



**Town of Newbury, New Hampshire**  
**Townwide Conservation Plan**

March 2008



**Town of Newbury, New Hampshire**  
**Townwide Conservation Plan**

March 2008

**Prepared for the Newbury Conservation Commission by:**

**E. Ann Poole, M.Sc.**  
**Ecologist & Environmental Planner**  
**Hillsborough, NH**



## **Preface**

### Why a Conservation Plan?

Every few years it's both healthy and necessary for a growing community to look at itself – preferably through the eyes of a professional – with a view toward better controlling its evolution.

For the Newbury Conservation Commission, specifically charged with protecting the town's environmental riches, the path to this goal took the form of a Townwide Conservation Plan. The plan's observations, conclusions and recommendations, presented in both text and maps, are contained in the following pages.

To make this most recent evaluation complete, we also commissioned a review of the 2001 Newbury Natural Resources Inventory, a catalogue of the town's natural heritage. A 39-page Addendum to the original NRI was prepared.

The 2007 Conservation plan and the Addendum to the 2001 NRI are available for townspeople to study in printed form at the Town Office Building and the Library, and on-line at the Newbury website: [www.newburynh.org](http://www.newburynh.org).

This report was made possible thanks to the generous contribution of time and information by the Members of the Newbury Conservation Commission:

**William Weiler**, Chair  
**Katheryn Holmes**, Vice Chair  
**Suzanne Levine**  
**Frank Perrotta**  
**Eric Unger**  
**William Annable** (Alternate)  
**Clare Bensley** (Alternate)  
**Deane Geddes** (Alternate)

Denise Rico, Principal, Terra Design LLC of Henniker, NH, produced the accompanying maps.

## TABLE OF CONTENTS

	<b>Page</b>
Table of Contents	i
List of Tables	iii
List of Maps	iii
I. Introduction	1
II. Goals and Objectives	3
III. Natural Resources	5
A. Setting	5
B. Land Cover	6
C. Important Natural Features	7
1. Promontories & Scenic Vistas	7
2. Rare Species	8
3. Important Natural Areas	8
4. Potential Linkages & Wildlife Corridors	11
IV. Threats	13
A. Land Use Conversion & Development	13
B. Fragmentation	14
C. Parcelization	15
D. Biological Pollution	17
V. Conservation Priorities	21
A. Northeast Newbury	22
B. Center Newbury	22
C. Sunapee Valley	23
D. Pleasant View	23
E. South Newbury Valley	23
F. Key Wildlife Corridors & Road Crossings	24

VI. Overview of Land Protection Tools & Techniques	25
A. Conservation by Private Landowners	25
B. Current Use	26
C. Acquisition of Fee Interest	27
D. Conservation Subdivision Design	28
E. Zoning	29
1. Large Lot Zoning	29
2. Down-Zoning	29
3. Open Space Zoning	30
4. Village Plan Alternative Subdivision	30
5. Mandatory Open Space Set Asides	30
6. Sensitive Environmental Area Zoning	31
7. Overlay District Zoning	31
8. Village District Zoning	32
9. Flexible Development Zoning	32
10. Feature-based Density Zoning	33
11. Lot Size Averaging	35
12. Agricultural Incentive Zoning	36
13. Wildlife Habitat Management	37
14. Transfer of Development Rights	38
VII. Conclusions & Recommendations	41
References	47
Maps	

## **TABLES**

1.	Newbury Townwide Conservation Planning Project Phases	1
2.	Information sources used in the identification of important natural areas	10
3.	Conservation Options for Landowner	25

## **MAPS**

1.	Base Map
2.	Water Resources
3.	Land Cover
4.	Unfragmented Lands
5.	Conservation Lands, Trails, & Historic Sites
6.	Important Natural Areas
7.	Slopes & Promontories
8.	Wildlife Corridors, Important Natural Areas & Zoning





## **I. INTRODUCTION**

In 2001, the Newbury Conservation Commission prepared an “index” or inventory of natural resources for the town as mandated by RSA 36-A:2. As permitted by that statute and as recommended in the Newbury Natural Resources Inventory (NRI), the Commission undertook a two-year project to update the NRI and create a townwide conservation plan. Specifically, objectives of the project were to:

- Analyze information regarding existing ecological conditions and land use in the Town of Newbury and update the 2001 Natural Resources Inventory;
- Assess natural areas and potentially important ecologically-significant sites in town;
- Identify and rank areas for conservation;
- Involve residents, as represented by the Newbury Conservation Commission and others, in developing alternative strategies for resource conservation; and,
- Prepare a strategic Conservation Plan for inclusion in the 2007 Master Plan that will inform and support conservation and land use planning, including specific recommendations for regulations if needed.

In June, 2006, the Commission hired a consultant to guide the project and develop the conservation plan. The project was conducted in a series of five phases (Table 1). This document, the Newbury Townwide Conservation Plan (2007), represents the culmination of that Project.

**Table 1. Newbury Townwide Conservation Planning Project Phases**

***Phase I. Data Gathering***

The first phase of the project consisted of gathering data and information regarding existing ecological conditions and land use in the Town of Newbury, including digitally mapped data regarding land use and landscape features. The information included:

- Political boundaries
- Roads
- USGS topographic contours (20' interval)
- Surface water hydrology
- Floodplains
- Watershed boundaries
- Boating access points
- Aquifers and resource waters
- Resource extraction sites
- USDA Natural Resources Conservation Service soil types (2005)
- USFWS National Wetlands Inventory Survey data
- Rare wildlife and plant species occurrences
- Wildlife and fishery management areas (e.g., wildlife management areas, stocked streams, wetland bird and amphibian monitoring sites, winter deer yards)
- Land cover type
- Historic cultural resources

Table 1. Newbury Townwide Conservation Planning Project Phases (cont'd)

- Recreational facilities
- Locally-designated scenic roads
- Scenic vistas
- Publicly-owned land
- Permanently protected conservation land

**Phase II.        *Natural Resources Inventory Update***

Using the information collected during Phase I as a baseline, the 2001 Natural Resources Inventory (NRI) report was reviewed. An Addendum was then prepared to present newly available information regarding ecological conditions and land use in the Town of Newbury as well as to correct errors, explain inconsistencies and otherwise update the information found in NRI report. The 2007 Addendum generally follows the 2001 NRI in organization and format. New and supplemental information not covered in the 2001 report is presented in the final section. Key findings are discussed within the respective sections.

**Phase III.        *Draft Conservation Plan***

Based on the results of the maps, analyses and field surveys, and comments received from the planning board and public, the consultant prepared a Draft Conservation Plan. The draft Plan included digital maps featuring new and revised information, identified critical natural resources and potentially significant habitat, and discussed issues affecting ecologically-sensitive areas at the local scale.

**Phase IV.        *Outreach***

Early on in the project, the Conservation Commission met with and established a working relationship with the Planning Board. The Planning Board has continued to be a valuable voice and active participant in the development of the Plan. In addition, the Conservation Commission has hosted public informational meetings to: involve and inform residents and other interested parties; explain the purpose of the project; describe the process being used to develop the conservation plan; display draft geographic information system (GIS) maps; seek comment and gather ideas as to what area(s) should be targeted for protection; and, request continued participation by interested residents as the plan is developed.

**Phase V.        *Final Conservation Plan***

Based on the results of the maps, analyses and field surveys, and comments received from the planning board and public, the consultant prepared this report: the final townwide Conservation Plan. Like the draft Plan, the final Plan includes digital maps featuring new and revised information, identifies critical natural resources and potentially significant habitat, and discusses issues affecting ecologically-sensitive areas at the local scale.

Additionally, the final Plan 1) compares and contrasts the results of the Conservation Plan with the existing Master Plan and Zoning Regulations and describes potential inconsistencies between and among them, and 2) provides conclusions, recommendations, and strategic options to the Newbury Conservation Commission regarding uses for the Conservation Plan.

## **II. GOALS AND OBJECTIVES**

Newbury's mountains, hillsides, woodlands, brooks, scenic views and natural areas are very important elements to the quality of life in Newbury for both residents and visitors. In addition, Newbury's location on Lake Sunapee makes it a prime target for growth. Though travel and tourism are important to the local economy, Newbury recognizes the need to take actions that will enhance the broader economic base of the community. Future development in Newbury will be regulated by the town's policies and ordinances which promote the protection of natural resources and preservation of the essential town character, while providing for the maintenance of a vital economy.

Recognizing the importance of natural resources to sustaining "quality of life," the goals of this Plan are to:

- Promote the conservation, protection and sound management of natural resources in the Town of Newbury;
- Preserve and enhance the ecological integrity of the town's natural communities and wildlife habitats;
- Sustain the scenic quality and visual character of the town;
- Support landscape-based recreational opportunities; and,
- Address non-indigenous, invasive nuisance species in an environmentally sensitive manner.

In keeping with these goals, this plan:

- Presents GIS-based information regarding existing ecological conditions and land use in the Town of Newbury;
- Points out natural areas and potentially important ecologically-significant sites in town;
- Describes alternative strategies for resource conservation; and
- Provides guidance in the form of specific recommendations to support conservation and land use planning.



### **III. NATURAL RESOURCES**

#### **A. Setting**

The Town of Newbury is situated at the southern end of Lake Sunapee, to the east of Mount Sunapee and north of the Warner River in Bradford. Total area of the town is 38.0 square miles (24,300 acres); 35.8 square miles (22,900 acres) of which is land area (See Map 1). The majority of land in town is in hardwood and conifer forest, most of which is in small holdings. The remaining area is in residential development, agricultural use, or urban land.

Various factors have influenced the growth and development in town. In many ways, land use in Newbury is typical of many small, rural towns in New Hampshire; commercial land uses are located along heavily traveled regional roadways while the majority of residential development is located in the back lands of the community. Major physical and topographic features are the primary factors that influence the initial as well as subsequent development of land. Forestry, tourism and recreational activities which began in the 19th century and continue to thrive, combine to form the town's primary economic base and dominant land uses. The Mount Sunapee-Pillsbury State Park system (including Mount Sunapee Resort), for example, has both a large physical, as well as economic presence, in town.

In addition to Lake Sunapee, the major water bodies in town are Chalk Pond, Gillingham Pond, and Todd Pond, Blodgett and Andrew brooks (See Map 1). All named ponds and lakes in town are classified by the NH Department of Environmental Services (DES) as "public waters", which means that they are subject to the State's Comprehensive Shoreland Protection Act (RSA 483-B). This law was enacted in 1991 and updated in 2001, and establishes standards for use and development of the land around the state's public waters, defined as all land located within 250 feet of the water.

An extensive amount of residential development has occurred, and rebuilding and upgrading of homes continues to occur, around Lake Sunapee, Chalk Pond, Gillingham Pond, and Todd Pond. High density residential development around Chalk Pond has caused an accumulation of external nutrients, particularly phosphorus, resulting from surface runoff and land erosion. When concentrations of phosphorus approach threshold levels (15 parts per billion), a lake may experience algal blooms which decrease the aesthetic, recreational, ecological, and economic value of the lake and land areas surrounding it. Intensive water quality monitoring of Lake Sunapee, Chalk Pond and Todd Pond by the DES, Lake Sunapee Protective Association, Lake Todd Village District and Chalk Pond / Sunapee Hills Association is ongoing. The results of these studies are published and available upon request by contacting DES' Volunteer Lake Assessment Program (VLAP) coordinator.

Settlement in Newbury has been influenced by two major roads: NH Route 103 (Sunapee-Bradford Road) and NH Route 103A (New London Road). Both roads are major collectors

designed to move medium traffic volumes at medium speeds between or within communities. There are no interstate highways or active passenger rail lines in Newbury.

Another factor that could affect settlement patterns in Newbury is the introduction of telecommuting, which does not require transportation infrastructure for people to travel to their workplace. The effect this may have on development in Newbury remains to be seen.

## **B. Land Cover**

To facilitate resource planning and management, the US Forest Service has developed a hierarchical framework of regional land classifications based on association of ecological factors at different geographic scales. The resulting ecological regions delimit areas of different biological and physical potentials. Newbury lies in New England Piedmont Ecological Region, Vermont-New Hampshire Upland Section (US Forest Service). In New Hampshire, this section covers the southwestern portion of the state. From maximum elevations of 2200 feet, it slopes southeastward to its boundary with the Gulf of Maine Coastal Plain. It is a sloping plateau dissected by steep, narrow valleys and underlain by granite, gneiss, and schist. This section is divided into four subsections, one of which is the Sunapee Uplands.

The Sunapee Uplands is characterized by glacial features such as isolated hills and peaks of hard, resistant rock (commonly referred to as monadnocks), numerous small lakes and narrow valley streams, and small hills composed of undifferentiated sediment or till (drumlins). The local soils are shallow, stony and nutrient poor and this is reflected in the composition and distribution of plant communities.

The plant community is predominantly a transitional hardwood-conifer forest. Transitional forests are positioned latitudinally and elevationally between northern hardwoods and central hardwoods or oak-pine forests, where both types co-exist. Transitional forests are found throughout central and southern New Hampshire and at lower elevations in the White Mountain region. They are characterized by red oak, white pine and hemlock mixed variously with American beech, sugar maple, and yellow birch, and red spruce. Red oak and beech are the primary sources of hard mast, or hard-shelled seeds, which is important food for wildlife.

The area is at relatively low risk of long-term or wide-spread ecological disturbance caused by hurricanes, wild fires, or catastrophic flooding. The principle agent of changes in the regional landscape is human activity. For example, the composition of present day forest on a landscape scale is heavily influenced by agricultural activity between the Colonial period and 1840, as well as by selective logging of certain species, particularly conifers.

Although the regional distributions of modern and pre-settlement forest types are similar, 250 years of land use activity has affected forest structure and composition across the landscape. Nineteenth-century timber harvesting resulted in a largely deforested landscape by the early 20th century. Insect and disease disturbances have resulted from chestnut blight, gypsy moth, spruce budworm, severe beech bark disease, butternut canker, and periodic birch and sugar maple

defoliators. At higher elevations, spruce decline is related to severe winter damage and soil nutrient depletion caused by acid rain.

Wildlife species commonly associated with transitional forests include gray jay, Cape May warbler, dark-eyed junco, red bat, snowshoe hare, red squirrel, fisher, moose, ruffed grouse, pileated woodpecker, turkey, red-tailed hawk, chestnut-sided warbler, Nashville warbler, black-throated blue warbler, red-eyed vireo, rufous-sided towhee, scarlet tanager, northern and southern flying squirrel, and white-tailed deer. Timber wolf, and mountain lion were extirpated through land clearing and settlement activities; coyotes, bobcats, black bears, and humans are the primary consumers today. Pine martens and fishers are locally common. Beaver-created wetlands are common and support a host of species, such as bullfrog, green frog, black duck, wood duck, hooded merganser, northern harrier, great horned owl, meadow vole, mink and otter. Spotted salamander, redback salamander, American toad, grey treefrog, spotted turtle, wood turtle, northern water snake, and ribbon snakes characterize a richer herpetofaunal community.

### **C. Important Natural Features**

#### 1. Promontories & Scenic Vistas

Newbury's landscape is dominated by Mount Sunapee and the Sunapee-Pillsbury ridge on the west side of town and Lake Sunapee to the north. Mount Sunapee lies in the towns of Goshen and Newbury. The mountain's three highest elevations are in Newbury (Mount Sunapee, 2,726 feet above sea level; South Peak 2,580 feet above sea level; North Peak, 2,280 feet above sea level) going down to 1,093 feet at Sunapee Lake.

Other notable promontories are Sunset Hill (1,840 feet above sea level) and Bly Hill (2,024 feet above sea level) in the northeast part of town; Eagle Nest (1,660 feet above sea level) west of Newbury Center; Bear Hill (1,540 feet above sea level) and Bald Sunapee (2,070 feet above sea level) in the south end of town; and, Poor Farm Hill (1,140 feet above sea level) and Morse Hill (860 feet above sea level) in the southeast corner of town. The northeast and southeast parts of town have the lowest elevations, ranging from 900 to 1,100 feet above sea level.

Panoramic vistas can be enjoyed from Mount Sunapee, Newbury Harbor, Sunset Hill, Eagle's Nest, and from Newell and South Roads across into Bradford (aka Pleasant View). For those traveling through the area, spectacular views can also be seen from points along Route 103 (Newbury-Sunapee), a state-designated Scenic Byway, and 103A (Newbury-New London).

Enchanting views can also be found at a more local scale. Three roads in Newbury are town-designated Scenic Roads: Cheney Road, Old Province Road, and Gillingham Drive. Prominent historic structures which were once the center of public life are located in the villages of South Newbury and Newbury Center. With its many hiking trails, back roads and by-ways, Newbury offers innumerable scenic opportunities year-round.

## 2. Rare Species

The NH Natural Heritage Bureau tracks exemplary natural communities, and rare plant and animal species. To qualify as exemplary, a natural community or system in a given place must be of a rare type, such as an old-growth forest, or must be a high-quality example of a common community type. Rare plant and animal species are listed as endangered or threatened, or are classified as being of “special concern”.

Plants and animals are listed as endangered or threatened because of the present or threatened destruction of habitat; over utilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; or other factors affecting survival. Reasons a plant or animal can be considered rare or a “species of special concern” are because it occurs only in a relatively small area; its populations are disjunct (i.e., occur in widely separated areas); is a relic (i.e., probably were more common when the state’s climate was much different); are reaching the periphery or edge of their range; have specific habitat requirements; are declining significantly in numbers due to human activities and are restricted to isolated fragments of remaining habitat.

Two exemplary natural communities, two rare plant species, and two rare wildlife species occur in Newbury. The exemplary natural communities, *montane circumneutral cliff* and *rich red oak rocky woods*, occur in the vicinities of Lakewood Manor and Sunset Hill, respectively. The rare plant species, fragrant fern (*Dryopteris fragrans*) and Loesel’s twayblade (*Liparis loeselii*), occur in the vicinities of North Peak and The Hay National Wildlife Refuge, respectively. The rare wildlife species, common loon (*Gavia immer*) and wood turtle (*Glyptemys insculpta*), occur in the vicinity of Todd Pond and are anecdotally reported to occur on Lake Sunapee. It should be noted that other rare natural communities, plant and wildlife species may occur elsewhere in Newbury that have not been recorded by the NH Natural Heritage Bureau.

## 3. Important Natural Areas

Important Natural Areas are defined as areas which have the potential to support a natural community of plants and animals, and are ecologically important in terms of features, functions, representation or amount. For purposes of this Plan, important natural areas are tracts of land exhibiting one or more of the following characteristics:

- Rare vegetation communities
- Significant habitats for wildlife
- Documented occurrences of species of conservation concern
- High physiographic or natural community diversity

To determine the presence of these characteristics, information regarding land use and landscape features was integrated and analyzed using a geographic information system (GIS) to generate descriptions of broad (landscape-scale) features in Newbury. This technique has been shown to



have a high degree of accuracy in locating significant natural areas in a timely and cost-effective manner.

Most of the information obtained came from the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT). NH GRANIT is a cooperative project to create, maintain, and make available a statewide geographic data base serving the information needs of state, regional, and local decision-makers. Table 2 summarizes the most useful information and its specific application to identifying important natural areas.

Once gathered, a computer-aided geographic information system was used to organize the data and create a series of digital maps. A visual analysis was then conducted and areas having a high degree of ecological co-occurrence were demarcated based on:

- Local expertise:
  - areas known to be significant from a biodiversity stand-point;
  - proximity to current conservation land;
  - unfragmented forest blocks
- Known presence of rare species or exemplary natural communities, based on data from the NH Natural Heritage Inventory database;
- Topography, hydrology, forest cover types, bedrock, soils, regional contiguous forest blocks, and landscape diversity, based on review of mapping resources;
- Wetlands outlined on National Wetland Inventory (NWI) maps;
- Other lands thought to have a high potential for the presence of significant natural features, and lands deemed representative of common natural communities and forest types

This analysis yielded five general areas of various size and locations in town: Northeast Newbury, Center Newbury, Sunapee Valley, Pleasant View, and South Newbury Valley (see Map 6 and Map 8, Important Natural Areas).

During the 2007 spring / summer growing season, field visits were conducted at the five areas during which and natural community types and wildlife habitats were observed. The visits were made on lands for which permission was granted to enter, or lands that were currently open to the public for recreation and nature study. More than thirty private landowners were contacted in writing for permission to visit their land and conduct inventory. Detailed ecological information about each area is presented in Chapter VI.

It should be noted that attention was focused on natural communities and wildlife habitat in uplands and wetlands. Aquatic habitats were not studied, and no attempt was made to document invertebrates, herbaceous and non-vascular plants, or fungi. Moreover, most local variation in species composition and habitat cannot be documented in the landscape-scale mapping. While the five areas included in this plan probably represent the variety of uplands and wetlands throughout the town, they are far from an exhaustive list which could be obtained only by a comprehensive ground survey. This report should be used as a starting point for future work at other sites to confirm or expand the information reported here.

<b>Table 2. Information sources used in the identification of important natural areas.</b>	
<b>Sources</b>	<b>Information provided</b>
Aerial photographs	<ul style="list-style-type: none"> <li>• Show relative sizes and precise locations of woodlands, grasslands, wetlands, and other natural areas</li> <li>• Indicate presence and location of human activities (e.g. roads, drainage ditches, pits, quarries, agriculture); settlements and other land uses</li> <li>• Reveal location of potential corridors and linkages</li> <li>• Indicate presence and nature of buffers</li> <li>• Help to verify information from older GIS and topographic maps</li> <li>• Can help discern landscape features such as cliffs and rock outcrops</li> </ul>
US Geological Survey (USGS) Topographic maps	<ul style="list-style-type: none"> <li>• Indicate approximate location and size of natural areas and features</li> <li>• Show relief</li> <li>• Indicate location and type of roads</li> <li>• Indicate location of railroad tracks, pipelines, power line corridors</li> <li>• Essential for field investigations – navigation, identification, mapping communities and other natural features and areas</li> </ul>
Federal Emergency Management Agency (FEMA) Flood insurance rate maps	<ul style="list-style-type: none"> <li>• Give the locations and elevations of floodplains and floodways</li> </ul>
NH GRANIT Land Cover Assessment data	<ul style="list-style-type: none"> <li>• Indicate vegetative community types</li> <li>• Show patch shape and size, approximate edge amounts, and relative degree of fragmentation</li> <li>• Assist in locating uncommon vegetation associations and community-dependant species</li> </ul>
Natural Resources Conservation Service (NRCS) County Soils Survey maps	<ul style="list-style-type: none"> <li>• Provide information about soils, slope, drainage</li> <li>• Can help locate specialized communities associated with certain soils and landforms</li> <li>• Used in wetland evaluations</li> </ul>
US Fish and Wildlife Service (FWS) National Wetlands Inventory maps	<ul style="list-style-type: none"> <li>• Indicate location, size and type of wetlands</li> <li>• Describe types of wetland communities by dominant plant species</li> <li>• Indicate presence of uncommon wetland communities</li> <li>• Indicate presence of wetland dependant species</li> <li>• Indicate presence of seasonal concentrations of migratory waterfowl</li> <li>• Indicate presence of fish habitat</li> </ul>
NH Natural Heritage Program data	<ul style="list-style-type: none"> <li>• Indicate the potential presence of plant communities and species of conservation concern</li> </ul>

#### 4. Potential Linkages & Wildlife Corridors

Wildlife corridors are relatively narrow, linear strips of habitat that serve as established travel routes used to move from one location to another. They may be the link to a seasonally used area, such as a nesting or over-wintering area, or they may interconnect larger blocks of breeding or foraging habitat.

Wildlife corridors provide environmental quality, as well as ecological values. They help to maintain biological diversity and genetic diversity, attenuate the extremes of heat and wind, and absorb noise. In rural areas like Newbury, patterns of land use by humans, such as roads, utilities, and site development, can interrupt wildlife travel lanes thereby fragmenting habitat and populations. Unfortunately, wildlife corridors are often considered after the fact when the frequency of vehicular accidents and collisions becomes problematic.

The spatial and temporal uses of corridors are species-dependant but, in general, wildlife corridors share several common characteristics:

- They follow water courses
- They provide cover
- They have relatively high prey abundance or opportunities to forage
- They present few physical barriers
- They are located away from human disturbances and lights

Again, using the geographic data gathered, the author identified potential habitat linkages and wildlife corridors on the basis of her professional judgment and knowledge of the area. They are depicted on Map 8, Wildlife Corridors, Important Natural Areas & Zoning.



## **IV. THREATS**

As is occurring elsewhere in New Hampshire, a growing population and increased demands on the landscape have resulted in less wildlife habitat and a higher degree of fragmentation of the habitat that remains.

Several forces and factors threaten the ecology and economy of the Town of Newbury and quality of life in the region. Chief among them are 1) land use conversion and development, 2) fragmentation (i.e. the division of contiguous habitat units into smaller, separate and isolated pieces), 3) parcelization (i.e. the subdivision of parcels into smaller ownership parcels), and 4) biological pollution (accidental or deliberate introduction of a foreign organism, animal or plant species).

By 2025, the population of the town is projected to grow by about 1,500 people representing a 73 percent increase from 2,042 people (2005 population) to more than 3,500 people. Thus, population growth and the accompanying land development are the biggest threats to Newbury's important natural areas and their linkages.

### **A. Land Use Conversion & Development**

The Sunapee region is one of the fastest growing regions in the state with most of the growth concentrated on wooded ridges, hillsides and shorelands. More and more people want to visit, to play and, increasingly, to live here. Their demands for housing, infrastructure, services and conveniences are posing serious challenges to maintaining the beauty, the quality of wildlife habitat and the overall ecological health of the region. Compounding matters is the trend toward larger average house sizes, larger lot sizes and a smaller per-household population.

While there are a number of negative effects on natural areas associated with land development, the most direct impact is simply the outright destruction of complex functioning natural communities and replacement of these communities with simplified, ecologically diminished landscapes. With development comes the removal of vegetation, grading of the land, installation and use of septic systems, impervious surfaces and the use of nutrients and pesticides for lawn care. Changes in shorelines for aesthetics, erosion control and recreational use can harm or destroy aquatic and terrestrial habitat and severely degrade the beneficial functions of wetlands. This leads to some species disappearing and other less-desirable species adapting to the new conditions. The resulting losses can contribute to a significant reduction in the diversity in species.

One of the most harmful forms of development is roads and the access they provide to previously undisturbed habitat and open space, thereby increasing the likelihood of development. Once a road is built, the land along side it becomes more valuable and more accessible to development. New subdivisions and services appear where roads have been constructed and more habitat is lost or fragmented.

Many animals have an aversion to roads, which may affect their behavior and movement patterns. Roads block migration routes, cut off wildlife from food sources and otherwise split habitat. Many species, such as large predators and small mammals, avoid roads altogether. Others, such as turtles, snakes and frogs, are often killed trying to cross them. In either case, the presence of a road or outlying development renders otherwise useable habitat useless for many threatened species. Roads also increase opportunities for damaging collisions between wildlife and vehicles, resulting in injury and death of animals and humans.

Another threat somewhat connected to land use conversion is the clear cutting of large tracts of land to liquidate the economic value of the forest. Typically a logger will buy land where the price does not take into account the value of the wood on the property. After removing all or nearly all the trees he puts the land back on the market at the same price.

## **B. Fragmentation**

Short of outright habitat destruction, habitat fragmentation is the primary threat to ecosystem function, habitat quality, species diversity and abundance in Newbury. Habitat fragmentation refers to an alteration of the spatial configuration of habitats that creates isolated or tenuously connected patches of the original habitat. In rural and developing areas, the principle causes of habitat fragmentation are agriculture, deforestation, linear transportation infrastructure and suburban sprawl.

The term habitat fragmentation can be considered to include six discrete processes:

- Reduction in the total area of the habitat
- Increase in the amount of edge
- Decrease in the amount of interior habitat
- Isolation of one habitat fragment from other areas of habitat
- Breaking up of one patch of habitat into several smaller patches
- Decrease in the average size of each patch of habitat

Directly and indirectly, habitat fragmentation causes: species displacement; loss and degradation of habitat; disruptions in movement and breeding patterns; reductions in ecological resilience and reproductive productivity; increased mortality; reduced genetic variability; and, increased vulnerability to excessive mortality.

The major effect of habitat fragmentation is a reduction in the amount of available habitat for plants and animals. Habitat fragmentation invariably involves some amount of habitat destruction. Plants and localized animals in these areas are usually directly destroyed. More mobile animals (especially birds and mammals) retreat into remnant patches of habitat. This can lead to crowding effects and increased competition.

The remaining habitat fragments are smaller than the original habitat and may not be representative of the initial landscape. Species that can move between fragments may use more

than one fragment. Species which cannot move between fragments must make do with what is available in the single fragment in which they ended up.

Area is the primary determinant of population dynamics and persistence of a species within a fragment. The size of the fragment will influence the number of species which are present when the fragment was initially created, and will influence the ability of these species to persist in the fragment. Small fragments of habitat can only support small populations of plants and animals and small populations are more vulnerable to extirpation. Minor fluctuations in climate, resources, or other events that would be absorbed by large populations can be catastrophic to small, isolated populations. Thus fragmentation of habitat can be an important cause of species declines.

Habitat fragmentation also leads to edge effects. Microclimatic changes in light, temperature, and wind can alter the ecology around the fragment, and in the interior and exterior portions of the fragment. Fires become more likely in the area as humidity drops and temperature and wind levels rise. Invasive and noxious species can establish themselves more easily in such disturbed environments. Habitat along the edge of a fragment has a different climate and favors different species from the interior habitat. Small fragments are therefore unfavorable for species which require interior habitat.

Habitat fragmentation can accelerate the decline of rare or uncommon species. The existence of viable habitat is critical to the survival of threatened and endangered species, and in many cases the fragmentation of any remaining habitat can lead to difficult decisions regarding land conservation. Given a limited amount of financial resources available for land conservation, there is ongoing debate as to whether it is wiser to protect the existing isolated patches of habitat or to buy land to get the largest contiguous piece of land possible.

A common response to the problem of habitat fragmentation is to attempt to link the fragments with protected corridors of native vegetation. Corridors may help mitigate the problem of isolation but not the loss of interior habitat. Another solution is to enlarge small remnants in order to increase the amount of interior habitat, however this may be impractical since developed land is often more expensive and could require significant time and effort to restore.

Ultimately, however, there is no good solution to habitat fragmentation and the best solution is to avoid or minimize it through conservation and effective land use planning.

### **C. Parcelization**

Unlike forest fragmentation, which is known to disrupt wildlife habitat, parcelization is the change in ownership patterns when larger forested tracts are divided into smaller parcels owned by several owners. As land is split up and sold, efficient farming and forestry practices become more difficult to carry out and new threats are introduced to communities. Landowners are less likely to engage in forestry. Farming operations may conflict with rural residents. Rural housing introduces exotic species into otherwise intact ecosystems.

Nationwide, 80 percent of the new housing construction happens in rural areas, with only 57 percent on lots larger than 10 acres (Watershed Agricultural Council, 2007). As subdivision increases the number of smaller pieces owned by diverse owners with different visions for their land, it becomes a challenge to coordinate efforts to teach and implement best management practices that address soil and water conservation, wildlife habitat, timber production, recreation opportunities and aesthetics.

In New Hampshire, parcelization threatens towns rich in lakes and forestland, where subdividing land for recreational and retirement use is common. In Newbury, forests cover nearly 80 percent of town (19,300 acres) and private landowners own over 90 percent of the forest area. A visual review of tax maps from 2005 and 2007 reveals that the average parcel size for these lands in town is declining, indicating a shift away from large forest land holdings toward smaller rural residential dwellings.

There are many causes of parcelization. Perhaps the greatest driver may simply be escalating property values and land prices. As land valuation and development opportunities increase in Newbury, market conditions prompt an increased desire to subdivide and develop property for economic gain. Other factors that foster forest parcelization include:

- Population growth,
- Changing demographics,
- Shifts in cultural values regarding land management,
- Inadequate land-use planning and regulation, and
- Lack of planning within families to ensure consistent forestland ownership through multiple generations.

New Hampshire State statutes (notably Title LXIV, Chapters 672 and 674) and decisions of the State Supreme Court grant towns tremendous powers when it comes to managing how land is divided. The General Court has declared that planning, zoning and related regulations pertaining to public health, safety and general welfare and the appropriate and wise use of land are the responsibility of municipal government and that municipal governments are enabled to meet the demands of evolving and growing towns.

Often, it's not a question of whether land will divide or not, but rather how the land will be divided. How land is subdivided on site can have serious consequences for both delivery of services and conservation of natural areas. One oft-touted alternative to typical residential subdivisions is clustering, which is beneficial in some ways. However, numerous small lots, such as those created by cluster or open space zoning, in distant or isolated parts of town can have both economic and ecological consequences.

Cluster / open space developments usually occur away from municipal sewer and water systems and public services (e.g., fire, police, schools, libraries, etc.), put greater demands on existing roads and their improvement, and create more air pollution. In fact, many cluster developments in the countryside can simply create "clustered sprawl". As Daniels (1999) notes, "cluster developments may leave some land open, but the clusters are often based on fairly high densities,



such as one dwelling per two acres. Fifty houses on 100 acres with 30 acres open still puts 150 or more new dwellers in the countryside. These developments are auto-dependent and the residents can bring on conflicts with farming or forestry neighbors as discussed above. In short, cluster development is a suburban style that will hasten the conversion of rural areas to suburbs.”

#### **D. Biological Pollution**

Biological pollution is the translocation of living organisms, either accidentally or intentionally, from the places where they evolved to new environments. The ecological impacts of these species introductions are often unpredictable and irreversible. In the absence of natural enemies, their populations can explode and threaten forests, crops, native species, water quality, and property values. When that occurs they are called invasive exotic pests or non-indigenous nuisance species.

There have been tens of thousands of plant or animal species introduced from other countries, but few ever become invasive species. Those species that truly become invasive place an ever increasing economic burden on the citizens. Once biological pollutants are imported, they grow, adapt, multiply and spread on their own unless direct, vigorous, and often costly actions are taken to stop them.

Unlike pollutants in air and water which follow the rules of physics and can be reduced or prevented by legislation, the movement and spread of biological pollutants is much more difficult to manage. Making matters worse is the expansion of global trade and transportation networks.

New Hampshire has first hand experience with non-indigenous nuisance species. The species run the gamut from plants, such as purple loosestrife and Japanese knotweed, to familiar animals, such as Norway rat, rock bass and European starling, to pathogens, such as Dutch elm disease and chestnut blight. These non-native species have caused dramatic changes to the regional ecosystem.

Chestnut blight, a fungal pathogen that causes a form of canker, was introduced on nursery stock in the 1890s. By 1940, chestnut was destroyed as a commercial species. The cankers grow rapidly and in most cases continue to develop until the stem is girdled and killed; then they continue to colonize the dead tree. The blight fungus is spread from tree to tree as spores on the feet, fur, and feathers of the many animals and insects that walk across the cankers.

Today, incredibly, chestnut still survives in much of its former range, but only as sprouts from the old root systems. The roots and root collar are resistant however they are killed by the disease before they can mature, flower, cross-pollinate and set seed. The chestnut doesn't seem to stand much chance of adapting. A breeding program based on producing hybrids of resistant trees shows promise but the chestnut may never fully recover its dominant status in the forests of the eastern United States.

Japanese knotweed, *Polygonum cuspidatum*, was introduced into New England in the early 1900s and since then has become so widespread that it has become a serious weed problem. It is a perennial plant with an extensive system of underground rhizomes that is very invasive that may reach a depth of 6 feet and extend to 23 feet from the parent plant. Fortunately the plant does not set true seed owing to the absence of male fertile plants, but regeneration of the plant is vegetative and can occur from the smallest rhizome fragments and is the primary method of spread within a site and between sites.

Knotweed can be found growing adjacent to roads and highways where maintenance practices have accelerated its spread. Recent research has shown that the plant can be spread by the smallest amount of cut stem material and extreme care should be taken to ensure that areas of knotweed are not cut, flailed or trimmed unless the work is being undertaken as part of an agreed control operation. Where cutting or flail mowing is undertaken and an area of knotweed is identified, no mechanical contact should be made with the plant as it is possible to cause the spread of the weed by the transfer of the smallest part of cut material becoming attached to the cutting equipment potentially being transferred to the next site to be mowed.

In 1999, hemlock woolly adelgid (HWA), a small, aphid-like insect native to Japan and China, was found on a residential landscape planting in Merrimack. The following year, an alert citizen noticed infested hemlocks in Portsmouth's Elwyn Park.

HWA has devastated native hemlock stands in Virginia, New Jersey, Connecticut, Pennsylvania and parts of New York by mechanisms not yet completely understood. Since 2000, state officials have recorded more than two dozen HWA sightings, seven of them on native trees, the rest on ornamental hemlocks. The insect has been found in Merrimack, Hillsboro and Cheshire Counties; Rockingham has reported most HWA sightings.

Though individual hemlock trees have relatively low timber value, their sheer abundance in our forests makes them an important living resource. In addition to their aesthetic value in natural and human-created landscapes, hemlocks provide wildlife habitat, contribute to water quantity and quality, and play an important role in maintaining forest biodiversity.

In the case of intentional introductions, the difficulty in reversing an introduction and its adverse effects should figure prominently in the decision process on whether to allow an introduction. A strictly precautionary approach would prohibit deliberate introductions and would take strong measures to prevent unintentional introductions. Recognizing the difficulties with introductions, the objectives should be to reduce the risk of adverse impacts of introductions (accidental and intentional), to establish corrective or mitigating procedures (as in a contingency plan) in advance of actual adverse effects, and to minimize unintended introductions to wild ecosystems.

The use of introduced species, including genetically modified and genetically selected organisms (for example chestnut tree hybrids), may allow for continued or increased production from habitats that have been so altered or degraded that native species are no longer viable. However,

care should be taken not to use this potential productivity from introduced species as justification for further abuse of habitat or for delaying their restoration.

Unintended introductions are inherently un-precautionary (i.e., lack proof of harm) because they are rarely evaluated in advance. A precautionary approach should aim to reduce the risk of unintended introductions and minimize their impacts.



## **V. CONSERVATION PRIORITIES**

A science-based approach was used to identify desirable locations for conservation and open space protection in Newbury. Using digitized geographic data, various reports, anecdotal information and field reconnaissance, the consultant (a) highlighted the most significant natural resource features, (b) collated said features at a common spatial scale for synthesis and analysis, and (c) evaluated conditions on the ground.

A geographic information system (GIS) was used to collate and analyze mapped information on the basis of “co-occurrence” or overlap of natural resource features. Information regarding land use and landscape features was gathered from the UNH Complex Systems Research Center, NH Department of Environmental Services, NH Natural Heritage Inventory, NH Fish & Game Department, and others. Included were:

- Political boundaries
- Roads
- USGS topographic contours (20’ interval)
- Surface water hydrology
- Floodplains
- Watershed boundaries
- Boating access points
- Aquifers and resource waters
- Resource extraction sites
- USDA Natural Resource Conservation Service soil types
- US Fish & Wildlife Service National Wetlands Inventory Survey data
- Rare wildlife and plant species occurrences
- Wildlife and fishery management areas (e.g., wildlife management areas, stocked streams, wetland bird and amphibian monitoring sites, winter deer yards)
- Land cover type
- Historic cultural resources
- Recreational facilities
- Locally-designated scenic roads
- Scenic vistas
- Publicly-owned land
- Permanently protected conservation land

Four maps were developed depicting basic natural resource features: Water Resources (Map 2), Land Cover (Map 3), Unfragmented Lands (Map 4), and Lands of Special Importance (Map 5). Also mapped were ecologically-significant features: rare plants, wildlife and natural communities; peatlands; NWIS wetlands; wet meadow shrub wetlands; timber clear cuts; forest stands of paper birch/aspen, spruce/fir, and hemlock; grasslands greater than 25 acres; south-facing slopes; ledges and cliffs; and prime farmland soils (Map 6).

These resource base maps were then integrated into a resource co-occurrence map to aid in identifying areas where several resource values coincide and overlap, thus signaling locations with multiple conservation values and potentially higher priority for protection.

As described in Chapter III, a visual analysis of the information was conducted and areas having a high degree of ecological co-occurrence were demarcated. This analysis yielded five general areas of various size and locations in town: Northeast Newbury, Center Newbury, Sunapee Valley, Pleasant View, and South Newbury Valley (see Map 6, Important Natural Areas). Spot field assessments of the five areas were conducted by an ecologist in spring 2007 to observe wildlife and wildlife habitat characteristics such as vernal pools, potential winter deer yards, and plant diversity hotspots.

Prior to embarking on this field work, the ecologist sent letters to landowners of, and abutters to, the five areas requesting permission to access their property. Based on signed permissions returned, the areas were accessed with the landowners' wishes in mind. The five areas described here for planning purposes, should be considered for conservation / open space protection (Map 8, Wildlife Corridors, Important Natural Areas and Zoning).

#### **A. Area 1 - Northeast Newbury**

This area is roughly bounded by NH Rte. 103A to the west, Chalk Pond Road to the south, Stoney Brook Road to the east, and the Newbury-New London town line to the north. The area is characterized by rolling hills interlaced with wet meadow-shrub wetlands. Hemlock, white pine, spruce/fir-dominated stands occur in large patches across the area, particularly on north- and northwest-facing slopes. The Baker Hill Golf Course overlies a substantial area of Prime Farmland Soils. These soils have slope and drainage characteristics that are most suitable land for producing food, feed, fiber and forage crops.

Signs of wildlife were observed throughout the area. Overall, this area appears to be heavily used by moose, white-tailed deer, coyotes, leporimorphs (rabbits and hares), ruffed grouse (partridge) and seed eating birds. Other wildlife likely to occupy the area include lungless salamanders, wood frogs, wood turtles, woodcocks, woodland warblers, thrushes and weasels.

#### **B. Area 2 - Center Newbury**

This relatively small triangular area located west of the Newbury Center is bounded by Newbury Heights to the west, the Andrew Brook crossing and Mountain Road to the south and NH Rte. 103 to the east. The area is roughly bisected by the former railroad grade which is heavily used by wildlife as a travel corridor. Forested and scrub-shrub wetlands lie adjacent to the railroad grade. Mixed hemlock-hardwood stands occur on east-facing slopes. Of particular note is the gorge-like Newbury Cut which stands out as a unique historical and ecological feature of the area.

Overall, this area appears to be used by both upland and wetland-associated species such as wood duck, eastern painted turtle, raven, raccoon, skunk, white-tailed deer and coyote. Other wildlife likely to occupy the area include red-spotted newts, mole salamanders, spring peepers, wood frogs, gray tree frogs, American toads, green frogs, northern leopard frogs, spotted turtles, northern water snakes, northern black racers, great blue herons and dabbling ducks.

### **C. Area 3 - Sunapee Valley**

This large kidney-shaped area extends from Andrew Brook at Mountain Road southward to Box Corner and occupies the valley formed by Mount Sunapee and the Goshen ridge to the west, and Bald Sunapee to the east. It is a highly scenic and diverse area of rocky brooks, wet meadows, bogs, spruce forests, fields and farmland, floodplain, and ledges and cliffs. The area lies to the east of Mount Sunapee State Park and the recently protected North Woodlands Easement.

Signs of wildlife were observed throughout the area. Overall, this area appears to be heavily used by black bears, moose, white-tailed deer, coyotes, leporimorphs (rabbits and hares), ruffed grouse (partridge) and migratory songbirds. Other wildlife likely to occupy the area include mole salamanders, woodcocks, birds of prey, beavers, foxes and bobcats.

### **D. Area 4 - Pleasant View**

This area, roughly centered at Newell, South and Pleasant View Roads on the Newbury-Bradford town line, encompasses the Gillingham Pond, Mountainside and Forest Brook Subdivisions, and the broad sandy flats between Gillingham Pond and Pleasant View Road. This relatively level well-drained area is underlain by a stratified drift aquifer and offers scenic southerly views across active hayfields toward the Mink Hills in Warner.

Wildlife likely to occupy the area include grassland snakes, grassland birds, hawks, turkey vultures, shrews, moles, field mice, Eastern cottontail rabbits, woodchucks, red foxes and white-tailed deer. Turtle nest sites could be expected where there are blow-outs or areas of loose sand and gravel near wetlands and streambeds.

### **E. Area 5 - South Newbury Valley**

This is the largest, most-developed and most-dissected of the five areas investigated. It covers an approximately 4 square-mile area centered on the confluence of Andrew, Ring and Morse brooks. The area is crisscrossed by many well-traveled roads, including NH Rte. 103 and Village, South, Old Post and Sutton roads, and encompasses the village of South Newbury.

Once the hub of Newbury and the seat of government, the village was bypassed in the 1960s by the construction of NH Rte. 103. Then, in 1989, the town government moved three miles north to Newbury Center. The old village of South Newbury remains virtually unchanged and appears as it may have in earlier times with classical-revival community structures and quaint, well-kept homes set close to radiating roads.

Like the Pleasant View area, it is a relatively sandy area of wet meadows, scrub-shrub wetland and peat lands with rocky brooks and hemlock stands at the periphery. Wildlife likely to occupy the area include lungless salamanders, spring peepers, wood frogs, gray tree frogs, American toads, green frogs, northern leopard frogs, eastern painted turtles, northern water snakes, woodcocks, common mergansers, migratory songbirds, weasels, skunks, beavers and white-tailed deer. Two species of concern, the common loon (*Gavia immer*) and the wood turtle (*Glyptemys insculpta*), are recorded as occurring in this area (NH Natural Heritage Inventory, 2006). Turtle nest sites could be expected where there are blow-outs (depressions formed by erosion) or areas of loose sand and gravel near wetlands and streambeds.

#### **F. Key Wildlife Corridors & Road Crossings**

An extensive network of wildlife pathways criss-cross Newbury and extend into neighboring towns. These comprise strategic and local wildlife corridors, and wildlife links essential to the movement and distribution of moose, white-tailed deer, black bears, coyotes, bobcats, river otters, beavers, and other species. High-risk road crossings are anticipated to occur where the corridors intersect with relatively high-speed / high-volume roads. Map 8 depicts local wildlife corridors and potentially dangerous road crossings.

The importance of linkages between critical habitats and relatively large blocks of unfragmented land to promoting biodiversity is recognized by the Newbury Conservation Commission. The corridors, within which development may affect the movement of wildlife, are shown as broad bands. However, that is not to say that any or all development within the corridors depicted will have an adverse effect. The nature and effect of development within or near local wildlife corridors will in practice vary according to the location of the corridor, habitat, and the requirements of individual species.



## **VI. OVERVIEW OF LAND PROTECTION TOOLS & TECHNIQUES**

Communities need to use a combination of tools and techniques as part of a comprehensive effort to protect land. Examples of common tools that communities can use include conservation by private landowners through easements; current use; acquisition; conservation subdivision design; and innovative zoning techniques, several of which are used by the Town of Newbury.

### **A. Conservation by Private Landowners**

Private landowners play a crucial role in the conservation of open space and wildlife habitat in Newbury. Economic decisions strongly influence land use decisions. But personal values also influence how private landowners make decisions on their own land. Many landowners realize the strong ecological or forestry value of their land and wish to legally protect it from future development. Broad arrays of options are available for private landowners facing these decisions. A list of conservation organizations and respective activities is contained in the appendix to the Newbury Natural Resource Inventory Addendum (2007).

One means of protection available to private land owners is a conservation easement. A conservation easement is a voluntary agreement between a landowner and a private land trust or government that permanently limits some land uses (for example, subdivision and development) in order to permanently protect the property's natural characteristics. Under such an agreement, the land trust or government holds a nonpossessory interest in the property and is empowered to enforce restrictions against the current landowner and all subsequent owners of the land.

The agreement limits certain uses on all or a portion of a property for conservation purposes while keeping the property in the landowner's ownership and control. The agreement is usually tailored to the particular property and to the goals of the owner and conservation organization. Conservation easements allow landowners to continue owning and using their land and to sell it or pass it on to their heirs. It applies to present and future owners of the land.

Most conservation easements are donated by people who wish to protect a beloved place. Under certain circumstances, easements are sold at a bargain price or fair market value. Donations and bargain sales that meet IRS requirements can result in federal tax benefits.

In New Hampshire, conservation easements assist in the preservation or restriction of the use of selected predominantly undeveloped open spaces or areas, including but not limited to: (1) the protection and conservation of water resources and watersheds; (2) the protection and conservation of forests and land being used to produce timber crops; (3) the protection and conservation of farmland; (4) the protection of existing or planned park, recreation or conservation sites; (5) the protection and conservation of natural or scenic resources; (6) the protection of scenic areas for public visual enjoyment from public rights of way; and (7) the preservation of sites of historic, geologic or botanic interest.

<b>Table 3. Conservation Options for Landowners</b>			
<b>Land Protection Options</b>	<b>Descriptions</b>	<b>Results</b>	<b>Tax Deductions Income Estate</b>
Conservation Easement	A legal agreement between a landowner and a land trust or government agency that permanently limits a property's development potential.	Land conservation values are protected by the organization. The owner continues to own, use, and live on the land.	Yes   Yes
Outright Land Donation	Land is donated to land trust or agency.	The organization owns & protects the donated land. The income tax deductions are spread over several years.	Yes   Yes
Donation of Undivided Partial Interests	Interests in land are donated to land trust, or agency over several years, until organization has full ownership.	The organization owns & protects the donated land.	Yes   Yes
Donation of Land by Will	Land is donated to land trust or agency at death.	The organization owns & protects the donated land.	No   Yes
Donation of Remainder Interest in Land With Reserved Life Estate	Land is donated to land trust, but owner (or others designated) continue to live there, usually until death.	The organization owns & protects the land.	Yes   Yes
Bargain Sale of Land	Land is sold to land trust or agency for a price below fair market value.	The organization owns & protects the land.	Yes   Yes
Mutual Covenant	A group of landowners agree to restrictions on their land use. May not involve a conservation group.	Can be nullified by subsequent agreement of owners.	No   No

Each decision to protect a property is a personal one. It involves the landowner's financial and tax circumstances, the land resource itself, and the owner's vision for the future of the land. Since every situation is different, the objective of this section is only to outline the principal land conservation options available to private landowners. Actual contact and negotiated agreements are left to the landowners, their legal and financial advisors, and the partner organizations.

## **B. Current Use**

Current use taxation is a preferential property tax program designed to encourage land owners to keep land undeveloped and in use for forestry, agriculture, tree farming, recreation, wetlands and wildlife habitat. The Current Use tax program encourages retention of open space by assuring some parity between what a land owner can generate in income from the land and what is

charged in taxes. The alternative taxing strategy is to tax the land on its “highest and best use”, such as housing, commercial or industrial development.

Land owners who have qualifying land must apply to the town to participate in the program. The town must accept the application if the land qualifies. Usually, parcels must be at least 10 acres with no structures or improvements to qualify. The town applies a tax rate to current use lands using per-acre assessment rates set annually by the Current Use Board. Since current use is based on the income the land is capable of producing, the assessment ranges are calculated based on market values of the product. For forest land, this means the types of timber (the product) growing on the land. The forest land assessment ranges reflect market values for timber.

When land that has been enrolled in this program is taken out of current use and developed, a land use change tax is charged and paid to the town. The land use change tax is 10 percent of the market value of the land at the time of the change. Since 1990, Newbury has allocated 50 percent of its land use change tax to the general fund. The remaining 50 percent is allocated to the conservation fund which is administered by the Conservation Commission and provides for the proper use and protection of natural resources in town.

### **C. Acquisition of Fee Interest**

The greatest and most extensive interest that may be acquired in realty is described in law as a fee interest, a term that implies a proprietary ownership, free and clear of conditions. A fee interest can be sold (in its entirety or in part) or passed on to heirs or successors. An “acquisition of fee simple interest” is the outright purchase of full title and all rights by a town from the land owner. It allows for the protection and public use of the land.

Land acquisition by a fee or lesser interest in a private property is an approach to relieve regulatory burdens and achieve a variety of environmental protection objectives that cannot be accomplished through regulations alone, such as public access to land. Land acquisition, including conservation easements, can be accomplished through the variety of techniques, including donation as gifts of devises in wills, conditioning subdivision approval upon donation for open space purposes, “bargain sales” with landowners, and outright purchase. Often local land acquisition is best accomplished by a cooperative effort between a governmental unit and a local land trust or environmental organization.

Acquisition of a fee interest and securing an easement interest both have important advantages. Acquiring a fee interest ensures public access and 100 percent public control over land. Depending on its terms, an easement may also permit public access. Because voluntary acquisition of either full or partial interest avoids the “takings” issue, acquisition may ensure permanent protection, whereas regulations are much more susceptible to changing political climates.

Despite advantages, outright public purchase of land can be expensive, especially for high-value waterfront and scenic properties. Public purchase of a fee interest removes the land from the tax

roles (however, an agency or nonprofit organization may continue to pay the taxes in order to dampen criticism of acquisition efforts). Acquisition can be time-consuming and politically unpopular, especially if done by condemnation. Even if the acquisition is by gift, the community often must provide management and protection for the land. Moreover, full control does not always guarantee absolute protection. If, for example, only a portion of a sensitive environmental area is purchased, development on the remainder may destroy the ecological balance in the “protected” area.

To maximize the benefits of acquisition and minimize limitations, local governments generally avoid condemnation and undertake acquisition only on a willing seller or donor basis.

Acquisition by donation, devise, and bargain sales are common to reduce costs. Often acquisition is carried out in cooperation with a local non-profit land trust or environmental organization, which negotiates with landowners and assumes long-term responsibility for management of the property. The non-profit then sells the property to the town, or contributes funding for the purchase of the property and transfers title to the town at no cost. A non-profit is often able to negotiate a property sale at a reduced price and to sell to a town at a lower than market value.

In the case of acquisition of interest by donation, a private land owner or developer can convey all or a portion of a property at no cost to the town. The owner can take advantage of certain tax benefits associated with the donation.

#### **D. Conservation Subdivision Design**

Conservation Subdivision Design (CSD) is a land development strategy that can help communities protect natural resources, agricultural land or cultural resources while allowing for the maximum number of residences under current community zoning and subdivision regulations.

Some of the benefits of CSD are:

- Protected water quality
- Protected wildlife habitat
- Reduced infrastructure construction costs
- Reduced maintenance costs
- Reduced demand for publicly funded greenspace
- Means for expanding public trails and greenways

The primary difference between conservation subdivisions and conventional subdivisions involves the location of the homes on the parcel being subdivided. Whereas conventional lot-by-lot subdivisions spread development evenly throughout a parcel, conservation subdivisions are characterized by common open space and clustered compact lots.

By reformulating the approach to conventional subdivision design, CSD strategically concentrates home construction on the development site in order to protect sensitive and valuable open space, habitat, and other environmental resources. Except where a density bonus is offered, conservation subdivisions are density neutral (i.e., the same numbers of lots are built in a conservation subdivision as would be built in a conventional subdivision). Other differences may involve management and ownership of the land that has been left for preservation.

## **E. Zoning**

### 1. Large Lot Zoning

Large lot zoning is the practice of specifying a minimum lot size that is larger than necessary to accommodate a dwelling or private sewage disposal system (if any). The open space is in the form of private yards surrounding individual dwellings. As such, it is not accessible to the public and the responsibility for maintenance rests with the private land owner. Such space is not truly “open” because it is enclosed in private holdings. The owners generally retain the right to fence the property, to alter or remove plant cover, grade, and build such accessory structures as are permitted by the zoning code.

Although large lot zoning does reduce the number of homes that can be built, it may also spread out the homes in such a way that none of the remaining land is useable for farming, forestry, or even recreational trails. For this reason, large lot zoning should be considered for protecting blocks of land large enough to manage for a specific resource, such as forestry or agriculture. Lot sizes should be of sufficient size (i.e., 25 to 50 acres) to allow for commercially viable use of the resource. The Town of Lyme has a minimum 50 acre lot size in their Mountain and Forestry District; the Town of New London has a minimum 25 acre lot size in their Forest Conservation District. The Town of Lyme also has an agricultural protection district requiring larger lots for any new land uses. Development on important agricultural soils is allowed only if there is no other feasible site on the property, if no more than 25 percent of the soil is used and if the rest of the soil is protected with a conservation easement.

### 2. Down-zoning

Down-zoning is a process where the current zoning is changed to a less intense use. Down-zoning is one of the most popular tools for curbing development and suburban sprawl. Down-zoning is best accomplished through the community master planning process. Based on the completion or update of the master plan, it will be obvious which areas of town should not be developed as they are presently zoned and which areas may be better able to grow.

With down-zoning, the number of development rights pertaining to a parcel of land is reduced. Because fewer building lots may be created, the result is more “open” land per dwelling unit although this open space may be enclosed in private holdings. If the down-zoning is drastic enough the land may remain as open space because it is uneconomical to develop. It is important

that drastic down-zoning be based on public purposes as presented in the Master Plan so as to avoid “takings” challenges.

Down-zoning by only increasing the minimum residential lot size is not recommended. Although increasing the minimum lot size from 2 acres to 5 acres may lessen the number of houses that can be built on a subject parcel, bigger lots in general increase sprawl.

### 3. Open Space Zoning

Open space zoning is a useful technique for preserving open space while still allowing development to occur. Open Space zoning, also known as cluster zoning, permits smaller lots in exchange for reserving a percentage of the development project for open space. The smaller lots are clustered in one or two sections of the project and the remaining land is restricted by easement and placed in the control of a homeowners association, land trust, public entity or retained by the original owner.

Typically, from 30 percent to 80 percent of the project may be in open space. The goal of open space is to protect archaeological or historical sites, and best uses such as agriculture, recreation, wildlife habitat, scenic views or other benefits. Open Space zoning not only preserves valuable open space but is more economical for the developer because streets and utility services are shorter.

### 4. Village Plan Alternative Subdivision

Another method to preserve open space is the Village Plan Alternative Subdivision, or VPA. The VPA is a planning tool that promotes compact development with a mix of land uses, including residential, small-scale commercial, recreation and conservation in close proximity to one another within a neighborhood. It is designed to implement the specific provisions of RSA 674:21.VI (a) to allow for the creation of new villages with mixed-use development that is scaled to the smaller populations and lower density of New Hampshire towns. The VPA differs from cluster zoning in two ways: first, a mixed-use village component is included in the VPA, and second, the VPA requires a 20/80 split in the amount of developed land versus the amount set aside for conservation.

### 5. Mandatory Open Space Set Asides

This is a technique whereby the zoning ordinance simply requires a percentage of the project site to be set aside as open space under restrictive easement. Common requirements are 10-15 percent. There is such a provision in Newbury’s Subdivision regulations but not the Zoning Ordinance. In addition to set-asides, conservation / open space subdivision design requirements may be adopted to protect areas designated as important for habitat conservation.

## 6. Sensitive Environmental Area Zoning

The zoning ordinance may prohibit the development of such areas as steep slopes, floodplains, stream buffers, wetlands, archeological sites, and endangered species habitat. These areas are retained as open space under restrictive easements and the developer may or may not receive density credit for these areas to apply to the buildable portion of the project. Unlike an overlay district which protects features within a specified district, Sensitive Environmental Area zoning covers the entire town.

Newbury currently has separate zoning articles for the protection of:

- Shorelands (Article VII)
- Wetlands (Article VIII)
- Steep slopes (Article IX)
- Floodplains (Article X)
- Skyline / hillsides (Article XVIII) and
- Aquifers (Article XX)

Currently, the Conservation Commission monitors logging operations and conducts site visits on sites having wetlands. The Town Code Enforcement Officer has oversight of approved subdivision plans to ensure they comply with town regulations. It is unclear whether the current enforcement policy is adequate. If not, the town may want to consider adopting policies for increased oversight (e.g. Requests for Determination or Notice of Intent) in said zones.

## 7. Overlay District Zoning

An Overlay District Zone is a separate zoning district that overlies the current zoning district. As a result, the regulations of both the underlying zone and the overlay zone must be adhered to. Overlay districts seek to protect a particular type of physical (i.e., mappable) resource that is only within the overlay area. Overlay districts are often used for environmentally sensitive areas such as aquifers, farmlands, wetlands and river shorelines. However, there are many other goals that could be met with an overlay zone such as preservation of historic architecture, or protection of water supplies and scenic areas.

Once resource areas of concern are identified, the planning board proposes special regulations for that particular resource and the town must vote approval of the regulations. Overlay districts have been successfully used to protect a wide variety of resource values. Typically, they prohibit certain land uses or land use practices within the overlay district. However, other uses may be allowed if it can be shown the use will not negatively impact the targeted resource.

Another common use of overlay district zoning is to preserve the historic character of an area. Historic overlay district zoning is often adopted when a town wants to protect historically significant areas, sites and buildings that meet recognized standards of architectural and historic significance. Historic districts provide regulations over and above the regular zoning protection

for such areas. To administer the provisions of the ordinance, towns typically create an independent Historic District Commission (HDC). The HDC is responsible for the public interest(s) as embodied in the Historic Overlay District Ordinance.

Historic overlay district zoning can be an open space protection strategy when 1) the use of existing historic buildings, or 2) infill of newer buildings in an already developed area, is encouraged rather than development of new buildings on open space. Often, a formalized local expression of special concern for historic resources can be leveraged into financial benefit (e.g. federal tax incentives, public and private grants, low-interest loans) for community projects in an historic district.

“In 1976, federal tax policy was reoriented to encourage the preservation of historically and architecturally significant properties. The tax laws have changed many times since then, and so have the federal preservation tax incentives, but the benefits--though more circumscribed--still exist. The work must conform to standards set by the Secretary of the Interior; it must be approved by the DHR and the National Park Service, and it is limited to income-producing properties; but even with those restrictions, over 100 New Hampshire properties involving investments of hundreds of millions of dollars have participated in the program. The tax incentives are particularly beneficial for large-scale projects that would not be feasible otherwise, and have served as important economic generators for financially-distressed areas” (New Hampshire Department of Cultural Resources).

The Town of Newbury does not currently have any Historic Overlay Districts.

#### 8. Village District Zoning

Village District Zoning creates a specific zoning district for the unique needs of a small scale mixed use village. Unlike conventional commercial zoning which can create a suburbanized setting by requiring large parking lots and setbacks, a Village District seeks to encourage a mix of uses in a village and encourage new construction to be consistent with the lot sizes, setbacks and scale of existing structures. This can make a substantial difference in creating a village or town center that people want to live in, shop at and revisit.

The area of Blodgett’s Landing is currently designated as a separate zoning district with reduced setbacks and reduced lot sizes. However, the Town of Newbury does not currently designate either Newbury Center or the village of South Newbury as a village districts.

#### 9. Flexible Development Zoning

Flexible Development Zoning is an alternative method of subdividing land for residential development. In a Flexible Development subdivision, lot sizes and frontage are relaxed in order for the developer to prepare a site plan which conforms to natural resources rather than the strict requirements of subdivision regulations. Unlike open space zoning, however, in flexible zoning there is no set aside of open space. All property is subdivided into private property.



In a conventional subdivision plan, developers attempting to place the maximum number of lots on the property will grade large areas of land, harm sensitive areas and increase the amount of roadway. Under flexible zoning, the number of lots allowed under a conventional subdivision plan is allowed but the lots and roadway design can change so that natural features are avoided. While flexible development can help to protect some natural features, it is not the best approach everywhere, since it still means the loss of open space. As with open space zoning, flexible zoning should not permit more lots than would be allowed under a conventional subdivision plan unless this is clearly part of an area planned for additional density. In addition, the ability to build a conventional subdivision should be demonstrated prior to allowing a flexible development to proceed.

#### 10. Feature-based Density Zoning

*Note: This section is excerpted from the draft document Innovative Land Use Planning Techniques: A Handbook for Sustainable Development, prepared by the NH DES.*

Feature-based density is a zoning technique where the permissible density is calculated based on a set of factors contained in the ordinance, as opposed to a uniform standard being applied to all of the land in the zoning district. Conventional zoning prescribes one minimum lot size for a particular use throughout each zoning district, along with a residential density uniformly applied to each parcel of land in the district. It can be an effective tool when the planning board's goals for development density are related to such things as the geography of the community, for example denser development is desired close to a village area, features of the landscape, or road attributes.

Overlay zoning for features such as steep slopes and wetlands is sometimes used as a way of making exceptions to the minimum lot size/maximum density provisions of the underlying district. This is the case in communities where, in addition to the requirement that development be kept away from wetlands and steep slopes for example, the area unsuitable for development is excluded from the area used for calculating the maximum number of lots. Zoning ordinances sometimes enable adjustments in the other direction, i.e. smaller lot sizes/increased density, to factor in the benefits of a particular land use to the community. Density bonuses for affordable housing are the most well known example.

Basing the permitted density on a feature of the parcel is not a new concept. Soil-based lot sizing is an approach used by some communities based on a single factor-suitability of the soils for treatment and dilution of septic system effluent. Similarly, subdivisions proposed in outlying areas on inadequate roads are often reduced in size by the applicant after a planning board raises concerns that a large subdivision might be scattered and premature (as provided by RSA 674:36II (a)) without a substantial upgrade of the road at the applicant's expense (pursuant to RSA 674:21V (j)).

When zoning ordinances begin with uniform requirements and evolve toward additional considerations and/or flexibility, e.g. with multiple density districts, multiple overlays, cluster provisions, etc., they become more and more complex. A feature-based density approach can actually simplify the ordinance by replacing district-specific density regulations, overlays and certain other provisions, and result in more successful implementation of the master plan. Feature-based density can strengthen the ability of the planning board to ensure that the zoning ordinance and individual subdivision layouts achieve many goals of the local community. These include:

- Conservation of forest, agricultural land, scenic resources, wildlife habitat.
- Concentration of development activity close to services.
- Provision of a range of building lot sizes and prices throughout the community.
- Layout of subdivisions in a manner that is conducive to neighborhood dynamics.
- Walkability, linkage between areas.

Feature-based density is appropriate for any size community. It may be applied town-wide or in specified districts. It can be an effective tool when the planning board's goals for development density are related to such things as the geography of the community, e.g. dense development is desired close to a village area, features of the landscape, or road attributes.

For feature-based density, the factors chosen need to be rationally related to density and to the purposes listed in the enabling statute (RSA 674:17). Data on the features chosen need to be available in a suitable form and level of detail to provide the planning board and landowner a reasonably accurate determination of developable area. For a reasonable cost relative to the overall cost of development, more detailed information should be able to be obtained by the applicant if desired. Consider steep slopes for example. A relatively inexpensive town-wide soil-based map or map based on digital topographic data can be obtained from your regional planning commission showing, for example slopes over 25 percent, slopes 15-25 percent, and slopes less than 15 percent. For large land areas, these may provide an adequate basis for determining whether or not steep slopes are likely to be an issue on the property. However, the scale of the source data makes it impossible to determine the proportion of the property in each slope category. On-site surveying is required in that case.

Following a presentation on Norwich's innovative approach organized by the Upper Valley Lake Sunapee Regional Planning Commission, the Newbury Planning Board developed a similar approach incorporating feature-based density into that town's zoning ordinance. Newbury had previously adopted overlay districts for shorelands, wetlands and steep slopes. The Planning Board had been discussing and evaluating the relationship between natural features such as these and permitted development density. The community supported excluding these areas from the portion of a lot used for calculating the permitted number of lots. Public input and acceptance strongly influenced the ultimate factors incorporated by Newbury. As a result of public input and of the physical layout of the community, Newbury did not include an "anti-sprawl" factor such as distance to the town center in the calculations. Several important conservation and recreation areas were identified as ones where a lower density in adjacent properties is desired.

## 11. Lot Size Averaging

*Note: This section is excerpted from the draft document Innovative Land Use Planning Techniques: A Handbook for Sustainable Development, prepared by the NH DES.*

Lot size averaging refers to the approach of requiring the average size of all of the lots in a subdivision to be equal to or greater than a specified minimum rather than requiring that each individual lot meet the minimum size threshold. The terms "density zoning" and "area-based allocation" of dwelling units are sometimes used as well. The conventional approach is to require each lot to be equal to or greater than a prescribed minimum lot size. Zoning has evolved to make adjustments to the underlying assumption that all lots in a subdivision should be of the same size. Conservation subdivisions are the most well known approach for enabling flexibility. In this form of lot size averaging, developed lots are typically smaller than the usual minimum lot size and grouped together in one portion of the lot while the cumulative reductions are compiled in one large lot reserved for open space uses. Some communities have required conservation subdivisions in certain situations such as to conserve important farmlands.

Conservation subdivision is often reserved for larger subdivisions. Lot size averaging can be used for minor subdivisions as well. This makes it especially helpful for a forest or farm owner who wants to create just one additional building lot but leave as much productive acreage as possible.

Lot size averaging is appropriate in any size community and in any zoning district where the current minimum lot size is based more on the overall resulting density desired in the area than on requirements relating to the size of individual lots such as the minimum needed for the provision of on-site water supply and wastewater disposal.

It is important for planning boards to carefully consider the municipality's ability to implement and enforce an ordinance prior to proposing a particular approach. A simple lot size averaging subdivision plan does not require any more expertise or follow-up than a subdivision plan where all lots are the same size. However, to ensure that municipal records are clear regarding lots restricted from further development, the planning board's filing system must be carefully organized by parcel number and cross-referenced with other municipal records. If the ordinance is going to allow development rights to be held in reserve for future use, some additional careful record keeping is required.

Several communities in New Hampshire allow lot size averaging. Lyme, in the Upper Valley Lake Sunapee Region, has had a lot size averaging provision in the zoning ordinance for many years. Lot size averaging is permitted for residential subdivisions in any district where residential uses are permitted. The ordinance grants the planning board the authority to approve reduced lot sizes, frontage and setbacks. The minimum dimensions are to be determined by the board based on the character of the land, soils, traffic safety, and other issues. The ordinance also authorizes the planning board to approve a density bonus of up to 25 percent for subdivisions of 20 acres or more where open space permanently protected by a conservation

ease to the town or a conservation organization comprises at least 75 percent of the lot. Lyme's lot size averaging approach is used by many applicants and the board has found it quite simple to administer.

## 12. Agricultural Incentive Zoning

*Note: This section is excerpted from the draft document Innovative Land Use Planning Techniques: A Handbook for Sustainable Development, prepared by the NH DES.*

Agriculture has long been an important part of the economic, social, and cultural fabric of New Hampshire. Farmers have been producing crops from New Hampshire soil for 375 years. Today, although agriculture is important to communities, it is facing significant challenges, not only from the increasing pressures of growth and development, but also from municipal regulations that may be inhospitable to many agricultural practices. The definition of agriculture under New Hampshire state law is very broad (RSA 21:34-a). According to the RSA, agriculture includes all aspects of breeding, raising, and selling livestock; silviculture (timber and logging), honey and maple syrup production, and crops ranging from vegetables and fruit to hay and seeds along with the processing, storage, and transportation of the agricultural products. The purpose of this model ordinance is to preserve the diverse agricultural lands and uses in New Hampshire.

Although many people enjoy farmland for its open spaces or the fresh vegetables available at the farm stand, farming is fundamentally a business and land use. One unique aspect of agriculture is that it does not fall neatly into a prescribed area of a community like a traditional commercial or industrial zone. Instead, productive farms are located where the physical characteristics of the land, such as prime soils and adequate water supply, occur regardless of the zone. Wherever farms are located, communities need to carefully consider both the benefits of and challenges to sustaining agriculture. Moreover, one farmland preservation technique cannot succeed alone; a coordinated package of financial incentives and land use regulations are preferred. According to the American Planning Association (APA), in the United States, leading farmland preservation counties employ at least six techniques: a comprehensive plan, transfer or purchase of development rights, differential assessment, right-to-farm laws, agricultural zoning, and urban growth boundaries.

Although there are many benefits to agriculture, there are some significant challenges that need to be addressed by the community. The primary challenge is that a farm is a working business. Depending on the type of farm there is the possibility of truck traffic, signage, increased traffic from customers, noise, and in some cases smell from livestock. Another challenge is that farms frequently require accessory dwellings and other structures that are usually not permitted under standard zoning ordinances and subdivision and site plan regulations. Finally, the engineering and site design requirements in municipal regulations can be expensive, making it difficult to expand the farm. Farms implementing best management practices (BMPs) can reduce their impact on the environment from fertilizer application and pesticide use.

NH RSA 674:21 authorizes innovative land use controls, and mentions agriculture specifically in the village plan alternative where only 20 percent of a parcel may be developed and the other 80 percent must be set aside by easement for agriculture, forestry, conservation, or public recreation.

Because the master plan provides the basis for a community's zoning ordinance, it is very important that the steps outlined in Section II of this chapter are followed. There are many opportunities to discuss agriculture in the master plan, such as the economic development chapter, the land use chapter, or the natural resources chapter. Existing conditions and the vision of the community should be reflected in the plan.

According to the New Hampshire Farm Viability Task Force, "current use taxation greatly reduces the property taxes on farmland and is the single most important public policy benefit for farm owners." Still, if the value of a farmer's land rises to the point where it eclipses his income potential, then there is increased pressure to sell the land, with or without the current use law. Transferable development/density rights or the purchase of development/density rights are other important tools for the community and the farmer to consider. Both provide options for a farmer to receive capital for the increased value of his real estate and encouragement to maintain the farm.

### 13. Wildlife Habitat Management

*Note: This section is excerpted from the draft document Innovative Land Use Planning Techniques: A Handbook for Sustainable Development, prepared by the NH DES.*

None of Newbury's zoning articles for the protection of sensitive environmental areas listed previously deal specifically with protecting important wildlife habitat.

Ideally, protection of wildlife habitat begins at the largest scale appropriate. This scale is determined through study of the range of the particular animal and the extent of its habitat across a multi-state and multi-regional area. Due to difficulties in coordinating across political boundaries and biological boundaries, most government entities must settle for either a coordinated approach with neighboring regions, or a regional-level approach that acknowledges that the range may extend beyond political boundaries.

The New Hampshire Wildlife Action Plan, which was mandated and funded by the federal government, identifies statewide strategies for identifying, restoring and maintaining critical habitats and populations of wildlife species of conservation and management concern. It is a pro-active effort to define and implement a strategy that will help keep species off rare species lists.

At the town level, protection occurs in reference to larger plans, but is refined by local wildlife habitat mapping and inventories. Town protection starts in the master planning process when

areas are identified for protection through the use of natural resource inventories and maps. These areas can then be protected through zoning ordinances and regulatory measures.

The tool presented here can be used in three ways: as voluntary guidelines for developers, as a set of design principles adopted by a town or board, and finally, as a set of standards that could be incorporated into site plan and subdivision ordinances as performance standards.

Habitat sensitive site design and development practices may be used in three ways:

- 1) As an educational tool for citizens and developers to encourage voluntary practices for habitat sensitive site design.
- 2) As a checklist for conservation commissions and planning boards in reviewing applications and suggesting voluntary alternative site designs and development practices at the planning stage.
- 3) As elements of a performance zoning ordinance that awards density bonuses or requires compliance with the checklist items as a condition of subdivision approval.

A pre-application review meeting between the developer and planning staff to discuss the checklist elements is strongly encouraged. Model language for a subdivision and site plan review regulation and accompanying checklist is presented in the draft document Innovative Land Use Planning Techniques: A Handbook for Sustainable Development, prepared by the NH DES and available online at: [http://www.des.state.nh.us/repp/ilupth/Habitat\\_Protection.doc](http://www.des.state.nh.us/repp/ilupth/Habitat_Protection.doc)

#### 14. Transfer of Development Rights

Transfer of development rights (TDRs) programs redirect development from areas that are a priority for conservation to areas identified by the community as appropriate for growth. The development rights on a parcel of land are not exercised at the “sending area” but transferred to the “receiving area”. Under this system the zoning ordinance gives the property owner in the so-called “sending area” the option to sever development rights from the land and transfer them to other land in a designated “receiving area.” When development rights are severed from property a permanent easement is recorded which prevents future development of the property and so it must remain as open space.

Local governments undertake transfer of development rights (TDR) programs to use the market to implement and pay for development density and location decisions. TDR programs allow landowners to sever development rights from properties in locally-designated protected or low-density areas, and sell them to purchasers who want to increase the density of development in areas where towns have planned for higher density, such as in and around village centers.

TDR programs appear to offer many advantages to local governments that want to control land use but also compensate landowners for restrictions on the development potential of their properties. TDR programs make development more predictable and use the market to

compensate landowners for lost property value. TDR programs are also more permanent than traditional zoning regulations.

Creating TDR markets can be a complex task. Decisions must be made to set up sending and receiving districts, underlying zoning, density planning and credit ratios. Communities may not support TDR programs, and local governments may have to invest in community education programs to explain them to the public. Some programs also require government-run TDR banks. Every choice affects the demand for TDR credits, their price and the success of the program.

Although TDR programs appear to be a potentially powerful land use tool, few communities have had success in using these programs because of the associated challenges. TDR programs do not reduce the need for zoning and can actually be more complex to administer. However, as the number of successful models increase, manageability should become easier.





## **VII. ISSUES & RECOMMENDATIONS**

Minimizing land conversion, fragmentation, and parcelization requires a combination of overlapping approaches:

- Land use planning and design;
- Land conservation; and,
- Wise management of both conservation land and developed land.

Issues and recommendations for each approach follow.

### **Issues: Land Use Planning & Design**

1. Land conversion, fragmentation, and parcelization result in permanent changes from which recovery is unlikely, if not impossible. Development will continue but the Town of Newbury can do a better job guiding how and where development occurs by implementing broader elements of natural resource-based community planning and design. In particular, the Town of Newbury could be more effective in meeting the communities' needs for improved natural resource management through informed and active use of the master planning process and rule-making authority.
2. The town Master Plan, currently being updated, will include a Natural Resources chapter. When completed, that chapter should identify community goals, uses, and funding for land preservation. These are critical components of a natural resource-based planning approach. The Master Plan should address where development should occur and what type of development is desired. Zoning and subdivision regulations then implement plan goals, including design elements that can reduce fragmentation. At the subdivision level, for instance, conservation subdivisions can help to conserve important natural areas and wildlife corridors (See Map 8). On the individual site level, design elements that adapt structures to the existing topography, limit the building "footprint" to the smallest necessary area of land, reduce impervious surfaces, and retain natural vegetation help to reduce fragmentation and support wildlife populations, while serving to protect water quality.

### **Recommendations: Land Use Planning & Design**

1. The Planning Board and the Conservation Commission should conduct a comprehensive environmental review and evaluation of the adequacy of existing ordinances, policies and regulations to conserve priority natural resources. The review should include: (1) resource conservation measures, (2) conservation subdivision techniques, (3) stormwater management practices, (4) waterbody and watercourse buffer requirements and building setbacks therefrom, (5) wildlife crossing and corridor requirements, and (6) performance based zoning practices.

2. The Planning Board should investigate the need for and consider adopting zoning regulations requiring developers to practice conservation subdivision design. Town zoning, subdivision and land use ordinances can provide flexible techniques to encourage appropriate economic growth with incentives for open space and resource protection. The Town of Norwich, Vermont, for example, has adopted a conservation subdivision planning and design ordinance for protecting corridors. The creative mix and use of compliance and incentive-based ordinances can provide the town with capacities to protect resources on a site-by-site basis and link through greenways to other conservation and recreation sites across the town.
3. The Conservation Commission should develop a habitat conservation checklist for application review. A checklist may increase adherence by applicants and planning boards to habitat-related objectives and design criteria.
4. The Planning Board and the Conservation Commission should adopt a policy requiring that at least one Conservation Commission member be present on all Planning Board site visits where there is proposed construction of structures, roads, or clearing of land on undeveloped land.
5. The Conservation Commission should review town-owned conservation and open space lands to ensure the appropriate deed restrictions were recorded to implement Town Meeting and town board votes.

### **Issues: Land Conservation**

1. For most people, the need to conserve and protect the natural environment is not obvious. When an animal is seen, it is assumed that it and others are thriving. It is only after they stop seeing wildlife, that they realize that something is amiss.
2. For biodiversity, bigger is better. Relatively large areas of contiguous, unfragmented natural land with a diversity of habitat types – grassland, shrubland and forest – need to be maintained. Large areas of unfragmented land are necessary to ensure the protection of sensitive species. Isolated pockets of natural lands are of value to the community but, to maximize ecological value, it's important to connect blocks of unfragmented land wherever possible.
3. As population and development have increased in Newbury, the number of large blocks of open space has diminished. This has put wildlife and the natural environment at risk. In order to allow for more development and protect the environment, there needs to be thoughtful consideration about where the town can grow and where wildlife and the environment should get priority. A broad distribution of moderately-sized **natural areas**, in the 125 to 500 acre range, can support species that don't need really large blocks of land in which to breed, and can support small populations of

more localized sensitive species. Ideally, these smaller tracts should be as close as possible to any larger tracts, contain a diversity of habitat types, and be linked to other natural areas. Stream valleys and ridge tops often do “double duty” serving as both critical habitat and wildlife corridors. Riparian (streamside) corridors, for example, are used by almost 70 percent of all vertebrate species.

4. When the town has decided what areas need to be preserved, a plan of implementation needs to be developed. The plan is needed to guide development into areas not harmful to wildlife.
5. Currently 50% of the Land Use Change Tax penalty under the Current Use program goes to the Conservation Fund. As land costs increase and LUCT receipts decrease, a larger allocation towards the Conservation Fund will provide the Town a better opportunity to preserve some of the lost open space.

### **Recommendations: Land Conservation**

1. The Conservation Commission working in concert with other outside organizations, such as SPNHF, Ausborn Sargent, LSPA, and SAWC, should educate landowners and the general public about the benefits of conservation.
2. The Conservation Commission should work to protect a few large tracts of natural land. Research shows that forest interior birds seem to require a minimum of 1500 acres, while 5000 acres or more is ideal. This may seem extreme but tracts this size may be possible to protect in the context of townwide or regional planning. By building partnerships and combining forces with other towns, state agencies, and conservation organizations, it may be possible to protect a large block in perpetuity.
3. The Conservation Commission should develop a prioritized list of important land areas to protect. Some should be selected to preserve critical habitat. Others should be selected to create a network of protected wildlife corridors along stream valleys and on ridge tops to connect blocks of unfragmented land. In addition to studying critical habitat, selection criteria can be developed by using mapped information regarding existing **important natural areas** (See Map 6), unfragmented land (See Map 4), and wildlife corridors (See Map 8) and how they relate to waterways, wetlands, ridge tops and other key areas. The width of wildlife corridors is subject to debate, but some studies have suggested that corridors must be at least 350 feet in width to maintain at least some “interior” (as opposed to “edge”) conditions.
4. The Conservation Commission should develop an implementation plan to protect the important land areas. Various techniques should be considered such as incentives to maintain open space, easement donation or purchase, land purchase, and land use

regulations. Subdivision regulations can be used to guide development away from wildlife corridors.

5. The Conservation Commission should work toward achieving a 100% allocation of the land use change tax to the Conservation Fund.

### **Issues: Wise Land Management**

1. It is necessary to not only add land for conservation, but also to manage conservation lands and other properties to support key species. Whether natural lands are publicly or privately owned, management usually means making some decisions about what constitutes a “key” species. For instance, bird species that live in grassy or shrubby habitats, like the American woodcock, American bittern, and common grackle, have declined dramatically in the past thirty years as pastures and hayland have gone out of production.
2. There are many species that do not need large forests in which to live. For these species, such as woodpeckers, small mammals and some larger ones, even narrow undisturbed corridors can provide critical travel routes. As noted, often such corridors are located on ridge tops or along waterways. Permanent conservation of these small but important areas is ideal, but wise management by private landowners can also work. Streamside buffers of natural vegetation, and the use of natural landscaping in these areas instead of lawns, are important contributions that individual homeowners can make.
3. For owners of large forested properties, a forest stewardship plan can help them enhance their property’s value to wildlife while accommodating timber harvesting or other economic activities. If certain areas are to be protected in the long term, a conservation easement can be attached to the property and held by a land trust. Easement monitoring is important to ensure the terms of the easement are being upheld.

### **Recommendations: Wise Land Management**

1. The Conservation Commission should encourage public and private owners to manage conservation lands to provide diverse habitat. To preserve some wildlife species, some conservation lands must be managed to create or maintain shrub and grasslands (clearing, mowing, burning, etc.). On the other hand, some forest species require extensive tracts of undisturbed forest. The need for a diversity of habitats further underscores the value of conserving large parcels that can accommodate different landscapes.

2. The Conservation Commission should encourage non-conservation land owners to manage individual properties to provide diverse habitat. Private land owners should be encouraged to use economic incentives such as the Landowner Incentive Program (LIP) administered by NH Fish & Game, the Environmental Quality Incentives Program (EQIP) or Wildlife Habitat Incentives Program (WHIP) administered by the USDA Natural Resources Conservation Service, and enrolling in land in Current Use, to conserve soil, water, native grasses, and other native species.
3. Land owners should be encouraged to prepare Property Management Plans for land located in the Important Natural Areas or wildlife corridors. Those lands should be managed in such a manner as to protect ecologically-important features and functions.
4. Property-specific management plans should be developed for all conservation properties owned or otherwise managed by the Town of Newbury. The plans should identify goal(s) to be achieved, what is to be protected, and specify how it is to be maintained. Minimum-impact trails would be used to accommodate recreational, research-oriented, and educational outings. Activities such as haying, brush cutting, or timber removal would go forward only with the approval of the conservation commission. More specifically, these areas should have no permanent roads and, after cessation of activities temporary roads and clearings be converted to rugged, natural surface trails for hikers and/or horseback riding.



## **REFERENCES**

Anonymous. 2003. Conservation Options: A Landowner's Guide. Land Trust Alliance. Washington D.C. 58pp.

Daniels, Thomas. 1999. What to Do About Rural Sprawl? Paper Presented at The American Planning Association Conference (28 April 1999). Seattle, WA. Available online at: <http://www.mrsc.org/subjects/planning/rural/daniels.aspx>

Fidel, Jamey. 2007. Roundtable on Parcelization and Forest Fragmentation: Final Report (May 2007). Vermont Natural Resources Council. Montpelier, VT. Available online at: [http://svr3.acornhost.com/~vnrcorg/frt/Roundtable%20Report\\_4-4-07\\_Edit.doc](http://svr3.acornhost.com/~vnrcorg/frt/Roundtable%20Report_4-4-07_Edit.doc)

Forman, Richard T.T., Daniel Sperling, and John A. Bissonette, editors. 2003. Road Ecology: Science & Solutions. Island Press. Washington DC. 481pp.

Kanter, John, Rebecca Suomala, and Ellen Snyder. 2001. *Identifying and Protecting New Hampshire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups*. NH Fish and Game Department. Nongame and Endangered Wildlife Program. Concord, NH. 143pp.

NH Department of Environmental Services. 2004. Habitat-Sensitive Site Design and Development Practices to Minimize the Impact of Development on Wildlife. Fact Sheet ID-4. NHDES. Concord, NH. Available online at: <http://www.des.state.nh.us/factsheets/id/id-4.htm>.

NH Department of Environmental Services. 2004. Minimizing the Impact of Development on Wildlife: Actions for Local Municipalities. Fact Sheet ID-5. NHDES. Concord, NH. Available online at: <http://www.des.state.nh.us/factsheets/id/id-5.htm>.

NH Department of Environmental Services. Undated. Innovative Land Use Planning Techniques: A Handbook for Sustainable Development (draft). NHDES. Concord, NH. Available online at: <http://www.des.nh.gov/REPP/index.asp?go=ilupth>

Terrell, Mary and Gary Dunning, editors. 2000. Forest Land Conversion, Fragmentation and Parcelization. Yale Forest Forum Series, Volume 3, Number 6. New Haven, CT. Available online at: <http://environment.yale.edu/documents/downloads/0-9/03.06.pdf>

Skelly, Christopher. 2003. Preservation through Bylaws and Ordinances: Tools and Techniques for Preservation Used by Communities in Massachusetts. Massachusetts Historical Commission. Boston, MA. 66pp, plus appendices.

Sperduto, Daniel D. and William F. Nichols. Undated. Natural Communities of New Hampshire. NH Natural Heritage Bureau and The Nature Conservancy. Concord, NH. 242pp.

Taylor, Dorothy Tripp Taylor. 2000. Open Space for New Hampshire: A Toolbook of Techniques for the New Millennium. New Hampshire Wildlife Trust. Concord, NH. 98pp.

Thorne, Sarah. 2001. New Hampshire's Vanishing Forests: Conversion, fragmentation and parcelization of forests in the Granite State. Society for the Protection of NH Forests. Concord, NH. 153pp.