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## Introduction

### *What is open space?*

This question posed to thirty different people would probably yield thirty different answers. The term “open space” evokes various images in people. To a municipal recreation director, open space might mean playgrounds and public beaches while a hiker might think of vast expanses of wild lands. Suburban residents might think of their back yards.

The adoption of a functional classification of open space helps to establish priorities for both this plan and for conservation efforts. Six major functional types of open space have been described<sup>1</sup>; these are:

- **Natural Resource Protection Areas:** includes animal and vegetative habitat and riparian corridors
- **Outdoor Recreation:** includes two categories
  - Active Recreation: parks, playgrounds, beaches, trails, etc.
  - Passive Recreation: plazas, sitting areas, arboretums, etc.
- **Resource Management:** forests, fisheries, farmland, etc.
- **Protection of Public Health and Safety:** floodplains, wetlands, unbuildable areas or areas with limitations for development like steep slopes a high water table, shallow depth to bedrock, etc.
- **Areas that Shape Community Character or Design:** buffer strips, front, back, and side yards, urban plazas, greenways, open space dedications related to development, etc.
- **Historic or Archaeological Sites:** battlegrounds, historic structures or grounds, historic districts, town greens, etc.

For the purposes of this element of the Regional Master Plan, the definition of open space follows:

***“Those broad undeveloped areas that can support both a wide variety of flora and fauna and human activities.”***

This definition, by virtue of its wording, excludes some of the more intensively used open spaces listed above such as city parks, town greens, and golf courses. Areas such as these are addressed in another CNHRPC report, “Regional Open Space & Recreation Plan” (Document 80-1). Those areas that are less intensively used, for example, forests, fields, wetlands, and so on, are the areas that are important for wildlife habitat and pollution control. They are also the areas that are important for human well being and for outdoor recreation and tourism, two major elements of the State’s economy. Therefore, even though such areas as municipal parks could technically be classified as “open space”, the broad vegetated open spaces that compose forests, wetlands, and the like will be the primary focus of this element. ***The purpose of the Regional Open Space Master Plan Element is to identify the broad undeveloped expanses in the Region, to describe the natural resources existing in these expanses, and to serve as a planning tool and a reference to guide local conservation efforts.***

In its simplest definition, open space is land that has not been developed or converted to other uses. These are the natural features that make the Central New Hampshire Region a special place to live. They include forests, fields, river corridors, wetlands, wildlife habitat, and greenway corridors, as well as agricultural lands. These are used for wildlife habitat, forestry and agriculture, recreation, and relaxation. As alluded to at the beginning of this section, open spaces have different meanings to

different people, but the majority of people in the State would probably conclude that open spaces are vitally important to New Hampshire's economy, biodiversity, and human well being.

Without the benefit of open spaces free from the pressures of development, wildlife and the forest products, recreation, and tourism industries would be much less healthy than they are today. In order for the Central New Hampshire Region to continue to experience the quality of life that it does today, adequate open space must be maintained in its present state.

### ***Why Plan for Open Space?***

One of the most important reasons to plan for open space is to set a course for the Central New Hampshire Region of coordinated development that maintains the Region's high quality of life. In many communities, many authorities make decisions on land use without the benefit of a unifying plan to coordinate their actions. The result is haphazard development that disregards the Region's unique characteristics and sense of place. This homogenizing approach toward land use threatens to make the Central New Hampshire Region indistinguishable from other areas of the country.

In such periods of intense development as the one we are experiencing in the early 21<sup>st</sup> century, towns tend to be reactive toward development proposals. They tend to allow development without sending a clear message to developers about what the town really wants. Development proposals are accepted simply because they conform to the town's current regulations. For a variety of reasons, no alternate plans that would protect the town's (and in a larger scale, the Region's) uniqueness have been developed.

If open space is to become a priority to the Region and the towns comprising it, and if the Region is to create order out of an unmanaged growth chaos, then an effective land use Master Plan Element that addresses open space is necessary to direct growth to those areas that can accept it and, more importantly, keep development out of those areas worthy of conservation. The Master Plan Element should be a clear statement of how the Region can protect open space while accommodating growth. In addition, it should provide a guide to local officials and developers so that unpleasant last-minute surprises, such as the subdivision of a favorite expanse of woods, are not encountered.

## **Overview of the Regional Master Plan**

To date, the Central New Hampshire Regional Master Plan consists of the following elements and related documents:

**Table 1.** Elements of the Central New Hampshire Regional Planning Commission Master Plan completed to date.

<b>Master Plan Element</b>	<b>Year Completed</b>
Goals and Objectives	May 1989
Land Use	May 1991
Housing	September 1992
Affordable Housing Assessment of the Central Region	November 1999
Transportation	February 1994
<b>Related Documents</b>	
Regional Profile	July 1988 (updated 1998)
Natural, Cultural, and Historical Resources Inventory of the Central New Hampshire Region	July 1999
Development Trends Study	November 1999

Of the above, the Transportation Element is scheduled to be updated in 2000.

Elements to be compiled in the future include the Community and Recreational Facilities Element, the Population and Economics Element, and the Water Resources Management and Protection Plan.

The Regional Master Plan is intended to guide communities toward thinking about their decisions and how they will affect the Region in addition to individual communities. The Regional Open Space Master Plan Element is a part of the Regional Master Plan and will work in harmony with the other elements of the master plan.

### **The Regional Open Space Element**

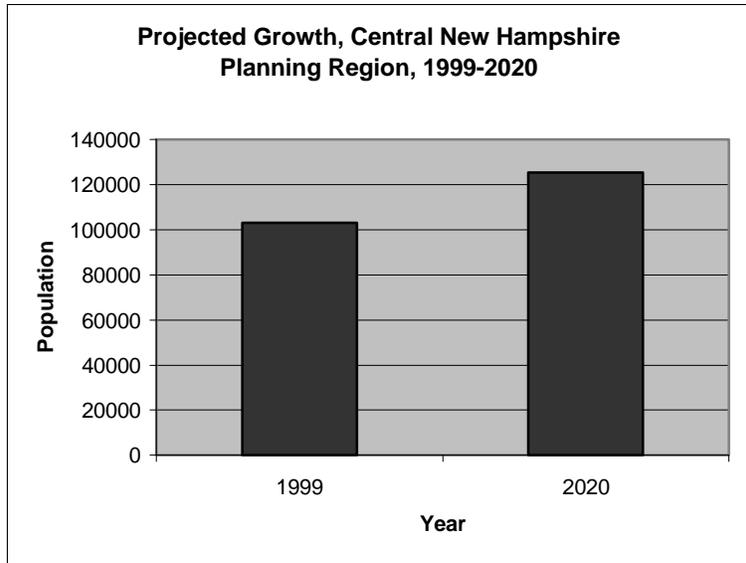
The Regional Open Space Master Plan Element is intended to be more than just a listing of the Region's open spaces, which would serve only to duplicate many individual efforts throughout the Region. Instead, it is intended as a vision of how open spaces could enhance the wildlife and human life in the Central New Hampshire Planning Region.

One of the most important reasons to plan for the protection of open space in the Central New Hampshire Region is the great increase in population that the State has experienced in the past fifty years. New Hampshire is the fastest growing state in New England. Its population grew by 6.8% in the period from 1990-1998 while averaging a yearly increase of approximately 15,000 people.<sup>2</sup> Most of the growth occurred in Hillsborough, Rockingham, and Strafford Counties, with Merrimack County currently the fourth-fastest growing county. The Central New Hampshire Planning Region, which includes most of southern Merrimack County and two towns in Hillsborough County (Deering and Hillsborough), is expected to grow by about 18% (about 22,000) in the next 20 years.<sup>2</sup> The Central New Hampshire Region faces the risk of developing more of its open spaces and losing a sense of

identity and a great deal of its natural features as the growth continues. This could affect the Region's quality of life.

Because of these serious growth pressures, it is imperative that a coordinated effort to protect valuable, regionally significant open space areas occurs in the near future, especially in this period of relatively good economic growth. This effort would be best realized if municipalities worked across municipal boundaries to identify the conservation intentions of their neighbors. Since natural resources, such as a forest or a

river, typically cross municipal borders, addressing natural resources at the regional scale will result in less habitat and forestry fragmentation than if considered on a town-by-town or parcel-by-parcel basis. This element of the Regional Master Plan is intended as a tool to guide these efforts.



## **References**

1. Gibbons, J. 1998. Open Space Fact Sheet 1: Open Space: What is it, how do we plan for it and build consensus to protect it? University of Connecticut Cooperative Extension, Haddam, CT.
2. Sundquist, D. and Stevens, M. 1999. New Hampshire's Changing Landscape: Population Growth, Land Use Conversion, and Resource Fragmentation in the Granite State. Society for the Protection of New Hampshire Forests and The Nature Conservancy, Concord, NH.



## **Regional Open Space Goal, Objectives, and Activities**

### ***Rationale***

The Goal, Objectives, and Activities of this Master Plan Element are intended to provide a policy framework and to give direction to the Element. The goal listed below is a general statement of ideal conditions. The Objectives and Activities describe programs and procedures that would help to achieve the goal.

This section of the Element is intended for the Conservation Commissions in the Region, the group that is actively working on conservation issues in their respective towns. The following is intended to be used as a “checklist” of sorts to guide conservation efforts for the benefit of both the particular Town and the Region as a whole.

The following Goal, Objectives, and Activities originated from those that appear in the Regional Master Plan that were written in 1989. They have been tailored to the Regional Open Space Master Plan Element by the Steering Committee and reviewed by the Regional Resource Conservation Committee.

### ***Goal of the Regional Open Space Master Plan Element***

***“To create a network of permanently protected open space throughout the region that provides for long-term protection of biodiversity, wildlife habitats, areas with historic value, and other natural resource values.”***

### ***Conservation and Preservation<sup>1</sup>***

#### ***Objective:***

Support municipal efforts and promote intermunicipal cooperation on conservation, protection, and sound management of natural resources and open areas of ecological and cultural significance in order to preserve ecological integrity, a “sense of place,” and natural scenic beauty for the inhabitants of and visitors to the Region.

#### ***Activities:***

- ✓ Conserve forestland and farmland for timber and food production, wildlife habitat, recreational uses, economic value, and preservation of the natural and cultural landscape.
- ✓ Set conservation priorities based on conservation features and values of open space such as large undeveloped areas, diversified wildlife habitat, known wildlife populations, recreational opportunities, scenic views, and water and forest resources.
- ✓ Connect existing conservation areas and conserve adjacent unprotected areas.
- ✓ Extend protection of large areas of natural resources over municipal boundaries to ensure unfragmented habitat for flora and fauna living in the Region; likewise, protect local community natural resources that serve as portions of the corridor between the larger areas.

## ***Water Resource Management and Protection<sup>1</sup>***

### ***Objective:***

Conserve open space for the management and protection of the Region's water resources, recharge systems, and wetlands.

### ***Activities:***

- ✓ Protect riparian buffers and setbacks around wetlands, rivers, streams, lakes, and ponds including adjacent upland areas to enhance wildlife habitat values, recreational opportunities, and aesthetics.
- ✓ Adopt local ordinances and regulations that enhance wetland and other water resource protection efforts.
- ✓ Protect wetlands through the Conservation Commissions' support and participation in the State wetlands regulatory program.
- ✓ Identify water resource attributes of land to be protected through municipal acquisition or conservation easements.
- ✓ Reduce sedimentation and stabilize roadside banks by practicing responsible stormwater management and maintenance.

## ***Land Use Planning<sup>1</sup>***

### ***Objective:***

Coordinate local land use planning so that these efforts support open space conservation.

### ***Activities:***

- ✓ Adopt local ordinances and regulations that support open space conservation and direct development toward less culturally-, historically-, environmentally-, and ecologically-sensitive areas.
- ✓ Use non-regulatory, voluntary, or educational techniques that support open space conservation.
- ✓ Encourage towns to communicate with one another regarding open space planning efforts.

## ***Recreation<sup>1</sup>***

***Objective:*** Conserve open space for recreation.

### ***Activities:***

- ✓ Encourage and support the role of the private landowner in the responsible use of open space by individuals.
- ✓ Protect existing trail networks with easements, rights-of-way, and trailhead access and parking.
- ✓ Encourage landowners to maintain access to their lands for hunting, fishing, and other recreational uses.
- ✓ Encourage the responsible use of private lands by recreational users.
- ✓ Maintain access to hilltops for vistas, water view trails, and scenic ledges.
- ✓ Consider outdoor recreation value of open space for trails, boat access, swimming, etc.
- ✓ Provide access to water resources for recreational activities, such as boating, swimming, aesthetic appreciation, and wildlife observation for the benefit of the Region's residents and visitors.

## ***Public Investment and Participation<sup>1</sup>***

***Objective:***

Support efficient use of public resources for the benefit of Regional open space.

***Activities:***

- ✓ Promote public investment for the purpose of securing conservation land and permanent open space.
- ✓ Use such tools as fee-simple purchase, easements, and other land conservation tools to conserve open space.
- ✓ Allocate the Current Use change tax and other fees, such as the timber tax, for funding conservation efforts.
- ✓ Use funds in combination with donations, bargain sales of land and conservation easements, and in-kind services for matching grant requirements.
- ✓ Encourage community participation in open space conservation efforts.
- ✓ Encourage communities to evaluate the economic value of open space.

## ***References***

1. CNHRPC, Regional Master Plan Element: Goals and Objectives, 1989.

## **Open Space Identification and Description**

### ***Methodology***

As mentioned previously, the purpose of this Element is not to merely list open spaces in each municipality in the Central New Hampshire Planning Region, but to provide a resource for a land protection design that will benefit the Region's wildlife and human life. To this end, the Conservation Commissions of most communities in the Region were interviewed to learn more about their own protected lands and how those lands applied to the Region. To establish a regional framework during the interviews, each Conservation Commission was asked to consider and comment on land in the towns just beyond their borders that they would like to see protected. The results of these interviews are not presented as a list of priorities for each Town; instead, the regional context is maintained while noting special circumstances in particular towns.

Maps generated using existing conservation areas and hydrography data provided a wealth of information in themselves. The commission uses Geographic Information Systems (GIS) data generated by the State and municipalities to graphically display information on roads and natural features. This data is stored at the State GIS server, the GRANIT system. Two of these data layers are conservation areas and hydrography, which are updated periodically to ensure the most recent information is displayed. For example, the commission's conservation lands data layer was updated in 1998 by the Society for the Protection of New Hampshire Forests and obtained from the GRANIT system. In some cases, individual municipalities in the Region sent detailed maps of their conservation areas to the planning commission to update the information at the local level in addition to the information received from the State.

A Base Map and a map of Town Unfragmented Lands overlaid with Conservation Lands were used during conversations with Conservation Commissions. The maps allowed highlighting of large blocks of contiguous open space and helped to emphasize the need for focused conservation efforts and the need for adding onto what has already been conserved. By presenting the known information in a visual manner, one could see which "gaps" needed to be filled in order to create a network of open space that would benefit the flora and fauna of the Region.

## ***Potential Areas of Significant Open Space***

### Mount Kearsarge State Forest – Warner Town Forest – Low State Forest – Fox State Forest

#### ***Wildlife Habitat***

The area between Mount Kearsarge in Wilmot and Warner and the western border of the Region in Hillsborough and Bradford marks the largest area with the fewest Class I through Class V roads in the Region. Because of its roadless nature, this area presents an extraordinary opportunity to protect parcels of land that can support some of the larger animals living in the Central New Hampshire Region, such as moose, deer, and black bear.

Portions of this tract have already been protected in the northern portion of the Region. In Warner, the State and the Town of Warner have protected large tracts of land in the Mount Kearsarge State Forest and the Warner Town Forest. In Salisbury, the Reiner Woodland Conservancy protects an additional 849 acres in the north. In Bradford and Hillsborough, Fox and Low State Forests comprise two other major protected areas. As mentioned previously, the Kearsarge, Low, and Fox State Forests represent some 60% of the total area of State Forests in the Region, and the Warner Town Forest is among the largest town forests in the Region. Much more land can be protected by adding onto what has already been protected and filling in the gaps between the parcels.

This stretch has the most topographic relief in the Region. Mount Kearsarge is the highest point in the Region and the third highest peak in New Hampshire south of the White Mountains. The hills in northern Hillsborough and southern Bradford are characterized by steep slopes and are relatively inaccessible. The areas in between Mount Kearsarge and the Low State Forest are just as hilly, readily apparent from the lack of roads.

One major road cuts through this tract, Interstate 89. This road and the amount of traffic travelling on it essentially acts as a barrier to movement for most larger animals in the Region, especially bears. Therefore, in terms of habitat, the stretch of land between Mount Kearsarge and the western border of the Region can be viewed as two separate parcels, one to the east of I-89 and one to the west of I-89. In terms of genetic diversity, the Interstate forces some populations living on either side of it to interact with only those individuals on the same side of the highway.

This area is further bisected by New Hampshire Route 114 in Henniker, Warner, and Bradford. While not used as extensively as I-89, it could potentially act as another barrier to movement. Its position in the Region could potentially divide this tract into three separate parcels.

#### ***Recreational Opportunities***

An area as wide open as this affords one the opportunity to do most recreational activities that one can think of. The State Forests allow hiking and picnicking, there is mountain biking in Fox State Forest, swimming, boating, fishing and hunting, and ice fishing on the many lakes and ponds, and snowmobiling on the many designated trails in winter.

Mount Kearsarge is located within an hour's drive from most of the Region, and this is a popular place to go on a summer or autumn afternoon. According to the Town of Warner, the view from the top of Mount Kearsarge encompasses the White Mountains, Green Mountains, New Hampshire and Maine coasts and the tallest buildings in Boston.<sup>1</sup> A family may choose to climb a trail to the summit or drive up an auto road for an afternoon.

### ***Recommendations***

One important action the towns in this area should take is to expand the areas of the State and Town Forests by adding parcels as time, funding, and landowner wishes permit. Individual Conservation Commissions should work together to effect the most efficient mode of protection possible. Working across town borders will help to ensure that conservation efforts do not end at town boundaries.

The Towns of Henniker, Warner, and Bradford should seek out easements or purchases on Route 114 to ensure that construction does not present an additional barrier to wildlife movement. These easements could be then connected to the State Forests further away from the roads. At present, there is only one easement on Route 114, a Town-owned parcel in Henniker north of Routes 9 & 202 and the village.

Greater communication between the Conservation Commissions in Bradford, Henniker, Hillsborough, Salisbury, and Warner will help to clarify goals and will help collaboration on conservation projects. Participation in the Regional Resource Conservation Committee will help to foster relationships between individuals on the respective Conservation Commissions.

### **Kuncanowet Town Forest and Conservation Area**

This 1150-acre conservation area in western Dunbarton is made up of a number of conservation easements acquired partially through the Land Conservation Investment Program. The KTFCA lies south of the portion of the Hopkinton-Everett Flood Control Reservoir that extends into Dunbarton and complements the Dunbarton Town Forest, which lies mostly in the area of the reservoir as well. It extends westward into Weare to Clough State Park.

The KTFCA is accessible via two Class VI roads. One enters the area from the south, through the Dunbarton Town Forest Holiday Shore Lot and the Gravis easement. A second, Everette Road, skirts the area north of the Heino and Upton Lots of the conservation area and continues into Weare. These unmaintained roads open the area to hiking, hunting, and snowmobiling.

The Kuncanowet Town Forest and Conservation Area is a significant open area when viewed in conjunction with the Hopkinton-Everett Floodplain Reservoir and Kimball Pond in southern Dunbarton. Efforts are currently focused on acquiring the remainder of the land around Kimball Pond, which would establish a diverse open space area of over 850 acres. This is significant since this is one of the largest undeveloped bodies of water near the Concord-Manchester corridor. A second area in which Dunbarton could consider focusing conservation efforts is along the northern border with Hopkinton. Connecting the KTFCA with the Hopkinton-Everett Flood Control Reservoir and the Chase Wildlife Sanctuary would create protected open space that could be extended north along the Contoocook and Blackwater Rivers via the flood control reservoir in Hopkinton. The French Easement acquired by Hopkinton in late 1999 placed a significant amount of land in southern Hopkinton and around the Flood Control Reservoir in permanently protected status.

### **Flag Hole Marsh – Hoit Road Marsh – Spender Meadow – Whitney Hill**

This area of diverse habitats, located in southern Canterbury crossing the borders with Loudon and Concord, presents an extraordinary opportunity to work across town borders to effect significant conservation. This area is characterized by extensive wetlands and undeveloped uplands. An extensive trail system comprised of both Class VI roads and State-sponsored and club-maintained snowmobile trails provides access to the area for wildlife observation and hunting. In addition to the habitat value afforded by the wetlands and uplands, the area is of cultural value as well, with cellar holes strewn about the area.

Three aspects of this area make it attractive for future conservation efforts: first, there are high conservation values for wildlife habitat and recreational use. Second, there are existing protected lands in Canterbury, Loudon, and Concord protected by all three municipalities and the NH Fish and Game Department including the Schoodac Conservation Area, Morrill Mill Pond, Hoit Road Wildlife

Management Areas, and the Maxfield Lot. Finally, much of the land remains in large parcels, owned by a relatively small number of people, which could facilitate conservation efforts. Therefore, future conservation efforts in this location could add protection and connection to an area that has already seen significant conservation success.

#### Boscawen Town Forest – Pillsbury Lake District/Hunting Preserve – Mast Yard State Forest

The area centered in Boscawen and bordered by the Boscawen Town Forest, Pillsbury Lake District in Webster, and The Mast Yard State Forest in Concord and Hopkinton is another area to seek out conservation easements for the purpose of connecting larger conservation areas. Like the Flag Hole Marsh area in Canterbury, it has a number of significant areas that have already been protected from development. These areas include those mentioned above, and also a number of conservation easements and the Hirst Wildlife Management Area. For this reason, and because this area could become the target of additional residential and commercial development in the coming decades, this area should be a focus of additional conservation efforts. The recent sale of the Tamposi parcel in Boscawen highlights the need for conservation efforts targeted at large landowners. Horse Hill, which peaks in Concord, has been identified as a conservation priority of the Concord Conservation Commission.<sup>2</sup>

The area is accessible through a number of Class VI roads leading into the Mast Yard State Forest and the Boscawen Town Forest. In addition, the State snowmobile trail corridor #11 leads through this area. These roads and trails can afford access to the area in both summer and winter for recreational and hunting and fishing pursuits. At least one of the trails, the Wier Road Trail, has received a formal introduction to the residents of Concord in the Concord Conservation Commission's publication, the *Concord Trail System Guidebook*.

## **River Corridors**

### Merrimack River

#### **Unique Communities**

The Merrimack River is associated with a number of unique natural communities recognized by the New Hampshire Natural Heritage Inventory. These habitats are remnants of the Region's natural landscape and contain communities that are particularly diverse in species. As such, these communities serve as indicators of ecological change. These communities include the following:<sup>3</sup>

- ❖ ***Inland Dunes Community*** – found on shifting and recently stabilized sand dunes composed of nutrient-poor soils. The process of flooding and shifting of the dune creates a dynamic environment. One of the rarest communities in New England. Some plants associated with this community are blue stem, witchgrass, jointweed, and gray birch.
- ❖ ***New England Dry Riverbluff Opening Community*** – found on high, steep, sandy riverbluffs with nutrient-poor soils that are often subjected to erosion and undercutting. Only in the Merrimack River corridor does this habitat support a lasting community. Some species associated with this community are gray and white birch, wand bush clover, and little blue stem.
- ❖ ***Mesic Riverbluff Forest*** – found on soils derived from wind and waterborne deposits of glacial outwash. These forests are usually found on higher river terraces and bluffs. A variety of habitats support species such as hemlock, red oak, ash, basswood, and Christmas fern. These communities are important for resident wildlife and migrating birds.
- ❖ ***Acidic Riverside Seep Community*** – found along major rivers where groundwater seepage emerges around bedrock exposures. The process of flooding and annual ice scour helps to

maintain a herbaceous community that remains free from succession to woody plants. Some of the plant species associated with this community are cranberry, maleberry, highbush blueberry, and leatherleaf; plant species that are usually associated with bog communities.

- ❖ **Floodplain Forest** – found on alluvial soils of large rivers. Annual flooding provides deep, nutrient-rich soils. Some of the best farmland in the State is found in these areas. The species associated with these communities are those such as silver maple, box elders, and ostrich ferns; flood-resistant species that help to create a lush environment frequented by migrating waterfowl and other birds.

### ***Recreational Opportunities***

The Merrimack River is used quite extensively by visitors to and residents of the Region for swimming, canoeing, walking and exploring, birdwatching, power boating, and fishing. Characteristics that draw people to the river are its scenic beauty, natural areas, proximity to home, and water-based recreational opportunities.<sup>3</sup> This use of the river is expected to continue as leisure time becomes more important to the Region's residents.

### ***Existing Development***

Development pressures are also expected to continue in the river's corridor. For the six communities in the Central New Hampshire Region that front the Merrimack River (Boscawen, Canterbury, Concord, Pembroke, Bow, and Allenstown), the 1990s saw new single-family housing development increase by an average of 11% over the 1990 Census.<sup>4</sup> The population increased in these six towns by an average of 6.4% in the period from 1990-1998 (see **Table 5**).

### ***Recommendations***

To ensure that the coming development does not affect the integrity of the river corridor, and to maintain the high quality of the water flowing through the Region, Conservation Commissions in the Merrimack River corridor should seek to establish buffers along the riverbanks through each town's zoning laws. The University of New Hampshire Cooperative Extension recommends a buffer of at least 300 feet, the minimum buffer width needed for successful wildlife movement. The River Management and Implementation Plan produced by the Upper Merrimack River Local Advisory Committee recommends that communities cluster development away from the river to conserve the integrity of the riparian corridor.<sup>5</sup> Optimally, a 1000-foot buffer should be sought. Since the communities associated with the river corridor are among the rarest in New Hampshire, efforts should be made to protect those communities for the species that depend on them, either directly or indirectly, for survival. ***The 1998 Natural, Cultural, and Historical Resources Inventory of the Central New Hampshire Region***, produced through the Regional Environmental Planning Program process, can help to identify priorities. In addition, the commissions should work together to secure conservation lands that will protect the integrity of the riparian corridor for wildlife movement.

### **Contoocook River**

#### ***Wildlife Habitat***

The course of the Contoocook River in the Central New Hampshire Region carries the river through Deering, Hillsborough, Henniker, Hopkinton, and Concord through an ancient glacial lakebed. Hillsborough, Henniker, the village of Contoocook in Hopkinton, and the village of Penacook in Concord are communities that were founded on the banks of the Contoocook River. The buildings located in these communities fragment the corridor into several different sections; however, significant amounts of farmland still surround these villages and provide cultural significance and riparian corridor continuity. As a result, long-range wildlife movement is still possible, even though the movement is not exclusively along the water's edge. The portion of the corridor in Deering is largely undeveloped, although few formal conservation efforts have been enacted in this area of the corridor.

It is therefore more conducive to wildlife movement. Opportunities exist to secure more land along the river from development to keep the remainder of the corridor intact.

### ***Recreational Opportunities***

Like the Merrimack River, the Contoocook River is used for such activities as canoeing, nature observation, and walking along the banks of the river. Like the Blackwater River, the banks of the Contoocook River are suitable for low-impact recreational activities like bicycling, horseback riding, photography, picnicking, and the like where such facilities exist.

### ***Existing Development***

As mentioned above, the corridor is home to a number of districts that form four communities' town centers. However, between town centers, the land is relatively undeveloped and rural. In the 1990s, the five communities in the corridor saw an increase in new single-family housing at a rate of 6.6% over the 1990 Census.<sup>4</sup> In addition, the five communities saw an average population increase of 3.6% in the time period from 1990-1998 (see **Table 5**).

### ***Recommendations***

The towns in the Contoocook River Valley should seek out buffer zones along the river that would help to conserve the integrity of the riparian corridor for wildlife movement.

Conservation Commissions in the towns along the corridor should create a dialog among themselves of priorities and future conservation efforts. If possible, the commissions should work together to effect conservation projects that will protect the integrity of the corridor for wildlife movement. The Regional Resource Conservation Committee is already established in part for this purpose.

## **Blackwater River**

### ***Wildlife Habitat***

The Blackwater River corridor is home to a number of plant and animal species. A wide range of habitat types, including open fields, wetlands, and forests helps to maintain an equally diverse wildlife population. Some of the inhabitants are mammals like the red fox and the black bear, an occasional visitor. In addition, birds like the snow goose (another occasional visitor), osprey, bald eagle, and common loon (all endangered or threatened in New Hampshire), reptiles like the wood, painted, and spotted turtles, and amphibians like the spotted salamander all call the Blackwater River corridor home.

The forest cover along the Blackwater consists mainly of white pine, hemlock, red oak, and red maple. In addition, stands of red spruce, aspen, beech, and yellow birch are scattered throughout the corridor.<sup>5</sup> In the Blackwater Dam and Reservoir System, the forest is managed for sustained yield by DRED. Softwoods are managed on a 90-year rotation while hardwoods are managed on a 100 to 120-year rotation. DRED manages the forests to maintain a diversity of both age classes and species. By managing the forest in this way, DRED maintains the health of the forest and maximizes the vigor of the timber resources, which ensures sustained yield from the forests for future generations.

The open fields in the Blackwater Dam and Reservoir System are primarily agricultural lands used for growing hay. DRED wishes to maintain 3-5% of the reservoir system in an early successional stage, which provides for diversity of habitat in the Region.<sup>5</sup> There is a shortage of open grassy areas as woody plants overtake abandoned agricultural fields.

The wetlands in the corridor include hemlock-fir swamps, red maple swamps, sphagnum bogs, and scrub-shrub deciduous wetlands. In addition to the permanent wetlands, a number of vernal pools exist within the corridor.<sup>5</sup>

The corridor is also home to a number of exemplary natural communities, including floodplain forests, the Greenough's Pond wetland complex in Salisbury, and a dwarf shrub bog.<sup>5</sup> Floodplain forests form along river channels where the current is slow and seasonal floods inundate point bars. The dominant tree species are red and silver maple. Greenough's Pond contains a number of different habitats including an acidic fen community, a floating-leaved emergent swamp, and the coontail, an uncommon plant. The shrub bog contains *Sphagnum sp.* and leatherleaf and has no inlet or outlet.

### ***Recreational Opportunities***

The Blackwater River is used extensively for recreation. For example, canoeing and kayaking races are held annually on the river. In addition, the river could be used for fishing, boating, and swimming. The banks of the Blackwater River are suitable for hiking, bird watching, bicycling, horseback riding, picnicking, photography, snowmobiling, cross-country skiing, and so on.

The US Army Corps of Engineers conducts controlled releases in the spring from the reservoir to provide adequate flow for the New England Division Kayak Championships and the Snyder's Mill Kayak Slalom. Attendance at these events averages approximately 150 participants and 200-300 spectators.<sup>5</sup>

### ***Existing Development***

The Blackwater River is fortunate to be one of the lesser-developed rivers in the Region. Only one State highway is located close the river, Route 127. It is used mainly by the residents of Webster and Salisbury during their commutes to and from work. The river corridor is not conveniently located near Interstates 93 or 89, and so does not see the traffic that an area closer to the interstates might.

Salisbury has historically been a quiet agricultural community with very little industry. The population remains low and it remains one of the most sparsely populated areas in the Region. However, these attributes are attracting more people to the Town. Salisbury had new housing start rate of 10% in the 1990s, or an increase of 39 new houses.<sup>4</sup> In addition, Salisbury's population increased by over 7% in the 1990s (see **Table 5**).

Webster has been able to remain a small, sparsely populated community throughout its history. It was never able to capitalize on industry or agriculture, so the majority of its residents commute to work in Concord or Franklin. The Town has had moderate growth through the 1990s with a total of 78 new housing starts in the decade, which equated to an increase over the 1990 Census of 15%.<sup>4</sup> Similar to Salisbury, Webster's population increased by over 6.5% in the 1990s (see **Table 5**).

### ***Recommendations***

The Blackwater River corridor is relatively well protected due to the Blackwater Dam and Reservoir System in Salisbury and Webster and the Mock Memorial Forest, Pearson Park, and the Riverdale Sanctuary in Webster. The relative pristine nature of the riparian corridor makes this area important for wildlife movement. The river's setting as a wildlife movement corridor takes on an additional level of importance when viewed as an extension of the Contoocook River, into which the Blackwater River flows in Hopkinton.

For this reason, and for the fact that the corridor is likely to see more development as the Region's population grows, it is recommended that Salisbury and Webster establish buffers of at least 300' in each town's zoning regulations. This will help to conserve the wildlife habitats along the river, the natural beauty of the river, and the recreational opportunities that come from the placid character of the river.

## Soucook River

### ***Wildlife Habitat***

Because the Soucook River flows in close proximity to Route 106, the highway's presence is felt along the entire corridor. The banks of the Soucook River alternate between undeveloped, secluded wildlife habitat areas and heavy industrial activity. This has fragmented the corridor into "islands" of biological activity that are physically separated from other islands. The consequences of such fragmentation can be as extreme as extinction of plants or animals in particular islands.

The condition of the corridor notwithstanding, the Soucook River supports mammals like otter, beavers, foxes, and porcupines, fish such as brook trout, rainbow trout, and brown trout, and various songbirds and ducks. These species live in such habitats as wooded swamps, marshes, and sandy woods.<sup>6</sup> The many wetland areas and swamps along the Soucook River provide exceptional habitat for migratory and nesting waterfowl.

The Soucook River drains directly into the Merrimack River and is therefore connected to both the Atlantic Ocean and the northern reaches of New Hampshire. The corridor is therefore important for wildlife movement from near the Lakes Region of the State to the coastal and mountain regions.

### ***Recreational Opportunities***

The changing status of the bank, i.e.: the alternating natural and industrial sections of the river, helps to make the Soucook a river little used for recreation. The Soucook River has relatively few points that the public can use to access the river, despite the fact that Route 106 is located close to it along its corridor. Since the river averages only about forty feet wide and is sometimes too low in summer to navigate a boat, the Soucook is not especially suited for recreational travel on the water. However, fishing from the banks is common in the intermittent deeper sections.

### ***Existing Development***

Loudon, through which much of the Soucook River flows, is one of the faster growing Towns in the Central New Hampshire Region. **Table 5** shows that Loudon's population experienced a growth rate of over 10% in the 1990s. Also in the 1990s, Loudon had 189 new housing starts for a 17% increase since 1990.<sup>4</sup> In addition, four new commercial and one new industrial structures were built in the 1990s. The ownership status of the banks of the river (mostly commercial) makes creating a greenway along the river more difficult than if the parcels were owned by individual homeowners.

Concord and Pembroke share the Soucook River downstream from Loudon. Concord, the only City in the Region, has been growing slowly since the early 1900s. In the 1990s, Concord added 386 new houses for a 6% increase over the 1990 Census.<sup>4</sup> Very few of these were likely to be on or near the banks of the Soucook River, however, since the area is occupied by the Concord Municipal Airport and commercial properties. Pembroke has more than doubled in population since 1950 (**Table 5**); however, there was an increase in housing of only 5% (71 new houses) in the 1990s.<sup>3</sup>

The New Hampshire International Speedway has been a major force in the development of Loudon over the past decade. As auto racing becomes more popular, more businesses attempting to associate themselves with the speedway move into the watershed. The most recent development is a hotel built at the intersection of Route 106 and Interstate 393.

### ***Recommendations***

At the moment, the only conservation areas on the Soucook River are the Soucook River State Forest, the Taylor State Forest, a few small conservation easements, and a few small wellfields belonging to the Pembroke Water District in Concord and Pembroke. Where lands can be purchased or put under easement to extend existing conservation areas or establish new conservation areas, efforts should

be made to do so. In addition, Loudon, Concord, and Pembroke should adopt riparian corridor buffer zones in each respective zoning ordinance.

Given the commercial and industrial nature of ownership along the Soucook River, it is recommended that efforts be made to update individual municipal Master Plans to address the importance of the natural aspects of the river and direct development and potentially harmful uses elsewhere. Alternatively, Conservation Commissions should work with commercial and industrial interests located along the corridor to educate them on the potential impacts on the river and to establish a physical vegetated buffer between operations and the river. This will help to ameliorate the effects of commercial and industrial activity that are located close to the river.

To protect the integrity of the river, and to take a watershed approach toward natural resource protection, the Loudon Conservation Commission might consider conservation efforts on the tributaries of the Soucook. Shaker and Pickard Brooks originate in Canterbury near the Canterbury Shaker Village. By working with the Canterbury Conservation Commission, easements may be acquired in this area. By protecting the natural resources in this area, both Canterbury and Loudon are able to fulfill conservation priorities. Likewise, the Loudon Conservation Commission might seek out joint conservation efforts with Concord and Pembroke to protect the Soucook River. The Regional Resource Conservation Committee is designed in part to foster intercommunity relations.

The Loudon Conservation Commission should persuade its selectpersons to include more protection measures for the river and underlying aquifer as the Town updates its Master Plan. An amendment to the Town's zoning ordinance, enacted in 1987 and revised in 1995, could recommend what types of businesses can exist in the Commercial/Industrial Zone. This would reduce the number of businesses moving into Loudon on Route 106 that would pose a direct threat to the river and aquifer through the course of their operations.

### ***Smaller River Corridors***

#### Turkey River

The vast majority of the Turkey River, including the Upper and Lower Turkey Ponds, many of the unnamed tributaries, and Turee Pond in Bow is under conservation in one form or another. In Concord, St. Paul's School owns most of the land around the ponds and a great deal of the land downstream of the ponds. Another major owner of land in the corridor is the State, with four small State Forests (Cilley, Upton-Morgan, Russell-Shea, and West Iron Works Road) located in the area. White Farm, owned by the Concord School District, is also in this area as well as the Department of Resources and Economic Development farmland at the junction of Clinton Street and West Iron Works Road. The Audubon Society of New Hampshire is located within the watershed; a number of trails can be accessed at the Society's headquarters on Silk Farm Road. In Bow, the northern shore of Turee Pond is devoted to conservation land. Of that, the Town owns much of the land. In addition, the Richard Hanson Memorial Recreation Area is located on the shores of Turee Pond.

The only unprotected area of the Turkey River corridor is the area across from the Cilley State Forest, the southern shore of Turee Pond, the Shaw's Supermarket parcel on Clinton Street, and the Maple Leaf Farm. If possible these areas should be brought under easement or purchased as time, funding, and landowner wishes allow in order to bring the entire corridor under conservation.

#### Punch and Stirrup Iron Brooks

These two brooks, located in eastern Salisbury, are popular trout- and fly-fishing spots with local residents. Both empty into the Merrimack River. Punch Brook flows east into Franklin before draining into the Merrimack. Stirrup Iron Brook crosses the border into Boscawen and drains into the Merrimack after a short course in that Town. They are located in an area of Salisbury that has few

roads that are spaced far apart, but very little of the land has been placed under conservation. This is probably due to the lack of development pressure that is felt elsewhere in the Region.

To protect the recreational opportunities that these two brooks afford, it is suggested that protection given the State Forest Nursery be extended northward along the corridor bounded by Old Turnpike Road to the west and the eastern border of Salisbury. This area includes the headwaters of the two brooks and the Shaw Farm, a 66-acre Town-owned parcel located on North Road.

#### Mill Brook

Mill Brook, a brook trout stream, flows from the southeastern side of Mount Kearsarge, crosses the border from Warner, and continues southeast through Salisbury to the Blackwater River. Like Punch and Stirrup Iron Brooks, the majority of Mill Brook flows through areas that have not been placed under conservation. It is suggested that the Mount Kearsarge State Forest be extended southward along the western border of Salisbury to the junction of Buckhorn Road with the Warner town line. This can be done by the Town of Salisbury or the State through easement or purchase as time, funding, and landowner wishes permit. This will place a good deal of the upper reaches of Mill Brook under conservation.

#### Bela Brook

Bela Brook originates from the northeastern slopes of the hills in northern Dunbarton, flows northwest through Dunbarton, turns abruptly eastward to flow through Bow, crosses into Concord and then flows northeast into Turkey Pond. Throughout this three-town journey from headwaters to outlet, only about a fifth of the brook's length is under conservation. One small section of the brook is under the protection of the federal government (Hopkinton-Everett Reservoir), another is managed by the Town of Bow (Bow Town Forest), and St. Paul's School owns the area around Turkey Pond. A few small conservation easements are located at intervals along the course of the brook.

In order to conserve the land in northeastern Dunbarton, the fastest-growing Town in the Region according to the number of houses built in the 1990s (159 new houses, 26% more than the 1990 Census<sup>3</sup>), the land around Bela Brook should be conserved through the establishment of riparian buffer zones in its zoning ordinances.

#### Warner River

The Warner River flows northwest from Lake Massasecum in Bradford, turns to the northeast, and crosses the border into Warner. It flows southeast through Warner along Interstate 89, crosses into Webster and Hopkinton before emptying into the Contoocook River. Only a few small conservation easements in Warner comprise all the conservation efforts on the Warner River. If the integrity of the river is to be maintained, then more conservation efforts should be focused on the river away from I-89 as time, funding, and landowner wishes permit before development and road-building claim the banks. At the very least, the town of Warner should adopt riparian buffer zones into its zoning ordinances.

### **Summary**

Existing maps and interviews with conservation commissioners combined to identify terrestrial and river corridors that are significant for the natural resources they contain and the benefits they provide to wildlife. The most prominent of these corridors is the tract of land extending from Wilmot to Bradford and Hillsborough. A great deal of the Region's State-owned lands are in this tract, with three prominent State Forests. In addition, the Warner Town Forest is another large parcel conserved in this area. This corridor is large enough to support a number of uses in all seasons. It is used by humans for recreational pursuits like hiking, biking, and snowmobiling, but it is also extensively used for forest products, hunting (an economic use), and wildlife habitat. Although many acres of land have been

protected in this corridor, opportunities exist to protect a great deal more. For example, the Loon Pond watershed in Hillsborough has been identified as a conservation priority by the Hillsborough Conservation Commission. The Conservation Commissions in the towns in this area are encouraged to work across town boundaries to effect integrated land protection.

Other significant open space corridors include the Flag Hole Marsh area in Canterbury, near the border with Concord and Loudon. This area is crossed by Class VI roads and snowmobile trails, affording access to hunters, nature observers, and cross-country skiers, among others. A few large landowners own most of the land in this area. The area bounded by the Mast Yard State Forest in Hopkinton, the Boscawen Town Forest and Hirst Wildlife Management Area, and the Pillsbury Lake District/Hunting Preserve in Webster is thought of as a potential island to which corridors could be linked. A number of trails cross the area as well as a state snowmobile trail. The Concord Conservation Commission has identified Horse Hill, which peaks between the Mast Yard State Forest and the Boscawen Town Forest, as a conservation priority. The Kuncanowet Town Forest and Conservation Area in Dunbarton could be extended north through the Chase Wildlife Sanctuary to the Hopkinton-Everett Flood Control Reservoir and along the Contoocook River to create a significant corridor for wildlife movement. In addition, the KTFCA could be extended eastward to include Kimball Pond, creating another wildlife corridor.

The Merrimack and Contoocook Rivers are the preeminent rivers in the Region. Both have been the focus of population growth over the past two hundred years and development within these riparian corridors pose an obstacle to wildlife movement. However, since development pressures threaten those areas that have not been developed, it is recommended that conservation efforts and buffer zones focus on the riverbanks to preserve the habitat that remains and the integrity of the riparian corridor. These efforts should be focused on the Merrimack north of Loudon Road in Concord and in Pembroke, where a great deal of the riverbank is either undeveloped or used at very low intensity (e.g.: farming). On the Contoocook River, it is recommended that conservation efforts focus on the areas between built-up areas between the Contoocook, Henniker, and Hillsborough village centers. In addition, the relatively undeveloped riverbank in Deering should be protected for the wildlife habitat present there.

Among the river corridors listed are the Blackwater and Soucook Rivers. These two corridors, one in the very heart of the Region and the other in the east-central portion of the Region, are both important for wildlife habitat. The Blackwater River corridor contains a number of unique natural communities such as a dwarf shrub bog and an acidic fen community. In addition to its value for wildlife habitat, the Blackwater River is popular as a recreational river. The Soucook River's habitat value comes from the fact that it is being encroached upon by private property owners. Although it does not experience the same level of recreational activity, it is used by the local residents for low-intensity recreational activities such as fishing. For both rivers, it is recommended that the riparian corridor be conserved through buffer zones and/or easements. The Blackwater River, with its recreational opportunities and popularity, is likely to experience more growth along its banks in the future. The Soucook River has very little protected land along the corridor and a great deal of commercial development, especially in Loudon and Concord. For a river that is mostly unblocked by dams, it is important that wildlife be able to move unimpeded along the length of the corridor along the banks as well.

This evaluation of open space in the Central New Hampshire Region highlights the existence of many parcels of land and natural areas that would better be put to use as wildlife habitat, recreational areas, forestry and agriculture, rather than to be permanently converted to new development. The rate of population growth the Region experienced in the 1990s is expected to continue for the foreseeable future. This growth threatens to make it indistinguishable from most other regions in the United States. If the Region is to maintain its sense of identity, then protecting these intercommunity and localized natural areas should be a priority. Town Conservation Commissions should be the first to act to protect open space and wildlife habitat. Conservation Commissions must reach out to their respective communities and gain the support of its residents. They must then conserve vital natural areas in their communities and attempt to extend these areas to municipal boundaries, where they can be integrated with conservation land in neighboring towns. These actions will, over time, construct a system of open space that will benefit wildlife, boost the Region's economy, and better quality of life in the Region.

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## Appendix A: Value of Open Space

Open space in New Hampshire is important not only for wildlife habitat and human well being, but also for New Hampshire's economic well being. Open spaces, such as those in the Mount Kearsarge region, are what attract visitors from out-of-state, and open spaces are what these visitors spend millions of dollars per year to see and experience. In fact, open space contributed (directly and indirectly) \$8.2 billion to New Hampshire's economy in 1996/1997, or over 25% of the State's gross product.<sup>1</sup> It could be argued that without the scenic value of these areas, there would be a reduction in the tourism industry, the outdoor sporting industries, and the various recreational industries that today thrive in New Hampshire because of open spaces. Preserving open space, therefore, makes good economic sense.

Open spaces also provide services that society would be forced to pay millions of dollars to replace if they were eliminated.<sup>2</sup> Wetlands filter toxins out of water, sequester and desynchronize floodwaters, and in some cases provide a recharge area for groundwater, making wells a viable source of public and household water. Greenways reduce traffic noise and consume carbon dioxide to give us oxygen. Replacing these services, which are provided at no cost, would be astronomical despite the relatively good economic situation New Hampshire is currently enjoying.

Open spaces cost less for a community to retain intact than to develop for the purpose of expanding the tax base.<sup>3</sup> Studies show that, for new residential developments, the income generated through property taxes is less than the cost for community services such as education, new sewer lines, and police and fire protection. New commercial development is not as costly to the community in terms of services provided, but the influx of new residents working at the establishment will in some cases require new residential development. In the end, retaining undeveloped land costs less to maintain and preserves a community's unique characteristics.

In the following section, the reader will encounter this theme time and time again: that protecting open space is as important to the economy of New Hampshire as it is to the wildlife and people living here.

### ***Open Space Resources in the Central New Hampshire Region***

#### Endangered, Threatened, and Special Concern Species Habitat

Eighteen of the twenty towns in the Central New Hampshire Region have at least one plant or animal species listed in the New Hampshire Natural Heritage Inventory, a State program to find, track, and facilitate the protection of New Hampshire's rare plants and exemplary natural communities.<sup>4</sup> According to the Natural Heritage Inventory, "endangered species" are those in danger of being extirpated from the state, while "threatened" species face the possibility of becoming "endangered." A "species of special concern" is a plant or non-harvested wildlife species documented to have a naturally restricted range or habitat in the state, be at a low population level, and be in such demand by man that its unregulated taking would be detrimental to the conservation of the population.<sup>5</sup>

#### Agricultural Lands

Productive farmlands include active and inactive farms located on prime agricultural soils. Agricultural lands are the areas on which crops can be grown or that can be used for pasturing animals. These areas include hayland, pasture, cropland, orchards, and nurseries. These lands typically contain the best soils in the Region's communities and have typically been in agricultural use for a number of years. The Natural Resources Conservation Service classifies many of these soils as "prime farmland," a resource that is scarce in the Central New Hampshire Region given that the western half

of the Region is too steep or has soils too thin and stony for farming. Prime farmland in the Region is typically found in river floodplains and farms are constrained physically by the shape of the valley.

### Forests

The forests in the Central New Hampshire Region are temperate forests. Temperate forests grow between 40 and 50 degrees latitude and are characterized by stands of mixed hardwoods and softwoods. They have fertile soils with a high organic content and support populations of small and large mammals and bacteria and fungi, which decompose organic matter to help make soil. There are virtually no stands of "old growth" forest in the Region due to the massive deforestation in the mid-1800s in an attempt to make New England a sheep-farming region. Most of what we see is second-growth forest that is approximately 100 years old.

### Floodplains and Rivers

Floodplains were created long ago by the waters rushing forth from melting glaciers. They are continually being modified by the rivers that run through them. Floodplains are generally flat tracts of land that border the river and are formed when a river overflows its banks. Flooding is a natural process of the river system that serves to slow floodwaters, reducing damage further downstream, to fertilize the soil, making floodplains the most likely site for a farm, and to recharge groundwater resources, making well a reliable source of drinking water. Floodplains also provide habitat to a wide variety of plants and animals.

Rivers serve to channel rainfall and other water that does not soak into the ground. Water collects in small channels, which drain into larger ones until a network drains the landscape. The Merrimack River watershed in the Central New Hampshire Region is comprised of the Suncook, Turkey, Soucook, and Contoocook Rivers and all their tributaries. Therefore, the watershed encompasses the Central New Hampshire Region and extends far beyond it.

Riparian corridors are undisturbed, naturally vegetated areas contiguous with and parallel to rivers and streams. They are important for maintaining water resources by filtering pollutants, maintaining water temperatures, stabilizing stream banks, supplying woody debris for stream habitat, providing food for aquatic life, and storing surplus runoff for gradual release during low base flow. The minimum width for a riparian buffer is determined to be 95 feet, which is divided into three zones. Zone 1 begins at the top of the stream bank and occupies a strip of undisturbed forest of 15 feet. Zone 2 begins at the edge of Zone 1 and occupies 60 feet of managed forest. Zone 3 begins at the edge of Zone 2 and is comprised of 20 feet of natural or controlled grazed grasslands. Although the 95-foot width is considered to be the minimum, local constraints such as the nature of the stream, soils and topography, and land use may restrict the width to less-than-ideal condition.<sup>5</sup>

### Wetlands

Wetlands are typically defined by three parameters: drainage, soil type, and vegetation. The National Wetlands Inventory defines wetlands by hydrology, hydric soils, and vegetation, including trees and plants that dominate an area and require wet conditions to grow. They are transitional zones between surface water and upland sites. Many wetlands are remnants of glacial pools that have been slowly filling in with sediment over the past 10,000 years. A wetland can serve a number of purposes such as to provide wildlife habitat, facilitate groundwater recharge, sequester and desynchronize floodwaters, and filter toxins depending on the type of soils and bedrock beneath it. In addition to these services, wetlands contribute to the scenic quality of an area.

Wetlands have been viewed in the past as areas with little economic value and have been subjected to filling, draining, and dumping with little regard for the consequences. In recent times, however, science has shown that wetlands serve a purpose in maintaining and improving environmental quality by performing the services mentioned above. In addition, wetlands are critical to bird migration in providing a rest stop with food, water, and shelter.

### Lakes and Ponds

The Central New Hampshire Region is dotted with lakes and ponds of all sizes. Some, like Penacook Lake in Concord, serve as public water supplies for its residents. Others have boat launches and public and private beaches and are used extensively for recreation. Many different types of activities are found on the Region's lakes from fishing to serving as portions of snowmobile paths in winter.

Lakes are important to wildlife for a variety of reasons. First, they provide an assortment of habitats and can therefore support a number of different plant and animal species. The shore can range from marshy in places to sandy in others and boggy in still others. In the water, the stratification of the water in deeper lakes in the summer and winter can provide habitat for cold water and warm water fish. Second, water bodies often serve as resting areas for migrating birds, providing a source of food, shelter, and, of course, water.

## ***Importance of Open Space***

### Wildlife Habitat and Biodiversity

Why is protecting wildlife habitat so important? Consider this prediction: in 2000, 90% of all U.S. citizens will live in urban areas.<sup>6</sup> This does not necessarily mean that people are moving to places like New York City and Boston. Instead, urban areas are expanding to meet us where we live. For example, the "Boston area" is now considered by some to encompass cities like Nashua, Portsmouth, Manchester, and, to a lesser extent, Concord.

With the expanding urbanism comes increasing habitat fragmentation as forests and fields are developed for new residential, commercial, and industrial complexes. With a decrease in habitat comes a decrease in the number and type of species that can occupy an area, until all that remains is habitat suitable for plants and animals commonly associated with humans, such as squirrels, skunks, and hardy common-variety plants. Other, larger animals are forced to find more suitable places to live, and if the entire habitat is disturbed by human activity, the species becomes locally rare or extinct. Humans should protect wildlife habitat, and therefore the species living in them, because the rate of extinction is currently about 100 times its natural rate. If the status quo remains with regard to unmanaged growth, this rate is expected to increase within the next sixty years to 100 to 1000 times faster than it is today.<sup>6</sup> To put this into perspective, the last time the rate of extinction was this high was approximately 65 million years ago, after an asteroid collided with earth. In the past 200 years, at least six species of mammals and birds that once occurred in New Hampshire have already been pushed to extinction.<sup>7</sup>

Protecting wildlife habitat will help ensure that the level of biodiversity remains for future generations. Biodiversity is defined as being "the variety and variability of all living organisms."<sup>6</sup> This diversity includes all the plants, animals, bacteria, fungi, and protozoans living in an area, their genetic variability, the community in which they live, and the processes and interactions that shape the biological and physical elements of the earth into a complex web. Species diversity, or the wide range of species in an area, and species richness, the number of each species present, are both important indicators of ecosystem health. With regard to species diversity, over 15,000 plant and animal species have been identified in New Hampshire.<sup>6</sup> They live in 100 types of natural communities.<sup>1</sup>

What does biological diversity have to do with the well being of New Hampshire? It is well known that a great deal of our medicines is derived from natural sources. Penicillin and aspirin are two common treatments for everyday maladies that were discovered as a result of observing natural processes; penicillin, in fact, was discovered by accident. Despite these medical successes, less than one percent of the plant and animal species known today have been examined for direct human benefit.<sup>7</sup> Considering the status of human disease in the late 20<sup>th</sup> century, it would make sense to preserve habitats for the plants and animals living there so that more of them could be tested for a possible

solution to these puzzles. The answers may be right here in New Hampshire, but time and financial resources limit how many plants and animals can be tested for possible benefit.

Habitat protection will ensure that endangered and threatened species will have a place to attempt recovery. Species such as the golden eagle, the lynx, the timber rattlesnake, and the common loon<sup>8</sup>, the very symbol of New Hampshire wildlife, are all endangered or threatened species that have specific requirements for survival that are magnified because of the rarity of suitable habitat.

As much as it makes sense to protect open space for the benefit of the endangered species living in the Region, it makes just as much sense to protect open space for the great deal of non-endangered species. Such common animals as deer and porcupines are important for maintaining the natural and economic health of the Region. Other carnivores and raptors help to keep the herbivores in a stable population. Preserving open space for these “common” animals helps to guarantee habitat will remain to keep these and endangered species populations stable for years to come.

#### Pollution Control

Open spaces such as forests, wetlands, and river and greenway corridors serve humans by providing services that would otherwise be very expensive to replace. Pollution control is one

of these services. If wetlands ceased to provide the services they do at the present (at no cost to us), then perhaps their action as pollution filters would have to be replaced by some technological means to keep pollutants out of surface waters. Wetlands also sequester and desynchronize floodwaters. Would we have to design and construct enormous stormwater retention basins for the purpose of holding waters that would surely flood our towns? If greenways were to be removed, then perhaps building walls along Interstates 93 and 89 would be necessary to keep noise pollution from affecting us in our homes, at work, while we sleep, and while we tend our gardens. Fortunately, greenway corridors help to position us away from the highway and deflect and absorb noise.

A green buffer on river and stream banks improves water quality because the vegetation helps to filter out toxins.<sup>2</sup> The stream also stays cooler because of the shading provided by the trees on the bank. Buffers are important for stabilizing the banks of a river, thereby decreasing erosion. They also provide a unique habitat for the species requiring such a place to live. A forest is invaluable in its ability to filter the air we breathe. Plants cleanse the air through photosynthesis by taking in carbon dioxide from and releasing oxygen into the atmosphere. Plants also absorb pollutants directly into their leaves, assimilate them into less harmful forms, and store them in their tissues until they die, at which time fungi complete the breakdown process. Vegetation can absorb ozone, sulfur dioxide, carbon monoxide, and airborne particles of heavy metals.<sup>2</sup>

The amount of development the Central New Hampshire Region is experiencing today is turning a great deal of open space into lands that are more intensively used. Fields are becoming residential developments, forests are becoming new commercial districts. With an increase in urbanization comes an increase in the amount of land that becomes impervious to water infiltration because of the construction of new roads, parking lots, roofs and driveways in these new subdivisions. If water cannot soak into the ground, it runs off over the surface of the land, water and picks up such contaminants as sediment, oil and gasoline, and bacteria. Eventually, the water and its contaminants reaches a stream or river, where the pollutants can be deposited or transported further downstream. This “nonpoint source” pollution is a major threat to the health of our waterways, which serve as habitat and feeding areas for terrestrial and aquatic organisms. In the end, unmanaged growth

#### **Seven Biological Principles for Habitat Protection at the Landscape Scale:<sup>6</sup>**

- 1. Maintain large, intact patches of native vegetation by preventing fragmentation of those patches by development.**
- 2. Establish priorities for species protection and protect habitats that contain the distribution and abundance of those species.**
- 3. Protect rare landscape elements. Guide development toward areas of landscape containing “common” features.**
- 4. Maintain connections along wildlife habitats by identifying and protecting corridors for movement.**

consumes open spaces and pollutes our lakes, streams, and rivers, making both terrestrial and aquatic habitats unlivable for the wildlife that define New Hampshire.

In addition to the threat of nonpoint source pollution, other hydrological effects of urbanization include the following:<sup>9</sup>

- ❖ A decrease in transpiration and an increase in runoff (total amount and velocity) as more vegetation is removed,
- ❖ Some lowering of the water table as more wells are drilled,
- ❖ Some increase in soil moisture as more septic tanks and sanitary drains are installed. If an increase in soil moisture is significant, the land could become waterlogged and nearby wells or streams could become contaminated, and
- ❖ Accelerated land erosion, stream sedimentation, and stream aggradation as lands are cleared for large tracts of housing.

### Quality of Life

Given the choice, people would generally rather live near a natural area than far from one, and real estate prices reflect this preference. Why are people willing to pay more to live near a park or forest when a comparable house can be found in a slightly less natural area? The answer is that natural areas are nicer to look at than a factory façade or a new, treeless development in the suburbs, and they afford the opportunity for recreational activities. They provide a cleaner, healthier environment for our children to play in. Proximity to open space affords more opportunities to take advantage of that resource. It counts as a “quality of life” factor.

Many people are starting to realize what open, green spaces can do for their cities and towns. The Mayor of Boston has supported efforts to restore the “Emerald Necklace,” Frederick Law Olmsted’s system of parks and connecting corridors that wind through Boston and its neighborhoods from the Back Bay neighborhood to the Neponset River.<sup>10</sup> A series of greenways such as this is a point of pride for the residents of Boston, and the opportunity for recreation, relaxation, and renewal in the city will exist for those with a limited capacity for mobility as well as for those who can travel outside the city.

Open areas are good places for exercising. Studies show that exercising reduces health care costs; people who exercise spend 30% fewer days in the hospital and make 14% fewer claims against their health insurers.<sup>2</sup> These savings are passed on to public health services, employers, individuals, and eventually on to society in general in the form of lower health insurance rates. In addition, exercising helps to prevent premature death, which results in approximately 132 million lost workdays nationwide. Finding and training replacements costs industry \$700 billion per year.<sup>2</sup>

### Recreation

For just about every open area, there is a recreational activity associated with it. Forests and mountainous areas invite camping and hiking in the summer, hunting in autumn, and snowmobiling and cross-country skiing in the winter, lakes welcome boating, and streams are perfect for fly-fishing. Not only are these activities a way to spend one’s time on one’s vacation, but they are also a source of revenue for the Region. Entire industries have sprung up around recreation in order to provide the adventurer with just the right equipment. The “eco-tourism” industry caters to people wanting an adventure in the outdoors. Hotels and restaurants depend on the presence of people visiting New Hampshire to ski, bicycle, and so on. For those sorts of companies existing in the Central New Hampshire Region, the preservation of open spaces is paramount to the success of their business.

### Tourism

Like recreation, tourism is an industry that depends on the presence of open spaces. Unlike recreation, tourism already makes up a significant portion of the state’s economy. It has the potential to become an even larger portion in the coming decades as leisure time becomes more and more important to Americans.

A common sight in the summertime months is a recreational vehicle travelling north on Interstates 93 or 89 on its way to a natural area that is considered to be special to the occupants. For some, that special place is the Canterbury Shaker Village or the Pittsfield Balloon Festival. While the tourists are here, they spend money on food, gas, and perhaps lodging and entertainment, but they would not spend any in the Central New Hampshire Region if those natural areas or events did not exist. If the areas around the Shaker Village were allowed to be developed, the area would probably lose much of its appeal and draw fewer visitors. In addition to the summer tourists, the Region would lose revenues because of the absence of the autumn “leaf peeper” tourists that come to revel in the natural beauty of the area. Leaving our natural areas intact allows us to benefit from the millions of dollars spent by these tourists year after year.

### ***Natural Resources in the Central Region***

The Central New Hampshire Region is fortunate to have within its borders a number of different natural resource areas that support a diverse community of plants and animals. The more common of these are mixed hardwood and softwood forests, tracts of which run from a few acres to a few thousand acres. Lakes abound, as do wetlands of all varieties (bogs, swamps, marshes, and fens). One of the largest rivers in New England, the Merrimack, runs through the heart of the Region and acts as a backbone in terms of the Region’s history and until recently, its economy. Several smaller rivers, such as the Contoocook, Soucook, Suncook, Blackwater, Turkey, and Warner Rivers, also traverse the Region. Less common natural resources are Atlantic White Cedar Swamps and Pine Barrens, which, in conjunction with the wild lupine, support a federally endangered species, the Karner Blue Butterfly. In addition, engineered flood reservoirs in Salisbury and Webster (Blackwater Flood Control Area) and in Dunbarton, Hopkinton, and Henniker (Hopkinton-Everett Flood Control Area) provide large expanses of natural areas for wildlife.

#### Forests

Some of the most important natural resources in the Region are the tracts of forests that are used as a renewable source of wood. The New Hampshire Department of Resources and Economic Development Division of Forests and Lands owns over 11,000 acres (17.3 mi<sup>2</sup>) of State Forest throughout the Region in thirteen towns and thirty-eight parcels. The smallest State Forest is the Taylor State Forest in Concord at ten acres and the largest is the Mount Kearsarge State Forest in Salisbury, Warner, and Wilmot at 4,753.1 acres.<sup>11</sup> These forests are maintained, according to the Division, to “protect, improve and develop New Hampshire’s forest resources and increases awareness of the contributions that forests make to the quality of life in New Hampshire.”<sup>12</sup> Since the great majority of the population uses wood products, the working forests ensure a steady supply of wood for future generations.

The largest expanse of forest in the Region is in the northern and western reaches. This is especially apparent when viewing the attached **Town Unfragmented Lands and Conservation Lands Map** (Map IV). The tract stretches from western Salisbury, eastern Sutton, and northern Warner, proceeds into southwest Warner and northwest Henniker, and progresses into southern and western Bradford and northeast and north-central Hillsborough. In this stretch is found the Mount Kearsarge State Forest, the Harriman-Chandler State Forest, and the Low State Forest. These State Forests alone comprise 6908.1 acres, or approximately 60% of the State-owned forests in the Region. In addition to the State-owned forests, the Warner Town Forest exists in this tract and contributes an additional 960 acres.

A second large expanse of forest in the Region extends from northern Canterbury eastward into northern and northwest Loudon. In this tract is the Shaker State Forest, a 226.5-acre forest associated with Canterbury Shaker Village. The Shaker Village itself is protected by a Department of Resources and Economic Development conservation easement and conserves an additional 650

acres in the tract. A third large conservation area in Canterbury is the Meeh and McCullough easements secured through the Land Conservation Investment Program. These easements permanently protect 800 acres in eastern Canterbury. Loudon has no State-owned land in this stretch, but large, roadless areas exist in northern Loudon. Northeast Loudon is home to the Osborne and Bergeron Wildlife Management Areas and a number of conservation easements held by the Loudon Conservation Commission. The Wildlife Management Areas extend into Pittsfield.

A third expanse of forest starts at Bear Brook State Park in Allenstown, a 10,000-acre tract that is open to recreational activities ranging from swimming in the summer to snowmobiling in the winter. From Bear Brook, the tract extends north-northeast into eastern Epsom and eastern Pittsfield. There are no other State-owned conservation lands in this area, but a few town-owned lands and conservation easements exist here. A second arm of this tract extends from Bear Brook north-northwest into Pembroke. Again, there are no other State-owned parcels here, but the Whittemore Town Forest exists among a number of criss-crossing Class VI roads.

A final tract of expansive forest in the Region is in western Dunbarton. This is the Kuncanowet Town Forest and Conservation Area, an 1150-acre tract made up of a number of conservation easements held by the Dunbarton Conservation Commission. From the Town Forest, the tract stretches eastward across central Dunbarton to Bow to include Kimball Pond. Another tract stretches northward into southern Hopkinton and includes the Chase Wildlife Sanctuary. The southern reach of the Hopkinton-Everett Flood Control Reservoir is also in this tract; it extends westward into Weare and Clough State Park.

### Rivers

In earlier times, rivers played a much more important role in our everyday lives than they do today. Our towns were settled on rivers for the power potential, for drinking water supplies, and for transportation. As late as the early 1900s, rivers were the primary conduits for transporting logs from the mountains to the sawmills downstream. In addition to this function, rivers provided mechanical power to a number of mills throughout the Region. With the advent of electricity, rivers again provided the mechanical power to spin the turbines, thereby creating electric power. Now, rivers are viewed primarily as a source of drinking water and recreational opportunities. The hydroelectric dams still exist, but the emphasis is more on the impounded water than on the structure itself. The corridors on either side of the river are as important now for agriculture as they were a hundred years ago, primarily because the thin, rocky New England soils are too inefficient to work except in the floodplains of our larger rivers.

The Merrimack River is the largest river in the Region and one of the largest in New England. Its banks are more developed from Loudon Road in Concord south relative to north of that point. North of Concord, the river flows through fields and forests and past Town-owned conservation areas, the Merrimack State Forest, and the Sanborn agricultural easement in Boscaawen. In Canterbury, the river flows past the Riverland Conservation Area. In Penacook, the river flows past the Morrill Farm and passes the Sewalls Falls area a little further downstream. In Concord, the New Hampshire Technical Institute owns significant parcels of land on the eastern bank north of Loudon Road. The Garvins Falls Dam spanning the river in Bow has undeveloped land on either side of the river adjacent to the dam. At the moment, these lands are in jeopardy because of electricity deregulation and the possible sale of the dam to the community or another private interest. Along the entire length of the corridor, Interstate 93 runs north and south. Interstate 89 merges with I-93 near the Merrimack River in Bow. The river is important for agriculture, since the wide floodplain is composed of deep sand that is periodically flooded and refreshed with nutrients. High bluffs overlook the river in Canterbury, Boscaawen, and Concord. In Canterbury and Boscaawen, these are remnants of the bottom of glacial Lake Hooksett. The bluffs below what is now Concord Heights are the remains of a delta, the point of entrance of a glacial river flowing from the approximate location of the Soucook River into glacial Lake Hooksett.<sup>13</sup>

The Contoocook River is the second largest river in the Region. It originates in southwest New Hampshire and flows northeast to the Merrimack River in Concord. It enters the Region from the

southwest through Deering, skirts southeastern Hillsborough and then flows through the hearts of Henniker and Hopkinton. The river flows through the village of Penacook before emptying into the Merrimack River. The Contoocook River is dammed in many places in its run from Deering to Concord; one of the most notable dams is the Hopkinton-Everett Dam. Some of the larger conservation areas on the banks of the Contoocook River include the Mast Yard State Forest in Concord and Hopkinton and the Hopkinton-Everett Flood Control Reservoir in Hopkinton.

The Blackwater River flows from Blackwater Bay in Salisbury and flows southward, forming part of the Blackwater Dam and Reservoir System, a federally-owned area of approximately 3500 acres in Salisbury and Webster established for flood control. The river flows through Webster past the Mock Memorial Forest, Pearson Park, and the Riverdale Sanctuary. In addition, a number of conservation easements front the river. It then flows into Hopkinton, where it empties into the Contoocook River.

The Soucook River originates from the confluence of several streams and from the outflow of Rocky Pond in northern Loudon and northeastern Canterbury. It flows south through Loudon through deep sand and gravel. The aquifer underlying the Soucook River is considered to be one of the highest-yielding stratified drift aquifers in the State.<sup>13</sup> For that reason, the area could support a public water supply if the need arises. The river parallels Route 106 as it flows southward into Concord and Pembroke, forming the border between the two communities. The Soucook then drains into the Merrimack River opposite Bow. There are no major conservation areas along the Soucook River besides the Soucook River State Forest, a 50-acre parcel owned by the State (Department of Resources and Economic Development), and the Taylor State Forest in Concord. However, the Broken Ground area of Concord, including Oak Hill, is located close to the Soucook River corridor and could easily be integrated into a highlands/lowlands natural area.

The Suncook River originates from the Suncook Lakes in Barnstead and flows southwest through Pittsfield and Epsom and forms the border between Pembroke and Allenstown. It empties into the Merrimack River at the southernmost point of the Region. The only major conservation area on the Suncook River is Bear Brook State Park in Allenstown.

The Warner River originates from Lake Massasecum in Bradford. It flows east out of Bradford and into Warner, where most of its watershed lies. It flows southeast through Warner into Webster for a short distance before flowing into Hopkinton, where it drains into the Contoocook River. There are no major conservation areas along the Warner River besides a few small conservation easements in Warner.

The Turkey River starts at Turkey Pond in Concord and crosses the border into Bow before emptying into the Merrimack River. Turkey Pond is fed by Turee Brook, which starts in Bow, and Bela Brook, which starts in Dunbarton. The majority of the land along the river is conserved by the State or St. Paul's School, although a few significant parcels have not been formally conserved.

In addition to the larger, named waterways in the Region, each community has scores of unnamed brooks and streams interconnected with ponds and expansive wetlands. These areas provide extensive wildlife habitat, recreational opportunities, ecological benefit, and aesthetic beauty of unforested areas.

#### Lakes and Ponds

One of the most prominent conservation efforts in the Central New Hampshire Region is that taking place in Dunbarton to secure the southern shore of Kimball Pond. Kimball Pond, one of the southernmost bodies of water in the Region, is also one of the most protected. To the north lie the French easement and the Great Meadow Lots. The eastern and western shores are protected by conservation easements as well. The Dunbarton Conservation Commission is currently in the process of raising funds to purchase the southern shore of the pond, thereby protecting the entire shoreline (see Appendix A).

The protection of this body of water is important because it is an intact natural area in the greater Manchester and Concord corridor and as such, is threatened by development. Dunbarton's

population increased by 19% in the 1990s<sup>1</sup> and 159 new houses were constructed in the town in the 1990s, a 26% increase since the 1990 Census.<sup>15</sup>

A second prominent lake in the Region is Penacook Lake in Concord. Since this body of water serves as the drinking water supply for the city, the entire perimeter of the lake is owned by the city, except for one parcel at the northern end of the lake, to ensure the quality of the water running off the hills around the lake.

Another pond with active conservation efforts occurring along its shores is Sanborn Pond in northeastern Loudon. Three-fourths of the perimeter of this pond have been protected by the Merrill and Batchelder easements and the Sanborn Family Trust. The pond is located near the Bergeron and Osborne Wildlife Management Areas. Completing the protection of the perimeter will help to expand this habitat.

### ***Current Use in the Central Region***

According to New Hampshire RSA 79 (Current Use Taxation), the public interest is served by the preservation of open space and the maintenance of an “attractive outdoor environment”. The preservation of open space is encouraged by taxing land in open space at a rate lower than land that is built up. Many landowners have taken advantage of the tax savings by placing their land in current use, thereby conserving the land for wildlife habitat or agriculture.

Current use comes with a caveat: a landowner whose land is currently in current use status can develop his land at any time. As more of his land is subdivided and developed, each portion is removed from the Current Use status. For each parcel that comes out of Current Use, the landowner pays a penalty equal to 10% of the assessed market value after development. Therefore, current use does not permanently protect land but provides an economic incentive to not disturb or develop the land. **Table 2** shows the status of current use lands in the Central New Hampshire Region as of December 31, 1998. **Table 3** shows the percentage of land in the communities and the Region in current use.

**Table 2** shows that there is a great deal of land in the Region in current use. Over 450 mi<sup>2</sup> of forestland, farmland, and wetlands have been put into current use status to realize the tax savings. To help with conservation efforts, eleven communities in the Region have elected to provide a portion of the Land Use Change Tax to the Conservation Commission in a Conservation Fund. This fund provides some of the money necessary to acquire conservation lands in the Town.

From **Table 3**, we see that the amount of land in current use varies from town to town. The highest percentage of land in current use is in Deering, at 71.9% of its 20,288 acres. The town with the lowest percentage of land in current use is Allenstown at 19.5 of its total area, primarily because Bear Brook State Park comprises over half the land acreage.

**Table 2.** Current use acreage for communities in the Central New Hampshire Region.

	Farmland (ac)	Forestland (ac)	Unproductive Land (ac)	Wetland (ac)	Total (ac)	Conservation Fund?*	% to Conservation Fund	Cap?
Allenstown	166.31	1,587.77	1.00	811.65	2,566.73	No	--	--
Boscawen	1,581.85	7,985.10	71.50	674.03	10,312.48	Yes	50%	\$10,000
Bow	264.02	4,394.62	651.05	413.99	5,723.68	Yes	100%	No
Bradford	562.74	13,129.33	0.00	0.00	13,692.07	Yes	50%	No
Canterbury	1,694.61	16,814.01	191.60	1,158.91	19,859.13	Yes	100%	No
Chichester	933.15	6,035.37	17.60	399.68	7,385.80	No	--	--
Concord	3,076.40	16,179.56	0.00	1,113.76	19,521.80	Yes	25%	No
Deering	743.95	12,836.56	222.98	785.21	14,588.70	Yes	50%	No
Dunbarton	842.81	8,567.09	430.81	116.67	9,957.38	Yes	50%	No
Epsom	1,614.66	12,236.96	156.00	393.53	14,401.15	No	--	--
Henniker	1,405.00	14,032.00	0.00	614.00	16,051.00	No	--	--
Hillsborough	888.50	14,425.04	1,198.37	199.09	16,711.00	No	--	--
Hopkinton	2,006.90	12,271.88	3.00	1,538.05	15,819.83	Yes	35%	No
Loudon	2,270.00	13,202.00	999.00	1,133.00	17,604.00	No	--	--
Pembroke	1,093.51	7,848.38	150.29	0.00	9,092.18	No	--	--
Pittsfield	1,324.25	7,752.61	266.78	360.74	9,704.38	No	--	--
Salisbury	944.00	15,583.00	146.00	424.00	17,097.00	No	--	--
Sutton	577.36	17,168.70	39.44	768.63	18,554.13	Yes	25%	No
Warner	730.80	20,498.61	1,112.67	82.00	22,424.08	No	--	--
Webster	803.36	10,052.16	78.56	497.35	11,431.43	No	--	--
Wilmot	655.00	11,245.00	784.00	311.00	12,995.00	No	--	--
<b>CNHRPC Region</b>	<b>24,179.18</b>	<b>243,845.75</b>	<b>6,520.65</b>	<b>11,795.29</b>	<b>285,492.95</b>			

\* From land use change tax.

After *New Hampshire Department of Revenue Administration 1998 Current Use Report: Acreages, Percentages, and Other Stats.*

**Table 3.** Percentage of acreage in current use in each community in the Central Region.

	Total acres in Current Use	Total Town Acreage	% Acreage in Current Use
Allenstown	2,566.73	13,184	19.5
Boscawen	10,312.48	16,256	63.4
Bow	5,723.68	19,264	29.7
Bradford	13,692.07	22,784	60.1
Canterbury	19,859.13	28,672	69.3
Chichester	7,385.80	13,568	54.4
Concord	20,369.72	41,920	48.6
Deering	14,588.70	20,288	71.9
Dunbarton	9,957.38	20,416	48.8
Epsom	14,401.15	21,696	66.4
Henniker	16,051.00	28,352	56.6
Hillsborough	16,711.00	28,288	59.1
Hopkinton	15,819.83	28,416	55.7
Loudon	17,604.00	29,696	59.3
Pembroke	9,092.18	14,528	62.6
Pittsfield	9,704.38	15,488	62.7
Salisbury	17,097.00	25,344	67.5
Sutton	18,554.13	27,456	67.6
Warner	22,424.08	35,392	63.4
Webster	11,431.43	18,048	63.3
Wilmot	12,995.00	18,955	68.6
<b>CNHRPC Region</b>	<b>286,340.87</b>	<b>488,011</b>	<b>59.7</b>

After *New Hampshire Department of Revenue Administration 1998 Current Use Report: Acreages, Percentages, and Other Stats.*

## ***Open Space vs. Development in New Hampshire***

In most municipalities in New Hampshire, there is barely money available to do what is needed to be done, let alone to do all the extras that their residents would like to see done. To realize a greater income, some communities set out on a course of economic development that usually includes new commercial and residential development in order to increase the tax base. However, the problem with such rapid expansion as this is that the community's unique characteristics, which probably drew people there in the first place, are being compromised. In addition, the taxes collected from the new development are often less than what the town spends on community services such as fire and police protection and new schools for the new, young families moving in.<sup>3</sup> As alluded to before, commercial development is not as costly in services to the community but the following residential development brings more expenses than the revenues taken in.

Because of costs, few developers would prefer to build in areas that would require terrain modifications. Instead, a developer would opt to build in soils that can readily accommodate effortless construction. These soils are most often found in floodplains or in forestlands. Unfortunately, there are often other land uses on these soils that conflict with development; namely, working farms in the floodplains and forests in the remainder of the developable areas. These are also the features that contribute to a community's uniqueness. Removing or destroying them changes that little piece of the community forever.

From 1980 to 1990, New Hampshire's population was growing at a rate of about 20,000 people per year as the total population grew from approximately 900,000 to 1,000,000.<sup>1</sup> A soaring economy in the mid-1980s helped to push the population growth rate to the highest the state has ever seen. The change in land use from the early 1980s to the early 1990s has been dramatic. **Table 4** illustrates how New Hampshire's open areas (out of statewide area of approximately six million acres) have been converted to developed areas within that period.

**Table 4.** Land use change in New Hampshire from 1982 to 1992.

<b>Year</b>	<b>Crop Land (acres)</b>	<b>Pasture Land (acres)</b>	<b>Forest Land* (acres)</b>	<b>Developed Land (acres)</b>
<b>1982</b>	157,800	124,500	4,085,900	411,400
<b>1992</b>	141,500	98,300	3,932,100	563,200
<b>Change in Acres, 1982-1992</b>	<b>-16,300</b>	<b>-26,200</b>	<b>-153,800</b>	<b>151,800</b>
<b>Percent Change, 1982-1992</b>	<b>-10.3%</b>	<b>-21.0%</b>	<b>-3.8%</b>	<b>36.9%</b>

\* Non-federal forest land.

From *New Hampshire's Changing Landscape*, Society for the Protection of New Hampshire Forests & The Nature Conservancy 1999.

Although the data are somewhat dated, the numbers indicate some significant trends. In the time period from 1982 to 1992, New Hampshire lost over twenty-five square miles of cropland, the most productive soils in the State. The total acreage of land in farms in 1997 (415,031 acres) and the average size of farms (141 acres) have both declined from the 1982 levels (469,582 acres and 170 acres, respectively), even though the number of farms actually increased (2,757 in 1982 to 2,937 in 1997) over the same period.<sup>13</sup> Over forty square miles of pastureland were lost to development from

1982 to 1992. And, New Hampshire lost over 240 square miles of forestland in the decade from 1982 to 1992, which would have been prime habitat for plants and animals.

The late 1980s were considered to be the period of highest growth in New Hampshire while the early 1990s were characterized by the recession, therefore slowing growth to their lowest levels in the time period indicated by **Table 4**. Growth rates in the late 1990s and early 2000s are considered to be similar to those of the late 1980s.

A method of quantifying how much a community's open spaces are worth was developed by the American Farmland Trust and used by the University of New Hampshire Cooperative Extension to find the Cost of Community Services that results from the development of land in four towns in southern and central New Hampshire. Each of the four towns, Stratham, Fremont, Dover, and Deerfield, experienced population growth in the period from 1983 to 1993. In the same period, each town spent more on community services to residential areas than was taken in from taxes, in some cases by as much as 15%. Open space, on the other hand, takes in fewer taxes than residential areas but requires fewer community services. In each town, open space required less than the taxes it brought in to maintain; in one case, it brought in almost three times more than the town spent on maintaining it.<sup>3</sup>

While open space may not necessarily bring in large amounts of tax revenue to a community, it will be a net asset when the cost of providing services to new developments is factored into the equation. In other words, open space pays its own way. Each community in the Central New Hampshire Region should assess their fiscal situation when deciding whether to encourage development of open land.

### ***Development Trends in the 1990s***

In 1950, New Hampshire's population was approximately 500,000. By 1990, the population doubled to over 1,000,000 (**Table 5**). By 2020, the population is projected to reach 1.5 million, or three times greater than the 1950 population, in just seventy years.<sup>1</sup> In the Central New Hampshire Planning Region, the population has grown by an average of 206% since 1950.<sup>1</sup> The Region's population is expected to increase by an additional 19% by 2020.<sup>1</sup> **Figure 1** illustrates the Region's population growth throughout the 1900s and projects the amount of growth in early the 2000s. New Hampshire is experiencing exponential growth the likes of which have never been seen in its history. The rising population needs a place to call home, and more and more families are choosing to build single-family homes in the suburbs of our larger towns. This process has contributed to sprawl, fragmented our open spaces, and placed human well being and wildlife habitat in danger of deterioration.

Since 1990, 3285 residential, 61 commercial, and 20 industrial structures have been erected in the Central New Hampshire Region.<sup>15</sup> This represents an 8.3% increase in housing structures (single family, multifamily, and mobile homes) since the beginning of the decade (39,775 in 1990). Based on local zoning specifications that determine minimum lot size, an additional 5470 acres are estimated to have been developed into homes, businesses, or manufacturing establishments in the period from 1990 to spring 1999. Map III (**Regional Development Trends**) shows the specific areas in which growth was most apparent over this time period.

The Regional Master Plan helps to direct this growth toward areas that are prepared to receive it. The Regional Land Use Element generated a "Preferred Growth Areas" map is intended as much to steer development toward specific areas as much as it is to direct development away from other areas.<sup>16</sup> A Regional Development Plan proposes that future heavy industry be located in areas that are zoned industrial and that less intense commercial and industrial developments be located close to community centers. So, while growth is occurring at a high rate, there are plans already written to help communities deal with that growth.

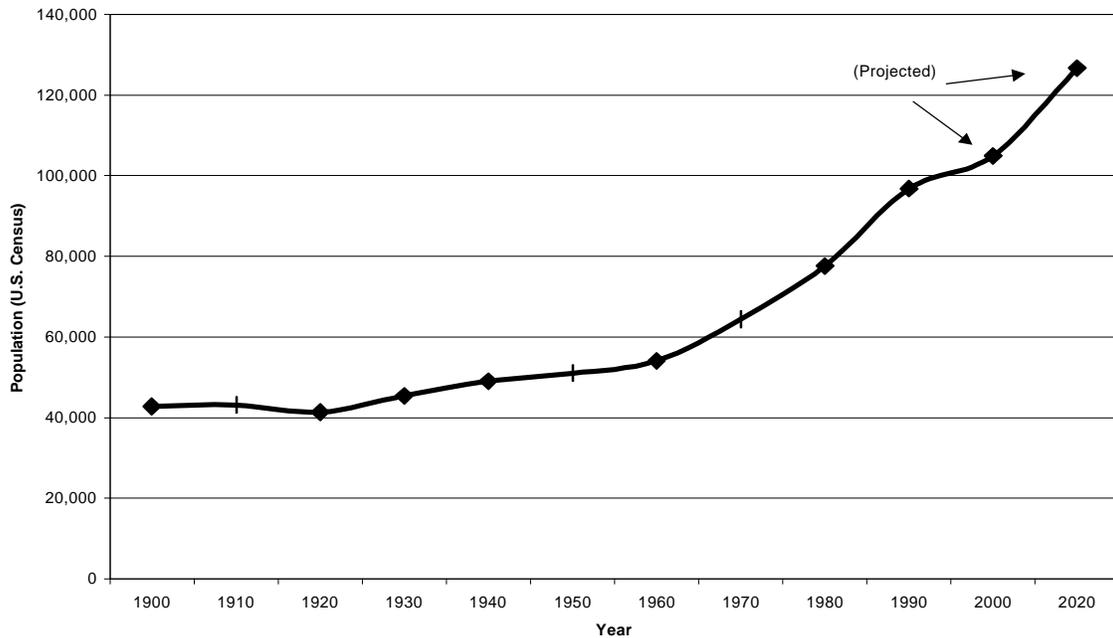
**Table 5.** Population trends of the communities in the Central New Hampshire Region.

Town	U.S. Census Population						Percent Change			
	1910*	1930*	1950*	1970*	1990*	1998**	1910-90	1910-50	1950-90	1990-98
Allenstown	1,457	1,549	1,540	2,732	4,649	4,850	219.08	5.70	201.88	4.32
Boscawen	1,240	1,359	1,857	3,162	3,586	3,607	189.19	49.76	93.11	0.59
Bow	676	780	1,062	2,479	5,500	6,503	713.61	57.10	417.89	18.24
Bradford	695	587	606	679	1,405	1,416	102.16	-12.81	131.85	0.78
Canterbury	680	505	627	895	1,687	1,800	148.09	-7.79	169.06	6.70
Chichester	606	567	735	1,083	1,942	2,115	220.46	21.29	164.22	8.91
Concord	21,497	25,228	27,988	30,022	36,006	38,180	67.49	30.19	28.65	6.04
Deering	353	324	392	578	1,707	1,765	383.57	11.05	335.46	3.40
Dunbarton	513	572	533	825	1,759	2,094	242.88	3.90	230.02	19.04
Epsom	725	678	756	1,469	3,591	3,896	395.31	4.28	375.00	8.49
Henniker	1,395	1,266	1,675	2,348	4,151	4,139	197.56	20.07	147.82	-0.29
Hillsborough	2,168	2,160	2,179	2,775	4,498	4,665	107.47	0.51	106.42	3.71
Hopkinton	1,578	1,485	1,831	3,007	4,806	5,059	204.56	16.03	162.48	5.26
Loudon	838	801	1,012	1,707	4,114	4,553	390.93	20.76	306.52	10.67
Pembroke	3,062	2,797	3,094	4,261	6,561	6,733	114.27	1.05	112.06	2.62
Pittsfield	2,222	2,018	2,321	2,517	3,701	3,961	66.56	4.46	59.46	7.03
Salisbury	478	350	423	589	1,061	1,137	121.97	-11.51	150.83	7.16
Sutton	698	512	554	642	1,457	1,479	108.74	-20.63	163.00	1.51
Warner	1,226	1,062	1,080	1,441	2,250	2,483	83.52	-11.91	108.33	10.36
Webster	445	360	386	680	1,405	1,498	215.73	-13.26	263.99	6.62
Wilmot	614	495	370	516	935	1,003	52.28	-39.74	152.70	7.27
CNHRPC Region	43,166	45,455	51,021	64,407	96,771	102,936	124.18	18.20	89.67	6.37
New Hampshire	430,572	465,293	529,880	737,681	1,109,252	1,185,000	157.62	23.06	109.34	6.83

\*US Census Bureau

\*\* *New Hampshire's Changing Landscape*, Society for the Protection of New Hampshire Forests and The Nature Conservancy, 1999

**CNHRPC Population Trends, 1900-2020**



**Figure 1.** Population change in the Central New Hampshire Planning Region over the past century and projected population in 2000 and 2020.<sup>16</sup>

## **Summary**

Open space can be thought of as a resource that does not affect our everyday decision-making but are important to us in more subtle ways. They are important to our health and well being and to our economy. The forest products industry and numerous entrepreneurs make a living from open spaces in the Region. Agriculture thrives in the Region, as evidenced by the number of apple orchards and vegetable farms in the communities. Some dairy farms still remain in the Region. In addition to the human benefits, open spaces are critical for the survival of the wildlife that makes the Central New Hampshire Region unique.

Open spaces perform the functions that are taken for granted by most people. They filter toxins out of the air and water and help keep our waterways clean and flowing smoothly. They provide a place for humans to go to seek out quietness and recreation.

Unfortunately, open spaces are being pressured by development, especially in the southern reaches of the Region. The Region has grown in population by over six percent in the 1990s and over 3,200 new houses have been constructed in this time period. Some of our most valuable forest and agricultural lands are now home to residential subdivisions and commercial districts. Growth in the Region is desirable, because it brings in new ideas and manpower to work on these ideas. Unmanaged growth is not desirable, because it compromises the areas that mean a great deal to us.

Some of the points this section has pointed out are the following:

- ❖ Open spaces provide habitat to plants and animals that may directly benefit humans at some point in the future;
- ❖ Open spaces provide for pollution control and therefore relieve us of building expensive technological equivalents;
- ❖ Open spaces give humans a place to relax and exercise, thereby increasing personal health, societal health, and workplace productivity;
- ❖ Open spaces give humans a place to go to experience the State's natural areas;
- ❖ Open spaces provide a place to participate in such sports as hunting, fishing, and snowmobiling;
- ❖ Open spaces bring revenue into the State when people come to New Hampshire to experience the State's natural beauty;
- ❖ Open spaces cost less to maintain than residential housing developments do;
- ❖ Current use is helping to keep land undeveloped, but it is only a temporary solution; and
- ❖ Open spaces are rapidly disappearing in the Central New Hampshire Region.

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## **Appendix B: Land Protection How-to**

Barriers to the successful protection of land range from the subtle, i.e.: the Town's Conservation Commission is opposed in its efforts by the political nature of its selectmen, to the more obvious, i.e.: who can help this landowner with the process of putting his land into conservation? This section seeks to compile a variety of resources in one section to answer many questions that are likely to arise.

In the first section, an anecdotal account is presented that relates the Deering Conservation Commission's gaining acceptance in town as a group that is assembled to help the town, not to keep it preserved in any specific state. The Deering Conservation Commission is now among the most successful in gaining conservation easements of any Conservation Commission in the Central New Hampshire Region. Also included in this section is a listing of values that the Canterbury Conservation Commission uses to evaluate how ecologically important a parcel of land is for the purposes of devoting time and resources in any given conservation project.

The second section of this appendix is a listing of all the major land conservation groups, ranging from the smaller local land trusts to larger, nationwide organizations. Included in this section is a short description of what kind of projects the organization is likely to take on, so that the user of this document can consult the appropriate organization if the town Conservation Commission is unable to complete a project successfully.

The third section of this appendix describes the process by which the University of New Hampshire Cooperative Extension helps communities to identify the most ecologically important natural resources in the community so that conservation efforts may be directed toward those areas. This approach would help a Conservation Commission to organize and justify its actions based on the facts discovered through this process.

The final section of this appendix is a sample conservation easement deed that a Conservation Commission could modify to virtually any future conservation project. It is included here courtesy of the Society for the Protection of New Hampshire Forests.

### ***Deering Conservation Commission's Method of Land Protection***

The Deering Conservation Commission has devised an approach toward land protection that has become quite successful in recent years. The method involves tax maps, 1:1000 scale GIS maps, public outreach, and targeted mailings, but it really begins long before a landowner is approached.

The most important act a Conservation Commission can do is to gain the support of the community. In the 1970s, the Conservation Commission and their families would go out on a spring day to collect roadside trash. Over the years, this has become an annual cleanup day and picnic that involves over 100 families picking up assigned quarter-mile stretches of town roads. The cleanup even goes as far as to pick up old tires dumped illegally on a Class VI road. Since 50% of all parcels greater than fifty acres in Deering are owned by absentee owners, the Clean-up Day succeeds in removing potentially harmful threats that would not have been taken away for years. This act of volunteerism also preserves the "scenicness" of Deering, which is probably one aspect of the Town that drew people there in the first place. By starting with a small project and using it to show that the Conservation Commission is a group with the Town's best interest in mind, the commission builds public support for itself. This type of activity builds a foundation for other projects and creates a climate in which people feel they can approach the commission.

Another way of increasing the commission's exposure is to set up a display with literature on its activities in the Election Day venue. Election Day is typically the time when people are at their most civic-minded, so a stop at the Conservation Commission display could be expected. Along with literature, there could be a sign-up sheet for residents to sign up for a Clean-up Day or other activity, a member to talk to about conservation issues, and a poster of an activity in which the commission has recently taken part. By placing a point of contact in a position to answer questions coming directly from the residents, the commission gets the chance to interact with the people with whom they're working to protect natural resources and therefore build public support for their measures.

Deering created a 1:1000 scale GIS map of its natural resources and placed it under a tax map overlay. At this scale, it is easy to see protected lands, natural resources, and the properties on which they exist. When displayed in a public setting, it is approached by residents who, by human nature, look up the parcel on which they live. It is at this time that the resident sees, probably for the first time, the natural resources associated with his or her piece of property. In addition, the resident sees the areas that have been put into conservation that may lie adjacent to his own property. While not addressing him or her directly, the map suggests that putting his own land into conservation will be a welcome gesture when the time comes to do so.

A mailing is then targeted to those people owning lands near conservation areas or consisting of natural resources. The mailing first goes to people owning more than fifty acres and living in Deering, then to people owning more than fifty acres but living outside of Deering. A similar series of mailings is done for those owning more than twenty acres. The mailing consists of a packet with options for land inheritance, including reasons why land should be put into a conservation easement. An invitation to an event that will allow the recipients to ask questions regarding estate planning and conservation easements is a final component to the mailing. If there are not enough resources in the budget to spend on a mailing, then flyers hung at well-traveled street corners will let people know of the event.

At the event, the 1:1000 scale tax/GIS map is displayed for everyone to see. The map serves as a focal point for the meeting, with people again searching out their own properties and locating the natural resources and conservation areas associated with them. The map also gives people a personal investment in land protection. One person might suggest one way to go in order to link two conservation areas, while another person might suggest a different way to go. In either case, the residents themselves are formulating an opinion on how to best conserve lands that they feel are important, which is the ultimate goal.

Also at the event are representatives from local and national conservation groups that take conservation easements; for example, the Society for the Protection of New Hampshire Forests (also known as the Forest Society), the Piscataquog River Watershed Association, the Nature Conservancy, and so on. These professionals could answer any questions the residents might have about land protection: how to do it, the tax benefits, the implications of putting land under easement, and so on. The Conservation Commission's role in this process is to act as a liaison between the landowner and the conservation organization, since most well-established organizations have specific conservation goals.

Through this method of outreach, suggestion, and direction, the Deering Conservation Commission has been successful in conserving several large blocks of land. In November 1999, another parcel was placed under conservation by the Forest Society to connect two other conservation lands. The total continuous protected area in that section of Deering from that deal now stands at about 1400 acres. The Deering Conservation Commission is now in the position of being the group that prospective easement donors approach first when they want to put land under the protection of a conservation easement. By approaching the residents of Deering in an organized, low-pressure manner, the Deering Conservation Commission has been able to secure large tracts of conservation land for future generations that most towns have yet to achieve.

Some tips offered by Gary Bono of the Deering Conservation Commission:<sup>1</sup>

1. You will not be able to conserve all areas of the community at one time. Concentrate on different areas at different times.
2. Do not take the attitude of a “hard sell”. People will put their land into conservation without the benefit of scare tactics.
3. Work with your audience. Don’t attempt to use the same method with every landowner. Each needs individual attention to get the easement package that is most beneficial for each party involved.
4. Be accommodating to people wanting to donate land, even if the land is not in your short-term plans for protection. Do not alienate a potential easement donor by citing liability issues.

### ***Canterbury Conservation Commission’s Land Protection Goals***

The Canterbury Conservation Commission takes an interesting approach to rating a property that is on the market and is under consideration for purchase or easement. The wheel below (from the 1989 Master Plan rewrite) features statements about the property that can be used to describe the property and develop a relative priority for its protection. A property possessing more of these qualities is judged as one that is more important to the scenic, natural, and recreational interests of the town and should therefore be acted upon immediately.

The goals are arranged in a wheel rather than a list to allow connection lines to be drawn for each parcel under consideration. For example, preserving open space helps to preserve wildlife habitat and may help to create more diverse recreational opportunities.

(To be inserted at a later time.)

**Figure 2.** Canterbury's wheel of qualities that helps the Conservation Commission to set conservation priorities.

## ***Public Land Trusts of New Hampshire and the Central NH Region***

### **American Farmland Trust**

Northeast Office  
110 Spring Street  
Saratoga Springs, NY 12866  
Contact: Jerry Cosgrove, Northeast Field Director  
(518) 581-0078  
[www.farmland.org](http://www.farmland.org)

The American Farmland Trust (AFT) works to stop the loss of productive farmland and to promote farming practices that lead to a healthy environment. The trust is a source of technical information about farmland conservation generally and in particular agricultural conservation easements and conservation options in estate planning. AFT does take a very limited number of demonstration land protection projects across the region, but they encourage landowners to work with their local land trusts to secure easements.

### **Audubon Society of New Hampshire**

3 Silk Farm Road  
Concord NH 03301  
Contact: Rich Cook  
Tel: 224-9909  
Fax: 226-0902  
[www.nh.audubon.org](http://www.nh.audubon.org)

The mission of the Audubon Society of New Hampshire is to protect and enhance New Hampshire's wildlife habitat, including breeding, wintering, and migration stopover areas of all species. Large tracts of land contiguous with other protected areas are of special focus.

### **Ausbon Sargent Land Preservation Trust**

PO Box 2040  
New London NH 03257  
Contact: Deborah Stanley, Executive Director  
526-6555

Ausbon Sargent concentrates their efforts in the New London and Kearsarge Region of Central New Hampshire. No project is too small: one easement held by the trust is only two acres in size. The trust uses the Land Trust Alliance checklist to determine whether a project is right for them. If a parcel is considered to be ecologically significant or if it has public access to a natural area, the Ausbon Sargent is more likely to consider placing the parcel under easement.

### **BearPaw Regional Greenways**

PO Box 19  
Deerfield NH 03037  
Contact: Frank Mitchell, President  
463-7562

BearPaw is working to establish a network of voluntarily protected lands in central New Hampshire. These lands would eventually form greenway corridors that connect significant protected areas, such as Bear Brook State Park, Pawtuckaway State Park and Northwood Meadows State Park. The group targets key ecological features for protection, including wildlife habitat, natural communities, watersheds and water resources. In addition, BearPaw provides support and coaching to Conservation Commissions to acquire easements.

**Bow Open Spaces**

41 South Bow Road

Bow NH 03304

Contact: Bob Dawkins, Treasurer

225-3678

Bow Open Spaces is a management agency for easements held by the Bow Conservation Commission, the largest of which is a 761-acre parcel purchased in 1999. Bow Open Spaces and the Bow Conservation Commission are interested in protecting what remains of the Bow Town Forest.

**Concord Conservation Trust**

54 Portsmouth Street

Concord NH 03301

Contact: Tom Maslund, Chair

224-9945

**Gilmanton Land Trust**

RFD 1 Box 429

Gilmanton NH 03837

Contact:

364-6131

**Harris Center for Conservation Education**

341 Kings Highway

Hancock NH 03449

Contact: Meade Cadot, Director

525-3394

The Harris Center provides education and technical support to local Conservation Commissions and other conservation groups on how to successfully undertake a conservation easement, the wildlife aspects of the easement, and so on. While they don't hold conservation easements in the Central New Hampshire Planning Region, they do work here in an advisory role.

**Highland Lake Association**

PO Box 103

Washington NH 03280

Contact: James Lane, President

**Lakes Region Conservation Trust**

PO Box 1097

Meredith NH 03253

Contact: Tom Curren, Executive Director

279-3246

[www.lrct.org](http://www.lrct.org)

The Lakes Region Conservation Trust seeks to assist in preserving the character and unique qualities of the Lakes Region by protecting properties with significant conservation or cultural value.

**Piscataquog River Watershed Association**

47 Perkins Pond Road

Weare NH 03281

Contact: Gordon Russell

The towns in the Central New Hampshire Region within the Piscataquog River watershed are Deering, Henniker, Dunbarton, and a portion of extreme southern Hopkinton.

**Society for the Protection of New Hampshire Forests**

54 Portsmouth Street  
Concord NH 03301

Contact:

224-9945

[www.spnhf.org](http://www.spnhf.org)

SPNHF, or the "Forest Society", is the leading conservator of land in New Hampshire. Approaching its 100<sup>th</sup> birthday, the Forest Society has already eclipsed the 100,000 acres protected milestone. Some notable holdings in the Region are the 88-acre Hutchins Forest in Canterbury and the 107-acre Colby Hill Forest in Henniker. When considering land to place under easement, the Forest Society uses the following list of Goals and Objectives to choose projects:<sup>2</sup>

- To permanently protect and manage SPNHF's forest reservations as open space. To seek and protect lands that enlarge and enhance our existing land base.
- To demonstrate the practice of ecologically and economically sustainable forestry.
- To actively test, implement, and evaluate state-of-the-art land management techniques in order to meet our responsibilities as a leader in the conservation field.
- To generate revenue through the management of our lands for the highest-value growth of wood and other forest products and uses where consistent with other conservation values.
- To protect and manage important and unique natural areas, rare, threatened and endangered species, critical wildlife habitat and biological diversity.
- To provide public access for various forms of recreational, educational, and scientific use where appropriate.
- To continue to inform landowners, government officials, and the public at large through active demonstration and education about the importance of a healthy, vibrant, and biologically diverse forest resource in the state.

**The Nature Conservancy**

2 ½ Beacon Street, Suite 6  
Concord NH 03301

Contact: Robert L. Miller

224-5853

[www.tnc.org](http://www.tnc.org)

**Trust for Public Lands**

33 Union Street, Fourth Floor  
Boston MA 02108

Contact: Peter Forbes, Regional Director

(617) 367-6200

[www.tpl.org](http://www.tpl.org)

The Trust for Public Land (TPL) was founded in 1972 to conserve land for people to enjoy as parks, open space, as well as "working landscapes" like farms and forests. Unlike most land trusts, TPL does not permanently own or manage land. Instead, it acts as a catalyst to bring properties into protective ownership. TPL uses a revolving fund to secure properties that are threatened with development. The properties are then held off the market until they can be resold to a permanent steward. Most projects go to TPL as requests for assistance from a community, public agency or other nonprofit group that wishes to conserve a piece of land but for reasons of time, expertise, or availability of funding, cannot accomplish it alone. TPL does not have formal criteria for deciding whether to take on a project, but looks at workload and the need for TPL in the project, particularly if a local or regional group can secure an easement on its own.

**Turkey River Basin Trust**

33 Washington Street  
Concord NH 03301

Contact: Mary Louise Hancock

225-9721

The Turkey River Basin Trust monitors easements held by the Concord Conservation Commission and

works to ensure that the watershed does not experience harmful development. They are not actively seeking easements in the Turkey River watershed but might consider taking one if approached.

### **Sample Conservation Easement Deed**

[THIS IS A NON-CONTRACTUAL CONVEYANCE PURSUANT TO NEW HAMPSHIRE RSA 78-B:2 AND IS EXEMPT FROM THE NEW HAMPSHIRE REAL ESTATE TRANSFER TAX.] [If tax stamp required, allow 3" margin from top of page to title of deed

#### **CONSERVATION EASEMENT DEED**

**[NAME OF GRANTOR(S)]**, single/husband and wife, of/with a principal place of business at [street name and number], Town/City of \_\_\_\_\_, County of \_\_\_\_\_, State of New Hampshire, (hereinafter referred to as the "Grantor", which word where the context requires includes the plural and shall, unless the context clearly indicates otherwise, include the Grantor's executors, administrators, legal representatives, devisees, heirs, successors and assigns),

for consideration paid, with WARRANTY covenants, grant[s] in perpetuity to

the **SOCIETY FOR THE PROTECTION OF NEW HAMPSHIRE FORESTS**, a corporation duly organized and existing under the laws of the State of New Hampshire, with a principal place of business at 54 Portsmouth Street, City of Concord, County of Merrimack, State of New Hampshire, 03301-5400, having been determined by the Internal Revenue Service to be an income tax exempt, publicly supported corporation, contributions to which are deductible for federal income tax purposes pursuant to the United States Internal Revenue Code, [Town or City of \_\_\_\_\_, situated in the County of \_\_\_\_\_, State of New Hampshire, acting through its Conservation Commission pursuant to NH RSA 36-A:4] (hereinafter referred to as the "Grantee" which shall, unless the context clearly indicates otherwise, include the Grantee's successors and assigns),

the Conservation Easement (herein referred to as the "Easement") hereinafter described with respect to that certain parcel/area of land (herein referred to as the "Property") with any and all buildings, structures, and improvements thereon/being unimproved land situated on [street name] in the Town/City of \_\_\_\_\_, County of \_\_\_\_\_, State of New Hampshire, more particularly bounded and described in Appendix "A" attached hereto and made a part hereof.

#### **1. PURPOSES**

The Easement hereby granted is pursuant to NH RSA 477:45-47, exclusively for the following conservation purposes:

[choose appropriate section(s) among the following:]

- A. The preservation of the land [and the water body of (name of water body) to which it provides access and on which it fronts] subject to the Easement granted hereby for outdoor recreation by and/or the education of the general public, through the auspices of the Grantee; and
- B. The protection of the unusual natural habitat of \_\_\_\_\_; and

C. The preservation and conservation of open spaces, particularly the conservation of the acres of productive farm and/or forest land of which the land area subject to the Easement granted hereby consists [, the protection of the undeveloped water frontage along the (name of water body), to which the land area subject to the Easement granted hereby provides access and upon which it fronts], the preservation and conservation of the wildlife habitat on the property, and the scenic enjoyment of the general public; and

[D. The preservation of that historically important land area which is \_\_\_\_\_ and/or the historic structure which is \_\_\_\_\_; and]

[E. insert additional purposes, as appropriate]

The above purposes are consistent with the clearly delineated open space conservation goals and/or objectives as stated in the [date] Master Plan of the Town/City of \_\_\_\_\_, which states “ \_\_\_\_\_ and with New Hampshire RSA Chapter 79-A which states: “It is hereby declared to be in the public interest to encourage the preservation of open space, thus providing a healthful and attractive outdoor environment for work and recreation of the state’s citizens, maintaining the character of the state’s landscape, and conserving the land, water, forest, agricultural and wildlife resources.”

All of these purposes [this purpose] are [is] consistent and in accordance with the U.S. Internal Revenue Code, Section 170(h).

The Easement hereby granted with respect to the Property is as follows:

2. USE LIMITATIONS [(Subject to the reserved rights specified in Section 3 below)]

A. The Property shall be maintained in perpetuity as open space without there being conducted thereon any industrial or commercial activities, except agriculture and forestry as described below, and provided that the productive capacity of the Property to produce forest and/or agricultural crops shall not be degraded by on-site activities.

i. For the purposes hereof, “agriculture” and “forestry” shall include animal husbandry, floriculture, and horticulture activities; the production of plant and animal products for domestic or commercial purposes; the growing, stocking, cutting, and sale of Christmas trees or forest trees of any size capable of producing timber or other forest products; and the processing and sale of products produced on the Property (such as pick-your-own fruits and vegetables and maple syrup), all as not detrimental to the purposes of this Easement.

ii. Agriculture and forestry on the Property shall be performed, to the extent reasonably practicable, in accordance with a coordinated management plan for the sites and soils of the Property. Forestry and agricultural management activities shall be in accordance with the then current scientifically based practices recommended by the University of New Hampshire Cooperative Extension, U.S. Natural Resources Conservation Service, or other government or private, nonprofit natural resource conservation and management agencies then active. [Management activities shall not materially impair the scenic quality of the Property as viewed from public waterways, great ponds, public roads, or public trails.]

B. The Property shall not be subdivided [or otherwise divided in ownership] [and none of the individual tracts which together comprise the Property shall be conveyed separately from one another].

C. No structure or improvement, including, but not limited to, a dwelling, any portion of a septic system, tennis court, swimming pool, dock, aircraft landing strip, tower or mobile home, shall be constructed, placed, or introduced onto the Property. However, ancillary structures and improvements including, but not limited to, a road, dam, fence, bridge, culvert, barn, maple sugar house, or shed may be constructed, placed, or introduced onto the Property only as necessary in the accomplishment of

the agricultural, forestry, conservation, habitat management, or noncommercial outdoor recreational uses of the Property, and provided that they are not detrimental to the purposes of this Easement.

D. No removal, filling, or other disturbances of soil surface, nor any changes in topography, surface or subsurface water systems, wetlands, or natural habitat shall be allowed unless such activities:

i. are commonly necessary in the accomplishment of the agricultural, forestry, conservation, habitat management, or noncommercial outdoor recreational uses of the Property; and

ii. do not harm state or federally recognized rare, threatened, or endangered species, such determination of harm to be based upon information from the New Hampshire Natural Heritage Inventory or the agency then recognized by the State of New Hampshire as having responsibility for identification and/or conservation of such species; and

iii. are not detrimental to the purposes of this Easement.

Prior to commencement of any such activities, all necessary federal, state, local, and other governmental permits and approvals shall be secured.

E. No outdoor advertising structures such as signs and billboards shall be displayed on the Property except as desirable or necessary in the accomplishment of the agricultural, forestry, conservation, or noncommercial outdoor recreational uses of the Property, and provided such signs are not detrimental to the purposes of this Easement. [No sign shall exceed \_\_\_\_ square feet in size and no sign shall be artificially illuminated.]

F. There shall be no mining, quarrying, excavation, or removal of rocks, minerals, gravel, sand, topsoil, or other similar materials on the Property, except in connection with any improvements made pursuant to the provisions of sections 2.A., C., D., or E., above. No such rocks, minerals, gravel, sand, topsoil, or other similar materials shall be removed from the Property.

G. There shall be no dumping, injection, burning, or burial of man-made materials or materials then known to be environmentally hazardous.

3. RESERVED RIGHTS

- A. This provision is an exception to 2.\_\_\_\_. above.
- B. The Grantor must notify the Grantee in writing at least thirty (30) days before any exercise of the aforesaid reserved rights.

4. NOTIFICATION OF TRANSFER, TAXES, MAINTENANCE

- A. The Grantor agrees to notify the Grantee in writing 10 days before the transfer of title to the Property [or any division of ownership thereof permitted hereby].
- B. The Grantee shall be under no obligation to maintain the Property or pay any taxes or assessments thereon.

5. BENEFITS, BURDENS, AND ACCESS

- A. The burden of the Easement conveyed hereby shall run with the Property and shall be enforceable against all future owners and tenants in perpetuity; the benefits of this Easement shall not be appurtenant to any particular parcel of land but shall be in gross and assignable or transferable only to the State of New Hampshire, the U.S. Government, or any subdivision of either of them, consistent with Section 170(c)(1) of the U.S. Internal Revenue Code of 1986, as amended, or to any qualified organization within the meaning of Section 170(h)(3) of said Code, which organization has among its purposes the conservation and preservation of land and water areas and agrees to and is capable of enforcing the conservation purposes of this Easement. Any such assignee or transferee shall have like power of assignment or transfer.
- B. The Grantee shall have reasonable access to the Property and all of its parts for such inspection as is necessary to determine compliance with and to enforce this Easement and exercise the rights conveyed hereby and fulfill the responsibilities and carry out the duties assumed by the acceptance of this Easement.

6. BREACH OF EASEMENT

- A. When a breach of this Easement, or conduct by anyone inconsistent with this Easement, comes to the attention of the Grantee, it shall notify the Grantor in writing of such breach or conduct, delivered in hand or by certified mail, return receipt requested.
- B. The Grantor shall, within thirty (30) days after receipt of such notice or after otherwise learning of such breach or conduct, undertake those actions, including restoration, which are reasonably calculated to cure swiftly said breach, or to terminate said conduct, and to repair any damage. The Grantor shall promptly notify the Grantee of its actions taken under this section.
- C. If the Grantor fails to take such proper action under the preceding paragraph, the Grantee shall, as appropriate to the purposes of this deed, undertake any actions that are reasonably necessary to cure such breach or to repair any damage in the Grantor's name or to terminate such conduct. The cost thereof, including the Grantee's expenses, court costs, and legal fees shall be paid by the Grantor, provided that the Grantor is directly or primarily responsible for the breach.
- D. Nothing contained in this Easement shall be construed to entitle the Grantee to bring any action against the Grantor for any injury to or change in the Property resulting from causes beyond the Grantor's control, including, but not limited to, unauthorized actions by third parties, natural disasters such as fire, flood, storm, and earth movement, or from any prudent action taken by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to the Property resulting from such causes.

E. The Grantee and the Grantor reserve the right, separately or collectively, to pursue all legal remedies against any third party responsible for any actions detrimental to the conservation purposes of this Easement.

[7. POWER OF TERMINATION

A. If the Grantee ceases to enforce the Easement conveyed hereby or fails to enforce it within thirty (30) days after receipt of written notice from the Society for the Protection of New Hampshire Forests requesting such enforcement delivered in hand or by certified mail, return receipt requested, then said Society shall have the right to enforce this Easement. All reasonable costs of such enforcement shall be paid by the Grantee. In such circumstance, the Society for the Protection of New Hampshire Forests shall then also have the right to terminate the interest of the Grantee in the Property by recording a notice to that effect in the Registry of Deeds referring hereto and shall then assume all interests and responsibilities granted to the Grantee in this deed.

B. The interests held by the Society for the Protection of New Hampshire Forests are assignable or transferable to any party qualified to become the Grantee's assignee or transferee as specified in Section 5.A. above. Any such assignee or transferee shall have like power of assignment or transfer.]

8. NOTICES

All notices, requests and other communications, required or permitted to be given under this Easement shall be in writing, except as otherwise provided herein, and shall be delivered in hand or sent by certified mail, postage prepaid, return receipt requested to the appropriate address set forth above or at such other address as the Grantor or the Grantee may hereafter designate by notice given in accordance herewith. Notice shall be deemed to have been given when so delivered or so mailed.

9. SEVERABILITY

If any provision of this Easement, or the application thereof to any person or circumstance, is found to be invalid by a court of competent jurisdiction, by confirmation of an arbitration award or otherwise, the remainder of the provisions of this Easement or the application of such provision to persons or circumstances other than those to which it is found to be invalid, as the case may be, shall not be affected thereby.

10. CONDEMNATION

A. Whenever all or part of the Property is taken in exercise of eminent domain by public, corporate, or other authority so as to abrogate in whole or in part the Easement conveyed hereby, the Grantor and the Grantee shall thereupon act jointly to recover the full damages resulting from such taking with all incidental or direct damages and expenses incurred by them thereby to be paid out of the damages recovered.

B. [The balance of the land damages recovered (including, for purposes of this subsection, proceeds from any lawful sale, in lieu of condemnation, of the Property unencumbered by the restrictions hereunder) shall be divided between the Grantor and the Grantee in proportion to the fair market value of their respective interests in the Property on the date of execution of this Easement. For this purpose, the Grantee's interest shall be the amount by which the fair market value of the Property immediately prior to the execution of this Easement is reduced by the use limitations imposed hereby. The value of the Grantee's interest shall be determined by an appraisal prepared [for federal income tax purposes] by a qualified appraiser within one year of the date of this Easement, and submitted to the Grantee.] or

[The balance of the land damages recovered (including, for purposes of this subsection, proceeds from any lawful sale, in lieu of condemnation, of the Property unencumbered by the restrictions hereunder) shall be divided between the Grantor and the Grantee in proportion to the fair market

value, at the time of condemnation, of their respective interests in that part of the Property condemned. The values of the Grantor's and Grantee's interests shall be determined by an appraisal prepared by a qualified appraiser at the time of condemnation.]

C. The Grantee shall use its share of the proceeds in a manner consistent with and in furtherance of one or more of the conservation purposes set forth herein.

11. ADDITIONAL EASEMENT

Should the Grantor determine that the expressed purposes of this Easement could better be effectuated by the conveyance of an additional easement, the Grantor may execute an additional instrument to that effect, provided that the conservation purposes of this Easement are not diminished thereby and that a public agency or qualified organization described in Section 5.A., above, accepts and records the additional easement.

12. ARBITRATION OF DISPUTES

A. Any dispute arising under this Easement shall be submitted to arbitration in accordance with New Hampshire RSA 542.

B. The Grantor and the Grantee shall each choose an arbitrator within 30 days of written notice from either party. The arbitrators so chosen shall in turn choose a third arbitrator within 30 days of the selection of the second arbitrator.

C. The arbitrators so chosen shall forthwith set as early a hearing date as is practicable which they may postpone only for good cause shown.

D. A decision by two of the three arbitrators, made as soon as practicable after submission of the dispute, shall be binding upon the parties and shall be enforceable as part of this Easement.

The Grantee, by accepting and recording this Easement, agrees to be bound by and to observe and enforce the provisions hereof and assumes the rights and responsibilities herein granted to and incumbent upon the Grantee, all in the furtherance of the conservation purposes for which this Easement is delivered.

IN WITNESS WHEREOF, I (We) have hereunto set my (our) hand(s) this \_\_\_\_\_ day of  
, 199\_\_.

Name of Grantor

Name of Grantor

The State of \_\_\_\_\_  
County of \_\_\_\_\_

Personally appeared \_\_\_\_\_ and  
\_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, 199\_\_ and  
acknowledged the foregoing to be his/her/their voluntary act and deed.

Before me,

Justice of the Peace/Notary Public

My commission expires:

ACCEPTED: SOCIETY FOR THE PROTECTION OF NEW HAMPSHIRE FORESTS

By:

Title:

Duly Authorized

Date:

The State of New Hampshire  
County of

Personally appeared

Title

of the Society for the Protection of New Hampshire Forests, this \_\_\_\_\_ day of  
\_\_\_\_\_, 199\_\_ and acknowledged the foregoing on behalf of the  
Society for the Protection of New Hampshire Forests.

Before me,

Justice of the Peace/Notary Public

My commission expires:

ACCEPTED: TOWN OF \_\_\_\_\_ CONSERVATION COMMISSION

By:

Title:

Duly Authorized

Date:

The State of New Hampshire  
County of \_\_\_\_\_

Personally appeared

Name & Title

of the Town of \_\_\_\_\_ Conservation Commission, this \_\_\_\_\_ day of  
\_\_\_\_\_, 199\_\_ and

acknowledged the foregoing on behalf of the Town of \_\_\_\_\_  
Conservation Commission.

Before me,

Justice of the Peace/Notary Public

My commission expires:

ACCEPTED: TOWN OF \_\_\_\_\_ BOARD OF SELECTMEN

By:

Title:

Duly Authorized

Date:

The State of New Hampshire  
County of

Personally appeared

Name & Title

of the Town of \_\_\_\_\_ Board of Selectmen, this \_\_\_\_\_ day of  
\_\_\_\_\_, 199\_\_ and acknowledged the foregoing on behalf of the Town of  
\_\_\_\_\_ Board of Selectmen.

Before me,

Justice of the Peace/Notary Public

My commission expires:

THE FOLLOWING ADDITIONAL OPTIONAL CLAUSES ARE TO BE INSERTED WITHIN THE CE DEED WHEN THEY ARE APPLICABLE:

SEPARATE PARCEL (Add as new paragraph #11)

The Grantor agrees that for the purpose of determining compliance with any present or future bylaw, order, ordinance, or regulation (within this section referred to as "legal requirements") of the Town/City of [name], the State of New Hampshire or any other governmental unit, the Property shall be deemed a separate parcel of land and shall not be taken into account in determining whether any land of the Grantor, other than the Property, complies with any said legal requirements. The Property shall not be taken into account to satisfy in whole or in part any of said legal requirements or any area, density, setback or other dimensional standard applicable to such land.

MERGER (Add as new paragraph #11)

The Grantor and Grantee explicitly agree that it is their express intent, forming a part of the consideration hereunder, that the provisions of the Easement set forth herein are to last in perpetuity, and that to that end no purchase or transfer of the underlying fee interest in the Property by or to the Grantee or any successor or assign shall be deemed to eliminate the Easement, or any portion thereof, granted hereunder under the doctrine of "merger" or any other legal doctrine.

ARCHAEOLOGICAL INVESTIGATIONS (Add to "Reserved Rights")

Grantor reserves the right to permit archaeological investigations on the Property after receiving written approval from the Grantee. Prior to permitting any such investigations, Grantor shall send written notice to the New Hampshire State Archaeologist (or other person or agency then recognized by the State as having responsibility for archaeological resources) for review and comment, and to the Grantee, such notice describing the nature, scope, location, timetable, qualifications of investigators, site restoration, research proposal, and any other material aspect of the proposed activity. The Grantor and Grantee shall request the State Archaeologist (or other person or agency, as above) to consider the proposal, to apply the standards as specified in rules implementing RSA 227-C:7 (Permits Issued for State Lands and Waters), and to provide written comments to the Grantor and Grantee. The Grantee may, in its sole discretion, approve the proposed investigations only if it finds that all of the following conditions are met:

- i. The archaeological investigations shall be conducted by qualified individuals and according to a specific research proposal;
- ii. The proposed activities will not harm state or federally recognized rare, endangered, or threatened species; and
- iii. The proposed activities will not be materially detrimental to the purposes of this Easement.

TRUSTEE CERTIFICATION. (IF NOT ALREADY SEPARATELY RECORDED): (INSERT AS FIRST PARAGRAPH OF DEED)

I/WE (name) as Trustee(s) of the (name of trust) dated (date), as amended, with a mailing address of (address), hereby certify that as such Trustee(s) I/we have full and absolute power thereunder to convey any interest in real estate and the improvements thereon held therein and no purchaser or third party shall be bound to inquire whether as such Trustee(s) I/we have said power or am/are properly exercising said power or to see to the application of any trust asset paid to me/us as such Trustee(s) for a conveyance thereof, and I/we (hereinafter referred to as the "Grantor", which word where the context requires includes the plural and shall, unless the context clearly indicates

otherwise, include the Grantor's successors and assigns), [by the power conferred by said Trust, RSA 564-A, and every other power,] [add text in prior brackets only if fiduciary or quitclaim deed; not needed if warranty deed]

for consideration paid, with WARRANTY [QUITCLAIM/FIDUCIARY] covenants, grant in perpetuity to

PUBLIC ACCESS (Insert as new par. under "Use Limitations")

There shall be no posting to prohibit the public, through the auspices of the Grantee, from accessing and using the Property [or specified portions thereof] for [low-impact, non-motorized, non-wheeled] non-commercial, outdoor recreational purposes, which the Grantee shall be under no duty to supervise.

CONFIRMATION OF NO PUBLIC ACCESS (Add as new par. to "Benefits, Burdens, and Access")

WATER QUALITY PROTECTION (Add to "Purposes" section)

The preservation of the quality of ground water and surface water resources on and under the Property.

CONFIRMATION OF NO PUBLIC ACCESS (Add as new par. To "Benefits, Burdens, and Access")

This Easement shall in no way be interpreted to permit physical access by the public to or across the Property for any purpose.

AGRICULTURAL BEST MANAGEMENT PRACTICES (At Sect. 2.A.ii, delete "Agriculture and" and "and agricultural" in lines 1 and 3, respectively. Then, create new paragraph 2.A.iii with the following text.)

Agriculture shall be performed, to the extent reasonably practicable, in accordance with a coordinated management plan for the sites and soils of the Property. Agricultural management activities shall not be detrimental to the purposes of this Easement, as described in Section 1 above, nor materially impair the scenic quality of the Property as viewed from public roads or public trails. Said management activities shall be in accordance with the then-current scientifically based practices recommended by the UNH Cooperative Extension, U.S. Natural Resources Conservation Service, or other government or private, nonprofit natural resource conservation and management agencies then active, and shall be in accordance with "best management practices" as set forth in the following publications or as these publications may be specifically updated or superseded:

- a. "Manual of Best Management Practices for Agriculture in New Hampshire," New Hampshire Department of Agriculture, June 1993; and
- b. "Pesticide Management Guidelines for Groundwater Protection," University of New Hampshire Cooperative Extension, November 1992; and
- c. "Buffers for Wetlands and Surface Waters: A Guidebook for New Hampshire Municipalities," Audubon Society of New Hampshire, New Hampshire Office of State Planning, University of New Hampshire Cooperative Extension, U.S. Natural Resources Conservation Service, November 1995; and
- d. "Best Management Practices: Biosolids," University of New Hampshire Cooperative Extension, 1995; and
- e. "Best Management Practices to Control Nonpoint Source Pollution: A Guide for Citizens and Town Officials," New Hampshire Department of Environmental Services, May 1994.

## ***References***

1. Deering Conservation Commission. Personal communication.
2. SPNHF web site: <http://www.spnhf.org>.

## Appendix C: Glossary

### ***Aggradation***

The upward movement of a riverbed due to a change in watershed condition and relationship between sediment production and streamflow, the opposite of degradation. The river will build a new floodplain appropriate for its new bed elevation and will abandon its former floodplain.

### ***Aquifer***

Geological formation such as fractured bedrock or glacial sands capable of yielding a water supply, also known as groundwater

### ***Biodiversity***

A concept of genetic and ecological variability and the processes and actions that weave biological and physical elements of the planet together

### ***Bog***

Acidic, nutrient-poor, wetland with no inlet or outlet, generally composed of peat layers formed by waterlogged Sphagnum moss, primarily recharged by precipitation

### ***Conservation easement***

Legal agreement between a landowner and a government or private conservation organization that limits the type and scope of development on the land, restriction to development is permanently attached to the deed

### ***Cost of Community Services***

A line-item financial analysis of revenues and expenses for residential, commercial, industrial, and open space land uses for a given year

### ***Current use taxation***

Reduced rates of property taxation for farm, forest, or unproductive land; assessment is based at its the value for its use rather than at the fair market value

### ***Delta***

Shallow, water-filled, sandy V-shaped plains formed by meltwater streams flowing into glacial water bodies

### ***Fen***

A wetland similar to a bog, but with an outlet

### ***Floodplain***

Strips of relatively flat land abutting stream or river channels that are periodically flooded

### ***Geographic Information System (GIS)***

An organized collection of computer data that can produce maps showing data for display or analysis

### ***Green buffer***

The strip of vegetation along a waterway or highway that serves to stabilize river banks, filter toxins from overland water flow, or absorb and deflect noise

### ***Habitat***

The environment in which the requirements of a plant or animal are satisfied

### ***Hardwood***

A deciduous tree

### ***Hydrograph***

A map detailing position of river and stream channels

### ***Hydrologic***

Pertaining to water

### ***Impervious***

Not allowing water to pass through, most often used in development terms

**Marsh**

A wetland characterized by emergent grasses and sedges, has a more neutral water pH than a bog

**Master plan**

Long range plan for a town or municipality intended to be used to guide development and growth of a community, prepared in accordance with NH RSA 674

**Nonpoint source pollution**

Pollution of surface waters, wetlands, and aquifers caused by precipitation runoff that carries surficial pollutants, cannot be traced to any particular source

**Open space**

Land protected for non-development type uses, includes forestry and agriculture

**Riparian**

Pertaining to the shoreline of a naturally occurring flowing body of water

**Softwood**

A coniferous tree

**Stormflow**

Part of total stream flow (along with base flow, which is generated by groundwater), generated by precipitation

**Stratified drift aquifer**

Sorted, unconsolidated layers of sand and gravel that are saturated with a usable quantity of water

**Succession**

The gradual change in plant and animal communities in an area following disturbance or the creation of new substrate

**Surface water**

Open bodies of water such as lakes, streams, or ponds

**Swamp**

A wetland with woody-stemmed plants

**Transpiration**

Water that is pulled from the ground and returned to the atmosphere by vegetation as a function of photosynthesis

**Watershed**

Area of land that is drained by a stream or river, also called a drainage basin

**Water table**

The top of the saturated zone

**Wildlife corridors**

Tracts of land through which wildlife travel; typically follow waterways or geologic features, e.g.: ridgelines. Also called greenway corridors.