits derived from the Great Bay Estuary.

Access to Great Bay

Great Bay is popular for fishing, hunting, boating (kayaks, canoes, and motorboats), and wildlife watching. Public access to Great Bay is available at several locations in Newmarket.

- Town Boat Launch at Schanda Park, off Water Street.
- Heron Point Sanctuary. A parking area and walking trails along the shores of the tidal portion of the Lamprey River. Access is off Bay Road and then right onto Meadow Drive
- Lubberland Creek Sanctuary. A Nature Conservancy Preserve that offers parking and nature trails with views of Great Bay. Access is off Bay Road

FIGURE 1 – NH Coastal Watersheds

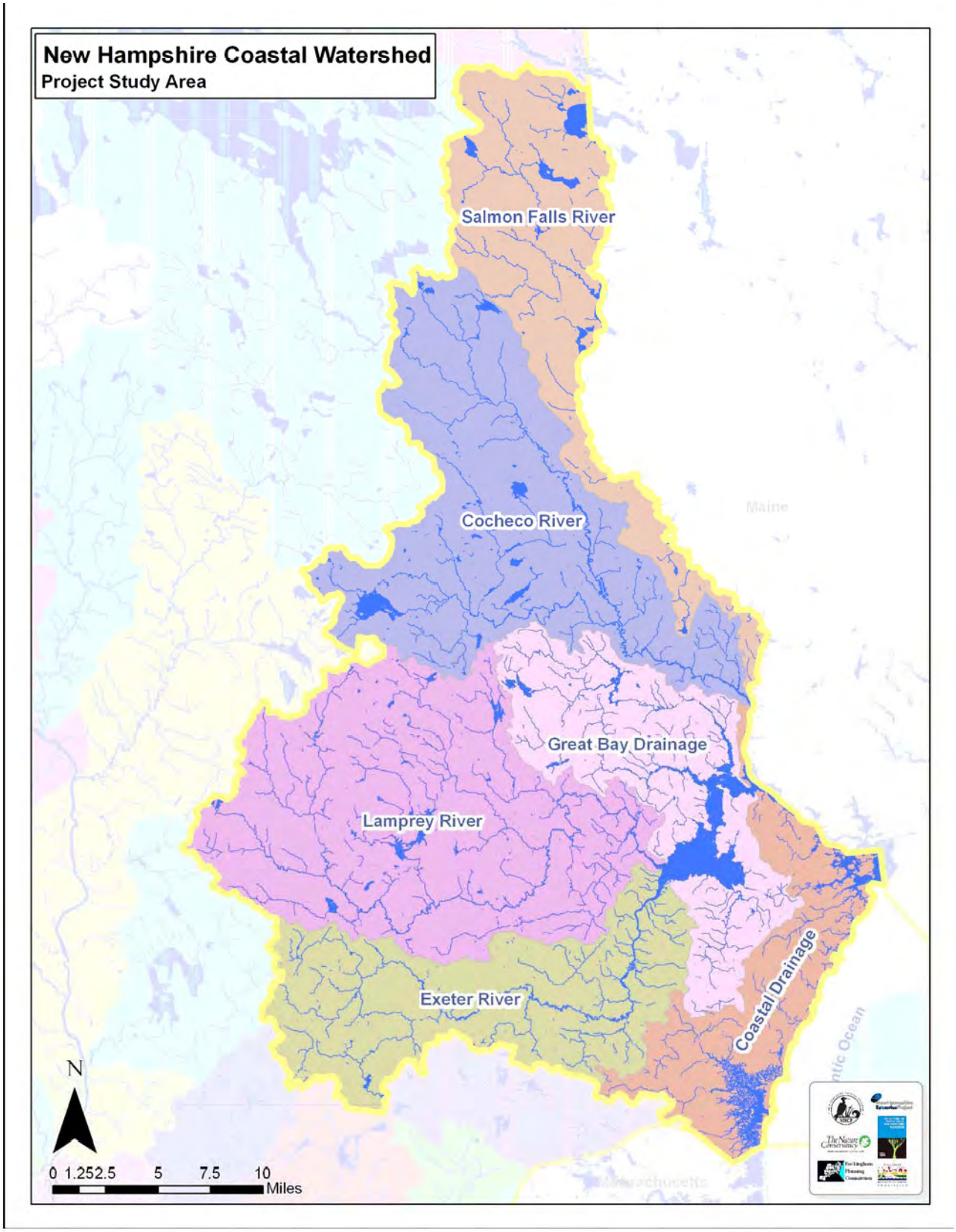
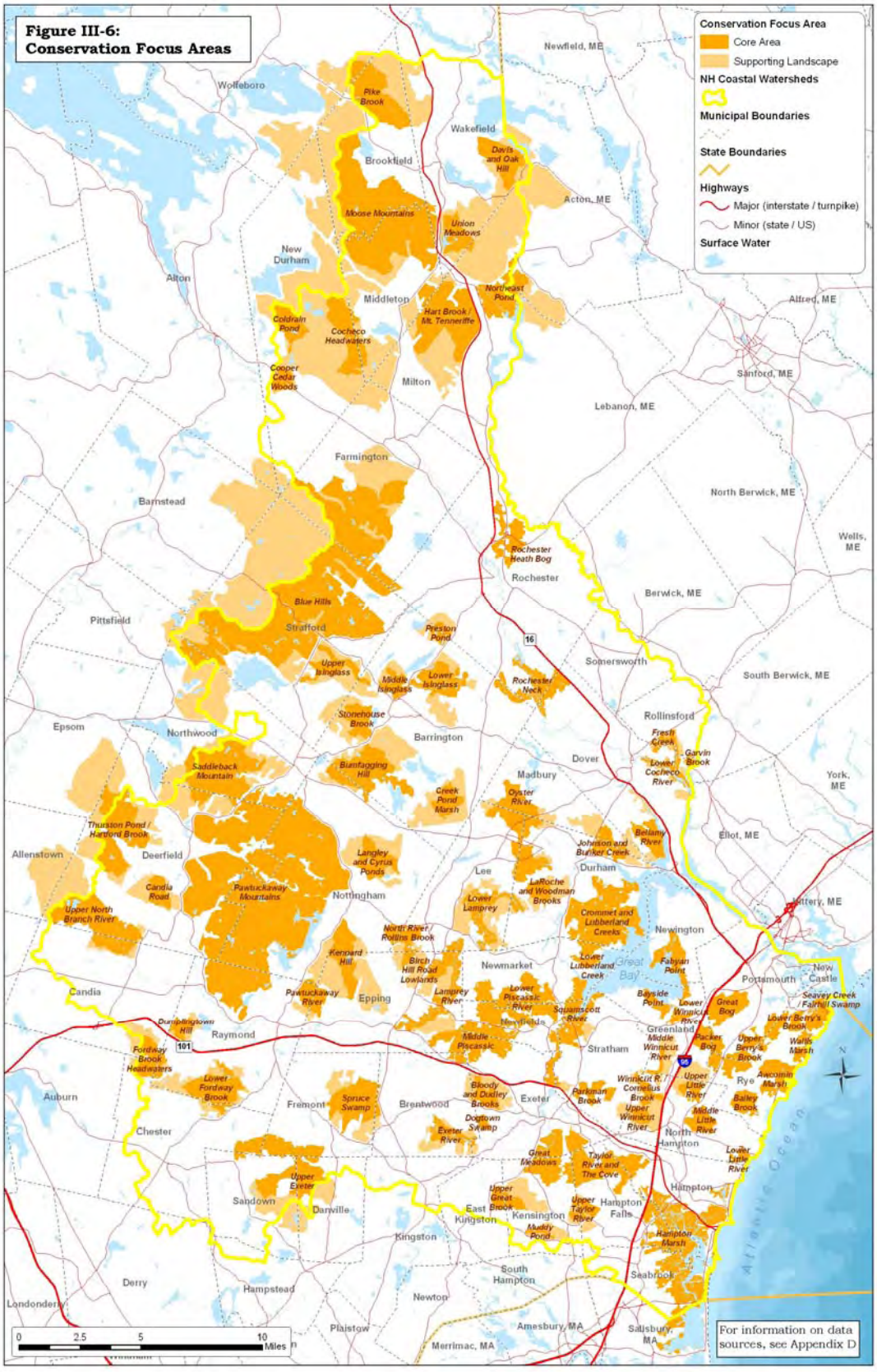


FIGURE 2 – The Coastal Plan Conservation Focus Areas – Newmarket



Lamprey River

The Lamprey is the largest river in Newmarket, flowing south from Durham through the center of downtown Newmarket before draining into Great Bay. The Lamprey River begins in the Saddleback Mountains of Northwood and meanders 60 miles through seven towns before it reaches the McCallen Dam at the Mills in Newmarket. The Lamprey River drains an increasingly populous watershed of 212 square miles, the largest watershed and the longest tributary to the Great Bay Estuary (Figure 1). Most of Newmarket is within its watershed; only portions of Bay Road and lands mostly east of Rt. 108 south of downtown drain directly into Great Bay.

Historically the Lamprey River supported large populations of river herring, sea lamprey, American shad, American eel, and Atlantic salmon. Dams constructed for industrial and commercial purposes have long blocked or limited fish passage upstream. The McCallen Dam, site of the first natural falls on the Lamprey, separates the tidal portion of the river from the freshwater portion. A Denil fish ladder on this dam enables alewives, American eels, sea lamprey, and American shad to move upriver. Blueback herring do not use the ladder and have been seen spawning below the dam. Three and a half miles upstream of McCallen is the Wiswall Dam in Durham, originally constructed in 1835. This dam has no fish passage creating a barrier to fish movement farther upriver. A project to install a nature-like bypass channel around the dam has been proposed. A third dam at Wadleigh Falls in Lee has been breached, but under typical flow conditions, its remnants still constitute a barrier.

Boat access to the Lamprey River is available at The Launch at Piscassic Street (also known as Sliding Rock Conservation Area). Access is off Elm Street via Beech St and Salmon St. The site also has a short nature trail, and picnic area.

Wild and Scenic River Designation

An 11.5-mile segment of the Lamprey River was officially designated as a recreational Wild and Scenic River on November 12, 1996. This designation extended from the southern Lee town line (bordering Epping) through Lee and Durham to the confluence with the Piscassic River in the vicinity of the Durham-Newmarket town line. A recreational river in the National Wild and Scenic Rivers Program (administered by the National Park Service) is one that is readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past. A 12-mile segment of the Lamprey River, from the Lee/Epping town line to the Bunker Pond Dam in Epping, was added to this designation on May 2, 2000, increasing the Wild and Scenic River designation to 23.5 miles. The Lamprey River Advisory Committee, with members from all four towns, has the principle responsibility for development and implementation of a long range River Management Plan and reviews and comments on projects that could impact the river.

New Hampshire Comprehensive Shoreland Protection Act

The New Hampshire Comprehensive Shoreland Protection Act (and rules) applies to all land areas:

- Within 250 feet, horizontal distance, of the natural mean high water level of natural fresh water bodies without artificial impoundments listed in the official list of public waters published by the department;
- Within 250 feet, horizontal distance, of the water line at full pond as determined by the elevation of the top of the impoundment structure of artificially impounded fresh water bodies listed in the official list of public waters;
- Within 250 feet, horizontal distance, of the highest observable tide line of coastal waters; and

- Within 250 feet, horizontal distance, of the ordinary high water mark of rivers, meaning all year-round flowing waters of fourth order or higher, as shown on the current version of the U.S. Geological Survey topographic maps…

In Newmarket this encompasses the Lamprey River (above the McCallen Dam) and Great Bay. Visit http://www.gencourt.state.nh.us/rsa/html/nhtoc/nhtoc-l-483-b.htm to view the full Shoreland Act.

In situations where the Town shoreland protection overlay is more stringent than the State regulations, the more stringent regulations take precedence.

Piscassic River

The Piscassic River is the largest tributary to the Lamprey River in Newmarket. It flows northeasterly from Newfields through the region of Neal Mill Road, Ash Swamp Road, Lang's Lane and Grant Road before flowing under Rt. 152 then to the Packers Falls Dam and then another ½ mile to the Lamprey. The lower Piscassic River, below the dam, is often thought to be part of the Lamprey River because it is an extension of the impounded waters of the Lamprey behind the McCallen Dam. The confluence of the Piscassic River with the Lamprey River is actually located just north of the Durham/Newmarket town line. Water from the Piscassic River (below the dam) was used as a drinking water source until 2004, until the water treatment plant was shut down. Since then the town has relied solely on groundwater from two municipal wells.

The Coastal Plan and the Wildlife Action Plan identified a portion of the Piscassic River in Newmarket (near the Newfields townline) as a conservation focus area with high quality wildlife habitat. The Piscassic River is recognized for the presence of rare plants and animals including wood, spotted and Blanding's turtles, more than 10 miles of river, location within a large unfragmented block of forest, presence of an aquifer and farmland soils, and connectivity along the watercourses (NHFG 2006, Zankel et al. 2006).

Follet's Brook

Follet's Brook flows southeasterly out of Durham and into Newmarket, meeting the Piscassic River just above the Packers Falls dam. The lower one third of the Follet's Brook watershed is in Newmarket. Before 1990, Follet's Brook was a principal municipal water supply following passage through the Packers Falls Road water treatment plant.

The Nature Conservancy study of Follet's Brook (Zankel 2004) provides the following description of the Follet's Brook watershed. The approximately 1,200-acre watershed, within Newmarket, Lee, and Durham, is a relatively large, unfragmented natural area. Follet's Brook is a small, free-flowing tributary that feeds into the Piscassic River just upstream of the Piscassic-Lamprey confluence. The brook is a low-gradient stream with a small, narrow channel (~ 3 feet wide) and a soft substrate of clay and sand. The watershed supports more than 120 acres of emergent, scrub-shrub, and forested wetlands. Beavers have created a network of swamps, marshes, and pools that attracts much other wildlife. Appalachian oak-pine forests with several vernal pools that harbor breeding amphibians and invertebrates dominate the uplands.

Lubberland Creek

Lubberland Creek originates in wetlands along Dame Road in Durham then flows southerly under Bay Road entering Great Bay on the north side of Moody Point. It is one of several small streams that drain

directly into Great Bay. The lower portions of the Creek flow through extensive salt marsh. A portion of the Gonet Drive subdivision borders Lubberland Creek.

The Coastal Plan also recognizes the Lower Lubberland Creek in Newmarket as another Conservation Focus Area (Zankel et al. 2006). The most significant features here include the extensive salt marsh along Great Bay and at the mouth of Lubberland Creek and associated wildlife species including nesting osprey and saltmarsh sharp-tailed sparrow, and many acres of farmland soils.

Wetlands

Approximately 26 percent of Newmarket is considered wetland based on soil conditions. Wetlands provide natural flood control, filtering of nutrients, sediments and pollutants, ground water recharge, fish and wildlife habitat, scenic vistas, and recreation and education options. Extensive freshwater wetland areas occur in Tuttle Swamp (described below), along the Lamprey River, Piscassic River, Lubberland Creek, and Follet's Brook. The Conservation Commission engaged several consultants to evaluate and map prime wetlands. West Environmental completed a final list and map of these high value wetlands following extensive field research and other data collection (West Environmental 2003).

Map 2 and Table 1 includes the 16 wetlands identified as prime wetlands by West Environmental. The detailed boundaries of each of these prime wetlands is recorded on a 1998 digital ortho photo, which along with the written documentation was submitted to the NH Department of Environmental Services and approved by that agency on November 24, 2006 (see letter in Appendix E). These prime wetlands are afforded additional protection within the Newmarket Zoning Ordinance. Any projects located in or adjacent to designated prime wetlands are considered "Major Projects" according to NH DES wetlands rules and application procedures and receive a much higher level of review and require more documentation on impacts, avoidance, and mitigation. Follet's Brook was considered a prime wetland candidate but was not included in the designation at this time as the Town is researching the feasibility of re-establishing the brook as a public water supply.

Tuttle Swamp Wetland System

One of the largest prime wetlands in Newmarket is an area known as Tuttle Swamp, located in the western section of Town. The waters of Tuttle Swamp begin in the headwaters of an unnamed stream in Newfields, flowing north into Newmarket on the east side of Bald Hill Road, under Grant Road and into the large wetland complex known as Tuttle Swamp that extends to the Newmarket-Lee town line where it meets the Lamprey River. This area is thought to be a major groundwater discharge area. The southeastern portion of Tuttle Swamp between Grant Road and Ash Swamp Road drains easterly eventually reaching the Piscassic River north and east of Ash Swamp and Grant Roads.

The Nature Conservancy, on behalf of the Great Bay Resource Protection Partnership, prepared a natural resource management plan for the Tuttle Swamp Watershed (Glode 2006). The plan was prepared with a desire to compile management recommendations for the entire area to facilitate cooperative management between landowners and to promote landscape level management of this exemplary wetland system. The Town of Newmarket and other conservation groups own several parcels within this watershed.

The Management Plan by Glode (2006) describes the watershed as follows.

"The Tuttle Swamp Watershed, including Ash Swamp, consists of a large wetland complex with associated forested uplands in the town of Newmarket, NH. The watershed has been recognized as a high priority conservation area due to its mosaic of wetland and upland habitat types including exemplary examples of acidic forested seepage swamps, floodplain forests, beaver flowages, and emergent marshes

(Stevens & Anderson 1997). Tuttle and Ash Swamps combined represent one of the largest headwater swamps in the Great Bay drainage. The Tuttle Swamp Watershed straddles the larger Lamprey and Piscassic watershed, with Tuttle Swamp draining into the Lamprey, and Ash Swamp draining into the Piscassic River. The protection of large headwater wetlands such as the Tuttle/Ash Swamp complex is important for ensuring the maintenance of downstream habitats and water quality, including the Great Bay estuary, a marine environment of enormous biological, commercial, and cultural value.

The Tuttle/Ash Swamp wetland complex provides important wetland functions including nutrient uptake, sediment removal, flood control, and groundwater recharge. Associated upland forests and grasslands surrounding the wetland systems provide critical wetland buffer functions, support wildlife habitat, and provide connections with other habitats outside the area addressed in this report. Tuttle Swamp supports several rare species and exemplary natural communities, including the largest example of a swamp white oak floodplain forest on the Lamprey River (Nichols & Sperduto 1997). The wetland natural communities that co-occur within the Tuttle Swamp Watershed can be broadly described as temperate minerotrophic swamp and emergent marsh – shrub swamp ecological systems (Sperduto 2004). Seventeen rare species are associated with these wetland ecological systems and the open field habitat within the watershed: Blanding's turtle, spotted turtle, wood turtle, climbing hempweed, tufted loosestrife, large bur-reed, black maple, fen ant, Eastern meadowlark, bobolink, blue-winged warbler, American woodcock, New England cottontail, red-shouldered hawk, whip-poor-will, sedge wren, and least bittern" (Glode 2006).

Table 1. Prime Wetlands in the Town of Newmarket as mapped by West Environmental, Inc (2006). The Wetland I.D. numbers correspond to the maps of the prime wetlands on digital orthophotoquads prepared by Strafford Regional Planning Commission and recorded with the NH Department of Environmental Services.

Wetland I.D.	Wetland Name	Size (acres)	Notes
NW-01	Tuttle Swamp	346	Largest wetland in Town; rare plants and animals
NW-04	Tuttle Swamp North Extension	19	Beaver pond connected to Tuttle Swamp
NW-05	Nostrom Farm	56	Unique wet meadow habitat; drains to Tuttle Swamp
NE-01/NE-05	Piscassic-Lamprey River backwaters	45	Open water; waterfowl habitat; recreation area
NE-02	Follet's Brook*	39	Former water supply; diverse marsh habitat *Not submitted to NH DES for designation as prime wetland as Town was studying feasibility for water supply
NE-03	Bay Road Interior	35	Freshwater wetland bird and turtle habitat
NE-04	Lubberland Creek, north side of Bay Road	45	Tributary stream to Great Bay
NE-06	Lower Piscassic River	33	Floodplain system; fishing area; wildlife corridor
NE-07	Town Center Wetland	8	Wildlife refuge in Town
SW-01	Bald Hill Road Swamp	110	Connects to Tuttle Swamp; Largest scrub-shrub wetland in Town
SW-02	Clark Hill Wetland	66	South of Ash Swamp Road; Large red maple swamp
SW-03	Upper Piscassic River	113	Largest floodplain wetlands in Town; fishing area; wildlife corridor
SW-04	Neal Mill Wetland	39	West side of Neal Mill Road; undisturbed wetland wildlife habitat
SW-06	Drelick Road Wetland	16	Small but diverse wetland with open water
SE-01	Ladyslipper Land Wetland	137	Second largest red maple swamp; vernal pools, drains into Piscassic River
SE-02	Central Piscassic River	23	Floodplain; fishing area; wildlife corridor

Groundwater

Aquifers are concentrations of groundwater and those having medium to high potential to yield groundwater occur in the seacoast areas as alluvial deposits of sand and gravel ("unconsolidated") or in bedrock fractures ("consolidated"). The major source of recharge to these aquifers is through precipitation filtering directly down into the aquifer. The unconsolidated sand and gravel deposits are called "stratified drift aquifers" and typically yield more groundwater than bedrock fractures.

Newmarket's most productive groundwater source is a stratified drift aquifer in an area known as the Newmarket Plains under Rt. 152 in the area of the Newmarket-Lee-Durham town lines (Map 2). The surficial area of the aquifer is about 410 acres. This aquifer is currently the only source of Newmarket's public drinking water from two municipal wells – Bennett and Sewall. The Bennett Well was installed in 1974 and is 48 feet deep. The Sewall Well, at 83 feet deep, was installed in 1985.

These two wells produce high quality drinking water that requires minimal treatment. However, recent studies indicated that too much water was being withdrawn from this source and that the groundwater levels in the aquifer were steadily dropping. See pages 10-11 in Chapter 2 for more discussion on the town's drinking water sources. Due to over pumping the aquifer was drawn dangerously low. The Town has several studies underway to look at additional surface and groundwater sources for drinking water.

In 2002, the Newmarket Town Council adopted a water conservation ordinance (#2002-05) to manage the ground and surface supplies to ensure a constant level of water, particularly during drought periods and after heavy rains (Appendix D). The water conservation program includes four stages from Stage 1 (voluntary) to Stage 4 (mandatory outside water ban). Recently the Town explored re-establishing Follet's Brook as a water source. However, it appears that this will not provide an adequate year-round supply and there are issues related to wetlands impacts.

The Town has two other identified stratified drift aquifers. One in the western part of town under Bald Hill Road and the other is beneath Rt. 108. However, neither of these aquifers is thought to have a high water supply potential. The Town has engaged several consultants over the years to investigate potential groundwater sites throughout town in locations of stratified drift aquifers. The town is currently in the midst of evaluating eleven different sites in the community for potential to yield groundwater as a new public water supply.

Newmarket Plains Aquifer

Comprehensive Environmental Incorporated (CEI) was hired by the Town to delineate the Wellhead Protection Area (WHPA) as well as inventory the potential contaminant sources (PCSs) within the WHPA and provide recommendations on managing PCSs. CEI listed potential contaminant sources within the WHPA in their report to the Town dated October 3, 2006 (Table 2).

Table 2. Potential Contaminant Sources within the Newmarket Wellhead Protection Area (adapted from CEI 2006).

PCS Type	NH DES # or EPA #	Site Name	Status/Concern
Auto Salvage	200511073	Beaulieu & Wife Tow, Salvage, & Repair	Site Remediation: Active – repair garage
Hazardous Waste Generator	EPA: NHD510129018	Newmarket Sand & Gravel	Active
Non-Point Sources	169-11	Town of Newmarket Sand & Gravel Area	Active
	169-12	Unknown	Unknown
	169-19	Wayne Rosa Construction Inc. Sand & Gravel	Active
	169-20	Develco Sand & Gravel	Active
	169-21	Newmarket Sand & Gravel	Active
	-----	Newmarket Police Department	Active police shooting range
	-----	Roads	Roads
	-----	Residential homes	Septic systems
Above Ground Storage Tanks	990518A	Town of Newmarket Public Works	Tanks removed
Hazardous Waste Generator	EPA: NHD500031539	Town of Newmarket Public Works	Inactive – facility no longer used
Underground Storage Tanks	None listed	Rosa Construction, Inc	Diesel tank removed in 1998

CEI identified several areas or actual or potential contaminant sources associated with the sources in Table 2. These include spilled oils, solvents, and other hazardous materials from past storage of vehicles, fuel spills with MTBE, lead leaching into groundwater from lead bullets, vehicle fuel leaks from earth moving equipment, failing private septic systems, snow and ice removal chemicals on roads (CEI 2006).

Environmental Data

The New Hampshire Department of Environmental Services maintains an online database of environmental site information that can be queried by town. This database includes listings of public water supply systems and the potential threats to these supplies such as underground storage tanks, solid waste landfills, hazardous waste generators, and other environmental site information. This database can be viewed at http://www2.des.state.nh.us/OneStop/.

Some of the information from this database is included here:

Public/Community Water Supply Systems

These systems all rely on groundwater as the source of drinking water

- Newmarket Water Works, Packers Falls Road (1933 connections)
- Great Bay Water System, Schanda Drive (87 connections)

- Moody Point, Cushing Road (68 connections)
- Wade Farm Condos, Dame Road (16 connections)
- Great Hill Maples, Hersey Lane (2 connections)

Potential Sources of Contamination

NH DES lists these sites as sites of potential sources of contamination because of the types of materials used or maintained on site, not necessarily because they've caused some contamination.

Solid Waste Landfills
The Newmarket Municipal Landfill on Ash Swamp Road was closed and capped in 1995. This site is now the location of the Newmarket Transfer Station.

Underground Storage Tanks
The NH DES database lists seven sites with permitted and active underground storage tanks in Newmarket:

- Evans ExpressMart, 44 Exeter Street: 2 gasoline tanks
- Newmarket Elementary School, 243 S. Main Street: 1 tank with #2 heating oil
- Newmarket Irving BlueCanoe, 78 Exeter Street: 2 gasoline tanks and 1 diesel fuel tank
- Newmarket Jr./Sr. High School, 213 S. Main Street: 1 tank with #2 heating oil
- Newmarket Post Office, 126 Main Street: 1 tank with #2 heating oil
- Newmarket Public Works, 4 Young Lane: 1 gasoline tank
- Newmarket Sunoco, 37 N. Main Street: 1 gasoline tank

Hazardous Waste Generators
The 13 permitted hazardous waste generators in Newmarket can be viewed at the NH DES online database.

Water Quality Sampling and Other Research

The Town, NH DES, and volunteers conduct water quality monitoring for various purposes in Newmarket. The data for each of these monitoring programs is available at the NH DES website: http://www2.des.state.nh.us/OneStop/ (click on "environmental monitoring data). In addition, the NH Estuaries Project funds and coordinates many projects on the environmental condition and trends of the Great Bay Estuary and its tributaries. Some of these studies are described below; more information is available at http://www.nhep.unh.edu/.

Town of Newmarket
The Town of Newmarket Water Department collects water quality data on the public water supply, specifically the Bennett and Sewall Wells. Samples are collected quarterly for the following:

- Microbiological Contaminants: Total coliform, E. coli, and Total organic carbon
- Inorganic Contaminants: Arsenic, Barium, Copper, Lead, Nitrate, and Nitrite
- Volatile Organic Contaminants: Haloacetic acids, Methyl tertiary-butyl ether (MBTE), 1,1,1-Trichlorethane, and Total Trihalomethanes

The results of the 2005 monitoring are available at http://newmarketnh.gov/town_departments/public_works/documents/2005WaterQuality.pdf and are

included in Appendix G. In 2005, as in years past, the drinking water met all U.S. Environmental Protection Agency (US EPA) and state drinking water health standards.

Ambient River Monitoring
The NH Department of Environmental Services directs a statewide river monitoring program, called the Ambient River Monitoring Program (ARMP), to determine the physical, chemical and bacteriological quality of rivers in the state. Sampling typically occurs on a rotating basis by watershed during the summer months. NH DES collected water quality data on the nine major coastal rivers including the Lamprey River (at the Rt. 108 bridge) in 2005. Field and lab measurements included dissolved oxygen, temperature, conductivity, pH, and turbidity, total Kjeldahl nitrogen (TKN), ammonia, nitrate/nitrite, total phosphorus, biological oxygen demand (BOD), E. coli, and chlorophyll-a. The 2005 results are available at http://www.nhep.unh.edu/resources/pdf/ambient_rivers_monitoring_nhdes-06.pdf (Landry and Fardy 2006).

Great Bay Coast Watch
The Great Bay Coast Watch (GBCW) is a citizen volunteer program coordinated by UNH Cooperative Extension/NH Sea Grant to protect the long-term health and natural resources of New Hampshire's coastal waters and estuarine systems through monitoring and education projects. Since 1990 or 1992 the Watch has monitored twenty-one sites in the Great Bay Estuary system once a month from April to November at low and high tide collecting important water quality data. Volunteers measure air and water temperature, water transparency, depth, dissolved oxygen, pH, and fecal coliform levels, and record general weather and environmental conditions. Great Bay Coast Watch monitors four sites in Newmarket on the Lamprey River: one site is just above the McCallen Dam in freshwater, the other three are below the dam at the Rivermoor Landing marina, near the Wastewater Treatment Plant, and near the mouth of the Lamprey as it enters Great Bay. Bacteria (fecal coliform) levels seem to have dropped over the last several years at GBCW sites. The two exceptions were site 5, Portsmouth Country Club, Greenland and site 12, Newmarket Sewage Treatment Plant, Newmarket. They were seen to have significant increases in a one-year comparison between 2004 and 2005 (Diamond et al. 2006).

Riparian Buffers
The Complex Systems Research Center at the University of New Hampshire conducted a characterization of 2nd order and higher streams within the Piscataqua/Coastal Basin of New Hampshire. Anthropogenic factors, including land use, impervious surface coverage, and transportation infrastructure, were analyzed to produce a categorical indicator representing the status of each stream. Results are presented on community-based, large format maps displaying the stream characterizations and the corresponding acreage tables. These can be viewed at http://www.nhep.unh.edu/.

Impervious Surfaces
The Complex Systems Research Center at the University of New Hampshire estimated the amount of impervious surface in coastal communities (Justice and Rubin 2006). The results area available at http://www.nhep.unh.edu/resources/pdf/impervious_surface_mapping-unh-06.pdf. The amount of impervious surface for Newmarket is listed in Table 3. Impervious surfaces in coastal New Hampshire has continued to increase from 1990 to 2005, however the rate of increase has slowed from an annual 4.5% from 1990-2000 to 3.5% from 2000-2005 (on average for the region).

Table 3. Amount of Impervious Surface in Newmarket (Justice and Rubin 2006).

Year	Acres of Impervious Surface	% Land Area
1990	480	5.9
2000	707	8.8
2005	819	10.1

Forests and Fields

Newmarket is a low-lying town in the coastal plain. The elevation ranges from sea level along Great Bay to 281 feet above mean sea level (msl) atop Bald Hill in the southwest corner of Newmarket (Map 1). Most of the town is less than 120 feet above msl, with most of downtown at 60 to 100 feet above msl. Besides Bald Hill, the other high points are Grapevine Hill (231 feet above msl) and Great Hill (228 feet above msl). The Newmarket Plains is at 100 to 140 feet above msl. Much of Newmarket is relatively flat. The steepest areas, with greater than 25% slopes, are in the center district of downtown which is densely developed, and at Bald Hill, Grapevine Hill, and Great Hill. The later is also mostly developed. Grapevine Hill is permanently protected through a conservation easement.

The New Hampshire Wildlife Action Plan described broad forest types across the State (NHFG 2006). Appalachian oak pine forests are found mostly below 900 feet elevation in southern New Hampshire (including Newmarket) in a region of the State associated with warmer and drier climatic conditions and historically influenced more by fire than other parts of New Hampshire. NH Fish and Game considers this forest type as one of the most “at-risk” habitat types because of its location within one of the most rapidly developing parts of New Hampshire. The issues facing these forests include human development, roads, and changes to natural disturbance patterns (e.g., fire, hydrology).

The 2001 land cover data (provided by Robert Pruyne, personal communication), describes Newmarket’s 4,454 acres of forests as 66% mixed forests (a mix of hardwoods and softwoods), 12% other hardwoods, 12-13% white/red pine, 7-8% oak/beech, and 1-2% hemlock. Since the Wildlife Action Plan used similar data to predict the distribution of forests across the State, it follows that Newmarket is within the broad forest type known as Appalachian Oak-Pine Forest. These forests are dominated by red oak and white pine with a mix of other oak and pine species along with varying amounts of shagbark hickory, red and sugar maple, beech, birches, cherries, and hemlock. Appalachian Oak-Pine Forest supports 104 vertebrate species in New Hampshire, including 8 amphibians, 12 reptiles, 67 birds, and 17 mammals. Threatened and endangered wildlife species occurring in oak-pine forests include osprey, Cooper’s hawk, and eastern hognose snake (NHFG 2006).

Development – such as houses, roads, and commercial buildings – is considered one of the greatest impacts on wildlife habitat. One of the ways that development most impacts wildlife is often not so obvious because it slowly fragments existing habitat into smaller and smaller parcels that become too small to support populations of some native species (such as black bear, fisher, or pileated woodpecker). This habitat fragmentation is happening across New Hampshire, but most dramatically in the southern region where development pressure is greatest. Despite the enormous development pressures in the last two decades, Newmarket and surrounding towns still retain some large, unfragmented blocks of forest land embedded with wetlands and fields. Newmarket (and neighboring towns) still supports several

blocks of land greater than 1,000 acres that are unfragmented by roads and other development. These are located in the same areas that the Coastal Plan and the Wildlife Action identified as conservation focus areas: Tuttle Swamp, Piscassic River, Follet's Brook, and Great Bay.

Although New Hampshire is a mostly forested state, fields and other open lands have always been a part of the natural landscape and, at least since the mid-1800s, an important cultural feature. Grasslands, shrubby areas, young forests, and even abandoned gravel pits and crop fields provide a variety of habitat conditions that support many wildlife species not found in more mature forests. Similar to forests, the larger and less fragmented these areas are, the more wildlife diversity that they will support. Often a mix of habitat types (forests, wetlands, fields) provides the most diversity of plants and animals. Newmarket is fortunate that several landowners have retained large grassland areas, often providing scenic vistas along our roads. The 2001 land cover data indicates that Newmarket has 601 acres of agricultural lands with most (595 acres) considered hayfields or pasture and the rest is row crops (4 acres) and orchards (2 acres). Map 6 depicts the general land cover of Newmarket.

New Hampshire Wildlife Action Plan

In 2001, Congress established a new "State Wildlife Grants" program that provided funds to state wildlife agencies for the conservation of fish and wildlife and their habitats. Each state was charged with developing a Comprehensive Wildlife Conservation Plan--the New Hampshire Wildlife Action Plan--to address the "species in greatest need of conservation." As part of the Wildlife Action Plan (WAP), NH Fish and Game identified wildlife species at risk—those with low and declining populations, assessed the condition of wildlife habitats, and evaluated risk factors for species and habitats.

NH Fish and Game identified 127 wildlife species of greatest conservation concern in the WAP that included freshwater mussels, insects, fish, amphibians, reptiles, birds, mammals and four species of game animals (See Appendix H). The WAP includes a suite of wildlife habitats that the species of concern are dependent on and which represent several scales (see Appendix H). NH Fish and Game mapped the known distribution of each of the 127 wildlife species in the WAP and assessed the risk factors affecting these populations. The top risk factors for wildlife and habitats were development, scarcity (of the species or habitat), altered hydrology, predation and herbivory, transportation infrastructure, mercury, introduced species, recreation, oil spills, climate change, and non-point pollution, with development ranking at or near the top.

The distribution of each of the wildlife habitat types was mapped and the relative condition of each habitat location across the State was assessed based on landscape context, wildlife diversity, human recreation impacts, development and land use, and air and water quality. NH Fish and Game used this analysis and mapping to "filter out" the pieces of the landscape that have the greatest biological diversity and highest value for wildlife. This was then mapped as the "Highest quality wildlife habitat in New Hampshire," representing the top 10-15% of wildlife habitats in the state, the ones most likely to maintain biological integrity over time, and therefore considered "Tier 1" by NH Fish and Game (Figure 3). Approximately 75% (7,038 acres) of Newmarket supports this highest quality habitat, highlighting the extraordinary importance of the Town to wildlife and ecological integrity within the entire State.

NH Fish and Game also analyzed habitats of highest quality as compared to all habitats in the same biological region. This is important because some species and habitats are only found in the southern part of the state and others are only in the north. The third component of mapping the highest quality habitat

was to include “supporting landscape,” areas that are important to maintaining the biological integrity of Tier 1 and Tier 2 habitats (Figure 3).

The final step by NH Fish and Game was to identify Statewide Conservation Focus Areas—those places that combine several high quality habitats in one area, or co-occurrence of these habitats (Figure 4). Statewide and within the region, Newmarket stands out as hugely significant to New Hampshire wildlife, plants, and natural communities.

FIGURE 3 - WILDLIFE ACTION PLAN – HIGHEST QUALITY WILDLIFE HABITAT MAP

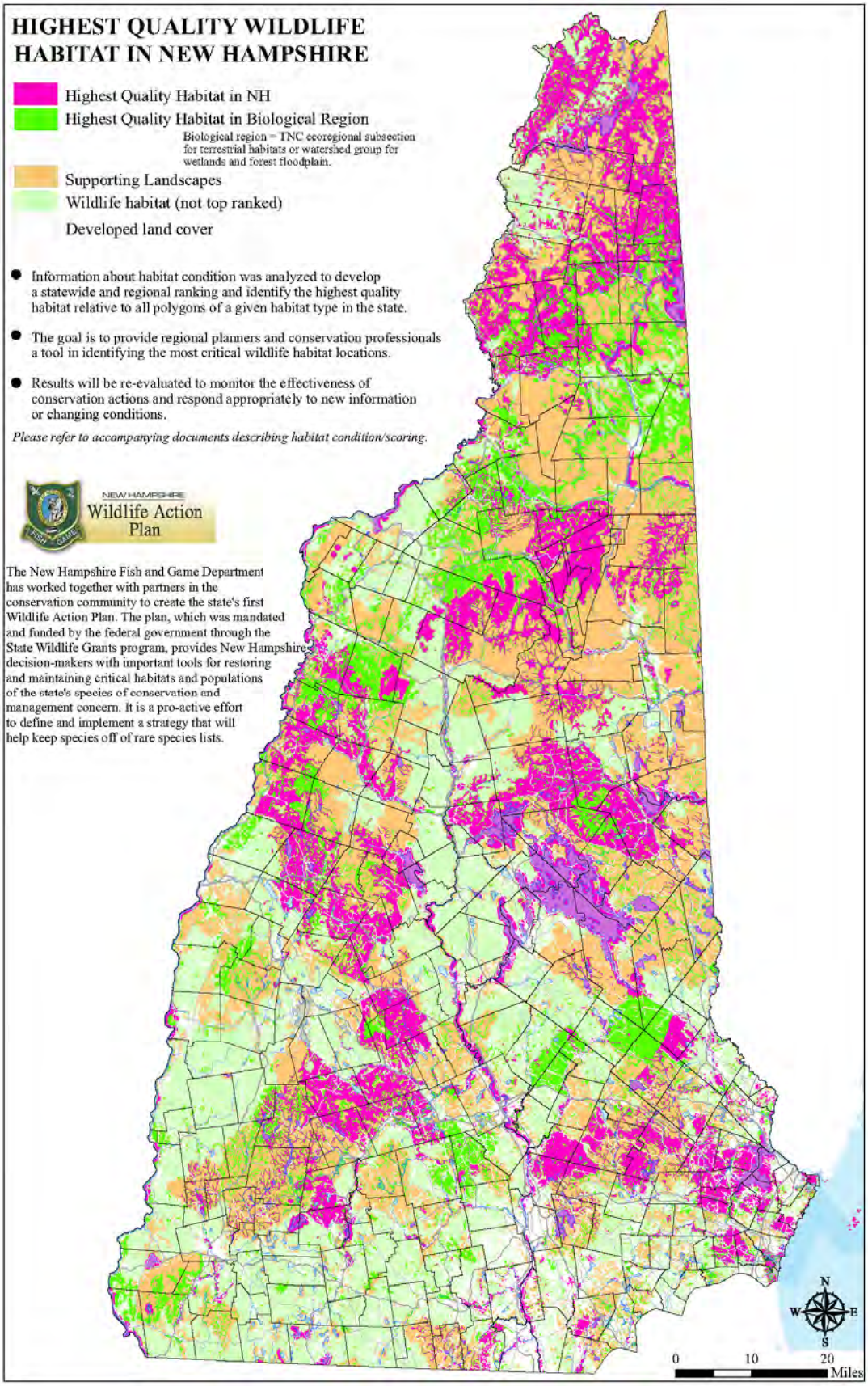
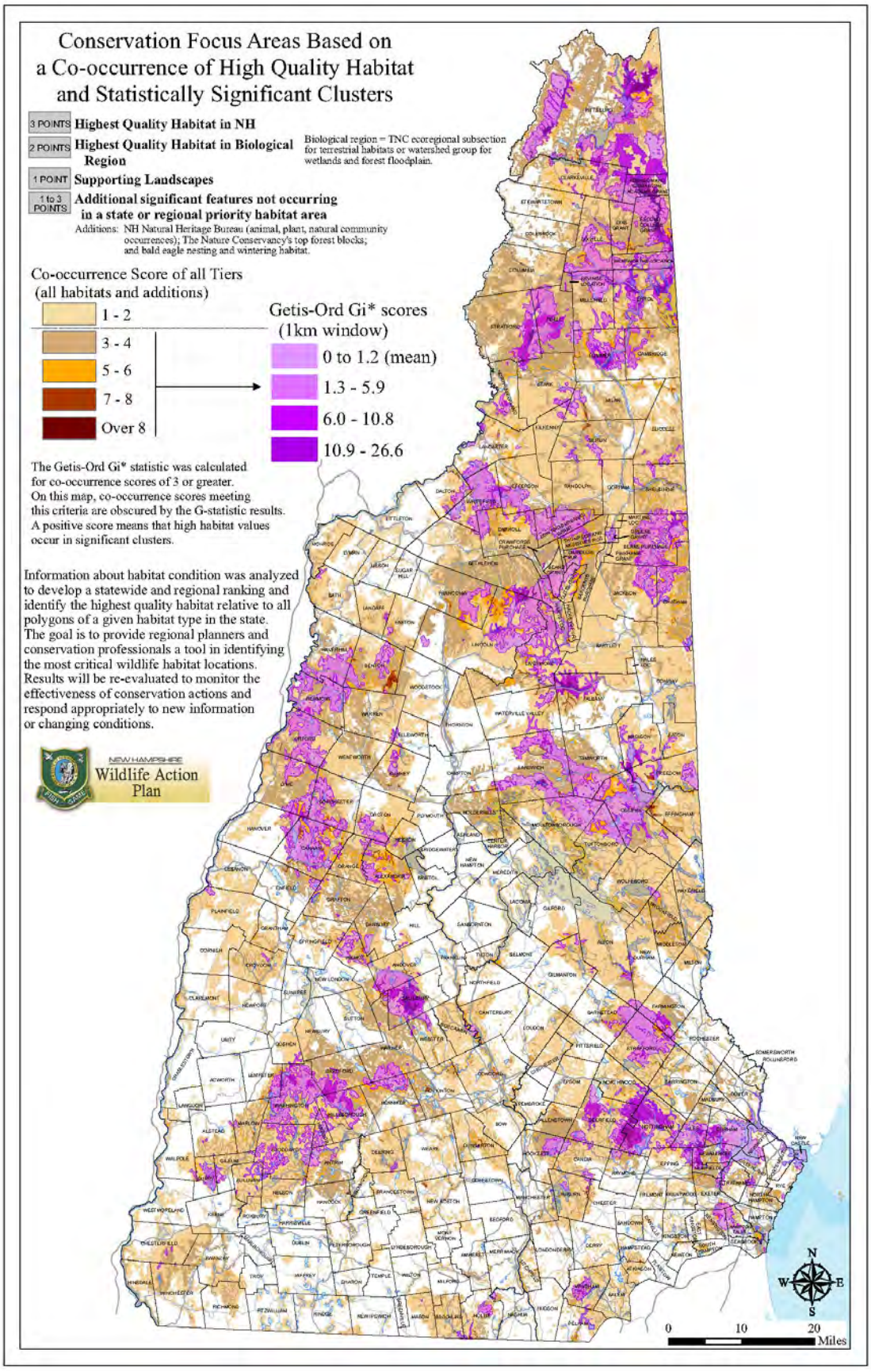


FIGURE 4 - WILDLIFE ACTION PLAN – CONSERVATION FOCUS AREAS MAP



Chapter 5 Conservation Lands and Other Open Spaces

A major goal of this Open Space Plan was to develop a comprehensive inventory of all existing conservation lands and other permanently protected open spaces within Newmarket. As mentioned earlier in this Plan, much has occurred in the conservation community in the last 15 years. This includes new federal and state grant programs (e.g., Land and Community Heritage Investment Program), new conservation partners (e.g., Great Bay Resource Protection Partnership), strong community support (e.g., $2 million bond), new open space subdivision incentives, and conservation-minded landowners and residents. Through enormous citizen volunteer efforts and leadership by Town staff and elected officials, Newmarket has taken advantage of this conservation spirit and helped conserve hundreds of acres that protect the natural resources and character of our community.

The inventory of conservation lands and other open spaces includes the following types of lands (Map 5):

- Town-owned conservation lands
- Conservation easements held by the town
- Other town-owned land with conservation purposes or potential
- Conservation lands owned by another conservation group or agency
- Conservation easements held by another conservation group or agency
- Open space subdivision common lands

The compilation of this inventory was perhaps the most difficult part of completing this Plan. This is attributed to conflicting sources of information within Town records regarding size, protection status, history of conservation parcels, and lack of documentation on many parcels. This inventory involved research of Assessors' records, previous natural resource inventories, Conservation Commission files, Complex Systems Research Center databases, data provided by private conservation organizations, subdivision plans and other Planning Board documents, and Town Council reports. Ideally, one outcome of this Open Space Plan is to develop a new record-keeping system to more accurately and consistently track future additions to the network of existing conservation lands including open space subdivisions.

The following table includes a summary of the amount of open spaces that are described in more detail in subsequent tables. These open spaces are provided in these categories because often the methods, purposes, and public uses vary depending on which entity conserved or dedicated these lands as open space. Approximately 15% (1,189 acres) of Newmarket is permanently protected for conservation purposes by the Town or a conservation organization. An additional 483 acres are set-aside as open space as part of open space subdivisions, increasing the amount of land removed from development to 21%. The 194 acres of other town-owned lands are not included in the percent protected lands as they currently have no official protection from future development.

Open Space Category	**Total Acreage**
Town Conservation Lands	359 acres
Other Town-Owned Lands	194 acres
Conservation Lands – Not Town	440 acres
Town-Held Conservation Easements	200 acres
Conservation Easements – Not Town-Owned	190 acres
Subdivision Common Lands	483 acres
TOTAL ACRES in NEWMARKET	**8,038 acres***

*total land area of Newmarket; does not include open waters of Great Bay, Lamprey and other rivers, but does include wetlands)

Town-Owned Conservation Lands

Newmarket has a diversity of town-owned conservation areas that range in size from small pocket parks (less than 1 acre) near downtown to the 160-acre Wiggin Farm-Tuttle Swamp Conservation Area on the west side of town. The Town of Newmarket has full ownership of these lands (called “fee simple” ownership). Table 4 lists each of these conservation areas and provides a brief description of the size, date conserved, location, and reference documents.

These lands were acquired through a variety of methods that include town bond and conservation funds (land use change tax), state and federal grants, conservation partner contributions, tax liens, and other sources. Each offers different opportunities for public use based on size, location, natural features, purpose and source of conservation funds. Some areas were acquired to protect specific resources such as drinking water or wetlands and some were acquired to provide public access to Great Bay or the Lamprey River. The Town owns these lands and the Conservation Commission is responsible for overseeing their stewardship and managing of public uses. Appendix D includes ordinances that apply to activities on town-owned conservation properties.

Other Town-Owned Lands

The Town owns several other parcels acquired or used for specific public uses mostly related to public drinking water supplies and solid waste disposal. These lands also provide other open space benefits including water quality protection, wildlife habitat, and connectivity with other open space. Table 5 lists these properties.

Conservation Lands – Not Town-Owned

The Great Bay Resource Protection Partnership (GBRPP) was organized in 1994 to develop a comprehensive conservation strategy for Great Bay, and to raise funds to buy critical parcels and conservation easements throughout the Great Bay Estuary. This land conservation partnership includes The Nature Conservancy, Audubon Society of New Hampshire, Ducks Unlimited, Great Bay National Estuarine Research Reserve, N.H. Fish and Game Department, Society for the Protection of New Hampshire Forests, U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service. The Nature Conservancy is the lead agency in charge of land acquisitions and manages federal grants on the partnership's behalf.

The GBRPP has actively worked with interested landowners to protect ecologically significant lands and waters in Newmarket. The focus of their land conservation work is in Tuttle Swamp, Piscassic River, Great Bay, and Lubberland and Crommet Creeks. The Partnership has conserved more than 600 acres in Newmarket through fee simple acquisition or through conservation easements. The Partnership has also contributed grant funds to several Town-led land conservation projects.

The Southeast Land Trust of New Hampshire (formerly the Rockingham Land Trust) also has a presence in Newmarket. This land trust holds several conservation easements and monitors the Hilton conservation easement through an agreement with the Town of Newmarket.

Table 6 lists the conservation lands owned in fee simple by these conservation organizations.

Table 4. Town-Owned Conservation Lands in Newmarket (as of January 12, 2007)

Conservation Area Name	Size (acres)	Year	Tax Map Lot #	Address	Recorded Documents
Follet's Brook	10	2004	U1, Lot 17-1	Packers Falls	Acquired by Town from Leary for open space/recreation. BK 4291 PG 2483; Plan D-31597
Follet's Brook	4.7	2005	U1, Lot 20	Packers Falls	Acquired by Town from Rousseau for open space/recreation. BK 4433 PG 1818; Sale of house Lot 20-1 BK4633 PG 2614; Plan D-33023
Follet's Brook	4.7	2005	U1, Lot 21	Packers Falls	Acquired by Town from Szacik for open space/recreation BK 4596 PG 0242; Plan D-33023
Follet's Brook	0.63	1990	U1, Lot 88	Mastin Drive	Conveyed to Town as open space as part of the Trotter Park subdivision. BK 2825 PG 1415 Lot B on Plan D-16753
Follet's Brook	8.49	1993	U1, Lot 96	Carolyn Drive	Conveyed to the Town as part of the Trotter Park Phase II subdivision. BK 2977 PG 0372 noted as Parcel G on "Plan of Lots – Trotter Park Phase II-Newmarket, NH" D-20528 and D-20287
Heron Point Sanctuary	30	1996	R2, Lot 119	Meadow Drive off Bay Road	Conveyed to Town with conservation restrictions by Klein and Parker: BK 3193 PG 1697 Klein and Parker acquired from Heron Pt Ltd in 1989: BK 3121 PG 0391 D-19531 Town merged lot lines in 1998 BK 3289 PG 2637
Lita Lane	19.5	1984	R3, Lot 30-47	Lita Lane	Conveyed to Town from Gouchberg for open space as part of a subdivision Book 2477 Page 0020 D-7938 and D-7939
Lita Lane*	~8.5	1999	R3, Lots 30-9, 30-10, 30-19 to 30-36	Lita Lane	Acquired by Town through tax lien BK 3435 PG 1587; D-7938 and D-7939 *Not officially designated as conservation land
Piscassic River - Loiselle	45.3	2003	R5, Lot 91-2	Rt 152	Acquired by Town as Conservation Land from Loiselle's BK 4100 PG 2110 and BK 4100 PG 2114, D-30811 Sale of 2-acre house Lot 91: BK 4261 PG 0859, BK 4261 PG 0862, B-31474 LCHIP Executory Interest: BK 4100 PG 2123
Riverbend	5.4	1988	U1, Lot 1-1P	Riverbend Road	Conveyed to Town as part of Woodhaven Phase II subdivision: "Park Area 4" on D-10912 Book 2732 Page 2207 and Book 2684 Page 1722
Riverbend	19,602 sq ft	1988	U1, Lot 1-4P	Riverbend Road	Conveyed to Town as part of Woodhaven Phase II subdivision: "Park Area 3" on D-10912 Book 2732 Page 2206
Riverbend	1.1		U1, Lot 1-46	Riverbend Road	???
Schanda Park	15,246 sq ft	1954	U3, Lots 5, 6, 7	Water Street	D-10736 BK 1306 PG 117 (U3, Lot 5: Doucette – tax forfeit) BK 2518 PG 1332 (U3, Lot 7; conveyed to Town)

Sliding Rock-Piscassic River	2.5	1978	U2, Lot 124	Piscassic Street	Conveyed to the Town as open space by Walter Cheney BK 2243 PG 0784 as set forth in "Plan of Lots, Sliding Rock, House Lots and Apt Complex, Newmarket, NH for Walter W. Cheney, Inc Jan 1973"
Tuttle Swamp	42	1990	R6, Lot 38	Rt 152	Conveyed to the Town as Conservation Land from Growth Mortgage Co., Inc Book 2840 Page 2061
Tuttle Swamp	2.8	1996	R6, Lot 39	Rt 152	Acquired by Town as Conservation Land from Ernest Currier Book 3150 Page 0663
Tuttle Swamp	14	1996	R6, Lot 40	Rt 152	Acquired by Town as Conservation Land from E. Currier and Lloyd Walker Book 3150 Page 0661
Wiggin Farm-Tuttle Swamp	160	2003	R6, Lots 21, 21A, 21B	Grant Road	Acquired by Town as Conservation Land from Falzone BK 4142 PG 1801-1812 Creation of 2-acre lot for parking area: D-30810 Fish & Game Easement BK 4142 PG 1825; Survey: D-32876 LCHIP Executory Interest BK 4142 PG 1813: Survey: D-32876
Wiggin Farm-Tuttle Swamp	2.015	2003	R6, Lot 21-1	Grant Road	BK 4142 PG 1801 This is the parking area and is exempted from the LCHIP & NHFG deeds

Table 5. Other Town-Owned Land with Conservation Purpose or Potential in Newmarket (as of January 12, 2007).

Site Name	Size (Acres)	Year	Tax Map/Lot #	Location	Public Purpose	Recorded Documents
Follet's Brook	14 and 9	1915	U1, Lot 16 and Lot 97	Mastin Drive	Drinking Water Source	BK 700 PG 32; BK 719 PG 224; BK 636 PG 382; BK 543 PG 272; BK 940 PG 87 Water Works
Sewall Well	19 ac	1985	R5, Lot 9-1	Rt. 152	Drinking Water Source	Acquired by the Water Commission from Sewalls: BK 2549 PG 1976 Survey: D-20007 Also see BK 3069-2622 and BK 3069 PG 2620
Bennett Well	18 ac		R6, Lot 52	Rt. 152	Drinking Water Source	BK 1859 PG 344; BK 940 PG 87; BK 720 PG 84 ? Water Works
Transfer Station/Landfill	128 ac		R6, Lot 36	Ash Swamp Road	Solid Waste Landfill	BK 1197 PG 269
Rt. 152	5.6	1986	R6, Lot 50B	Wadleigh Falls	Tax lien	BK 2615 PG 1069

Table 6. Other Conservation Land – Not Town Owned in Newmarket (as of January 12, 2007)

Site Name	Size (acres)	Year	Tax Map Lot #	Location	Landowner	Easement Holder if applicable	Comments
Great Bay	11.4	2001	R1, Lot 38-8	Barberry Coast	The Nature Conservancy		(Billeter) BK 3622 PG 2474; Lot 8 on D-22912
Great Bay	<1.0		R1, Lot 19	Bayview Drive	Great Bay Stewards		
Lubberland Creek	8.6	2006	R2, Lot 29-5	Bay Road	The Nature Conservancy		(Averill) BK 4721 PG 1938; D-22401
Lubberland Creek	57.3	2001	R2, Lot 25 and Lot 10	Bay Road	The Nature Conservancy		(Homiak) BK 3562 PG 2878
Lubberland Creek	49.0	1999	R2, Lot 26	Bay Road	The Nature Conservancy		(Knox) BK 3397 PG 2455
Lubberland Creek	18.0	1999	R2, Lot 27	Bay Road	The Nature Conservancy		(Knox) BK 3397 PG 2455
Lubberland Creek	24.7	2005	R2, Lot 28-1	Bay Road	The Nature Conservancy	NH Fish & Game	(Smas) BK 4578 PG 1045 Subject to CE: BK 2790 PG 1744
Lubberland Creek	7.6	2005	R2, Lot 28-2	Bay Road	The Nature Conservancy	NH Fish & Game	(Smas) BK 4578 PG 1045 Subject to CE: BK 2790 P 1744
Piscassic Greenway	20.0	2006	R7, Lot 31	Schanda Drive	Southeast Land Trust of NH	Town of Newfields	(Falzone) BK 4648 PG 0549; CE BK 4682 PG 0553 (Houghton) BK 4648 PG 0540
Great Bay/ Shackford Pt	23.5	2005	R3, Lot 36-1	New Road	NH Fish and Game	TNC – deed restriction	(Levy) BK 4432 PG 1208; D-32338
Great Bay/ Shackford Pt	34.9	2005	R3, Lot 36-3	New Road	NH Fish and Game	TNC – deed restriction	(Levy) BK 4432 PG 1208; D-32338
Tuttle Swamp	43.2	2005	R6, Lot 31-1	Ash Swamp Rd	NH Fish and Game	TNC – deed restriction	(Sewall) BK 4583 PG 0503; D-30195
Tuttle Swamp	32.5	2002	R6, Lot 32	Grant Road	NH Fish and Game	TNC – deed restriction	(Wood) BK 3721 PG 0758
Tuttle Swamp	42.7	2002	R6, Lot 37	Ash Swamp Rd	NH Fish and Game	TNC – deed restriction	(Squillace) BK 3622 PG 2419; Lot 37 on D-29142
Tuttle Swamp	65.6	2002	R6, Lot 41-1	Jan Lane	NH Fish and Game	TNC – deed restriction	(Benoit) BK 3826 PG 2398; D-30022

Conservation Easements

A landowner has a bundle of rights to use and modify the property that they own. A *conservation easement* is a legal agreement between a landowner and a conservation organization, agency, or municipality that transfers some of these rights (typically the "development rights") to the organization that holds the easement. Typically a conservation easement is granted in perpetuity and therefore the development rights are extinguished forever, preserving the land as open space. The easement conveyed through a deed, applies to the land regardless of who may own it in the future.

Land under easement is still privately owned and managed in accordance with the terms of the easement (some publicly owned lands also have easements held by another entity). Each easement is crafted to fit the features of the property to be protected, the needs of the landowners, and the goals of the entity accepting the easement. Easements are used to provide permanent protection from subdivision or other development or uses that could degrade or destroy ecological, scenic, or other natural resources. Easements often provide for continued farming, forestry, wildlife management, and recreation. Easements don't always require public access; although often landowners allow this access and some grant sources require public access as part of funding a conservation easement project.

A landowner who conveys a conservation easement is the *grantor* and the recipient organization is the *grantee.* Easements can be donated or sold for full or partial value. The easement document outlines the procedures for enforcing the easement, which typically lie with the grantee. In some transactions, another organization is given "back-up" or *executory interest* in the easement in case the grantee is unable to carry out its easement responsibilities.

In addition to these conservation easements, some landowners and developers of subdivisions convey easements to the Town that provide some protection to natural features on the property. The provisions in these easements are usually driven more by the landowner's interests than those of the grantee (e.g., Town or conservation organization).

Table 7 includes the conservation easements that are held by the Town as well as other easements or executory interests conveyed to the Town. Table 8 lists the conservation easements held by other conservation groups on lands within Newmarket.

Table 7. Conservation Easements Held by the Town of Newmarket and Other Easements with an Interest Held by the Town (as of January 12, 2007)

Grantor Name	Size (Acres)	Year	Tax Map Lot #	Location	Easement Interests	Recorded Documents
Hilton	96.0	2004	R7, Lot 15	Grant Road	Easement granted to the Town. Annual easement monitoring contracted to Southeast Land Trust of NH	BK 4354 PG 0448; D-31934 Easement monitoring to SELTNH: BK 4354 PG 0470
Nostrom	65.6	2006	R6, Lot 42	Jan Lane/Doe Farm	Easement granted to the Town Farmland Protection Program (U.S. Dept of Agriculture), Executory Interest	BK 4621 PG 2589; D-33538 Grant agreement: BK 4621 PG 2622
Schneer	5.6	2006	R4, Lot 55	Neal Mill Rd	Easement granted to the Town NH Fish and Game, Executory Interest	BK 4625 PG 1116; D-33470
Silverman	32.8	2006	R4, Lots 51, 53, 55A	Neal Mill Rd	Easement granted to the Town NH Fish and Game, Executory Interest	BK 4625 PG 1131; D-33470 Survey correction: BK 4625 PG 1113 Silverman-Schneer grant agreement: BK 4609 PG 2518
Richmond	26.0	2003	R5, Lot 50	Lang's Lane	Easement granted to Southeast Land Trust of NH Town of Newmarket, Executory Interest	See Table 5-4
Fox Hollow	??	2003	R7, Lots 17-1 through 17-6	Fox Hollow off Grant Rd.	Easement conveyed to Town of Newmarket on portions of Lots 17-1 thru 17-6	See Table 5-6
Bassett, Steve	7.7	1999	R7, Lot 24-3	Sanborn Drive (Newfields)	Easement conveyed to Newmarket	Conveyed to Newmarket a no cut and tree management easement 7.7 acres of Lot 24-3 BK 3433 PG 1451: D-27111; also refer to BK 3389 PG 1824 and BK 3389 PG 1829 No public access

Table 8. Conservation Easements – Not Held by the Town in Newmarket (as of January 12, 2007)

Original Grantor	Size (Acres)	Year	Tax Map Lot #	Address	Easement Holder	Recorded Deeds
Ahlgren-Palmisciano	3.9	1998	R2, Lot 50	Smith Garrison	Southeast Land Trust of NH	CE: BK 3349 PG 1640
Dearborn	35.7	2000	R6, Lot 27-6	Grant Road	NH Fish and Game	CE: BK 3466 PG 0378; D-27921
Levy	27.3	2005	R3, Lot 36-2	New Road	The Nature Conservancy	CE: BK 4432 PG 1211; Portion of Lot 2 on D-32338
Pearson	40	2000	R1, Lot 39	Bay Road	The Nature Conservancy	CE: BK 3495 PG 1691
Pearson II	42	2000	R1, Lot 1	Bay Road	NH Fish and Game	CE: BK 3495 PG 1680
Richmond	26.0	2003	R5, Lot 50	Lang's Lane	Southeast Land Trust of NH (Town of Newmarket – Executory Interest)	CE: BK 4170 PG 1050; D-31045
Sewall	14.7	2002	R6, Lot 31	Ash Swamp Rd	NH Fish and Game	CE: BK 3864 PG 0950; D-30195
The Nature Conservancy (Smas)	24.7	1989	R2, Lot 28-1	Bay Road	NH Fish and Game (LCIP)	CE: BK 2790 P 1744; D-19276
The Nature Conservancy (Smas)	7.6	1989	R2, Lot 28-2	Bay Road	NH Fish and Game (LCIP)	CE: BK 2790 P 1744; D-19276

Open Space Subdivisions

The Newmarket Zoning Ordinance includes Section 6.00: Residential Open Space Design Development by Special Use Permit. The intent of this provision is to allow an alternative residential development option that preserves larger areas of open space than conventional subdivisions. The open space design subdivisions are currently allowed in zoning districts R1, R2, and M-4 and require a special use permit. The open space must be designated as such on the approved and recorded subdivision plan. More than 480 acres are designated as open space associated with these subdivisions. Most of these lands are owned by a homeowner's association and are only open to the residents of that subdivision.

Table 9 lists the open space subdivisions in Newmarket. Some of the older subdivisions developed prior to the update to the open space design development section in the zoning ordinance in 2004 have less documentation and clarity related to the purpose, size and protection of the common open space. Currently the Town has little role in monitoring or tracking these subdivision open spaces unless a provision is specifically included in the subdivision covenants.

Table 9. Newmarket Open Space Subdivision Common Lands or Conservation Easements (as of January 12, 2007).

Name	Size (acres)	Year	Tax Map, Lot #	Location	Owner	Recorded Deeds and Notes
Bayfields Subdivision	3.59	1998	R2, Lot 11-25	Gonet Drive	Open space for Bayfields Homeowners Assn	D-26864 BK 3361 PG 0821
Bayfields Subdivision	26.69	1998	R2, Lot 11-26	Gonet Drive	Open space for Bayfields Homeowners Assn	D-26864 BK 3361 PG 0821
Bernier Subdivision	9.1	1999	R5, Lot 49-13	Winslow Drive	Open space for all Winslow Drive homeowners	BK 3419 PG 1652; D-27348 No public access
Piscassic River Village	11.92	1999	R5, Lot 37-40	Briallia Circle and Kendall Drive off Grant Road	Open space for Piscassic River Village Homeowners Assn	D-27566 BK 3262 PG 0460 No public access
Channing Way	9.79	2001	R4, Lot 43-R	Ash Swamp Rd	Channing Way Homeowner's Assn??	D-29436 BK 3805 PG 0599
Doe Farm Phase I	??	1989 and 1990	R6, Lots A, 6, 7, 8, 9, 21, 22, 23, 24, 25, 26, and 27	Doe Farm Lane	Current landowners of record Easement on portions of these lots held by Newmarket	BK 2798 PG 0124 (easement); BK 2798 PG 0121 (covenants) The back areas of these lots that follow the wetland soils are subject to open space easement as noted on D-19470 BK 2853 PG 0677 (easement conveyed to Town of Newmarket) Also see BK 2798 PG 0129 and BK 2853 PG 0673
Doe Farm Phase II	29.98	1993	R6, Lot 20-43	Wiggin Drive	Current landowner of record (CE conveyed to Newmarket)	Book 2909 Page 2571; D-20529. In Phase II Lot A disappeared with approval from Planning Board (10/26/93). Conservation easement conveyed to Newmarket on Lot 20-43, leaving a small buildable corner – need to find documentation on easement No public access
Durrell Woods	1.4	1987	R5, Lot 94	Grant Road	Durrell Woods Community Association, Inc	Lot 1 on D-16122 BK 2720 PG 1578 (Deed) BK 2720 PG 1580 (Covenants) BK 2720 PG 1583 (By-Laws)

Durrell Woods	4.8	1987	R5, Lot 38	Grant Road	Durrell Woods Community Association, Inc	Lot 74 on D-16122 BK 2720 PG 1578 (Deed) BK 2720 PG 1580 (Covenants) BK 2720 PG 1583 (By-Laws)
Durrell Woods	31.5	1987	R5, Lot 40	Durrell Drive and Grant Road	Durrell Woods Community Association, Inc	Lot 73 on D-16122 BK 2720 PG 1578 (Deed) BK 2720 PG 1580 (Covenants) BK 2720 PG 1583 (By-Laws)
Durrell Woods	37.9	1987	R5, Lot 130	Durrell Drive	Durrell Woods Community Association, Inc	Lot 72 on D-16122; up to 50% subject to use by school if requested BK 2720 PG 1578 (Deed) BK 2720 PG 1580 (Covenants) BK 2720 PG 1583 (By-Laws)
Fox Hollow	25.7	2003	R7, Lot 17	Grant Road to Fox Hollow	Open space land for Fox Hollow Homeowners Assn (Access for inspection by Town officials to open space; Conservation easement on portions of Lots 17-1 thru 17-6 conveyed to Newmarket)	Homeowners Assn document: BK 4330 PG 1630 includes 25.7 ac open space and conservation easement on lots 17-1 thru 17-6: D-31231 Town access: BK 4384 PG 2111 Cemetery viewing: BK 4384 PG 2117 No public access
Hamel Farm	15.8	1991	R4, Lot 42-22	Hamel Farm Drive	Common land for Hamel Farm Homeowners Assn	D-20954; BK 2923 PG 1105 No public access
Harvest Way	16.8	2002	R6, Lot 14	Harvest Way	??	Open Space “A” on D-30148
Harvest Way	8.13	2002	R6, Lot 14-17	Harvest Way	Carl Schultz	Conservation easement on 8.13 acres of Lot 14-17 D-30148
Hilton Drive	18.3	2001	R7, Lot 10	Hilton Drive	Open space land for Hilton Drive Homeowners Assn	BK 3607 PG 0348; D-28892 No public access
Madison	23.5	2001	R4, Lot 40-11	Madison Lane and Balsam Way off Ash Swamp Rd	Madison Estates Homeowner’s Assn	Open space dedicated on D-28969; BK 3594 PG 1760 No public access; Access allowed to Conservation Commission for inspection
Mockingbird Lane	5.3 & 0.3	2004	R3, Lot ??	Mockingbird Lane off Hersey Lane	Mockingbird Lane Homeowners Assn	BK 4256 PG 1453 D-29117
Moody Point	26.13	1987	R2, Lot 36-4	Cushing Road	Moody Point Community Association, Inc	Lot 4 on D-17107 BK 2700 PG 0367
Moody Point	17.06	1987	R2, Lot 36-11	Cushing Road	Moody Point Community Association, Inc	Lot 11 on D-17107 BK 2700 PG 0367

Norton Woods	~28	1989	Portion of R6, Lot 13 and of R5 Lot 47-10	Beatrice Lane	Norton Woods Subdivision and Norton Woods Condominium Assn	Book 2793 Page 2264 D-19386 No public access; Access granted to town officials to ensure that it remains as open space
Schanda Farm	71.77	1985	R7, Lot 14	Schanda Drive, Turkey Ridge Road	Pennichuck Water Works, Inc	Book 2598 page 0427; D-14233 No public access
Schultz Place	22.98	1987	R2, Lot 19-3	Schultz Drive and Pelczar Way off Bay Road	Not developed; status uncertain	D-16850 – Final subdivision site plan for Schultz Place; BK 3704 PG 0017 and BK 3770 PG 2361;
Sewall Farm	49.0	1987	R4, Lot 134	Ladyslipper Drive	Sewall Farm Community Association, Inc	Lot 68 on D-16121; Also see D-26094 BK 2829 PG 0287 (Covenants) BK 2829 PG 0292 (By-Laws)
Stonewall	9.4	??	??	Stonewall off Ash Swamp	??	???
Wade Farm	??	??	R2, Lot 5	Wade Farm	Wade Farm Homeowners Association	????
Vols Island	1.5	??	R1, Lot 40	Barberry Coast	Barberry Coast Assn	

Public Walking Trails

One of the benefits of open spaces as highlighted in Chapter 2 is the opportunity for people of all ages to use nature trails that wander through forests and fields or across boardwalks. This promotes a healthy lifestyle with access to fresh air and peaceful surroundings. Several of the conservation lands (both publicly and privately owned) in Newmarket have parking areas with access to nature trails. These areas are listed here with a brief description of the access point and trail. Most, if not all, of these conservation areas do not allow motorized vehicles, mountain bikes, overnight use, or horses. Directions are provided from the Newmarket Town Hall.

- **Wiggin Farm-Tuttle Swamp Conservation Area**
  A 160-acre town-owned conservation land purchased in 2004 with funds from the Town, LCHIP, NH DES, Great Bay Resource Protection Partnership, and Lamprey River Advisory Committee to protect the area's significant natural resources within Tuttle Swamp. The 1.5-mile trail leaves from the parking lot, passes over a wetland, and winds around the large field with a spur back to the wetland. No bikes, horses, all-terrain vehicles, and camping. Snowmobiles allowed *only* on the designated central corridor trail (not in the fields or off trail).

  At the top of the field, a gate marks the snowmobile trail corridor that extends onto the Hilton Tree Farm, across Grant Road. This trail through the Hilton property is open to the public for walking. The Town holds a conservation easement on the Hilton Tree Farm. Trail map available.

  Directions: West on Rt. 152 0.6 miles, then left on Grant Road 3.0 miles. The parking lot is on the right just before Doe Farm Road.

- **Tuttle Swamp Conservation Area (north end)**
  The Town has a small parking lot at the north end of Tuttle Swamp along Rt. 152 near Ash Swamp Road. There is currently no walking trail as the site is very wet.

  Directions: West on Rt. 152 3.1 miles. Parking area is on the left.

- **Piscassic River-Loiselle (Follet's Brook) Conservation Area**
  A 45-acre town-owned conservation area purchased in 2004 with funds from the Town, LCHIP, and NH DES to protect the property's significant resources, especially 1,900 feet along the Piscassic River. A trail is not yet developed at this site, although the parking lot is installed and the property is open to walking. No camping, bikes, motorized vehicles

  Directions: West on Rt. 152 approximately 1.0 mile. The driveway to parking area is on the right between the first and second house after Rt. 152 crosses the Piscassic River.

- **Sliding Rock Conservation Area (Piscassic Street Boat Lunch)**
  A 2.5-acre park that borders the Piscassic River and includes a public boat launch and short trail.

  Directions: Right onto Beech Street Extension 0.3 to the stop sign. Cross Elm Street and continue on Beech Street 0.2 miles then turn right on Salmon St. Follow for 0.3 miles then turn right on Piscassic Street. Follow until you arrive at the boat launch.

- **Riverbend Conservation Area**
  Two small "pocket parks" (1-acre and 2.5-acres) along the Piscassic River in the Riverbend subdivision.

  Directions: West onto Rt. 152 and almost immediately another right onto Packers Falls Road. Go 0.4 miles, take left on Riverbend Road. The 1-acre park is 0.2 miles on the right. The 2.5-acre park is 0.4 miles on the right.

- **Follet's Brook (Trotter Park)**
  A 1.25-acre pocket park on Mastin Drive.

  Directions: West onto Rt. 152 and almost immediately another right onto Packers Falls Road. Go 1.2 miles; turn left on Mastin Drive just after crossing the Piscassic River. Cross Follet's Brook and park is immediately on the left.

- **Heron Point Sanctuary**
  A 32-acre town-owned conservation area preserved as a wildlife sanctuary that overlooks the tidal portion of the Lamprey River and downtown Newmarket. Trail map available. Foot traffic only. No camping, hunting, or trapping.

  Directions: Follow Rt. 108 north through downtown Newmarket. After crossing the Lamprey River turn right onto Bay Road. Follow Bay Road 0.2 miles, turn right onto Meadow Street. The entrance to Heron Point is 0.2 miles on the right. Follow the dirt road to the parking area.

- **Lubberland Creek Preserve**
  A 231-acre nature preserve owned by The Nature Conservancy. A 0.8 mile trail leads into the woods up Jeff's Hill. Another trail runs 0.3 miles across the road to the edge of Great Bay at the mouth of Lubberland Creek. Another trail leads from the parking lot across the road and through the field to an overlook with a spotting scope near The Nature Conservancy's Great Bay office. Trail brochure available at http://www.nature.org/wherewework/northamerica/states/newhampshire/preserves/art6217.html. Foot traffic only; no pets, horses, or bikes.

  Directions: Follow Rt. 108 north through downtown Newmarket. After crossing the Lamprey River turn right onto Bay Road. Follow Bay Road 1.3 miles to the parking area on the left.

Chapter 6 Priority Areas for Conservation

The 1991 Smart Report identified six areas as being the most critical for conservation based on their research of the natural resources and consultation with the people of Newmarket. These generalized areas of town were mapped and identified as:

I. Follet's Brook and (Newmarket Plains) Aquifer Corridor
II. Neal Mill and Old Lee Road (Piscassic River)
III. Tuttle Swamp
IV. South Bay (Shackford Point on Great Bay west to New Road and south to Newfields)
V. North Bay (Moody Point north through Lubberland Creek and Jeffs Hill to the Durham Town Line)
VI. Upper Narrows (Lamprey River below the McCallen Dam, includes Heron Point)

The great news is that after 15 years, some lands have been protected within each of these six areas, and in some areas including Tuttle Swamp and North Bay a large portion of the priority area was protected. These conservation efforts are largely a result of collaborative efforts among the Great Bay Resource Protection Partnership, The Nature Conservancy, Southeast Land Trust of NH, Town of Newmarket, and state and federal grant programs. This highlights a major accomplishment and recommendation in the 1991 Smart Report to protect the most ecologically significant areas of Newmarket through permanent conservation.

Several other pockets of Newmarket were conserved through open space subdivisions, which add to this conservation lands network and maintain some connectivity across the town. However, based on recent reports from NH Fish and Game, The Nature Conservancy, and others, Newmarket still has high quality wildlife habitat, drinking water sources, and other natural resources that are threatened by development, fragmentation, and other land use changes.

The following areas were identified as high priority areas using information from NH Fish and Game, The Nature Conservancy, Great Bay Resource Protection Partnership, NH Estuaries Project, NH Coastal Program, Newmarket Conservation and Open Space Commissions, Newmarket Master Plan and Zoning Ordinance, Newmarket Planning Board, and the 1991 Smart Report. Several key natural resources are identified as high priority for protection including:

- Town drinking water sources: Newmarket Plains Aquifer, wellhead protection areas, Lamprey and Piscassic Rivers and Follet's Brook
- Floodplains: Lamprey and Piscassic Rivers
- Prime wetlands
- Great Bay estuary
- Highest quality wildlife habitat (NH Fish and Game Wildlife Action Plan)
- Ecologically significant areas (NH Coastal Plan, The Nature Conservancy et al.)
- Large unfragmented blocks of forest and farmland (> 500 acres)

Priority Conservation Areas

The following six areas were identified as priority areas for conservation (Map 7):

- **Tuttle Swamp Watershed**
- **Newmarket Plains Aquifer**
- **Piscassic River**
- **Great Bay**
- **Lower Lubberland Creek**
- **Follet's Brook Watershed**

❖ Tuttle Swamp Watershed

The Tuttle Swamp watershed was defined and mapped in a natural resource management plan prepared by The Nature Conservancy to help guide the management of publicly and privately owned conserved lands within the watershed boundary (Figure 5). The watershed includes Tuttle Swamp and Ash Swamp, a large wetland complex with associated upland forests and fields in the western part of Newmarket (Glode 2006). This Priority Area for Conservation encompasses the portion of the watershed in Newmarket as defined by Glode (2006) (Map 7).

The watershed is recognized as a high priority conservation area due to its mix of wetland and upland habitat types including high quality examples of acidic forested seepage swamps, floodplain forests, beaver flowages, and emergent marshes (Stevens & Anderson 1997). Tuttle and Ash Swamps combined represent one of the largest headwater swamps in the Great Bay drainage. The Tuttle Swamp watershed straddles the larger Lamprey and Piscassic watersheds, with Tuttle Swamp draining into the Lamprey, and Ash Swamp draining into the Piscassic River (Glode 2006)

The protection of large headwater wetlands such as the Tuttle/Ash Swamp complex is important to maintaining downstream habitats and water quality, including the Great Bay estuary, a marine environment of enormous biological, commercial, and cultural value. The Tuttle/Ash Swamp wetland complex provides important wetland functions including nutrient uptake, sediment removal, flood control, and groundwater recharge. Associated upland forests and grasslands surrounding the wetlands provide critical wetland buffer functions and support wildlife habitat. Tuttle Swamp supports several rare species and exemplary natural communities, including the largest example of a swamp white oak floodplain forest on the Lamprey River (Nichols and Sperduto 1997).

Seventeen rare species are associated with these wetland ecological systems and the open field habitat within the watershed. These are Blanding's turtle, spotted turtle, wood turtle, climbing hempweed, tufted loosestrife, large bur-reed, black maple, fen ant, Eastern meadowlark, bobolink, blue-winged warbler, American woodcock, New England cottontail, red-shouldered hawk, whip-poor-will, sedge wren, and least bittern (Glode 2006).

The Great Bay Resource Protection Partnership, the Towns of Newmarket and Newfields, and the Southeast Land Trust of NH have worked with interested landowners to conserve important parcels

within the watershed. This encompasses more than 700 acres of conservation land protected through both fee simple acquisition and conservation easements.

The Newmarket Conservation Commission recently completed a long-term study of the town's wetlands and identified 16 prime wetlands. One of the prime wetlands identified by this analysis is NW-01, the 346-acre Tuttle Swamp wetland, considered one of the most unique and significant freshwater wetlands in the seacoast area (Figure 6) (West Environmental, Inc 2006).

A portion of the Newmarket Plains Aquifer and Wellhead Protection Area falls within the Tuttle Swamp watershed. For more on the Plains Aquifer see the description on page 58.

Summary of Key Features of the Tuttle Swamp Watershed:

- A high priority of the Great Bay Resource Protection Partnership as described in the Natural Resource Management Plan (Glode 2006)
- High quality (exemplary) examples of several natural communities: swamp white oak floodplain forest, red maple-black ash-swamp saxifrage swamp, low gradient sandy-silty riverbank system
- Seventeen rare species: Blanding's turtle, spotted turtle, wood turtle, climbing hempweed, tufted loosestrife, large bur-reed, black maple, fen ant, Eastern meadowlark, bobolink, blue-winged warbler, American woodcock, New England cottontail, red-shouldered hawk, whip-poor-will, sedge wren, and least bittern
- Encompasses two large prime wetlands (NW-01 and SW-01) and two smaller prime wetlands (NW-04 and NW-05) identified by the Town of Newmarket (West Environmental, Inc 2006) that were also identified as sites worthy of preservation in a inventory of potential mitigation sites (West Environmental and Carex Ecosystems 2003)
- A portion of the Tuttle Swamp watershed falls within the Lower Piscassic River Conservation Focus Area as identified in the Coastal Plan (Zankel et al. 2006)
- Except for the developed areas the entire Tuttle Swamp watershed supports *highest quality wildlife habitat* ("Tier 1") and is further recognized as a *Conservation Focus Area* as defined by the NH Fish and Game Department in the Wildlife Action Plan (NHFG 2006)
- More than 700 acres are already protected within the watershed; These protected lands connect north and south to other conservation lands in Lee and Newfields and include the Town-owned Tuttle Swamp and Wiggin Farm conservation areas and the Nostrom and Hilton conservation easements
- Contains a portion of the Newmarket Plains Aquifer and Wellhead Protection Area
- Provides flood storage and groundwater recharge

From a Natural Resources Management Plan for the Tuttle Swamp Watershed by Glode (2006); reprinted with permission.

Figure 5: Tuttle Swamp Watershed

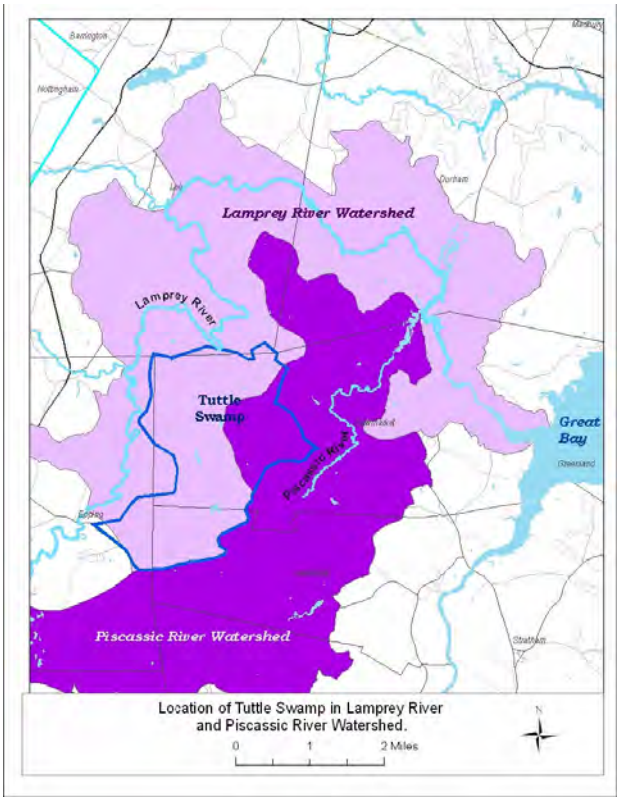
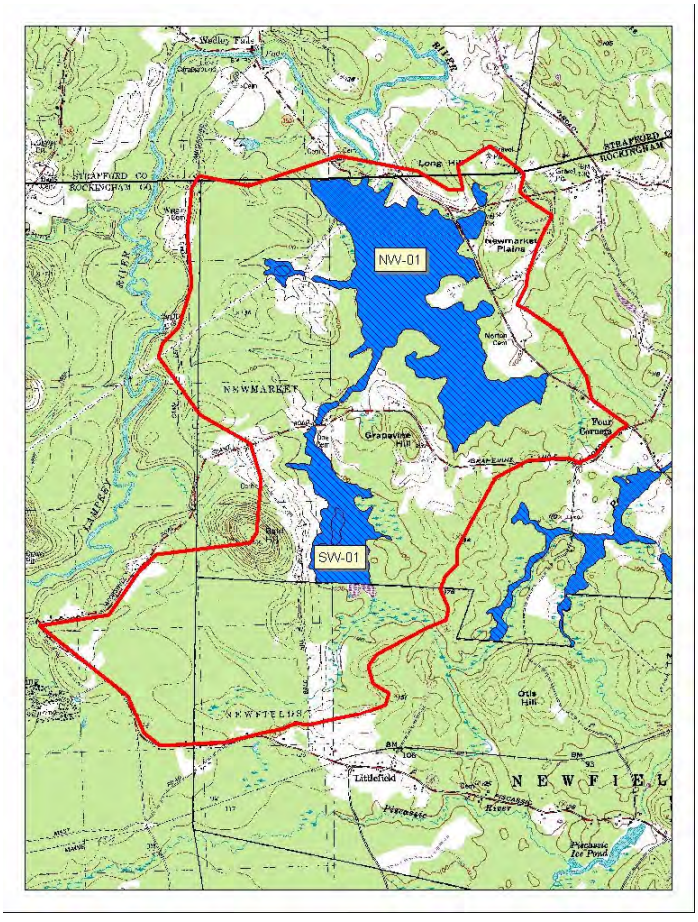


Figure 6: Tuttle Swamp Watershed with Prime Wetlands



❖ Newmarket Plains Aquifer

Stratified drift aquifers consist of well-sorted, sand and gravel deposits that are typically laid out in layers by historic glacial outwash streams and rivers. Depending on the depth and the coarseness of the material, these deposits generally provide good sources of groundwater because of their high capacity to store groundwater over large areas. Newmarket's most productive groundwater resource is a stratified drift aquifer generally referred to as the Newmarket Plains Aquifer located in the northwest part of town and into Durham, stretching from Ash Swamp Road to Lang's Lane and Lee Hook Road (Town Master Plan 2001).

The geographic extent of this stratified drift aquifer was delineated by the U.S. Geological Survey Water Resources Investigations 88-4128 and published in their report, *Geohydrology and Water Quality of Stratefied-Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern, New Hampshire* (Moore 1990). Newmarket has two groundwater wells that tap into this aquifer, currently serving as the only public drinking water supply. In 1999, the Town hired Dufresne-Henry to delineate the Wellhead Protection Area within the Newmarket Plains Aquifer (Dufresne-Henry 1999). The Wellhead Protection Area (WHPA) is the surface and subsurface area surrounding a well, supplying a public water system, through which contaminants are reasonably likely to move toward and reach the well. The Town hired Comprehensive Environmental Incorporated in 2006 to update the delineation of the WHPA (CEI 2006).

The NH Department of Environmental Services recommends a hierarchical approach to protecting groundwater that includes land conservation for the most sensitive resource areas, prohibiting a few "high-risk" land use restrictions and then applying proper management of hazardous substances. In 2001, NH DES notified the Town that the nature of the problems the town is facing with combined ground and surface water sources are among the most severe in the state as a result of the drawdown of the Newmarket Plains Aquifer, drought conditions, and inability to treat surface water with the existing water treatment plant. In addition, the U.S. Environmental Protection Agency was concerned that the extensive sand and gravel mining may have reduced the storage and filtering capacity of the Newmarket Plains Aquifer, and its ability to attenuate contaminants (November 17, 1998 letter from Doug Heath, U.S. EPA to Al Dixon, Newmarket Town Administrator).

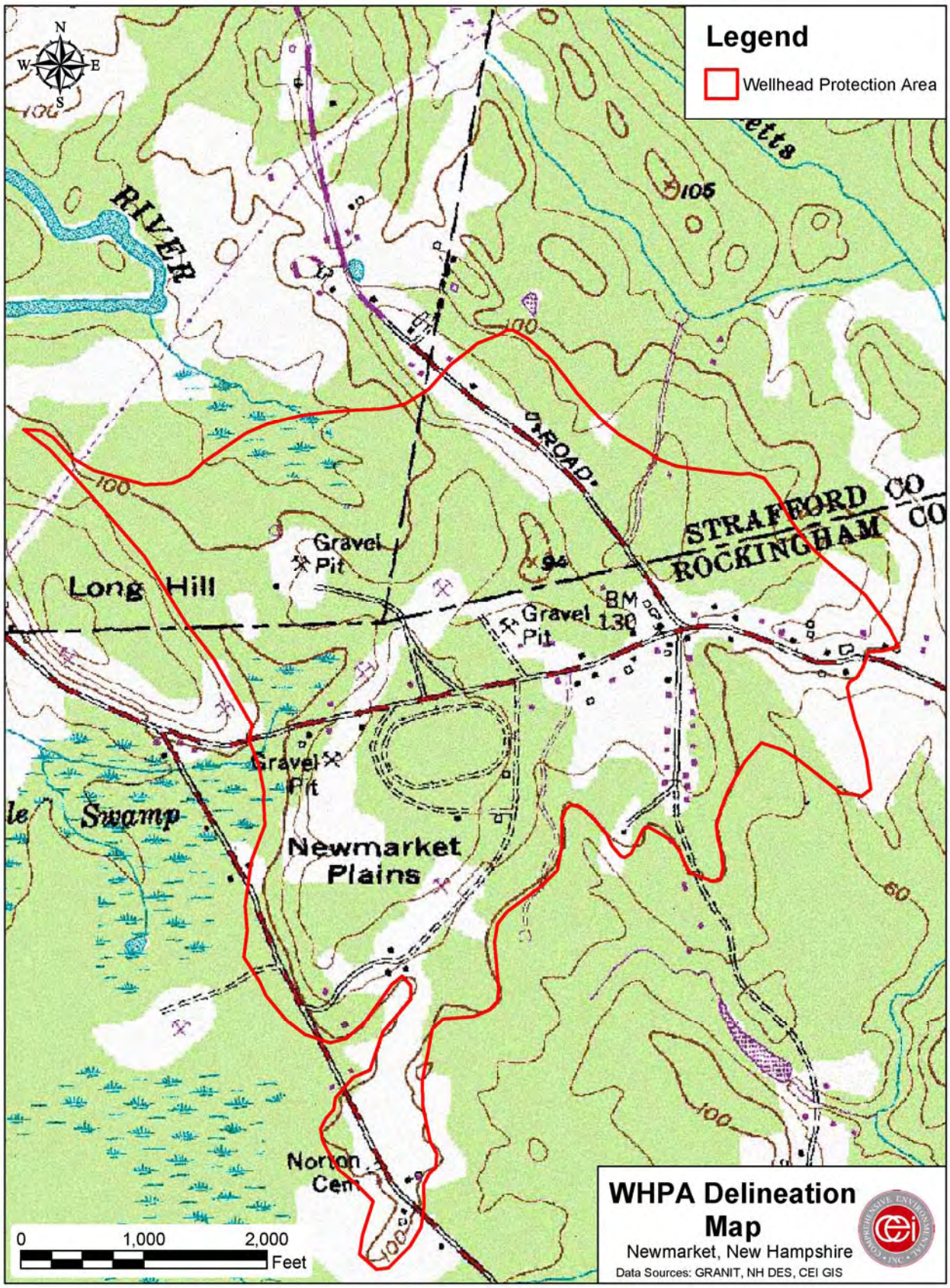
The major land uses over the aquifer and wellhead protection area are commercial and municipal sand and gravel operations, a now closed auto salvage yard, residential houses, shooting range, and town garage (recently moved). Several of these land uses are potential sources of contamination as identified by CEI (2006).

The Newmarket Plains Aquifer overlaps a bit with the Tuttle Swamp Watershed along the western edge of the aquifer. A diverse wetland lies in the northwest corner of the aquifer area that West Environmental, Inc (2006) identified as a prime wetland (NW-04). Prime wetlands receive additional protection in the Newmarket Zoning Ordinance. The sandy soils of the Newmarket Plains Aquifer are ideal for nesting wood turtles, identified by NH Fish and Game in the Wildlife Action Plan as a species of conservation concern (NHFG 2006).

Summary of Key Features of the Newmarket Plains Aquifer:

- The location of the Town's two groundwater wells that supply all the public drinking water
- Encompasses the Wellhead Protection Area delineated by Comprehensive Environmental Incorporated (CEI 2006)
- Encompasses part of a prime wetland (NW-04) that drains into Tuttle Swamp
- West Environmental and Carex Ecosystems (2003) identified the 23-acre wetland that drains under Rt. 152 and into Tuttle Swamp as worthy of preservation in their inventory of potential mitigation sites
- The sandy soils support potential habitat for wood turtle and whip-poor-will, species of greatest conservation need identified in the NH Fish and Game Wildlife Action Plan
- The Town owns two parcels within the aquifer overlay district that surround the Bennett and Sewall Wells

FIGURE 7 - NEWMARKET WELLHEAD PROTECTION AREA



❖ Piscassic River: Neal Mill Road to Ash Swamp Road

This Priority Area for Conservation encompasses the portion of the Lower Piscassic River Focus Area delineated in The Coastal Plan (Zankel et al. 2006) excluding the portion that drains into Tuttle Swamp (between Bald Hill Road and Schanda Drive) (Figure 8). The Piscassic River is the largest tributary to the Lamprey River in Newmarket. It flows northeasterly from Newfields through the region of Neal Mill Road, Ash Swamp Road, Lang's Lane and Grant Road before flowing under Rt. 152 then to the Packers Falls Dam and then another ½ mile to the Lamprey. The Coastal Plan and the Wildlife Action Plan identified a portion of the Piscassic River in Newmarket (from the Newfields townline and extending across Ash Swamp Road) as a conservation focus area with high quality wildlife habitat. The Piscassic River is recognized for the presence of rare plants and animals including wood, spotted and Blanding's turtles, more than 10 miles of river, location within a large unfragmented block of forest, presence of an aquifer and farmland soils, and connectivity along the watercourses (NHFG 2006, Zankel et al. 2006).

The Piscassic River corridor contains a diversity of natural communities, rare plants, and high quality wildlife habitat and is relatively intact considering the pace of development in the region. This area is especially significant to wildlife because of the mosaic of open fields, beaver-influenced ponds and wetlands interspersed with intact river corridor, vernal pools, floodplains, and upland forest (TNC 2002).

This section of the Piscassic River is upstream of the Newmarket Water Treatment Plant and the water intake pipe below the dam at Packers Falls Road. Although this surface withdrawal ceased in 2004 due to problems with the water treatment plant, it is possible that the Town will resume surface water withdrawals in the future. The land uses within the Piscassic River upstream of the plant have the potential to impact water quality.

Summary of Key Features of the Piscassic River:

- Supports *highest quality wildlife habitat* ("Tier 1") as defined by the NH Fish and Game Department in the Wildlife Action Plan (NHFG 2006)
- This area falls within the *Lower Piscassic River Conservation Focus Area* as identified in the Coastal Plan (Zankel et al. 2006)
- Encompasses six prime wetlands (Sw-02, SW-03, SW-04, SW-06, SE-01, SE-02) identified by the Town of Newmarket (West Environmental, Inc 2006) and portions were identified as sites worthy of preservation in a inventory of potential mitigation sites (West Environmental and Carex Ecosystems 2003)
- Contains several miles of frontage on the Piscassic River, as well as smaller tributaries, extensive riparian areas, and riverine wetlands
- A high diversity of tree species red maple, American elm, ironwood, black gum, white oak, black cherry along the river and in the floodplain. Shrubs include silky dogwood, arrowwood, nannyberry, winterberry, gray dogwood, speckled alder and lots of sedges and ferns. The uplands have hemlock, beech, red oak, white pine, and red pine with much less shrub and herbaceous understory. Black maple, sugar maple, gray birch, quaking aspen, shagbark hickory, black oak, green ash, and basswood are also found in this area.
- Several wildlife species of greatest conservation concern identified in the NH Fish and Game Wildlife Action Plan occur here: American woodcock, wood duck, wood turtle, spotted turtle
- Significant wildlife habitats include open fields, shrub-scrub beaver wetlands, riparian corridor, and floodplain forest
- Several large grasslands support breeding bobolinks and eastern meadowlarks
- The river has large populations of elliptio freshwater mussels

- A high diversity of natural communities, including oak-dominated upland forests, open water, cattail marsh, riparian shrub and forest wetlands, red maple, black ash, and black gum forested swamps that support
- Rare plant species include black maple and large bur reed
- The Town of Newmarket and Great Bay Resource Protection Partnership collaborated on a conservation easement on 38 acres along the Piscassic River where it enters Newmarket from Newfields
- Provides flood storage and groundwater recharge

❖ Great Bay: Lamprey River to Newfields Town Line and west to New Road

The Great Bay Estuary is nationally recognized and designated as the Great Bay National Estuarine Research Reserve. Rivers flowing into Great Bay once supported substantial runs of anadromous fish (species that live in saltwater but spawn in freshwater), such as Atlantic salmon, American shad, alewives and other river herring. Through conservation efforts some of these species are now returning in increasing numbers. Newmarket encompasses 967 acres of Great Bay waters (includes tidal portion of the Lamprey River) and nearly 11.2 miles of estuary shoreline.

The Coastal Plan (Zankel et al. 2006) identified the area in Newmarket between New Road and Great Bay from the Lamprey River south into Newfields (Figure 8) as one of the 75 Conservation Focus Areas within the entire 990 square mile-46 town Coastal Watershed. The significant ecological features identified in this focus area include several miles of estuarine shoreline, several hundred acres of saltmarsh, several rare plants and animals, and several excellent examples of natural communities.

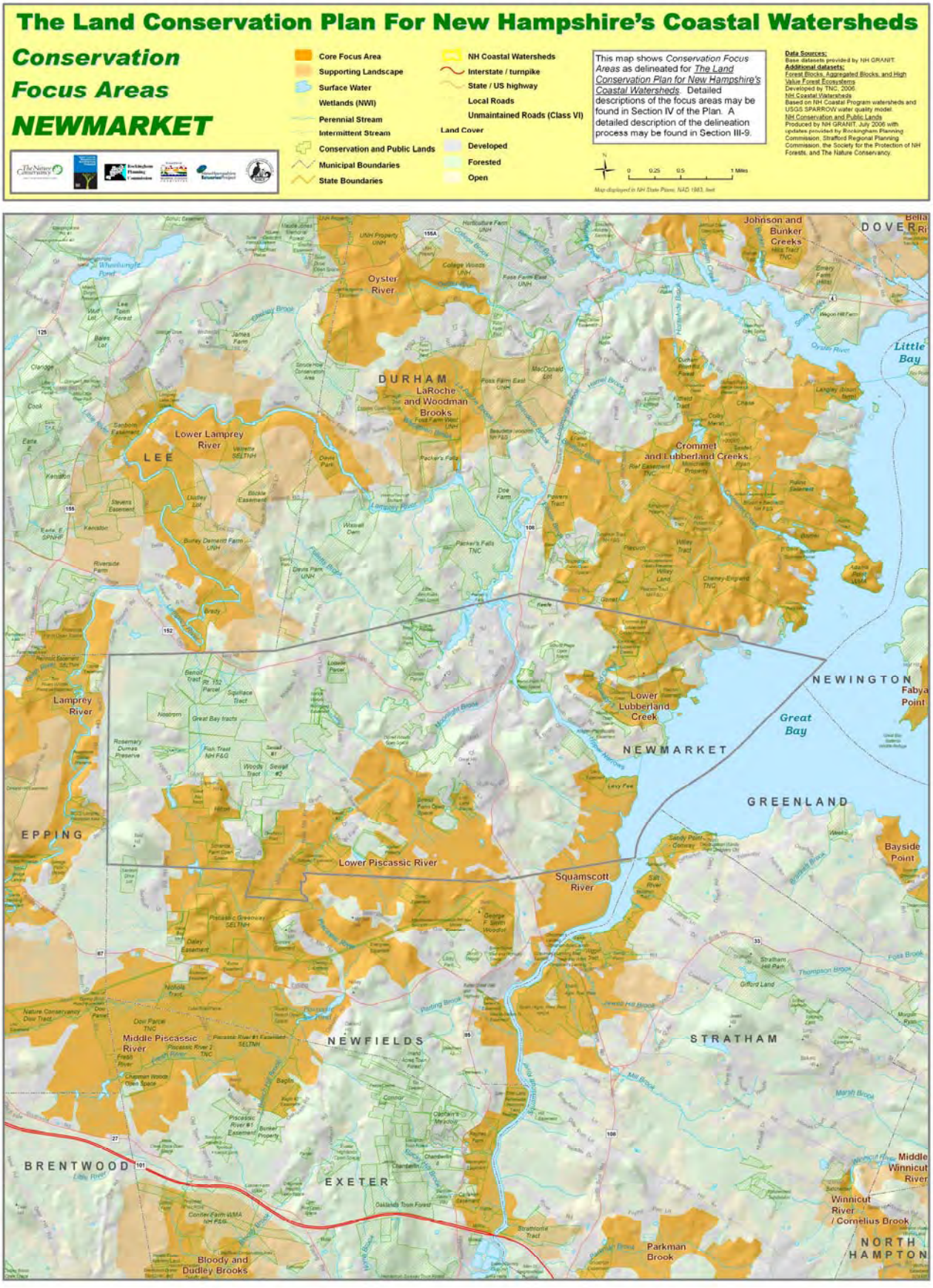
Summary of Key Features of Great Bay: Lamprey River to Newfields

- A high priority for the Great Bay Resource Protection Partnership
- Except for the developed areas, supports *highest quality wildlife habitat* ("Tier 1") and is further recognized as a *Conservation Focus Area* as defined by the NH Fish and Game Department in the Wildlife Action Plan (NHFG 2006)
- This area falls within the *Squamscot River Conservation Focus Area* as identified in the Coastal Plan (Zankel et al. 2006)
- Several animals of conservation concern are found here: saltmarsh sharp-tailed sparrow, osprey, and sora
- Significant wildlife habitats include grassland, salt marsh, and Appalachian oak-hickory forest
- Several miles of estuarine shoreline along Great Bay
- The Great Bay Resource Protection Partnership recently protected through fee simple acquisition and conservation easements the first parcels in this priority area that encompass 85 acres along the Lamprey River and Great Bay (the area known as "Shackford Point")

Next Page:

Figure 8: The Coastal Plan Conservation Focus Areas: Newmarket

FIGURE 8 - THE COASTAL PLAN CONSERVATION FOCUS AREAS FOR NEWMARKET



❖ Great Bay: Lower Lubberland Creek

Lubberland Creek originates in wetlands along Dame Road in Durham then flows southerly under Bay Road entering Great Bay on the north side of Moody Point. It is one of several small streams that drain directly into Great Bay. The lower portions of the Creek flow through extensive salt marsh. A portion of the Gonet Drive subdivision borders Lubberland Creek.

The Coastal Plan recognized the Lower Lubberland Creek in Newmarket as another Conservation Focus Area (Figure 8) (Zankel et al. 2006). The most significant features here include the extensive salt marsh along Great Bay and at the mouth of Lubberland Creek and associated wildlife species including nesting osprey and saltmarsh sharp-tailed sparrow, and many acres of farmland soils.

The Great Bay Resource Protection Partnership has successfully worked with many interested landowners in this focus area to protect more than 300 acres. Some of these lands, both fee simple acquisitions and conservation easements on private lands offer some of the most spectacular views of Great Bay from Bay Road in Newmarket. These conserved lands also offer a scenic backdrop for boaters on Great Bay.

Summary of Key Features of Great Bay: Lower Lubberland Creek

- A high priority for the Great Bay Resource Protection Partnership
- Except for the developed areas, supports *highest quality wildlife habitat* ("Tier 1") and is further recognized as a *Conservation Focus Area* as defined by the NH Fish and Game Department in the Wildlife Action Plan (NHFG 2006)
- A portion of this area falls within the Lower Lubberland Creek Conservation Focus Area as identified in the Coastal Plan (Zankel et al. 2006)
- West Environmental Inc (2006) identified two prime wetlands in this priority area: NE-03 and NE-04
- Includes several miles of shoreline along Great Bay
- Several animals of conservation concern are found here: saltmarsh sharp-tailed sparrow, wood turtle, spotted turtle, Blanding's turtle, blue-spotted salamander, osprey, and sora
- Significant wildlife habitats include grassland, salt marsh, vernal pools, and Appalachian oak-pine forest
- Includes more than 300 acres of conservation land protected by the Great Bay Resource Protection Partnership and The Nature Conservancy

❖ Follet's Brook Watershed

The portion of the Follet's Brook Watershed that lies within Newmarket defines this Priority Area for Conservation (Map 7). Follet's Brook flows southeasterly out of Durham and into Newmarket, meeting the Piscassic River just above the Packers Falls dam. The lower one third of the Follet's Brook watershed is in Newmarket. Before 1990, Follet's Brook was a principal municipal water supply following passage through the Packers Falls Road water treatment plant. The use of Follet's Brook for a public water supply in Newmarket dates back to the late 1800s, so there's been a human influence here for more than 100 years. The Town stopped water withdrawal in 1990 during the upgrade of the water treatment plant.

The Town has owned lands along Follet's Brook since the early 1900s. In the last few years the Town has acquired additional lands in this region to provide outdoor recreational opportunities and provide

additional protections within the Follet's Brook and lower Piscassic River watersheds. Simultaneously, although unrelated, the Town has explored the feasibility of re-establishing Follet's Brook as a water supply. This has included several test wells. However, wetlands regulations, low water flows, and other issues may limit the feasibility of this option.

A recent study of Follet's Brook by The Nature Conservancy (Zankel 2004) provided the following description of the Follet's Brook watershed. The approximately 1,200-acre watershed, within Newmarket, Lee, and Durham, is a relatively large, unfragmented natural area. Most of the watershed is within Durham, with Newmarket sitting at the mouth of the watershed. Follet's Brook is a small, free-flowing tributary that feeds into the Piscassic River just upstream of the Piscassic-Lamprey confluence. The brook is a low-gradient stream with a small, narrow channel (~ 3 feet wide) and a soft substrate of clay and sand. The watershed supports more than 120 acres of emergent, scrub-shrub, and forested wetlands. Beavers have created a network of swamps, marshes, and pools that attracts much other wildlife. Appalachian oak-pine forests with several vernal pools that harbor breeding amphibians and invertebrates dominate the uplands.

Summary of Key Features of the Follet's Brook Watershed

- A high priority of the Great Bay Resource Protection Partnership
- Supports *highest quality wildlife habitat* ("Tier 1") as defined by the NH Fish and Game Department in the Wildlife Action Plan (NHFG 2006)
- West Environmental and Carex Ecosystems (2003) identified Follet's Brook as worthy of preservation in their inventory of potential mitigation sites
- West Environmental, Inc (2006) identified Follet's Brook as a candidate for prime wetlands; since the Town is investigating the Brook as a potential drinking water source it was not submitted for designation as a prime wetland
- The Town of Newmarket owns nearly 100 acres in the Follet's Brook area, including the frontage along the Brook and connectivity to the Piscassic River via the Piscassic River-Loiselle Conservation Area

Chapter 7 Tools for Open Space Conservation

Municipalities have a range of tools and options available to conserve important open spaces. These include voluntary tools such as land protection and education, and regulatory measures such as open space overlays in the zoning ordinance. Some of these measures (e.g., land acquisition) depend on funding, whereas others require no financial outlays by the community. Most importantly, towns (and landowners) have access to many conservation partners to assist with all options, including state and federal funding sources, technical assistance, educational programs, and more.

New Hampshire champions local control and local government so it is important to understand the form of government in our community and how individuals, groups, and boards propose and adopt some conservation actions. Newmarket has a Town Council form of government with a Town Administrator that is responsible for the administrative and financial affairs of the Town (See Town Charter at http://newmarketnh.gov/municipal_charter/index.htm). Newmarket is an SB2 community so we hold a Deliberative Session in April to discuss and approve the proposed Town budget and warrant articles that we then vote on by an official ballot on the second Tuesday in May. The Town Administrator submits a recommended budget to the Town Council by January 15th. The Council reviews and makes changes as desired, before submitting the proposed budget to the Budget Committee by early February. Other warrant articles, including those involving land conservation, must be submitted by early March (5th Tuesday prior to the 1st session; RSA 39:3).

A menu of tools and options for open space conservation is described in detail below within the following categories:

- Education and Stewardship
- Land Conservation
- Land Use Planning

Education and Stewardship

Public Workshops and Events

Educational programs on conservation and environmental topics are important and helpful in sharing information, building support, receiving input, and engaging volunteers in Newmarket's open space conservation goals. Most people support conservation and might be interested in volunteering their time or doing things differently if they knew what to do. Inviting residents to learn about the natural features, conservation lands, public trails, and other conservation efforts is important in building support for future conservation projects.

Newmarket is fortunate to have several options for this outreach that include:

- Public presentations at the Town Hall (which could also be broadcast on Channel 13)
- Presentations to civic groups: Historical Society, Garden Club, Business Association, etc
- Field trips to conservation areas
- Volunteer work days at conservation areas
- Special events: Newmarket Heritage Festival, Old Home Days
- Newsletters and fact sheets that could be posted on the Town website

- Press releases, guest columns in newspapers, letters to the editor
- Neighborhood gatherings and living room meetings
- Conservation Commission website

Land Trust Alliance Standards and Practices

The Land and Community Heritage Investment Program (LCHIP) requires that any community or land trust that receives an LCHIP grant adopt the standards and practices developed by the Land Trust Alliance (see Appendix I for a copy of the 2004 Standards and Practices). Although the Standards and Practices are the ethical and technical guidelines for land trusts, they also provide important guidance for any organization or government agency that holds land or easements for the benefit of the public. LCHIP requests the adoption of this document to ensure that the conservation community (conservation commissions and local and regional land trusts) is accurately represented in terms of undertaking all land transactions in accordance with professional standards and ethics. The Newmarket Open Space Commission adopted practices 8 through 13 in the document as they apply to municipal land ownership. This was an earlier version, as the LTA revised the Standards and Practices in 2004.

Land Stewardship

Most of the energy and time devoted to open space conservation is spent on conserving the land, whether it is through fee simple acquisition, a conservation easement, or an open space subdivision. Typically, for those involved, there is a great sense of relief once the project is done and all the official documents are recorded at the Registry of Deeds.

However, open space conservation is in perpetuity, which brings an obligation to monitor and manage the property by the landowner(s). For an open space subdivision, this usually lies with a homeowner's association and is guided by the subdivision covenants and by-laws. A land trust or town that acquires a conservation easement is responsible for monitoring the easement annually to ensure that the provisions of the easement are followed or not violated.

Lands that are owned in fee simple by the town bring additional stewardship responsibilities to ensure that the resources are managed and protected and public uses are managed and monitored. This is particularly important if the land was purchased with outside funding sources. A land management or stewardship plan for each property is an important tool for describing the purposes for the property, funding sources, goals for habitat management and public use, and who will implement the management actions and monitor the property. Newmarket acquired several parcels from outside funding sources and hired a consultant to prepare management plans (Wiggin Farm-Tuttle Swamp and Piscassic River-Loiselle conservation areas). The first step is to complete the management plan, either by a consultant or volunteers; more important is for the Town to determine who is responsible for carrying out the management plan. The Conservation Commission maintains files in the Town Hall on existing management plans. These should be reviewed annually and a work plan developed each year to ensure that management actions are implemented and monitored.

Land Conservation

One of the most effective ways to permanently protect important natural resources within a community is through land conservation. New Hampshire loses 12,000 to 15,000 acres of open space a year to development. These changes spurred the State and communities to support and enact funding mechanisms to conserve open spaces that maintain community character and ecosystems. The State's Land and Community Heritage Investment Program (LCHIP) has consistently rated as one of the highest funding priorities among New Hampshire residents. Between 2001 and 2006, New Hampshire municipalities (approved by voters) allocated more than $135 million toward land conservation (data from Center for Land Conservation Assistance).

Although land conservation can be expensive as land values increase, many landowners in the seacoast have generously donated land or conservation easements. This spirit of giving is a tribute to the community land ethic in our region and helps leverage other funding so that other critical areas can also be protected. The Newmarket Open Space Commission worked with landowners who donated more than $300,000 in land value through bargain sales of conservation easements.

Land Conservation Options

Landowners have many options when considering a donation or sale of land or interest in land to a land trust, town, or other conservation organization. This can include conveyance of full ownership ("fee simple") of the land or partial interest in the land through a conservation easement. Landowners can consider a full donation (or sale), a "bargain sale" which involves a partial donation, or perhaps a donation or sale that includes a life estate. Often these conservation options offer tax advantages to the donor. Any landowner considering a gift of real estate should consult with an experienced tax attorney.

Likewise, municipalities can approach landowners whose land harbors important features that the community would like to protect for public benefit. Typically landowner contacts are kept confidential until the landowner has agreed to proceed in a more public discussion. Anyone representing the municipality in contacts with landowners should be familiar with land conservation options and have good listening skills to understand landowner interests, concerns, and questions. Land conservation projects can take many years to reach an agreement with a landowner, to gather public support for a project, to raise the necessary funds, to gather all the information (e.g., property survey, appraisal), and to complete the transaction. Land trusts can be valuable partners in all phases since they are experienced in landowner discussions and land negotiations.

The New Hampshire Center for Land Conservation published an informative booklet, *Conserving Your Land, Options for New Hampshire Landowners* (Lind 2004), that is important reading both for landowners and town staff and volunteers working with interested landowners.

Local Funding Mechanisms

Municipalities have many options in funding land conservation projects. The options used will depend on the specific project and opportunities for leveraging funds from grant sources or partners as well as the interests and concerns of the landowner. The following is a suite of funding mechanisms that can be used in Newmarket.

Ways to Hold Funds for Conservation

Conservation Fund
The Conservation Fund is a specific fund authorized by RSA 36-A; it is non-lapsing and can accumulate from year to year. The Conservation Commission has sole authority to expend from this fund without further approval from town meeting. However prior to using these funds for the purchase of any interest in real property, the Conservation Commission shall hold a public hearing and the Town Council must approve the acquisition. The town treasurer administers the Conservation Fund. Money in the Conservation Fund can come from several different sources including the Land Use Change Tax (described below). Other funding can originate from town appropriations, surplus funds from the Town budget, gifts from private individuals, by allowing the Conservation Commission to retain unexpended funds from the Commission's budget appropriation, or other sources.

Capital Reserve Fund
A Capital Reserve Fund (CRF) is commonly used to set aside town funds for a future capital purchase such as a fire truck or police cruiser. Such a fund can only be used for the purposes for which it was created. To be used for land acquisition a CRF would need to be proposed for that purpose and pass a warrant article by majority vote. The Town Council governs this fund, which can only contain town appropriations. The Capital Reserve Funds and Capital Expenditures are contained in the Town's Capital Improvement Program (CIP), a financial planning tool that is updated annually. The CIP plan takes into consideration the Town Council's goals and objectives, the vision of the Newmarket Master Plan, the Water and Wastewater Treatment plans and the financial capability to bring the program to fruition. The Public Water Supply Protection Fund described below is a capital reserve fund. The Town can also establish a separate trust fund that contains private donations to be used for the specific purpose of the trust fund. The latest Newmarket CIP is available at http://newmarketnh.gov/capital_improvement_program/documents/cip_doc_0708fullversiondoc.pdf.

Public Water Supply Protection Fund
Newmarket voters, through warrant article, initially established this as an Aquifer Protection Easement Fund in 1999, approving allocations to this fund in 1999, 2000 and 2001. In 2003 voters approved enhancing the purpose of the aquifer fund to include fee simple acquisitions as well as easements and to include potential surface water sources. Most of this fund was expanded for conservation easement along the Piscassic River (a potential drinking water source), although additional allocations could be made to this fund through future warrant articles.

Sources of Municipal Funding for Conservation

Land Use Change Tax
In 1973, New Hampshire implemented the Current Use Program that enables landowners to enroll parcels greater than 10 acres in "current use." The land is assessed at its present (open space) use rather than on its highest potential use (such as development). This provision offers landowners who enroll in the program relief from higher property taxes and helps preserve open space while the land is in current use. If a landowner decides to remove the land from current use, it is assessed a penalty (10% of the fair market value) called the Land Use Change Tax (LUCT). The landowner pays the LUCT to the town. A town can elect (by majority vote at town meeting) to dedicate a portion of the LUCT to the Conservation Fund. Newmarket voted to dedicate 50% of the LUCT to the Conservation Fund in 1989. These revenues are deposited in the Conservation Fund at the time of collection (RSA 79-A:25). Since the funds collected from the LUCT vary with development pressure the amount that is deposited into the Conservation Fund fluctuates, often dramatically, over time. For example, the portion of the LUCT deposited into the

Conservation Fund in 1997 was $1,025, in 2001 and 2002 it was zero, and from 2004 to 2006, the Fund received $148,826.

Municipal Bond and Warrant Article
The town may agree to borrow money for a specific conservation project. This action requires a 60% majority vote at town meeting via a warrant article. Citizens or the Town Council can submit a warrant article for vote at town meeting that would allocate money to a specific conservation project or otherwise address conservation needs. The Town of Newmarket used this technique to pass the $2 million land acquisition bond and to create and fund the public water supply protection.

Town Fund Balance
Sometimes, a town's revenues exceed expenses, resulting in surplus funds at the end of the year. These surplus funds cannot be expended without voters' approval and are incorporated into the town's unreserved fund balance. The Department of Revenue Administration requires a town to keep 5-10% of the total revenue from its town, county, school, and state property taxes in reserve. This maintains an adequate funding for cash flow and town emergencies (excerpted from Hart and Taylor 2002). Fund balances in excess of the 10% reserved for emergencies and cash flow, could be allocated by warrant article (majority vote) for specific purposes, such as land conservation or dedicated to an existing fund such as the Public Water Supply Protection Fund.

Tax Lien – Direct Acquisition
If a landowner does not pay property taxes for three years, the property comes under Town ownership. If the property fits with the needs of the Town's conservation plan, the Town may choose to retain the property as open space. The Town must vote, by either Town meeting or Town council, to retain the land.

Tax Lien – Sale or Exchange
If a property is acquired as detailed above and does not have conservation value in its own right, then it can be sold, with proceeds going to the Conservation Fund. In addition, a conservation easement could be placed on the property before it is sold. The Town must vote, by either Town meeting or Town council, to sell the land.

Donation
The town may receive donations of property and money. Land can be applied to the existing network of conservation lands and money can be applied to the Conservation Fund. The Town Council must vote to accept the donation.

Matching Fund Sources

The importance of land conservation partnerships can't be overstated. As noted in the Newmarket Open Space Commission four-year report (Appendix C), the Town leveraged $1.6 million in town funds with $1.6 million in funds from federal and state grants. These matching funds have come from several sources including LCHIP, NH DES water supply land conservation grant program, North American Wetland Conservation Act, Farm and Ranchland Protection Program, Lamprey River Advisory Committee, NH Center for Land Conservation Assistance, and Land and Water Conservation Fund. Any group or board in Town can write a grant for a specific conservation project. Grant applications are coordinated with the Town Administrator's office, as the Town Council must vote to accept a grant.

Some matching funds for conservation projects come from partners. Newmarket is fortunate to have the Great Bay Resource Protection Partnership, which has protected hundreds of acres of critical lands particularly along Great Bay and in Tuttle Swamp through their own efforts as well as contributed hundreds of thousands of dollars to land protection projects led by the Town. The Partnership's funding

comes from two main sources: North American Wetlands Conservation Act (NAWCA) and the National Oceanic and Atmospheric Administration (NOAA).

Likewise, the Lamprey River Advisory Committee contributed $200,000 to the Wiggin Farm-Tuttle Swamp acquisition. Table 10 lists some of the key grant sources. Contact information for each potential grant source is included in Appendix A. Much if this information was summarized from *Saving Special Places: Community Funding for Land Conservation* (Hart and Taylor 2002).

New Hampshire has dozens of private land trusts working statewide and regionally. A land trust is a local, state, or regional non-profit organization directly involved in conserving land for its natural, recreational, scenic, historical, or other natural resource value (Hart and Taylor 2002). Land conservation is the primary purpose of land trusts, and therefore they have specialized expertise in all aspects of land conservation. Land trusts are a great resource for landowners and communities. The Southeast Land Trust of NH (based in Exeter) is an active partner in our region.

Table 10. Key Grant Sources for Land Conservation

Grant Program	Purpose
NH Land & Community Heritage Investment Program	A State program to provide matching grant funds for the conservation and preservation of the state's most valuable natural, cultural, and historic resources
NH Department of Environmental Services Water Supply Land Protection Program	A State program to grant funds for the acquisition of land or conservation easements to assist in the protection of a community drinking water supply
NH Center for Land Conservation Assistance	A NH program that provides funds to cover a portion of land protection project costs such as surveys and appraisals
Farm and Ranchland Protection Program	A federal program to help farmers keep their land in agriculture; provides matching funds to purchase conservation easements
Land & Water Conservation Fund	A federal program to support local and state conservation and outdoor recreation programs
North American Wetlands Conservation Act (NAWCA) small grants program	A federal matching grants program that supports public-private partnership that involve long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats for the benefit of all wetlands-associated migratory birds

Keys To Success

Saving Special Places: Community Funding for Land Conservation (Hart and Taylor 2002) highlights several keys to success in passing any tax increases for land protection:

- The need for and benefits of land protection must be compelling
- The tax increase must be affordable
- The voters must trust that the funds appropriated will be spent as promised
- A good campaign must be conducted and must explain the benefits to undecided voters

Land Use Planning

Town Planning and Zoning

Newmarket has implemented many innovative land use planning tools to protect important natural resources. These are an important complement to land conservation and education and stewardship. Land use planning tools include:

- Municipal Master Plan:
- Zoning Ordinance
- Subdivision Regulation
- Site Plan Regulation
- Capital Improvement Program

Each of these tools is described in more detail below.

Municipal Master Plan
A Master Plan is a policy document that serves as a "blue print" for the future, guiding the character, physical growth and development of the community. It is a tool that aids in making decisions regarding budgeting, capital improvements, zoning, subdivisions, and other growth-related issues. Newmarket's Master Plan was prepared in 2001 and includes a vision statement and chapters on land use, population, housing, economic development, transportation, community facilities, terrestrial resources, historic resources, water resources, future land use, and implementation strategies. The Master Plan establishes the foundation for conservation and related land use regulations.

Zoning Ordinance
The Zoning Ordinance is a local ordinance adopted by the Town Council, which regulates the size, location, and use of land, buildings, and other structures with an overall goal of promoting the public health, safety and general welfare of the community. The Zoning Ordinance includes a map which divides the community into land use districts with a goal of separating incompatible use, a list of uses that are permitted by right or special use permit, and a table of dimensional standards that restrict lot sizes, density, building setbacks, and the height of structures. Newmarket's zoning ordinance also includes a series of overlay zoning districts, which protects various environmental features including aquifers, wetlands, watersheds, steep slopes, shore land and floodplains. The Ordinance also allows residential open space designs, which provides an alternative method of residential development that aims at protecting open space and preserving natural resources.

Subdivision Regulation
A "subdivision" is the division of a lot, tract, or parcel of land into two or more lots, plats, sites, or other divisions of land for the purpose of sale, rent, lease, condominium conveyance, or building development. The Planning Board has adopted regulations to approve or disapprove subdivision plans to assure that land is properly developed, has adequate services such as water supply, transportation, fire protection, and schools and is harmonious with the municipality and the environment.

Site Plan Regulation
Newmarket has adopted site plan review regulations that allow the Planning Board to review non-residential and multi-family housing developments prior to construction. These regulations consider design elements such as vehicle access, parking design, off-street loading, landscaping, pedestrian, bicycle and transit amenities, snow removal, drainage, water supply, utilities, solid waste and wastewater disposal, outdoor lighting, and architectural design.

Capital Improvement Program
The Capital Improvement Program (CIP) described on page 58 under Capital Reserve Funds is an outline of anticipated expenditures for capital projects over a six-year period. It links local infrastructure investments with the master plan goals and land use ordinances. It includes projects such as infrastructure improvements, the purchase of land, major equipment and vehicle purchases, and planning and engineering studies. It does not include maintenance and operational costs.

Regional Planning

New Hampshire has nine regional planning commissions (established by RSA 36:46) that operate as a non-profit local government organization. Each Commission serves in an advisory role to local governments to promote coordinated planning, orderly growth, efficient land use, transportation access, and environmental protection. Membership, which is optional, is obtained through annual dues assessed to each community on a per capita basis. The Commissions are not affiliated with the Counties. Newmarket is within the Strafford Regional Planning Commission and is next to the Rockingham Planning Commission. Both have resources on their website that are informative for regional open space conservation, transportation and land use planning.

- Strafford Regional Planning Commission http://strafford.org/
- Rockingham Planning Commission http://www.rpc-nh.org/

Statewide Initiatives

Minimum Impact Development Partnership
Minimum Impact Development (MID) Partnership is an approach to better guide development choices in New Hampshire communities; it was created collaboratively by The Jordan Institute (www.thejordaninstitute.org). The principles of MID voluntary (or regulatory) practices that result in "good development." This includes characteristics such as (excerpted from Foss, C. 2002, New Hampshire Audubon newsletter):

- Site design that incorporates available ecological services such as sunlight and prevailing winds, minimizes pollution, recharges groundwater, and includes landscaping that provides shade and winter storm protection and minimizes mowing, watering, and pesticide use
- Buildings that are energy efficient and comfortable, with excellent indoor environmental quality (temperature, humidity, ventilation, lighting, and acoustics).
- Neighborhood and community design that provides mobility for people and wildlife
- Site design and function that enhances community character

More information about the tools used in implementing MID is at http://www.nhmid.org/index.htm

Three Infrastructures
One of the principles of Minimum Impact Development is the concept of Three Infrastructures. The Jordan Institute and the Audubon Society of New Hampshire have described the integration of three kinds of infrastructure – green, built, and social – as critical to maintaining the qualify of life in our communities (http://www.nhmid.org/infrast.htm). They define these three infrastructures as follows:

Green Infrastructure is a network of interconnected lands and waters that provide goods and ecological services such as clean air and water, climate moderation, food and fiber, and waste decomposition. Green infrastructure includes conservation areas, recreation lands, wetlands, forests, farms, yards, and other open spaces

Built Infrastructure includes all human-constructed features that shelter and transport people, goods, and information such as roads and rails, buildings and bridges, communication networks, sewer pipes, homes and offices.

Social Infrastructure is the opportunities within a community for organized (event-based) and informal (place-based) social interaction. Social infrastructure includes organization meetings, education classes, cultural events, religious services, government functions, school and sports events, health clubs, libraries, community centers, trails, playgrounds, post office, and transfer stations.

The integration of green, built, and social infrastructure helps to define community character. To promote a high quality of life within a community, these three infrastructures should be effective, efficient, and well integrated.

SmartGrowth
Several years ago the NH Office of Energy and Planning prepared a report called Achieving Smart Growth in New Hampshire (available at http://www.nh.gov/oep/programs/SmartGrowth/index.htm). This effort was designed to develop and promote a set of principles that balance growth and development with preserving the character and resources of our communities and state. The impetus for this initiative was to address "sprawl, " the dispersed, auto-dependent development outside of compact urban and village centers, along highways, and in rural countryside that all communities experience.

Chapter 8 Recommendations

This Open Space Plan culminates in an array of recommendations that are intended to continue the legacy of open space conservation so clearly demonstrated in Newmarket. These recommendations are organized under three categories similar to Chapter 7 (Tools for Conservation): Education and Stewardship, Land Conservation, and Land Use Planning. Each recommendation includes the rationale; one or more actions to implement the recommendation; and the town department, board or commission, or partner that would best lead in implementing the recommendation.

Education and Stewardship

These recommendations focus on expanding the information available to residents about conservation areas in Newmarket, enhancing visitor experiences to these areas, sustaining the town's stewardship responsibilities, and ensuring that significant resources are protected through monitoring and management.

- **Recommendation:** **Erect and/or maintain information kiosks at the following conservation areas: Wiggin Farm-Tuttle Swamp, Piscassic River-Loiselle, Heron Point Sanctuary, Sliding Rock, Schanda Park**

Rationale

Each conservation area is unique in the natural features present, public uses that are allowed and prohibited, sensitivity to overuse, funding sources, and need for active management and maintenance. An important tool for conveying this information is through an information kiosk at the point of entry (e.g., parking lot) to each conservation area. This is a high priority as some of these lands are being impacted by used that are not allowed (such as all-terrain vehicles).

Actions

- Erect kiosk at Wiggin Farm-Tuttle Swamp Conservation Area (*Lead: Conservation Commission*)
- Place visitor information on each kiosk including site map, trail map, signs recognizing funders, public uses allowed and prohibited, site description including natural features (*Lead: Conservation Commission*)
- Develop brochures for the Wiggin Farm-Tuttle Swamp and Piscassic River-Loiselle Conservation Areas (*Lead: Conservation Commission*)
- Coordinate with the local snowmobile club to monitor and maintain the snowmobile corridor through the Wiggin Farm-Tuttle Swamp conservation area and to ensure that snowmobiles stay on the trail and to prevent any all-terrain vehicle use of the property (*Lead: Conservation Commission*)
- Communicate public use policies of the Wiggin Farm-Tuttle Swamp conservation area to neighbors and other town residents and visitors (*Lead: Conservation Commission*)
- Develop a brochure and trail maps that describes all the conservation areas in Newmarket that are open to the public (*Lead: Conservation Commission*)
- Place brochures, maps, and other information on the Town of Newmarket website (*Lead: Newmarket Webmaster*)
- Provide signs at prominent river crossings including Piscassic River and Lamprey River (*Lead: Conservation Commission*)

- **Recommendation:** **Provide information on town conservation lands and conservation issues to the public through the Town of Newmarket website and the public access Channel 13**

Rationale

The Town of Newmarket official website is a great avenue for reaching many of Newmarket's residents and visitors with information about conservation lands and issues at a relatively low cost.

Actions

- Create a visible link on the Newmarket home page for Conservation. This should be hyper-linked to the Conservation Commission, Open Space Commission and Planning Board web pages. Use this web page to post the Open Space Plan and associated documents, conservation land fact sheets and maps, and other conservation materials (*Lead: Newmarket Webmaster*)
- Consider televising the Conservation Commission meetings on Channel 13 to engage more residents in conservation efforts and issues (*Lead: Conservation Commission*)
- Continue to post meeting agendas and minutes for all the Town Boards on the Newmarket website (*Lead: Newmarket Webmaster)*

- **Recommendation:** **Conduct annual monitoring visits to Town-owned conservation lands and Town-held conservation easements**

Rationale

The Town of Newmarket is obligated to annually monitor several of its fee simple ownerships that were acquired with funding from LCHIP and NH DES as well as the conservation easements that it holds. To ensure sound stewardship and protection of natural resources and manage public uses all the town-owned conservation lands should be monitored annually. The Conservation Commission established a Land Management and Stewardship Subcommittee in 2006 to implement these monitoring and stewardship responsibilities. This is an important Town responsibility that relies almost entirely on volunteers. The Town contracted with the Southeast Land Trust of New Hampshire to conduct the annual monitoring of the Hilton conservation easement.

Actions

- Coordinate the annual monitoring of the Wiggin Farm-Tuttle Swamp conservation area with the staff of the Conservation Land Stewardship Program in the NH Office of Energy and Planning. The site visit should be conducted together with a monitoring report submitted to LCHIP and NHFG (*Lead: Conservation Commission*)
- Conduct the annual monitoring of the Piscassic River-Loiselle conservation area and submit a report to LCHIP (*Lead: Conservation Commission*)
- Conduct an annual monitoring of the Silverman-Schneer and Nostrom conservation easements. Submit monitoring report for the Silverman-Schneer easement to NHFG. Submit monitoring report for the Nostrom easement to the Farm and Ranchland Protection Program (*Lead: Conservation Commission)*
- Maintain electronic and paper copies of all monitoring reports in Conservation Commission and Planning Department files (*Lead: Conservation Commission*)
- Assess the effectiveness of the easement monitoring (Hilton) by the Southeast Land Trust of NH to determine if this collaboration should be renewed and to assess whether it could be expanded to other town conservation lands and easements (*Lead: Conservation Commission*)

➢ **Recommendation:** **Review the Town Ordinances that pertain to use of conservation lands to ensure that the ordinances are consistent with the purposes for which the land was conserved.**

Rationale

The Town has several ordinances that have relevance to public uses on town-owned conservation lands including regulation of dogs and use of conservation property. Some of the conservation lands, particularly those conserved with State and Federal grants, have greater restrictions on certain public uses such as prohibiting overnight camping, monitoring of dogs off leash in sensitive areas or times of year. The ordinances should be consistent with the deeds associated with each conservation area.

Action

- Compare the allowed and prohibited uses for the Wiggin Farm-Tuttle Swamp and Piscassic River-Loiselle conservation areas with the Town ordinances to ensure that there are no inconsistencies (*Lead: Conservation Commission*)
- Consider prohibiting dogs from the Wiggin Farm-Tuttle Swamp conservation area from May 1st to July 15th to protect grassland nesting birds and breeding Blanding's and spotted turtles. Consult with NH Fish and Game (*Lead: Conservation Commission*)

➢ **Recommendation:** **Develop a walking trail on the Piscassic River-Loiselle Conservation Area that connects to the conservation lands on the other side of Follet's Brook**

Rationale

The 45-acre Piscassic River-Loiselle Conservation Area is amenable to a nature trail that leads around the hayfield and into the oak-hickory forest that could support a large loop trail with interesting rock outcrops, vernal pools, and other natural features. This conservation area abuts the Carolyn Drive conservation land, which borders other town-owned lands along Follet's Brook. The Recreation Department is working on a potential trail network in this area.

Action

- Work with volunteers (e.g., eagle scouts) to develop and layout a walking trail that connects to other town-owned lands along Follet's Brook (*Lead: Recreation Department and Conservation Commission*)
- Consult the Department of Resources and Economic Development, Trails Bureau publication: *Best Management Practices for Erosion Control During Trail Maintenance and Construction Manual* available at http://www.nhtrails.org/Trailspages/BMP.html. Refer to this to guide trail placement and avoid negative impacts. Evaluate potential trail impacts from hiking prior to trail construction (*Lead: Recreation Department and Conservation Commission*)

➢ **Recommendation:** **Continue to evaluate and implement opportunities to develop a walking trail network throughout Town and connecting to open spaces in neighboring towns**

Rationale

The Statewide Comprehensive Outdoor Recreation Plan identified walking, wildlife watching, and hiking as some of the most popular recreational activities in the State and about 50% of all outdoor recreation activities take place within 10 miles of home (NH Office of State Planning 2003). One of the

recommendations in the Ten Year Recreation Master Plan for Newmarket is to create a local network of connecting trails

Actions

- Work with public and private landowners in Newmarket and Newfields to create a continuous walking trail from Wiggin Farm-Tuttle Swamp south to the Piscassic Greenway and to the State Aid Rail Trail. Much of this trail system is already in place or being developed, but may require permission across some lands (*Lead: Conservation Commission and Recreation Department*)

➢ **Recommendation: Maintain the open fields and implement other management activities at the Wiggin Farm-Tuttle Swamp and Piscassic River-Loiselle Conservation Areas**

Rationale

The Conservation Commission hired NH Soil Consultants in 2004 to write natural resource management plans for these two conservation areas (NHSC 2005). These thorough and detailed plans include the stewardship obligations of the Town as well as a suite of management recommendations with accompanying maps with specific guidance on habitat management including mowing. These plans should be implemented. A few management actions are included here, but the plans include other valuable recommendations. The plans are available at the Town Hall.

Actions

- Mow the field at the Wiggin Farm after August 15th each year. The lower section of the field along the wetland from the bridge crossing near the parking lot to the open water should be left un-mowed and allowed to revert to shrubs. This un-mowed area encompasses a peninsula that extends to the base of the hill at the site of an old well. See the management plan by Tarr (2004) prepared for the Town. Assistance is also available from NH Fish and Game (*Lead: Conservation Commission and Public Works Department*)
- Mow the walking trail every 2-3 weeks or as needed (*Lead: Public Works Department*)
- Coordinate the mowing of the Piscassic River-Loiselle with a local farmer (e.g., Sawtelle) if available or with town staff (*Lead: Conservation Commission*)
- Monitor town-conservation lands for invasive plants and implement control measures as recommended in the management plans. Guidance is available from the Great Bay Resource Protection Partnership (*Lead: Conservation Commission*)

➢ **Recommendation: Collaborate with the Great Bay Resource Protection Partnership on implementing the Natural Resource Management Plan for the Tuttle Swamp Watershed**

Rationale

The Nature Conservancy, on behalf of Great Bay Resource Protection Partnership, prepared a natural resource management plan for the Tuttle Swamp Watershed, most of which is in Newmarket. The purpose of the plan is to provide management guidelines that will help protect the ecological integrity of Tuttle Swamp and surrounding uplands. The management plan is also intended to encourage and assist coordination, cooperation, and communication between the individual landowners. The Town of Newmarket owns several parcels in the watershed including the Wiggin Farm and Tuttle Swamp conservation areas and holds a conservation easement on the Hilton Tree Farm. The Wiggin Farm-Tuttle Swamp conservation area was conserved with grants from LCHIP, NH DES, Great Bay Resource

Protection Partnership, and the Lamprey River Advisory Committee with a major focus of protecting the Tuttle Swamp ecosystem. The Town would benefit from a collaborative effort in managing these lands.

Actions

- The Conservation Commission and the Newmarket Public Works Department should review the natural resource management plan (on file at the Town Hall) and become familiar with the significant resources on town-owned land and the associated management issues (*Lead: Conservation Commission and Public Works*)
- Support and participate in efforts by the Great Bay Resource Protection Partnership to work together on implementing the plan (*Lead: Conservation Commission – Land Stewardship Subcommittee*)
- Consult with NH Fish and Game on implementing management activities on Tuttle Swamp conservation areas (*Lead: Conservation Commission – Land Stewardship Subcommittee*)

➢ **Recommendation: Re-Affirm commitment to the Land Trust Alliances (LTA) Standards and Practices**

Rationale

The Open Space Commission and Town Council adopted the LTA Standards and Practices in 2003, specifically those sections that apply to municipalities. The LTA updated the Standards and Practices in 2004 (see Appendix H for a copy). Some grant programs (e.g., LCHIP) require towns to adopt these standards and practices prior to receiving a grant. The Town of Newmarket negotiates with landowners on land acquisition, holds fee simple and easement interests in many properties, and is responsible for the stewardship of many of these lands. It is therefore a responsibility of anyone involved with these activities that they follow the ethical and technical guidelines developed by the LTA.

Actions

- Adopt a Town Resolution that affirms a commitment by the Town of Newmarket to follow the 2004 Standards and Practices developed by the Land Trust Alliance that are applicable to municipalities (*Lead: Town Council*)
- Members of the Conservation Commission, Open Space Commission, and Town Council and Newmarket employees involved with landowner negotiations, land acquisition, and land stewardship should review and follow the Standards and Practices

➢ **Recommendation: Host educational workshops on conservation topics and lead field trips to conservation areas to promote public awareness and involvement**

Rational

Numerous educational workshops have been held at the Newmarket Town Hall, although few in recent years. These have included workshops for landowners on estate planning and land protection, public informational workshops on Newmarket wetlands and other open spaces. The large meeting room on the lower floor of the Town Hall is an ideal location for such workshops. Given the changes in population growth, development, and land protection and new information on ecologically important areas in Newmarket from the Wildlife Action Plan and Coastal Plan, there is great opportunity to inform the public and galvanize interest in conservation issues.

Actions

- Partner with other towns, UNH Cooperative Extension, and local land trusts to host a workshop on estate planning and land protection for landowners. Highlight the successes in land protection in the past 10 years (*Lead: Conservation Commission and Open Space Commission*)
- Host an educational workshop on water quality and quantity in Newmarket that includes presentations on the status of Newmarket's drinking water sources and quality, water conservation program, Lamprey River in-stream flow study, shoreland and wetland protection, and related topics (*Lead: Conservation Commission*)
- Lead field trips to Newmarket conservation areas to raise awareness about the location, natural resource values, and public uses of town-owned conservation lands (*Lead: Conservation Commission*)

Land Conservation

These recommendations focus on continuing and enhancing Newmarket's success at dedicating local funding sources, obtaining State and Federal grants, and partnering with other conservation groups to protect important natural resources through fee simple acquisitions and conservation easements.

- **Recommendation: Dedicate 100% of the Land Use Change Tax to the Town Conservation Fund**

Rationale

The current use assessment is a property tax program that encourages landowners to maintain their property as open space through a reduced tax rate. As land is removed from current use, typically for development, it is logical to use the land use change tax to protect open space. Since 1989, 50% of the Land Use Change Tax (LUCT) in Newmarket goes into the Conservation Fund. By dedicating 100% of the LUCT to conservation, the Town can continue to protect the most significant open spaces identified in this Open Space Plan.

Actions

- Develop and implement an educational campaign to explain need for and benefit of this change prior to the vote (*Lead: Conservation Commission*)
- Submit a warrant article for vote at Town Meeting to increase the percentage of Land Use Change Tax dedicated to the (Conservation Commission) Conservation Fund from 50% to 100% (*Lead: Conservation Commission and Open Space Commission*)
- Research the history of Land Use Change Tax contributions to the Newmarket Conservation Fund including amounts per year and summary of how funds have been used since inception in 1989 (*Lead: Conservation Commission and Open Space Commission*)

- **Recommendation: Use tax lien properties to enhance existing network of conservation lands**

Rationale

Towns can acquire properties when the landowner fails to pay property taxes for three years in a row. Some of these lands may lie within priority areas for conservation and important to maintain as open space.

Actions

- All tax lien properties and donations should be reviewed by the Open Space Commission to determine conservation values before the lands are allocated to another use or sold (*Lead: Town Council and Open Space Commission*)
- If the property lies within a priority conservation area as identified by this Open Space Plan retain the parcel as conservation land. If the property has little conservation value, consider dedicating any proceeds from sale of the property to the Conservation Fund (*Lead: Town Council*)

➢ **Recommendation: Designate the Town-owned properties on Lita Lane as a conservation area, under the stewardship of the Conservation Commission**

Rationale

In 1984 a subdivision was approved off Lita Lane with 19.5 acres deeded to the Town as open space. In 1999 the remainder of the property that included the proposed development of 20 lots on about 10 acres was taken by tax lien and the houses were never developed. This site drains into a large prime wetlands system, abuts other conserved open space and is not highly suitable for development or athletic fields. The best use of this property is to officially designate it as town conservation land and add it to the other Lita Land open space. After becoming conservation land a further site evaluation might yield opportunities for a walking trail. There is currently no public conservation land in this part of Town with developed access.

Actions

- Designate the Lita Lane parcel taken by tax lien as conservation land under the stewardship of the Conservation Commission (*Lead: Town Council*)
- Evaluate this site and surrounding area for potential recreation walking trail and educational kiosk (*Lead: Conservation Commission and Recreation Department*)

➢ **Recommendation Maintain a list of priority conservation areas identified in this Plan and work with interested landowners and conservation partners to protect specific parcels in these areas**

Rationale

This Open Space Plan has identified many priority areas worthy of conservation given the presence of critical natural resources such as drinking water supplies, flood storage areas, prime wetlands, highest quality wildlife habitat, and connectivity. Given land values and the uncertainty of development pressure it is important to be proactive in identifying priority areas, talking with interested landowners, and identifying potential conservation partners and funding sources. Landowners or communities do not make land conservation decisions quickly, although towns need to be ready to take advantage of opportunities by establishing priorities.

Actions

- Develop a list of landowners within the priority conservation areas (*Lead: Open Space Commission*)
- Invite landowners to workshops on estate planning, land protection, and Newmarket conservation priorities (*Lead: Open Space Commission and Conservation Commission*)
- Initiate individual landowner contacts to share the information on the significance of their property to the respective natural resource values and to determine their level of interest in conservation (*Lead: Open Space Commission*)

- Coordinate landowner contacts with conservation partners (e.g., Great Bay Resource Protection Partnership, Southeast Land Trust of NH) who might also be pursuing conservation options with the same landowners (*Lead: Open Space Commission*)
- Maintain list and timeline of potential state and federal funding sources and as appropriate propose specific town warrants for funds to conserve specific parcels from interested landowners
- Work with interested landowners to protect current and future wellhead protection areas as the Town moves forward with locating new sites for groundwater wells (*Lead: Open Space Commission, Town Council*)

➢ **Recommendation:** **Work with a conservation partner to place conservation easements on existing Town-owned land that is owned and managed for conservation purposes but not currently restricted for such purposes**

Rationale

The Town owns several parcels that could have conservation easements placed on them to ensure that the natural resource values are protected in perpetuity. The advantage of placing easements on town-owned parcels, in addition to the added protection, is that the value of the easements can be used as in-kind match for other grant applications. This will enhance the town's ability to protect other lands within the priority conservation areas. The following town-owned parcels are worthy of additional protection through a conservation easement: Town landfill, Lita Lane parcels, and Follet's Brook parcels

Action

- Consult with the Great Bay Resource Protection Partnership and the Southeast Land Trust of New Hampshire on the most effective way to overlay conservation easements on selected town parcels to maximize protection and leverage of other grants (*Lead: Open Space Commission*)

➢ **Recommendation:** **Continue to collaborate with other conservation organizations including the Great Bay Resource Protection Partnership and the Southeast Land Trust of New Hampshire to conserve priority areas within Newmarket**

Rationale

The Great Bay Resource Protection Partnership has conserved over 600 acres of critical natural resource lands in Newmarket through fee simple acquisition and conservation easements. The Partnership is able to tap into significant federal funding sources to protect the nationally significant Great Bay Estuary. The Nature Conservancy, the land agent for the Partnership, established their seacoast office in Newmarket in 2006. In addition to their own land conservation projects, the Partnership has contributed nearly $500,000 toward projects led by the Town of Newmarket. We've received significant funds from the Lamprey River Advisory Committee and worked collaboratively with the Southeast Land Trust of New Hampshire. These collaborations are hugely important in all aspects of the land conservation process.

Action

- Maintain frequent communications with the Great Bay Resource Protection Partnership, Southeast Land Trust of New Hampshire, and other conservation partners to coordinate priority land conservation projects, landowner contacts, and funding options (*Lead: Open Space Commission*)

- **Recommendation:** **Continue to leverage Town conservations funds for land protection projects by regularly applying for funds from State and Federal grant programs**

Rationale
The Open Space Commission and Conservation Commission leveraged $1.6 million of town funds with $1.6 million of funds from federal and state grants over the past four years to conserve 430 acres. The Town received grants from the Land and Community Heritage Investment Program, NH Department of Environmental Services Water Supply Land Grant Program, Center for Land Conservation Assistance, and the federal Farm and Ranchland Protection Program.

Actions
- Keep track of the grant deadlines from each organization, as there is a lot of advance preparation to apply for grants. See Appendix A for a list of partners and grant sources (*Lead: Open Space Commission and Conservation Commission*)

- **Recommendation:** **Continue to reserve $500,000 of the $2 million land acquisition bond for the acquisition of athletic fields for public and school use**

Rationale
A portion of the $2 million land acquisition bond passed by Newmarket voters in 2002 was to be used for the acquisition of athletic fields. The Recreation Department and the Open Space Commission has searched for suitable land that is not too wet and not too rocky, and has met with limited success. Newmarket has few remaining large blocks of land left that are suitable for athletic fields. Since the School Board is in the midst of a similar search, looking for land to build a school or expand the existing school and provide for athletic fields, these two efforts may coalesce around the same location. The Open Space Commission recommended, and the Town Council approved, the set-aside of $500,000 from the land acquisition bond to be used toward the acquisition of land for athletic fields when a suitable location is found.

Action
- Continue to search for suitable locations for athletic fields (*Lead: Recreation Department and School Board*)

Land Use Planning

This section focuses on land use planning techniques to strengthen ordinances, make the process clear to applicants, and effectively protect key natural features, ecosystem services, and conservation areas.

- **Recommendation:** **Adopt this Open Space Plan as part of the Newmarket Master Plan**

Rationale
The Master Plan is a policy document that represents in text and maps the current conditions and vision for future land use in Newmarket. The Master Plan establishes the basis for local land use regulation and guides the non-regulatory actions of a community. This Open Space Plan augments the land use, water resources, terrestrial resources chapters of the 2001 Newmarket Master Plan with an updated natural

resource inventory, inventory of existing conservation lands, identification of priority conservation areas, and recommendations for achieving the vision of the Master Plan

Actions

- Work with the Strafford Regional Planning Commission to update Maps 1-7 included in this Open Space Plan (*Lead: Planning Department*)
- Adopt this Open Space Plan as part of the current Town Master Plan under a new Chapter titled Open Space Conservation and incorporate any updates during the next Master Plan update (*Lead: Planning Board and Town Council*)

➢ **Recommendation: Develop a Town record-keeping system to accurately and efficiently track existing lands in and additions to the network of conservation lands and subdivision open spaces in Newmarket**

Rationale

During the past 10 years several committees, boards, and other groups have collaboratively or independently conserved hundreds of acres of open space through fee simple acquisition, conservation easements, and open space subdivisions. Currently there is no consistent method of tracking these parcels. This information is important for Master Plan updates, identifying new conservation priorities, assessing impact of the open space subdivision ordinance, fulfilling monitoring and stewardship responsibilities, protecting sensitive resources, and assessing future recreation, development, and other projects.

Actions

- Require as a condition of approval to any open space design subdivision that the applicant submit in writing the size, ownership, public access, and protection/management status of set-aside open space associated with the subdivision and provide copies of the deeds, covenants, and by-laws associated with the open space to the Planning Department for review and approval by planning board and legal council prior to plan signing with final executed recorded copies to be filed in the Planning Department (*Lead: Planning Department*)
- Maintain a database of Existing Conservation Lands and other Open Spaces that is amended as new properties are conserved or as added through open space subdivisions. Develop a standardized form for the Conservation Commission, Open Space Commission, Town staff, and conservation partners to use in submitting new conservation lands for addition to the database. Link this database to a GIS map (*Lead: Planning Department*)
- Work with the Regional Planning Commission and the Complex Systems Research Center, which manages the GRANIT data mapper, to update and maintain the conservation lands layer for Newmarket (the current layer on the GRANIT website is out of date); there is a cost associated with this effort (*Lead: Planning Department and Conservation Commission*)

➢ **Recommendation: Update existing and implement new land use planning tools to provide additional protection to the Aquifer Overlay District and Wellhead Protection Area**

Rationale

The Bennett and Sewall Wells are currently the only source of public drinking water in Newmarket. It is essential that the Town maintain this as a viable clean source of water for residents on public water supply. All reasonable and cost-effective strategies should be implemented to protect the safety of this water supply. The NH Department of Environmental Services recommends a hierarchical approach to protecting groundwater that includes land conservation for the most sensitive resource areas, prohibiting a

few “high-risk” land use restrictions and then applying proper management of hazardous substances. To assist communities with groundwater protection the NH DES has several resources available including Best Management Practices (See Appendix F) and a newly developed 2006 model groundwater ordinance available at http://des.state.nh.us/dwspp/pdf/ModelOrdinance.pdf

Actions

- As recommended by Comprehensive Environmental Incorporated (CEI) in their October 3, 2006 report to the Town of Newmarket, follow the steps to reclassify groundwater within the wellhead protection area as a GAA class (highest level of protection) with NH DES. See Appendix F for more information on groundwater classification (*Lead: Town Council and Planning Department*)
- In the Newmarket Zoning Ordinance, update the Aquifer Protection Overlay section to reflect the redefined Wellhead Protection Area (as delineated by Comprehensive Environmental Incorporated)
- In the Newmarket Zoning Ordinance review the existing Aquifer Protection District to ensure that it provides maximum protection to drinking water supplies (*Lead: Planning Department and Board*). Review the NH DES model ordinance to consider additional provisions that will enhance protection of our drinking water including adoption of NH DES Best Management Practices (See Appendix F for more guidance)
- Evaluate the feasibility of re-locating the shooting range outside the defined wellhead protection area and outside any other sensitive resource overlay district to prevent any potential lead contamination (*Lead: Town Council*)
- Retain the old town highway facility as town open space to maintain a protective buffer around the Bennett Well (*Lead: Town Council*)
- Work with landowners and decision-makers in Durham as a large portion of the aquifer and Wellhead Protection Area lies within the Town of Durham (*Lead: Town Council, Public Works*)
- Conduct additional ecological studies within the Aquifer Overlay District, specifically for species of conservation concern identified by NH Fish and Game, including wood turtle and whip-poor-will (*Lead: Conservation Commission*)
- Identify all new sources of groundwater that could provide municipal drinking water supply and work with landowners to conserve the wellhead protection areas around these potential wells (*Lead: Town Council, Public Works, Open Space Commission*)

➢ **Recommendation: Require open space design development for residential subdivisions**

Rationale

As identified in the Natural Resource Inventory chapter of this Open Space Plan, Newmarket has an extraordinary diversity of natural features and relies on these open spaces to provide ecosystem services. The Newmarket zoning ordinance currently has an option for an open space design development that is allowed in zoning districts R1, R2, and M-4 with a special use permit. Used in combination with other tools such as land conservation and education and stewardship, the open space subdivision can be a complementary tool, however, the current language in the Newmarket ordinance should be strengthened to ensure that the natural resource values are preserved.

Actions

- Change the Zoning Ordinance and Subdivision Regulations to require open space design development town-wide and allow conventional subdivisions by special exemption only
- Modify the existing zoning ordinance and subdivision regulations to incorporate the following provisions in the open space design development:
    - Under “Purpose”, make reference to the Open Space Conservation Plan and the additional reasons for the open space subdivision to maintain ecosystem services: climate regulation, flood storage, nutrient cycling, purifying air and water, soil retention

- Require a high standard for land conservation: increase minimum required open space from 40% to 50% of developable land base
- Require shoreline setback of 250 feet from all perennial rivers and streams
- Require a site evaluation conducted by a certified natural resource professional prior to any design layout of the subdivision to maximize the conservation values; hired by the town but paid for by the developer. For the open space set aside the goals should be to conserve large blocks, provide wide wetland and riverine buffers (100 or more feet; 300 feet is needed for wildlife habitat), links/connectivity to other conservation lands
- The open space should be designated as conservation land and secured through a permanent conservation easement or deed restriction
- Remove density bonuses from this regulation
- In the subdivision regulations, consider deleting or modifying sections called Open Space Use and Management and Maintenance and Operation of Common Facilities. Determine how the town can enforce these provisions. Instead strengthen the upfront requirements of applicants to determine who will own the open space, agree on the conservation easement or deed provisions, and require these to be recorded prior to approval
- In the subdivision regulations add language that distinguishes between "common land" and "conservation land" as defined in the zoning ordinance
- Use minimum impact site design to prevent impacts on natural resources: reference NH Minimum Impact Development practices at http://www.nhmid.org/index.htm

- Involve the conservation community (e.g., Conservation Commission, Open Space Commission, local land trusts) in the design review and open space preservation process from the beginning of an application

Recommendation: **Implement all feasible Stormwater Management practices to prevent or minimize runoff that contains contaminants and causes erosion**

Rationale

Stormwater runoff can carry pathogens, nutrients, heavy metals, sediment, and other contaminants as it flows over land. The increase in impervious or paved surfaces associated with development reduces the natural infiltration of precipitation into the ground. With impervious cover, precipitation collects and carries contaminants before draining into nearby surface waters. Stormwater runoff from paved surfaces in developed areas can degrade downstream waters with both contaminants and increased volumes of water (from NH DES website). As with most seacoast communities, the amount of impervious surface has increased from 5.9% in 1990 to 10.1% in 2005.

Actions

- Update zoning ordinance and subdivision regulations to incorporate stormwater management provisions including minimum (low) impact development (*Lead: Planning Board and Department*)
- Select the best stormwater best management practices (bmp) based on site specific conditions (see http://www.des.state.nh.us/wmb/was/manual/) (*Lead: Planning Board and Public Works Department*)
- Implement maximum stormwater bmp provisions within the priority areas for conservation identified in the Open Space Conservation Plan; maximize protection of natural systems that provide natural flood storage, groundwater recharge, and filtration (e.g., wetlands, floodplains, riparian areas) (*Lead: Planning Board and Public Works Department*)

- **Recommendation:** **Implement the wetland mitigation projects in Newmarket as identified in a 2003 Report to the NH Estuaries Project, and other restoration projects as opportunities and funding allow**

Rationale

The NH Estuaries Project funded a project that inventored freshwater wetlands in 19 coastal communities, including Newmarket, for potential sites for wetland mitigation. Ten sites in Newmarket were identified in the inventory. These range in size from 0.5 acres to 650 acres and include creation, restoration, or preservation recommendations. Some of the sites included were Moonlight Brook (creation, perhaps catch basins) and wetlands associated with Tuttle Swamp and the Piscassic River.

Action

- The Planning Board and Conservation Commission should review this list for potential mitigation sites during review of applications for subdivisions and wetlands impacts (*Lead: Planning Board and Conservation Commission*)
- Consult the Great Bay Estuary Restoration Compendium (Odell et al. 2006) for opportunities to restore estuarine habitats and fisheries (*Lead: Planning Board and Conservation Commission*)

- **Recommendation:** **Evaluate the tidal wetlands (saltmarsh) to assess for potential designation as prime wetlands, similar to the freshwater prime wetlands designation**

Rationale

Newmarket recently completed a process of evaluating all the freshwater wetlands in town to determine the ecological, scenic, recreational, and social value and to identify and designate the most important ones as prime wetlands. The detailed boundaries of each of these prime wetlands was recorded on a 1998 digital ortho photo, which along with the written documentation was submitted to the NH Department of Environmental Services and approved by that agency in November 2006. These prime wetlands are afforded additional protection within the Newmarket Zoning Ordinance. Any projects located in or adjacent to designated prime wetlands are considered "Major Projects" according to NH DES wetlands rules and application procedures and receive a much higher level of review and require more documentation on impacts, avoidance, and mitigation. Newmarket has important tidal saltmarshes that should receive similar evaluation and protection through the prime wetland designation process.

Actions

- Apply for a grant to assist in evaluating the tidal wetlands (saltmarsh) in Newmarket for their potential designation as prime wetlands (*Lead: Conservation Commission*)
- Hire a certified wetlands scientist to conduct the saltmarsh evaluation and to complete the designation process (*Lead: Conservation Commission*)
- If the Town is not able to re-establish Follet's Brook as a drinking water supply consider adding this wetland to the prime wetland designations (*Lead: Conservation Commission*)

- **Recommendation:** **Maintain involvement in committees related to the Lamprey River including the Lamprey River Advisory Committee and the Lamprey River In-Stream Flow Study Committee**

Rationale

The Lamprey River is designated as a recreational Wild and Scenic River from the Bunker Pond Dam in Epping to the confluence with the Piscassic River near the Durham/Newmarket Town Line. The Lamprey River Advisory Committee (LRAC), with volunteer members from all four towns, has the principle

responsibility for development and implementation of a long-range river management plan and reviews and comments on projects that could impact the river. Although the section of the Lamprey River in Newmarket is not officially within the Wild & Scenic designation, Newmarket is recognized as a full member of LRAC. At 212 square miles, the Lamprey River watershed is the largest watershed and the longest tributary to the Great Bay Estuary. Given the location of Newmarket at the mouth of the River, it is in the Town's interest to work with upstream communities to protect water quality and quantity and to maintain flood storage and other natural services within the watershed. The NH Department of Environmental is conducting a pilot program to study and establish protected instream flows and water management plans on the Lamprey River, which has a bearing on the Town of Newmarket.

Actions

- Maintain a minimum of two volunteer members from Newmarket on the Lamprey River Advisory Committee (*Lead: Town Council appointments*)
- Participate in the public sessions on the Lamprey River In-Stream Flow Study coordinated by NH DES *(Lead: Town Council)*

Table 11. Summary of Recommendations, Newmarket Open Space Plan (Snyder 2007)

See Chapter 8 for more details on recommendations.

RECOMMENDATIONS	Conservation Commission	Open Space Commission	Planning Board & Dept	Town Council	Public Works Dept	Recreation Dept	Town Webmaster
EDUCATION AND STEWARDSHIP							
Erect and/or maintain information kiosks at the following conservation areas: Wiggin Farm-Tuttle Swamp, Piscassic River-Loiselle, Heron Point Sanctuary, Sliding Rock, and Schanda Park	X						
Provide information on town conservation lands and conservation issues to the public through the Town of Newmarket website and the public access Channel 13	X						X
Conduct annual monitoring visits to Town-owned conservation lands and Town-held conservation easements	X						
Review the Town Ordinances that pertain to use of conservation lands to ensure that the ordinances are consistent with the purposes for which the land was conserved	X						
Develop a walking trail on the Piscassic River-Loiselle Conservation Area that connects to Follet's Brook conservation lands	X					X	
Continue to evaluate and implement opportunities to develop a walking trail network throughout Town and connecting to open spaces in neighboring towns	X					X	
Maintain the open fields and implement other management activities at the Wiggin Farm-Tuttle Swamp and Piscassic River-Loiselle Conservation Areas; follow management plan	X				X		
Re-Affirm Commitment to the Land Trust Alliances (LTA) Standards and Practices				X			
Host educational workshops on conservation topics and lead field trips to conservation areas to promote public awareness and involvement	X						

RECOMMENDATIONS	Conservation Commission	Open Space Commission	Planning Board & Dept	Town Council	Public Works Dept	Recreation Dept	Town Webmaster
EDUCATION AND STEWARDSHIP, CONT							
Collaborate with the Great Bay Resource Protection Partnership on implementing the Natural Resource Management Plan for the Tuttle Swamp Watershed	X				X		
LAND CONSERVATION							
Dedicate 100% of the Land Use Change Tax to the Town Conservation Fund	X	X					
Use tax lien properties to enhance existing network of conservation lands		X		X			
Designate the Town-owned properties on Lita Lane as a conservation area		X		X			
Maintain a list of priority conservation areas identified in this Plan and work with interested landowners and conservation partners to protect specific parcels in these areas	X	X					
Work with a conservation partner to place conservation easements on existingTown-owned land that is owned and managed as conservation purposes but not currently protected		X		X			
Continue to collaborate with other conservation organizations including the Great Bay Resource Protection Partnership and the Southeast Land Trust of New Hampshire to conserve priority areas within Newmarket	X	X					
Continue to leverage Town conservations funds for land protection projects by regularly applying for funds from State and Federal grant programs	X	X					
Continue to reserve $500,000 of the $2 million land acquisition bond for the acquisition of athletic fields for public and school use						X	
LAND USE PLANNING							
Adopt this Open Space Plan as part of the Newmarket Master Plan			X	X			

RECOMMENDATIONS	Conservation Commission	Open Space Commission	Planning Board & Dept	Town Council	Public Works Dept	Recreation Dept	Town Webmaster
LAND USE PLANNING, CONT							
Develop a Town record-keeping system to accurately and efficiently track existing lands in and additions to the network of conservation lands and subdivision open spaces in Newmarket			X				
Update existing and implement new land use planning tools to provide additional protection to the Aquifer Overlay District and Wellhead Protection Area			X	X			
Require open space design development for residential subdivisions			X				
Implement all feasible Stormwater Management practices to prevent and minimize runoff that contains contaminants and causes erosion			X		X		
Implement the wetland mitigation projects in Newmarket as identified in a 2003 Report to the NH Estuaries Project, as opportunities and funding allow	X		X				
Evaluate the tidal wetlands (saltmarsh) to assess for potential designation as prime wetlands, similar to the freshwater prime wetlands designation	X						
Maintain involvement in committees related to the Lamprey River including the Lamprey River Advisory Committee and the Lamprey River In-Stream Flow Study Committee				X			

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Map 1 - Base Map

Town Of Lee

Town Of Durham

Town Of Epping

Town Of Newfields

Town Of Stratham

Great Bay

Lee Hook Rd

Packers Falls Rd

Dame Rd

Durham Pt Rd

Camp Ground Rd

Follet's Brook

Piscassic River

Elm St

McCallen Dam

Lubberland Creek

Bay Rd

Rt 152

Tuttle Swamp

Ash Swamp Rd

Grant Rd

Cushing Rd

Lamprey River

Bennett Way

New Rd

Great Hill

Alyce Dr

Grant Rd

Grapevine Hill

Grant Rd

Neal Mill Rd

Jacobwell Rd

Bald Hill Rd

Bald Hill

NH 108

Ibis Wildlife Consulting

Ellen J. Snyder
Newmarket, NH

0 0.25 0.5 Miles

Town of Newmarket Open Space Plan

Town of Newmarket Base Map

Main Roads
Roads
Political Boundaries
Water
Wetlands
Dams
Hilltop

N

Map 2 - Drinking Water

Town Of Durham
Town Of Lee
Town Of Epping
Town Of Newfields
Town Of Stratham

Packers Falls Rd
Dame Rd
Lee Hook Rd
Camp Ground Rd
Follet's Brook
Piscassic River
Elm St
Durham Pt Rd
Lubberland Creek
Bay Rd
Rt 152
Ash Swamp Rd
Grant Rd
Cushing Rd
Lamprey River
Bennett Way
New Rd
Great Bay
Alyce Dr
Grant Rd
Grant Rd
Neal Mill Rd
Jacobwell Rd
Bad Hill Rd
NH 108

NW-04
NW-04
NW-05
NW-01
SW-01
SW-01
SW-04
SW-03
SW-06
SW-02
SE-02
SE-01
NE-08
NE-01
NE-05
NE-07
NE-06
NE-06
NE-03
NE-04

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Newmarket, NH

0 0.25 0.5 Miles

Town of Newmarket Open Space Plan

Newmarket Ground Water and Drinking Water Resources

- Water Tower
- Water Treatment
- Municipal Wells
- Wellhead Protection Area
- Prime_Wetlands
- Stratified Drift Aquifer
- Water
- Wetlands
- Town Bounds
- Main Roads
- Roads

N

Map 3 - Significant Areas

Town Of Lee
Town Of Durham
Town Of Epping
Town Of Newfields
Town Of Stratham
Lower Lamprey River
Lamprey River
Crommet and Lubberland Creeks
Lower Lubberland Creek
Lower Piscassic River
Squamscott River
Great Bay
Follet's Brook
Piscassic River
Lubberland Creek
Lamprey River
Camp Ground Rd
Lee Hook Rd
Packers Falls Rd
Dame Rd
Durham Pt Rd
Bay Rd
Rt 152
Elm St
Ash Swamp Rd
Grant Rd
Bennett Way
Cushing Rd
New Rd
Great Hill
Grapevine Hill
Alyce Dr
Jacobwell Rd
Bald Hill
Bald Hill Rd
Neal Mill Rd
NH 108

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Newmarket, NH

0 0.25 0.5 Miles

Town of Newmarket Open Space Plan

State and Regional Areas of Ecological Significance

Coastal Plan
- Core Habitat
- Supporting Habitat

NH Fish and Game Wildlife Action Plan
- Highest quality habitat in NH (tier 1)
- Highest quality habitat in biological region (tier 2)

- Water
- Wetlands
- Town Bounds
- Main Roads
- Roads

N

Map 4 - Zoning Overlays

Town Of Durham
Town Of Lee
Town Of Epping
Town Of Newfields
Town Of Stratham
Great Bay

Packers Falls Rd
Dame Rd
Durham Pt Rd
Lee Hook Rd
Camp Ground Rd
Rt 152
Elm St
Grant Rd
Cushing Rd
New Rd
Jacobwell Rd
Bald Hill Rd
Mill Rd
NH 108

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Newmarket, NH

0 0.25 0.5 Miles

Town of Newmarket Open Space Plan

Newmarket Zoning Ordinance Overlay Districts

Steep Slope Overlay
Max Slope
25%
35%
60%

Newmarket Shoreline Overlay
Watershed Overlay
State Shoreline Protection
Floodplain Overlay
Wellhead Protection Area Overlay
Wetlands Overlay

Water
Wetlands
Town Bounds
Main Roads
Roads

N

Map 5 - Conservation Areas

Town Of Durham
Town Of Lee
Town Of Epping
Town Of Newfields
Town Of Stratham
Great Bay
Camp Ground Rd
Lee Hook Rd
Packers Falls Rd
Dame Rd
Durham Pt Rd
Follet's Brook
Piscassic River
Rt 152
Elm St
Lubberland Creek
Bay Rd
Cushing Rd
Lamprey River
Ash Swamp Rd
Grant Rd
Behnett Way
Alyce Dr
Grant Rd
Grant Rd
New Rd
Neal Mill Rd
Jacobwell Rd
Bald Hill Rd
NH 108

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0 0.25 0.5 Miles

Town of Newmarket Open Space Plan

Newmarket Conservation Lands and Other Open Space

- Town Owned Conservation Lands
- Town Conservation Easements
- Other Town Owned Lands
- Town Owned Recreation Lands
- Private Conservation Lands
- Private Conservation Easements
- Open Space Subdivision Common Lands
- 2005 Parcel Lines
- Water
- Wetlands
- Town Bounds
- Main Roads
- Roads

N

Map 6 - Landcover

Town Of Durham
Town Of Lee
Town Of Epping
Town Of Newfields
Town Of Stratham
Great Bay

Camp Ground Rd
Lee Hook Rd
Packers Falls Rd
Dame Rd
Durham Pt Rd
Follet's Brook
Piscassic River
Rt 152
Elm St
Lubberland Creek
Bay Rd
Cushing Rd
Lamprey River
New Rd
Bennett Way
Grant Rd
Ash Swamp Rd
Alyce Dr
Grant Rd
Grant Rd
Neal Mill Rd
Jacobwell Rd
Bald Hill Rd
NH 108

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Town of Newmarket Open Space Plan

Newmarket Land Cover 1998

1998 Land Use
Landuse Type
- Residential
- Industrial/Commercial
- Mixed Urban
- Transportation
- Playing Fields/Recreational
- Agriculture
- Farmsteads
- Forested
- Water
- Open Wetlands
- Idle/Other
- 2005 Parcel Lines

- Water
- Wetlands
- Town Bounds
- Main Roads
- Roads

N

Map 7 - Priority Areas

Town Of Durham

Town Of Lee

Town Of Epping

Town Of Newfields

Town Of Stratham

Great Bay

Follet's Brook Watershed
NHDES Delineation

Newmarket Plains Aquifer
CEI Newmarket Plains Aquifer Delineation

Piscassic River

Piscassic River
Coastal Conservation Plan

Tuttle Swamp
NFWS National Wetlands Inventory

Lubberland Creek

Lower Lubberland Creek
Coastal Conservation Plan

Lamprey River

Great Bay
Coastal Conservation Plan

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0 0.25 0.5 Miles

Town of Newmarket Open Space Plan

Priority Conservation Areas

Conservation Priorities
- Newmarket Plains Aquifer
- Great Bay
- Lower Lubberland Creek
- Piscassic River
- Tuttle Swamp
- Follet's Brook Watershed

- Conservation Land
- Water
- 2005 Parcel Lines
- Town Line

- Water
- Wetlands
- Town Bounds
- Main Roads
- Roads

N

ATTENTION

The appendices are not available with the online version of this report.

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