THE ROLE OF TOWN FORESTS IN PROMOTING COMMUNITY ENGAGMENT AND FOSTERING SENSE OF PLACE

A Project Presented

by

Bethany Claire Hanna

to

The Faculty of the Graduate College

of

The University of Vermont

In Partial Fulfillment of the Requirements
for the Degree of Master of Science
Specializing in Natural Resource Planning

October, 2005

ACKNOWLEDGEMENTS

First, I would like to acknowledge the dedication and efforts of those working to engage community in their town forest and thank the conservation commissioners, teachers, town planners, and foresters who have provided a wealth of knowledge and experience for this project. I would also like to thank my advisor Cecilia Danks and committee members Tom Hudspeth and Bob McCullough for the expertise; Walter Poleman and Mike Snyder who first introduced me to the Hinesburg Town Forest, the forest that first sparked my interest in this project; friends and fellow graduate students for their camaraderie and support; my family for their encouragement; and last but not least, my fiancé Ryan who has seen me through these past two years and more.

TABLE OF CONTENTS

ABSTRACT

Town forests offer the opportunity for a local community to participate in and benefit from the sustainable management of town-owned forestland for timber harvesting, wildlife habitat, watershed conservation, recreation and education. Despite a long history of town forests in New England, many towns currently underutilize their town forestlands. As communities face the challenges associated with increasing population, shifting economies, and loss of open space, the town forest as a place and the land and community ethic upon which its management is founded can play a positive role in the community by building social capital, promoting community engagement, and fostering sense of place. Informational resources including descriptions of features of individual town forests, institutional arrangements for decision-making, and networks for exchanging information would assist community leaders if they were readily available.

The primary objective of this project was to identify, research, and document six cases of town forests highly utilized by communities for diverse community benefits in Vermont, New Hampshire, and Maine to serve as examples for others. These "model" case studies, based on interviews of community leaders, highlight each forest's biophysical and cultural characteristics, management objectives, institutional arrangements, sources of funding, and outreach events. Local school programs, sustainable multiple-use management with community participation, and community outreach events were characteristics documented in the "model" town forests that may contribute to increasing community engagement and fostering sense of place. At the scale of a single forest, an interpretive guide for the Hinesburg Town Forest in Hinesburg, VT was designed and additional insights into community engagement including the importance of an updated management plan and communication networks between town forest user groups were gained through that process. The results of this inquiry will serve as a valuable resource for selectboards, town forest committees, and other community leaders who wish to actively engage residents in their town forest. They are publicly available on a website at www.uvm.edu/~rscfar/townforests/.

SECTION ONE: INTRODUCTION

Over the last century, municipal forests have been established in many communities across the northeast and now comprise in excess of 400,000 acres throughout the states of Maine, New Hampshire, New York and Vermont (Case Study: Lincoln Town Forest Project, 2003). In many communities, town forests are underutilized for habitat and watershed conservation, recreation, education, and sustainable timber harvesting. Town forests have the potential to contribute positively to the communities in which they are located. In rural towns where the economy has been dominated by large-scale timber harvesting, town forests may contribute to efforts to promote the community's long-term economic stability and environmental health. In other regions, as widespread housing and business development alter the rural character of small towns, concern over land use changes has created a need to build social capital and foster sense of place. As communities face these future challenges, the town forest as a place where a land and community ethic is honed can help fill this niche.

In many cases, town forestlands were established, not for their ecological quality or forest health, but for their degraded state. As such, they represent the majority of forested lands in New England—former agricultural lands that have been reforested through succession or planting. Thus, town forests, as examples of local forested lands, can serve as models of stand improvement and sustainable management for small woodlot owners.

Town forests also have the potential to contribute positively beyond the local community. Although not all town forests are relevant on a landscape level, some are large enough and spatially appropriate to play a role in landscape and ecosystem level

processes including watershed conservation and carbon sequestration. Additionally, as landscapes become increasingly fragmented, town forests can serve as crucial habitat for wildlife, such as deer wintering areas or breeding habitat for neo-tropical migrants, and can be included in landscape level conservation planning.

Town forests also have the potential to serve an educational role in connecting community members with place in terms of not only resource use, but through other means as well. Town forests are places to recreate and for spiritual renewal, and can serve as examples of sustainable forest management. Town Forests can be used as model forests, to teach community members the value of wildlife habitat, and how to sustainably manage their own property for both timber harvesting and habitat conservation.

Despite the potential town forests have to serve as community resources, several key components that would assist community leaders in town forest planning are missing. Comprehensive knowledge of town forest planning and management beyond the local level is limited; thus, town forests as a whole are largely unorganized at the state, regional, and national levels making any broader scale support efforts less effective. Town forest committees, conservation commissions, and selectboards need easily accessible resources to use when making decisions regarding a town forest's management.

While numerous non-profit organizations have been working to fill this role at the local level, only a few provide assistance at the state or regional levels. In a workshop on town forest management sponsored in part by one such organization, the National Community Forestry Center, Northern Forest Region (2003), workshop participants

identified several common community needs. Included among these were case-studies of successful town forest models, methods of bringing people together, funding sources, maps or mapping services, and a comprehensive informational resource for town forest management, all of which this project attempts to address, albeit to varying degrees.

Town forests, to the extent that they strive to meet the objectives of environmental health and community well-being through participatory, inclusive processes, can be considered models of other community-based forestry efforts. Community forestry in the early 20th century in the U.S. was once synonymous with local forest management. However, community forestry has since evolved to reflect the international model (better known in this context as joint forestry or social forestry) and its focus on linking community development and well-being to forest management. This most recent variation I will refer to as community-based forestry and will discuss it further in the following section[1].

In order to increase utilization of town forests for the objectives described above, it is helpful to look to community-based forestry models that focus on building community social capital, increasing community capacity, and fostering sense of place. This project compares the characteristics that comprise highly utilized town forests in northern New England to those of successful community-based forestry organizations through the achievement of three objectives.

My first project objective addresses the need for knowledge of town forests' status in New England. Thus, the focus of Part I was to identify several town forests in New England that have a high degree of community activity in the forest itself, a strong

[1] The term *community forestry* will be used as both a general umbrella term describing urban forestry, social forestry, and community-based forestry, as well as a specific term referring to local forest management as it evolved in the early to mid twentieth century.

sense of place concerning the forest, and active forest planning that contributes to forestland stewardship. I refer to these town forests as "models" for the purposes of this project.

The second objective addresses the core of this project—determining the characteristics of the model town forests selected. This inquiry centered on components such as the biophysical characteristics of the town forest, events and activities taking place in it, community leadership and support, and existing networks and partnerships. An analysis of the case studies outlines key components of six model town forests and their management, and addresses the following questions:

1) *What biophysical conditions, institutional arrangements, sources of knowledge, outreach events, stewardship and monitoring activities, and leadership qualities do the model town forests have in common and which ones are unique?*

2) *How might these characteristics assist in promoting community engagement, building social capital, fostering sense of place, and increasing forestland stewardship?*

Finally, through the creation of an interpretive guide for the Hinesburg Town Forest, the forest that first sparked interest in this project, I explore the contribution of educational materials and their role in increasing forest utilization, fostering sense of place, and promoting stewardship. In addition, I discuss the group process through which community can be engaged, the sources of knowledge within and outside a community, and the methods of sharing that knowledge as it relates to the development of these materials. The Hinesburg Town Forest is ideal for such a detailed small-scale study as its low to moderate utilization by the community is typical of many New England town forests. While the town has taken steps to increase sense of place and community

engagement in the forest, the lack of an updated management plan and objectives provide challenges to those who wish to enhance the town's use of the land.

In addition to the project in print, the town forest case studies are available online through the University of Vermont website http://www.uvm.edu/~rscfar/townforest. I hope the results of this inquiry will serve as a valuable resource for town officials such as selectboards, conservation commissions, and town forest committees, as well as community leaders who wish to actively engage residents in their town forest and encourage stewardship of town forestlands. In summary, this project identifies how a town forest as a place, the community as a common identity grounded in place, and community forestry as a management philosophy and land and community ethic, coalesce to engage community, foster sense of place, and increase stewardship towards the ends of community health and well-being.

SECTION TWO: COMMUNITY ON THE LAND: TOWN FORESTS AND THEIR ROOTS

In the following section, the literature addressing key project components is reviewed. First, a discussion of the evolution of town forests in New England as it relates to the roots of community forestry and national policy decisions provides an historical context for modern day town forests. Next, the community-based forestry model of management, the degree to which town forest management follows this model, and the key characteristics that contribute to the community-based forestry model's success are discussed.

Underlying the community-based forestry model is the relationship between humans and the land, and specifically, the importance of community participation in forest management. As such, I first discuss how town forests can be interpreted as common pool resources and the theories related to the management of the latter. Next I address several concepts that closely relate to community participation in forest management—social capital, community engagement, sense of place, and stewardship. Specifically, I discuss how town forests can potentially play a role in building social capital, and increasing community engagement and sense of place, which may lead to greater stewardship within the community.

Evolution of Town Forests in New England

The legacies of the past century show an undeniable change in society's values and in the policies implemented. The development and ultimate demise of the town forest movement during the first half of the 20th century is evidence of this. From the first common lands of colonial New England to our often forgotten town forests at present, one can observe the role of influential leaders, public conservation concerns,

outreach and education efforts, a social philosophy founded on capitalism, and the shifting winds of civic engagement in the formation of our ideas on forest management. A closer look at the history of community forestry in the United States and the roots of town forests, can lead to a greater understanding of the status of present town forests and their potential roles in the future.

In the United States, numerous precedents exist for management of communal lands including town forests. These historical examples can be divided into two categories: (1) indigenous models and (2) old world traditions as interpreted by new world practices of community-based natural resource management (Baker & Kusel 2003; McCullough 1995).

Despite the long-standing and wide-spread belief that, upon the arrival of Europeans to the new world, forests were wild and unmanaged, it is now understood that Native Americans frequently carried out management practices on communal lands. For example, regular controlled burns in forests promoted ideal habitat for valuable game species. These practices were developed and perfected over thousands of years through shared knowledge of ecosystem functions. Native Americans' belief that they were stewards of the land was reflected in their cultural relationship to it (Baker & Kusel 2003).

In the southwest, old world traditions from Spain and Mexico are carried out in the management of scarce water resources and land suitable for agriculture. Arable land along irrigation canals was divided among community members. Cooperative arrangements were developed by using communal irrigation systems in which those with

farms along the irrigation canal constructed and maintained the channel (Baker & Kusel 2003).

Traditions of communal land ownership and management carried over from Europe also form the historical basis for town forests in New England. Several distinct periods in the history of town forests can be distinguished and defined through the ownership and appearance of these common lands, the policies that created them and dictated their management, and the culture of the times. The following is an analysis of these periods.

Colonial New England

Common lands were an integral component of New England villages. Modeled after their old world counterparts, common lands were set aside in populated areas to provide community resources. The ultimate ownership of this land could be either private, in which case use of the land was dictated by the proprietor; or public, with the title held by the governing body. These lands were often divided by use; for example, specific parcels were designated for pasturage or timber harvesting. Timber rights could be divided among single members of the town or be held in common. In some cases, land was set aside for the sole purpose of supporting a church or school. (McCullough 1995).

As population pressures mounted, resource demand increased exponentially. Colonists cleared land for pasture and the cultivation of crops. Harvested wood provided materials for the construction of buildings—from houses, barns and fences, to ships that exported timber, a resource that had long ago become scarce in the old world. With this boom, large landowners could make substantial profits off their property. As resources

became scarcer, land became a commodity. Once held in common for the benefit of the community, these communal and public lands in many cases were subdivided and sold (McCullough 1995).

Conservation and the Town Forest Movement

Early settlers were witness to this rampant consumption and degradation of natural resources in New England. New England's forests, once seen as an inexhaustible resource, became devastated as communities grew and prospered. Formerly rich and productive lands lay idle having been clear-cut and farmed year after year resulting in significant soil and nutrient loss.

Fear of resource scarcity shook not only New England, but also the nation as a whole. Led by individuals such as John Muir and Theodore Roosevelt, the conservation movement began to take root in America just before the turn of the century. The town forest movement, boosted by nationwide support for conservation, began to take shape as communities sought to reclaim degraded lands.

> Within the forestry profession, concern for reclamation of idle lands and fear of regional timber scarcity—and a desire to acquaint the public with these problems—propelled the movement more directly than any other single factor (McCullough 1995, p.142).

Concurrently, Progressive Era politics focusing on science and efficiency helped to shape forest policy (Baker & Kusel 2003). European trained foresters Bernhard Fernow and Gifford Pinchot took the lead in promoting scientific forestry and sustained yield management of forest resources around the turn of the century. However, Fernow, unlike Pinchot who was appointed U.S. chief forester in 1898, was a strong proponent of local forest management and believed it could lead to widespread profitability of forests.

Due to Pinchot's lack of support for local forest management, the Forest Service remained absent from the scene until well into the 20th century (McCullough 1995).

Despite, or because of this lack of federal support, several non-profit organizations formed to promote local forest management within their states. The most influential of these, the Massachusetts Forestry Association[2] (MFA), was formed in 1898 and was directed by Harris Reynolds from 1911 until his death in 1953 (McCullough 1995; Foster 1998).

Reynolds was a key leader in promoting the town forest movement. He held influential positions such as the chairperson of the Society of American Forester's (SAF) community forestry committee and founder of the New England Forestry Foundation. As the author of numerous articles in forestry publications such as the *Journal of Forests, American Forestry*, and *the Bulletin of the Massachusetts Forestry Association*, Reynolds was instrumental in increasing public awareness of town forests' potential to contribute positively to community.

In addition to Reynolds, several others played key roles in the promotion of community forestry. Benton MacKaye, a progressive best known for his vision of what would become the Appalachian Trail, recognized the social impacts of forest management and policy and heralded the need for sustainable communities. Despite his sound belief in Progressive Era science and efficiency, he faulted other Progressives for the ends to which they put their beliefs to work. MacKaye publicized what he termed the "plight of the lumberjack" caused by current forest policies that promoted a cut and run

[2] The Massachusetts Forestry Association has gone through several name changes since its inception. In 1933 it became the Massachusetts Forest and Park Association which lasted until 1981 when it became the Environmental Lobby of Massachusetts and eventually, the Environmental League of Massachusetts (Foster 1998).

attitude, paid temporary workers low wages, and provided nothing more than a ramshackle cluster of housing for community. He recognized the social benefits of sound forest management and ardently advocated for forest policies that promoted community equity and well-being (McCullough 1995; Baker & Kusel 2003).

As conservation took root, recreation was touted as a means to escape the city to improve physical and mental health. Interest in recreation prompted the establishment of local public parks with elaborate trails and designed landscapes, and larger national parks such as Yosemite and Yellowstone out west (McCullough 1995).

As public awareness increased, each New England state began to adopt legislation that enabled municipalities to acquire land for town forests[3]. Communities began to see the potential for commonly owned and locally managed forests to serve as a means to reclaim idle lands, reduce resource scarcity, protect vulnerable watersheds, increase recreational opportunities and improve community well-being (McCullough 1995).

Federal backing for community forestry legislation increased with the support and promotion of conservation over production by organizations such as the Society of American Foresters (SAF) and the American Forestry Association (AFA). The community forestry committees organized by these groups were short-lived, however, and had little influence in promoting community forestry as a national movement over the long term. In the post-depression era, a long-time advocate of municipal forestry, Franklin D. Roosevelt, spurred the U.S. Forest Service (USFS) to create a national community forestry program in 1938 (McCullough 1995; Foster 1998). Despite what seemed to be increasing support for community forestry on the national stage and

[3] Massachusetts passed an enabling law in 1882, quite early compared to other states in New England states that followed suit over three decades later.

municipal forestry at the state and local levels, the political winds had shifted and threatened to halt community forestry's progression.

An Era Ended

Support for community forestry began to wane as concerns over its viability became widespread, which ultimately led to the failure of national community forestry legislation to be enacted in 1941. Without federal backing, the bottom fell out of the town forest movement. With little national support, the community forestry committees of the SAF and the AFA effectively dissolved (McCullough 1995).

Despite a lack of federal institutional support, a few management activities continued in town forests throughout New England. In Vermont, where the town forest movement was somewhat delayed, many towns did not establish forests until after 1951. One of two key changes developed at this time. First, a new law required articles for municipal forests in warnings for annual town meetings. Second and approximately a decade later, the state assigned a municipal forester to each of Vermont's two districts, which provided institutional structure. Massive tree plantings also continued with the reclamation of watershed and former agricultural lands.

Although there was initial public engagement with town forests, the town forest movement began to founder without the necessary long-term infrastructure and support for local management of forest resources provided by federal backing. While the USFS has supported the development of urban and community forestry programs since the 1970's, there has been a fundamental failure to recognize the "plight of the lumberjack" as depicted by Benton MacKaye in the early 20th century. The current Urban and Community Forestry Program attempts to address social issues associated with forest

management; however, it focuses largely on the urban environment and its associated problems of environmental health and well-being (Rains 1995). Overall, it has failed to stray far from its traditional focus on the management and contribution of municipally owned trees.

Community-based Forestry: A management philosophy for town forests

Since the inception of the town forest movement, over 400,000 acres of land in the northeast[4] have been conserved as town or municipal forests (Case Study: Lincoln Town Forest Project, 2003). Town forests and community forestry were founded on similar belief systems and propelled forward into the 21st century by the need to renew and revitalize our connection to the land that sustains us. Theoretically, both seek to promote social change by recognizing that community well-being and ecosystem health are fundamentally intertwined; however, this may not always be the case in practice.

Community-based forestry recognizes and strives to validate the fundamental relationship between community well-being and ecosystem health. It acknowledges that communities play a crucial role in ensuring sustainability and seeks to expand forest management to include not only communities of interest or identity, but also communities of place (Gray, Enzer, & Kusel, ed. 2001). Although definitions of community forestry vary depending upon the context, all share similar objectives in their emphasis on stewardship, sustainability, and improved community well-being. In the international model, community forestry (also referred to as joint forest management or social forestry in this context) is viewed as a tool for community development and a means to increase community capacity. Community forestry, as it evolved during the

[4] This statistic reflects the total lands conserved as town forests for the states of New York, New Hampshire, Maine, and Vermont. However, New York does not distinguish county-owned from town-owned lands.

20th century in the United States, is closely related to urban forestry and focuses on the connection between environmental health and community well-being through planting trees and conserving green spaces in urban areas. Finally, the most recent model of community forestry (more commonly known as community-based forestry) to be developed evolved from the international model as it applies to modern forestry in the United States, first in large scale forest operations in the west, and then more generally, throughout the country. This concept of community forestry is discussed in greater depth below and is the model to which I will be referring to in the context of town forest management.

The objectives of community-based forestry are four-fold, and define its management principles. The first objective is to maintain and promote ecosystem health and function through the careful stewardship and management of forest resources, informed by both science and local knowledge (Baker & Kusel 2003). Community-based forestry seeks to redefine our role in forest health to that of steward by recognizing the interdependent relationship between the environment and community.

The second objective recognizes the prominent role natural resources play in our economy. Community-based forestry strives to move beyond the current capitalist economy that fails to capture the value of ecosystem goods and services provided by intact forests such as carbon sequestration, water quality, and biodiversity. It seeks to develop innovative ways to factor in the benefits of healthy forests and recognizes the need to invest in natural capital to promote long-term economic stability in forest-dependent communities (Baker & Kusel 2003).

The third objective relates to the social processes involved in community-based forestry. It relies upon inclusive participatory processes in developing objectives for resource management and encourages collaborative interactions between diverse groups. In an era of decreased civic engagement (Putnam 1995), it is necessary that communities increase their social capital and build community capacity to ensure that these collaborative processes are successful (Gray et al., ed. 2001).

Finally, community-based forestry seeks to provide a means in which to balance both local and non-local interests in forest sustainability through a multi-scale approach. Nested institutions at the local, regional, and national levels can provide an avenue to integrate non-local interests into forest management decisions (Baker & Kusel 2003).

In their book Community Forestry in the United States, Baker and Kusel (2000) analogize the idea of community-based forestry as a three-legged stool.[5] The legs of the stool symbolize environment, economy, and equity, with equal weight and importance given to each. The leg of environment represents the goal of preserving ecosystem functions and natural capital while promoting sustainable management of natural resources. The economy leg stems from the need to ensure long-term economic survival of the community in the current, largely shortsighted, economic system. Emphasizing the true cost of natural goods and services provided by the forest helps to ensure long-term economic stability that is often absent in communities solely dependent upon outside management of local natural resources. Finally, the leg of equity refers to the goal of

[5] In Ecological Economics: Principles and Applications, Josh Farley and Hermann Daly (2003) use a parallel analogy that describes ecological economics as a three-legged stool where each of the three legs represents sustainable scale, just distribution, and efficient allocation, respectively. The theory of ecological economics is based upon the belief that our economic system is a subset of the environment and therefore constrained by it. This is in direct opposition to the neoclassical economist's view that the environment is a subset of the economic system and therefore places no constraint on the potential for economic growth.

balancing "distributional power, knowledge, economic benefit, and overall, expansion of human freedom" (Baker & Kusel, 2000, p. 85). Missing only one of these legs eliminates the stool's functionality, as it is unable to remain upright.

McDonough et al. (1986) view community-based forestry as inherently participatory, small scale, and designed to promote equitable distribution and meet community needs. The origins and composition of community-based forestry organizations vary widely and ownership of forest resources can be either public or private. Community-based forestry groups may range broadly from a cooperative of private landholders who wish to gain the benefits of the economies of scale, to a group of individuals from various resource management agencies working towards a common goal (Gray et al., ed. 2001).

Town Forests and Community-based Forestry

Town forests can be considered examples of community-based forestry to the extent they follow the community-based forestry model in practice. The term town forest is defined as forested land owned by a town, city, or municipality for promoting sustainable management of timber, wildlife, and other natural resources, while providing for both educational and recreational opportunities. Inherent in these objectives is the concept of multiple-use management—the importance of maintaining a working landscape while providing for recreational, educational and conservation needs (McBane & Barrett 1986). Tension over balancing resource use with conservation has existed throughout the history of town forest management. Although timber harvesting and the income from timber sales dominated original intentions for the establishment of many

town forests, the management objectives have always included increasing forest health and community well-being.

Since their establishment, town forests have provided many benefits to communities. At present, school groups and forestry practitioners learn from the educational opportunities town forests afford. Timber harvests provide jobs for area foresters and loggers and towns earn income from these sales (McBane & Barrett 1986). In some cases, towns permit residents to cut firewood and hunt game in their forests. Additionally, conserved open-space has increased property values, water quality, and opportunities for recreation and wildlife viewing.

In most cases, the ultimate authority over town forest management rests with the town selectboard, a group of elected officials who oversee town governance. A conservation commission or town forest committee may or may not advise the selectboard depending upon whether such a commission exists in the town, and the bounds of their responsibilities. However, the degree to which the selectboard utilizes this authority varies in each town and is dependent upon the significance and impact of the decision in question. The Hinesburg Town Forest is one example of this variation. The ultimate authority for decisions regarding the Hinesburg Town Forest rests solely with the town forest committee.

The degree of community participation in town forest management also varies a great deal between towns. While the nature of local resource ownership promotes accountability, the lack of community engagement in town forest management or even knowledge of the town forest's existence dominates the degree to which the community participates in management decisions (Foster 1999).

Town forests and community-based forestry share a common heritage of old world ideals formed in communal resource management and indigenous cultures fundamentally based on stewardship. In this shared history, we find the mutual goal of renewing and revitalizing our intimate connection to the land. Town forests and community-based forestry share common objectives—both seek to maintain ecosystem health and enhance community well-being. When a high level of community engagement exists and town forest management is truly an inclusive, participatory process, then town forests can potentially serve as models for other community-based forestry efforts (cited in Baker & Kusel 2001).

As described previously, community-based forestry groups in the United States vary widely in terms of forest ownership and degree of institutional support; town forests provide a valuable degree of built-in institutionalization. An embedded institutional arrangement can provide structure and greater recognition, which can potentially lead to expanding key state and federal support. However, like many community-based forestry efforts, town forests need to gain accountability and legitimacy through active environmental and social monitoring efforts. Without widely accepted evidence of community and ecological benefits of community-based forestry, there is little hope in achieving long-term support. In theory, the community-based forestry model for the management of town forests provides resources to meet local needs, enhances community cohesiveness, and ensures long-term sustainability of forest ecosystem processes and services; however in practice, the extent to which the community-based forestry model is followed varies greatly.

Success and the Community-based Forestry Model

If town forests are to be successful at engaging community, fostering sense of place, and encouraging forestland stewardship, it is useful to analyze past and present community-based forestry projects. Examining what contributes to their success and what hinders it can assist future town forest planning efforts. In recent years, several institutions have taken initiative and provided funding for community-based forestry and community-based ecosystem management research. While many of these initiatives are still maturing, several research projects have outlined key components of community-based organizations and group planning processes that lead to success in the achievement of the organization's goals and objectives. Ack et al. (2001) identify the following as key factors to successful community-based ecosystem management projects:

- *Participation*
- *Trust*
- *Long-term stability in group process*
- *Leadership*
- *Funding sources*
- *Knowledge* from local sources as well as through outside partnerships with non-governmental organizations and universities
- *Outreach*
- A *workforce* to carryout onsite tasks such as ecological monitoring, habitat restoration, and trail maintenance
- *Adaptive management*
- *Technology* to assist in carrying out management objectives
- Degree of *institutionalization* of management
- *Accountability*

In an editorial synthesis of an American Forests Workshop, Gray et al. (1998) present parallel points to those stated above. They stress the importance that outcomes of community-based processes be positive and therefore emphasize the need for mutual respect among community members. In addition, transparency and accountability through active monitoring and adaptive management ensures that changes are implemented when deemed necessary. Institutional arrangements that allow for collaboration of agencies and organizations at a multitude of scales, from the local to federal level, may provide essential support to communities with limited capacity, knowledge, or funds. Finally, it is necessary for communities to develop ways to ensure long-term investment in forest and ecosystem health.

Ostrum (1990) proposes that long-standing institutions for governing common-pool resources share several key characteristics. First, she states that individuals or groups authorized to use the resources must be identified and the resource boundaries delineated. Second, rules regarding resource use must be specific to the resource and local conditions for efficient resource management. Third, the rule-making process pertaining to resource use should be transparent and participatory, and methods of resolving conflict should be in place. Fourth, the condition of resources and their use must be actively monitored and appropriate actions taken for a violation of the operational rules. Fifth, outside agencies do not challenge the development of internal institutions. Finally, management of common-pool resources that are part of larger scale systems should be at multiple scales through what Ostrum terms “nested enterprises" (p. 90).

Qualities leading to effective community-based forestry and ecosystem management organizations closely resemble the key characteristics that achieve a high level of community capacity and social capital. This should not, however be surprising, as such processes form a virtuous cycle through the group interaction and decision-making processes inherent in community-based forestry efforts. In turn, community capacity and social capital strengthen the effectiveness of community-based forestry efforts, thus reinforcing positive community interactions and increasing community engagement. These concepts are discussed further in the following section.

Engaging Community in Town Forests: Social capital and the power of place

Town forests' roots intertwine with those of community-based forestry as evidenced in their similar management objectives. Town forests provide a venue in which to engage community, foster sense of place, and increase forestland stewardship. As we look toward future town forest planning, it is important to recognize our changing roles on the landscape: as inhabitant, as user, as visitor, as steward.

Town Forests: Common Pool versus Public Resources

Town forests afford a wide variety of benefits including timber and non-timber forest products, recreation, wildlife viewing, and protection of air and water quality to individuals and communities alike. Some of these benefits, such as timber and non-timber forest products, are considered common-pool resources for two reasons: first, it is difficult to exclude any individual from using or acquiring these resources; and second, these resources are subtractable, meaning they can be used up. Alternatively, benefits such as the protection of air and water quality are public resources; while it is difficult to exclude individuals from receiving their benefits, they are nonsubtractable.

The line between common-pool resources and public resources, however, is not always easy to delineate. For example, opportunities to view wildlife may seem like a public resource, but too many visitors can cause the forest to become degraded and wildlife populations stressed. Thus, it becomes subtractable and a common-pool resource. Because many of the benefits town forests provide are considered common-pool resources, albeit to varying extents, town forests can be included in the long-standing debate over how best to manage communal resources and the philosophical discussion that provides the foundation for this debate. Ostrum (1990) summarizes three models that have influenced and informed perceptions about how individuals use common-pool resources.

The first model, Garrett Hardin's "tragedy of the commons," illustrates how rational individuals would choose to maximize their use of a common-pool resource. Benefits received by the individual for maximum resource use are immediate and direct whereas any costs resulting from degradation of the resource are delayed and shared by all who use it. Consequently, rational individuals are encouraged to use more than their share, which results in a highly degraded communal resource. Hardin used the example of rational herders on an open access pasture. An individual herder would gain the most direct benefits by grazing as many animals as possible on the pasture. Any costs associated with overgrazing would be not only delayed, but also shared by all herders. Consequently, direct immediate benefits from maximizing resource use results in the resource's degradation.

The second model described by Ostrum and developed by Dawes (1973, 1975; cited in Ostrum 1990) frames Hardin's "tragedy of the commons" as the "prisoner's

dilemma game." Again, players' decisions are based on individually rational behavior. In other words, the players make a choice to maximize their benefits as individuals; this is considered their default strategy. However, when both players choose their default strategy, they experience zero benefits. Optimal benefits are produced when players cooperate, using only their share of the resource. Sub-optimal benefits result when one individual cooperates and the other does not. However, this produces such a large disparity in the distribution of benefits it is unrealistic that anyone would make this choice, assuming rational behavior and maximization of individual benefits.

The third model, the "logic of collective action" describes how collective benefit is not enough to overcome individually rational behavior. In other words, if individuals cannot be excluded from reaping the benefits provided by others, there is little incentive for them to contribute to the common good. Each model centers on this problem of "free-riding." However, these models also maintain the premise that resource use is "open-access" or unmanaged, and as Ostrum suggests, that the individuals using the resources are incapable of changing the constraints placed upon them as self-interested, rational individuals. Individuals, however, do not always make rational choices as demonstrated by spiteful and altruistic behavior, nor do they exist in a vacuum. The influence of community on individuals' perceptions, behavior, and choices is discussed in the following.

On Community and Stewardship

Curry and McGuire (2002) describe community as "a property of our personhood." In other words, individuals are inseparable from community; it influences who we are. They go on to write, "individual personhood blossoms through membership

in a community and atrophies if detached from the community" (p. 182). Community can be defined through *place* (based on a geographical area) and *identity* (based on social structure and interactions), as well as at various scales (Eyles, 1985). Selznick (1996) also emphasizes that community is a multidimensional concept. He identifies the following as critical components of community: (1) shared history and culture, (2) common identity to the extent that it does not become exclusive, (3) reciprocity and interdependence, (4) diverse networks, (5) recognition of value in the individual, (6) participation at various scales, and (7) institutional support for the integration of community elements.

Author, scholar, and farmer Wendell Berry (1993) describes a community as both an ecosystem and a household of place and emphasizes the necessity in defining community on the local level. A healthy community "makes itself harmoniously a part of—its local ecosystem," and is composed of what is both human and non-human (p. 155). He argues that without a local sense of community, any reference to community at larger scales such as the national or global community is "meaningless" (p. 120).

In A Sand County Almanac, Aldo Leopold (1966) also encourages us to expand our definition of community to include our natural surroundings and our fellow citizens. He encourages us to practice a "land ethic" and explains that it is our conscience that provides the basis for our ethics and prompts us to cooperate with others in the community. By including place as an integral part of our community, we can then rely on our conscience to guide our interactions with the land and to serve as stewards of it (Leopold, 1966). Ack et al. (2001) hypothesize that stewardship, "a philosophy of care

for and long term commitment to the land," is a cornerstone of community-based forestry (p. 119).

Community-based forestry was founded on the principle that social capital allows communities to take action collectively, and that this process creates a positive feedback loop in which social capital increases with time and community experience. "Social capital is self-reinforcing when reciprocity increases connectedness between people, leading to greater trust, confidence and capacity to innovate" (Pretty & Ward, 2001, p. 214). In his article "Bowling Alone: America's declining social capital," Robert Putnam (1995) highlights civic engagement, trust, and collective action as the three primary components of social capital. Rohe (2004) expands upon these key elements and adds that civic engagement leads to social networks, which generate trust, and a group will only take collective action repeatedly if that action results in individual and or social benefits. Briggs (2004) asserts that there must also be accepted rules of behavior that guide group interaction and process.

Flora and Flora (1996) describe social capital as horizontal, vertical, or nonexistent. Horizontal social capital involves equal recognition of and contribution by each member of the community. Each individual is also expected to receive these highly valued contributions as well. Horizontal social capital emphasizes "egalitarian forms of reciprocity" (p. 219). Vertical social capital also relies on reciprocity and trust. However, networks are hierarchical; many individuals at the bottom depend on a few at the top. Such is the case in impoverished communities that depend on a single industry for economic stability. Flora and Flora characterize communities where social capital is

non-existent by a high population turnover rate, frequent conflicts, and little if any interaction between residents.

Flora and Flora (1996) propose that building *social infrastructure* can lead to an increase in social capital. They identify three main contributors: (1) symbolic diversity, (2) widespread resource mobilization, and (3) diversity of networks. The authors describe *symbolic diversity* as recognition of value and acceptance of community diversity, awareness that *different than* does not mean *better than*, and process-based rather than outcome-based. Widespread community contributions, equality of access to resources, and both collective and individual investment in community resources describe *widespread resource mobilization*. Finally, the existence of both informal and formal networks that are inclusive, and link horizontally to other communities and vertically to larger scale institutions, represent a *diversity of networks.* Each of these contributors to social infrastructure can help build social capital.

In addition, social capital can increase with increased civic engagement, when people acquire new civic skills, when networks bridge community or cultural boundaries, and as a community culture that values collective action and community responsibility is developed (Briggs, 2004). Rohe (2004) emphasizes the need to engage community and pinpoints a lack of widespread community engagement as a factor that causes many community development projects to be unsuccessful over the long term.

A Common Thread: Town Forests and Sense of Place

Town forests have the potential to engage community and foster a community's sense of place. Town forests preserve a record of the past and incorporate current land use and conservation for the future. Datel and Dingemans (1984) suggest that historic

preservation, when integrated with the present, can be a means to accomplish the goal of increasing sense of place. Additionally, they feel "the landmarks and the landscapes of people's own past lives should form the basis of an effort to manage the sense of place" (p. 137). Town forests can help to fill the niche of increasing a community's sense of place because of the qualities they possess as a product of both our cultural and natural history.

Sense of place refers to our emotional connection to place developed in part from our experiences with it. According to Robert Hay (1988), sense of place is "an individually based, but group informed, localized, personal means of relating to the world, transforming mere space into personal space." He describes sense of place as belonging to three different realms: the "perceptual realm, emotional realm, and experiential realm" (p. 160). In other words, we experience place through our observations and interpretations of it and our memories of these perceptions; through our values we impose upon it; and through our sensory and physical experiences of it.

Place-based education can serve to strengthen sense of place within the community. Through shared local knowledge of community cultural and natural history, residents can begin to feel a greater investment in the area as they define their sense of place. Curry and McGuire (2002) view local knowledge as the "science in 'place'." They write, "Knowledge tied to local place leads more clearly to an ethic of connection to creation and a responsibility for place and those within the collective web" (p. 201). Town forest management largely relies upon local knowledge to inform many management decisions (Baker & Kusel, 2000). Thus, sharing a common identity and

developing one's sense of place contributes to the successful management of communal resources.

> *Community forestry…highlights the importance of place in the development of a group's collective identity. It asserts that being grounded in a place enables people to build community and strengthen civic institutions that promote citizen participation. It is also fundamentally about validating and revitalizing the relationship between people and the environment that surrounds and sustains them* (Baker & Kusel, 2003, pp. 80-81).

The reciprocity of the relationship between community-based forestry and sense of place becomes apparent when analyzing the primary goals of community-based forestry (sustainable resource management for local benefit) and the method used to reach these goals (civic engagement).

Putting the Pieces Together

The conceptual map shown in Figure 1 was developed to illustrate the relationships between key project components. Two virtuous cycles form the foundation of the model. On the right, community is strengthened through increased social capital and community engagement. On the left, sense of place is fostered through knowledge and experience of place. Both virtuous cycles may ultimately contribute to stewardship of not only the town forest, but also the broader community. The town forest as the location where sense of place is fostered and community members with diverse interests come together, and community-based forestry as the management philosophy for town forests that encourages community engagement and stewardship, may contribute positively to community health and well-being.

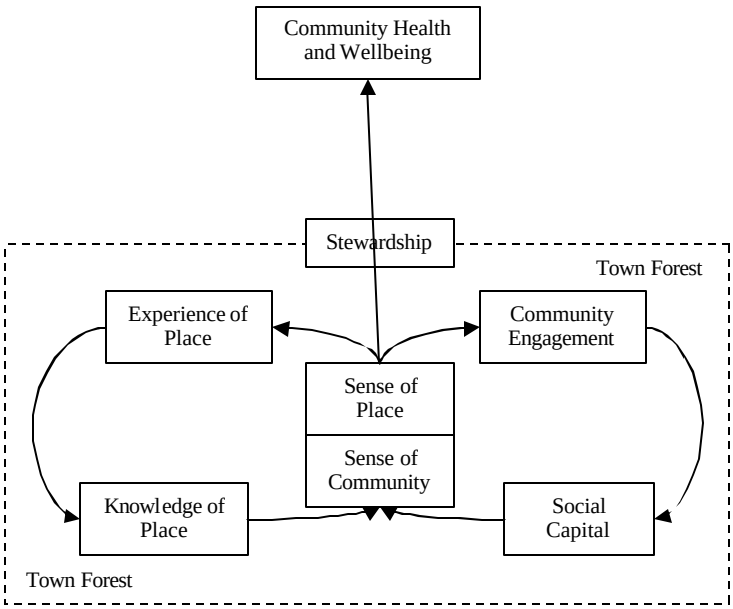


Figure 1 Project Concept Map. The diagram above depicts a conceptual map of key project components.

SECTION THREE: METHODOLOGY

My research methods for Parts I, II, and III employed qualitative techniques that are well suited to developing case studies. Parts I and II relied largely on interviews that allowed me to learn the perspectives of the interview subjects and acquire knowledge that could not be found in written form (Patton 2002).

Part I. Town Forests and Community Engagement: Identifying Model Town Forests

Interviews with state Urban and Community Forestry Program coordinators, county foresters, and others active in the field of community forestry provided input regarding model town forests in northern New England. I contacted each interviewee by email or phone, and asked him/her to "nominate" town forests that have a high degree of community engagement, a strong sense of place in the community, and active planning for forest stewardship. I also asked interviewees to state their reasons for nominating a forest, and to provide the name and contact information of others directly involved in that forest's management and planning, if possible.

Next, I compiled this information in a table located in Appendix B. From this list, I chose town forests that I felt might represent the best variety of uses and management objectives, taking into account which town forests were nominated most frequently. The town forests were not chosen all at once, but rather in groups, as I found out more detail about each.

Part II. Town Forest Inquiry

For each town forest selected, I interviewed between two and four people active in town forest planning, with the exception of Bangor City Forest in Bangor, Maine and China School Forest in China, Maine. In both these cases, there was only one person

who played a major role in the town forest's management. Those interviewed include local teachers, county foresters, conservation commissioners, and town planners.

Interviews were conducted over the phone, email, or in person. Spoken interviews ranged in length from approximately twenty minutes to one hour and fifteen minutes. Each interview was recorded when possible, including phone interviews, using a digital recorder. All recorded interviews were transcribed and notes were taken during both recorded and unrecorded interviews.

Other sources of information included town forest management plans, conservation commission and town council meeting minutes, town websites, newspaper articles, and other town forest literature such as maps and guides. In addition, publications on town forests developed by the National Community Forestry Center, Northern Forest Region (NCFC, NFR), provided information on town forest planning.

The focus of this research centered on the characteristics of the town forest and the community that encourage residents to be engaged in the forest and forest planning, foster a community sense of place, and contribute to forestland stewardship. The specific topics addressed are largely informed by community forestry literature as outlined previously in the section *Success and the Community Forestry Model* and by requests from those in the field as depicted by NCFC, NFR (2003). The following provides an account of the topics that were addressed for each town forest:

1. Biophysical characteristics
    a. Size of the forest
    b. Population of the town
    c. Location of the forest relative to population centers
    d. Accessibility of the forest
    e. Cultural features

    f. Ecological features
2. Activities/events
    a. Description
    b. Number and diversity of those involved
    c. Frequency/follow-up
    d. Opportunities for ongoing involvement
3. Institutional arrangements
    a. Forest management and Planning
    b. Partnerships—schools, non-governmental organizations, universities
    c. Funding
4. Individual leadership
    a. Key promoters
5. Knowledge
    a. Educational opportunities
    b. Interpretation
6. Stewardship and Monitoring

This served as a general guide for conducting each interview, however I also wrote out specific questions on the topics above that could be used during the interview. This method was a combination of *the general interview guide approach* and the *standardized open-ended interview* (Patton 2002). While I outlined specific questions on the topics I wished to cover as in the *standardized open-ended interview*, I allowed myself the flexibility to ask questions that were not originally included, which models the *general interview guide approach*. Please see Appendix C for the detailed interview guide.

Part III. Creating an Interpretive Guide: Hinesburg Town Forest

The first step in developing the interpretive guide was to meet with the town planner, selectboard member, and the town forest committee chair for Hinesburg. During this meeting, I talked about my interest in developing this guide, and we discussed potential themes, access, and possible funding sources. Having their initial support was imperative to moving forward with the project.

In addition, the guide was developed in conjunction with the PLACE (Place-based Landscape Analysis and Community Education) Program, a collaborative effort between the University of Vermont and Shelburne Farms. The PLACE Institute in which I participated matched residents of Hinesburg and Huntington, the two pilot communities, with graduate students at the University of Vermont. The semester long service-learning course focused on researching the cultural and natural history of the town landscape and developing a series of workshops, field trips, and printed materials outlining the findings. For my contribution to the program and the town of Hinesburg, I developed the interpretive guide entitled *Stories in Stone*.

Throughout the course, there was an emphasis on linking the physical and cultural landscapes. The theme attempts to do just that: to link the geology of the landscape to the town forest's historic land use. By researching the pieces, patterns, and processes that have shaped and influenced the town forest, I was able to integrate the geologic history of Vermont to past and present land uses in the Forest.

For this research I relied upon the Hinesburg Town Forest Management Plan, interviews of the town forest committee chair, a selectboard member, the conservation commission chair, and other town residents. These interviews provided input to help in

the identification of key cultural and natural features in the town forest that should be highlighted in the interpretive guide. In addition, current and historical documents such as orthographic photos, and natural and cultural history literature provided a wealth of information on the forest's natural and cultural history and the processes that have shaped it. Lastly, direct observation further codified what had been stated in interviews, and viewed previously in the historic and contemporary documents.

Revisions of the guide were made with input from PLACE Institute participants. As a course requirement, I presented the guide to both Hinesburg and Huntington groups, outlining key steps in the development process, as well as highlighting and explaining specific components that were incorporated. Each participant was given a guide and asked to comment on its content and design. Most visitors to the Hinesburg Town Forest are residents of either Huntington or Hinesburg, thus these groups were particularly well suited to this task. In addition, I presented the guide to representatives from the conservation commission and trails committee, and incorporated their feedback when making revisions.

SECTION FOUR: PRODUCTS

Part I. Town Forests and Community Engagement: Identifying Model Town Forests

A table, found in Appendix B, outlines the results of this initial inquiry. The town forests are organized alphabetically and broken down by state, county, and town. Descriptions of the forests with varying detail are included when information was available. The name and contact information of the person who nominated the forest are also given, as are additional contacts specific to the town forest, if more detailed information is desired. The purpose of this table is to provide information on the status of actively managed town forests in New England to individuals or groups interested in acquiring a more comprehensive understanding of current town forest management and utilization.

Part II. Town Forest Inquiry

This section describes in detail six town forests in Vermont, New Hampshire, and Maine. Each case study contains information on the town forest itself, the community in which it is located, and the planning process that outlines how and by whom decisions in the forest are made. The town forest case studies follow a similar progression: in most cases, the format is *Setting, Recreation, Education and Outreach, Forest Planning, and Looking to the Future,* or a variation thereof. Each write-up addresses a wide breadth of topics such as activities and events taking place in the forest, educational use, decision-making processes, institutional arrangements, and funding sources, to name a few.

The town forests selected for in-depth study vary widely in terms of community use, management objectives, and planning processes. On a whole, their unique combination of characteristics makes them particularly well suited for analysis. By no

means, however, are they representative of most town forests in existence. On the other hand, I also want to emphasize that there are many other town forests that could serve as interesting examples and provide additional learning opportunities. These case studies are intended for individuals or groups interested in learning more about the utilization and management of particular town forests. They are also available online at www.uvm.edu/~rscfar/townforest. Please see Appendix E for a summary of the case studies.

Hurricane Town Forest, Hartford, VT
Planning for Stewardship: A consensus-building approach

The Setting

The Hurricane Town Forest is located on a ridge above the Connecticut River Valley covering an area of 423 acres in Hartford, the eighth largest town in Vermont with a population estimated at 11,000. The Hurricane Forest Wildlife Refuge Park (HFWRP), also owned by the town but managed by the Hartford Parks and Recreation Department, is adjacent to the town forest to the northeast. Residents live near the town forest boundary on the northern half of the property and to the west of Reservoir Road. Access is provided via Reservoir Road where a trailhead parking area is located and by trail through the HFWRP. Students at Hartford Memorial Middle School created a trail map.

Hartford Water Company acquired the land that comprises the town forest for reservoirs at the turn of the century, while the HFWRP was a gift to the town from the Brown family in 1972. Four reservoirs were built to supply the municipal drinking water for the town of Hartford. After the town drilled wells in the 1950s, the reservoirs were abandoned and the property neglected. The town allowed residents to cut firewood in the town forest at various times, but particularly during the energy crunch of the 1970s. Since that time, timber has been harvested commercially and numerous logging roads built. Many of the current recreational trails have been developed from these same logging roads. As recreational use of the forest increased greatly over the past several years, recreational conflicts began to occur and adjacent property owners became concerned about the impact resulting from expanded use. The concern over impacts to surrounding property owners and fear of potential conflicts between forest user groups prompted a recreation plan to be developed.

Recreation

Recreational use in the forest is year round and includes hiking, mountain biking, snowshoeing, bird watching, skiing, hunting and ice-skating on the reservoirs. The town allows snowmobile and All-Terrain Vehicle (ATV) use on certain trails. Use tends to be greater by people living close to the forest although the wide range of recreation opportunities permitted in the forest attracts both long-time and recent residents in Hartford.

Education and Outreach

Michael Quinn, a teacher at Hartford Memorial Middle School, has been instrumental in developing programs to integrate the school curriculum into the Hurricane Town Forest. In 1999 and 2000, he learned of the Community Mapping Program through the Vermont Institute of Natural Science (VINS). With periodic assistance from VINS staff, they designed a simple project that involved making a boundary and trail map for the Hurricane Town Forest. Although some administration hurdles proved challenging, the project was eventually completed by a team of seven eighth grade students (instead of the original sixty that was planned) on weekends and holidays.

Since that time, students at Hartford Memorial Middle School have completed several other projects in the Hurricane Town Forest. An eighth grade class developed an orienteering course through the Community Mapping Program with assistance from VINS that seventh graders used to practice their orienteering skills. Eighth grade classes have also participated in vernal pools studies. Students would visit the pools approximately six times over the course of the school year, collecting and identifying

organisms and recording physical data. Another portion of the eighth grade class adopted a 100-meter length of trail and studied it intensely, observing what grew alongside it, writing about what they found, and presenting it to their classmates.

Up to three classes of twenty students each typically visit the forest during the school day, which required overcoming some concerns of the administration through persistence as well as tactful and creative scheduling. Gaining positive recognition from the town through student contributions such as the trail map also provided justification for the project and created an expectation for future students to fill, which in turn encouraged school administrators to support the student's involvement in the town forest.

Other local groups are active in the forest as well. Students in the forestry class at the Hartford Area Career and Technology Center implement portions of the management plan under the tutelage of consulting forester, Paul Harwood. In particular, the students perform patch cuts to release the historic apple trees and create openings for wildlife, helping to promote an uneven-aged stand. Area Boy Scouts also camp in the forest once or twice a year. Additionally, the conservation commission leads an annual community outing such as a snowshoeing or bird watching trip.

Forest Planning

Beginning in the mid-1990s, the conservation commission recognized that the Hurricane Town Forest should be managed more actively and appropriately. In 1998, they conservation commission took over management responsibilities for the town forest. One of their first tasks was to update the 1984 Forest Management Plan. Town staff applied for and received a grant from the Vermont Department of Forests, Parks and Recreation. A consulting forester completed the update, which the selectboard adopted in

February 1999. While it outlined forest management objectives for the property, it did not address any recreation issues or rules. The selectboard decided that a recreation management plan should be written so concerns over increased use of the property could be addressed.

In order to avoid a potentially explosive result, the conservation commission decided to adopt a consensus building approach to the recreation plan's creation. The first step in this process was to form a steering committee composed of neighbors of the town forest and individuals representing a wide array of user groups. A "Friends of the Town Forest" email listserv and newspaper ads and articles kept those interested in the plan informed of the process. Six steering committee meetings, two public forums, and a public conservation committee meeting all took place prior to a vote on the draft by the selectboard.

An initial concern that the plan dealt with was how to address the use of ATVs and snowmobiles. While there was concern over potential impacts of ATVs and snowmobiles such as noise pollution, user conflicts, and erosion, the steering committee hesitated to ban their use outright. Instead, they reached a compromise by allowing ATVs and snowmobiles to travel through the town forest, but made parking a trailer near the town forest boundary illegal. The resulting plan allows current conscientious users in the town forest but prevents it from becoming a destination area for motorized vehicle use.

Funding

Grants from state have played a crucial role in funding much of the work in the Hurricane Town Forest. Two grants from the Department of Forests, Parks, and

Recreation funded improvements to the trailhead parking area, two new trails, trail signs and allowed the conservation commission to hire the consulting forester to mark trees for the Hartford Area Career and Technology Center students and assist them in the timber stand improvement projects.

In addition, there is a small line item every year in the town's general fund for the management of the two town-owned woodlands by the conservation commission. This money will also provide funds to hire a forester when it comes time to perform another harvest in the forest. Although any revenues from the forest have historically gone to town's general fund, in March 2005, the selectboard agreed to the conservation commission request to establish a reserve fund to ensure ample funding for the town forest's management in future years.

Knowledge and Leadership

The conservation commission has looked to various individuals for knowledge and leadership in the implementation of educational programs and the forest and recreational planning process. The Hartford town planner, Matt Osborn, as a paid staff member has been an immense resource and leader throughout the planning process. In addition, Tad Nunez, director of Hartford's Parks and Recreation Department, has also provided considerable assistance and expertise to the conservation commission. While volunteers including the conservation commission, itself, play a crucial leadership role in town forest management, their limited amount of available time often leads them to be more reactive than proactive in nature.

Looking to the Future

With the successful development of the recreation plan and its implementation well underway, the conservation commission in Hartford has scheduled a small, selective-cutting timber harvest in the Hurricane Town Forest next winter. In addition, the conservation commission is investigating potential opportunities to acquire additional lands to create a wildlife and recreation corridor by linking three core habitat areas within Hartford, one of which is the Hurricane Town Forest and the adjacent Hurricane Forest Wildlife Refuge Park.

For additional information, please contact:

Matt Osborn, AICP Planner
Town of Hartford
171 Bridge Street
White River Junction, VT 05001
(802) 295-3075
mosborn@hartford-vt.org

References

Bouton, Jonathon. (January 18, 2005). Personal Communication.

Harwood Forestry Services, Inc. November 1998. *Forest Resource Management Plan for the Hurricane Watershed, Town of Hartford, Vermont*.

Hurricane Town Forest Recreation Plan. (July 16, 2002).

Osborn, Matt. (January 27, 2005). Personal Communication.

Quinn, Michael. (February 2, 2005). Personal Communication.

Wooster, Chuck. (January 27, 2005). Personal Communication.

Hillsboro Town Forest, Starksboro, VT
Making Community Connections: An incremental approach to building community

The Setting

The town of Starksboro is located just northwest of the Green Mountain National Forest and straddles the foothills of the Green Mountains and the Champlain Valley. This largely rural town has a population estimated at 1900, and approximately 10% of the town's area is conserved land owned and managed by the state.

The town of Starksboro established the Hillsboro Town Forest on May 4, 1954 when the Rockwood and Hanon Farms with a combined area of 235 acres, were taken over for taxes and to avoid road maintenance during the winter months. The town has added additional acreage since then, resulting in its current area of 287.7 acres. In addition to the two old farm sites, a cemetery with approximately 30-40 headstones is located within the town forest boundaries. Prior to the 1950s, a portion of the forest also served as a landfill.

A steep class IV road recently improved with assistance from the state to reduce erosion provides access to the town forest. Only a sign marks the town forest and no trail maps exist for the property. The Vermont Fish and Wildlife Department owns and manages the Lewis Creek Wildlife Management Area, a larger tract of conserved land totaling 1796 acres and located adjacent to the town forest. The natural communities represented in the town forest are northern hardwood forest, mesic red oak-northern hardwood forest, spruce-fir tamarack swamp, red maple swamp and buffer zone, seeps and vernal pools, and a shallow emergent marsh. The property also cradles the headwaters of Lewis Creek.

Education and Outreach

The town forest serves as an educational resource for both students and teachers at the Robinson Elementary School, located nearby. According to Robert Turner, conservation commission past chair, having a teacher serving on the conservation commission has helped to link the school system to the town forest. With funds provided from state preservation grant, a geographer was hired to assist the school in completing a mapping program and a self-guided historic tour of the property. In addition, students completed a project plotting historic childbirth cycles in early Starksboro by garnering information from gravestones in the town forest cemetery. One hope for the future is to integrate further the Robinson School's science curriculum into the town forest by establishing continuous forest inventory plots using a methodology based on Vermont's Forest Examination System (FOREX).

The conservation commission also takes an active role in creating outreach opportunities for Starksboro community members. In addition to leading regular hikes in the town forest and throughout the town, they have also organized woodland management, forest landowner, and wildlife workshops.

Forest Planning

Steve Weber of Vermont Fish and Wildlife and David Brynn, current Addison County forester and founder of Vermont Family Forests (VFF), wrote the original plan for the forest in January of 1986 at the request of the selectboard and with little to no public involvement. At that time, a survey of the land indicated a young, low quality forest. Prior to the writing of the plan, the primary use of the Hillsboro Town Forest had been the development of roadside firewood lots. The county forester would mark the

trees, and with the assistance of the town tree warden, residents could come into the plots, cut the marked trees, and remove them from the property for firewood.

Green Certification

In 2000, the conservation commission formed a town forest sub-committee. This group began a process to update the forest's management plan following standards for Forest Stewardship Council (FSC) green-certification. They reviewed past management records, held public meetings, and organized tours of the town forest. Interested residents and the town forest sub-committee reviewed several drafts of the plan. Community members were asked to answer such questions as—how many acres and what areas of the town forest do you think should be protected? In February of 2002, with the guidance of VFF, the Hillsboro Town Forest became the first municipally owned forest in the east to have a green-certified management plan. The following objectives were determined through this process and are outlined in the plan:

- *Protection of biological reserves*
- *Recreational opportunities, including hiking, hunting, snowmobiling, cross-country skiing, horseback riding, snowshoeing, and mountain biking*
- *High-quality educational opportunities*
- *High-quality timber management while protecting fragile and/or unique natural communities and important wildlife habitat*
- *Enhancement and maintenance of diverse wildlife habitat*
- *Protection and enhancement of forest health, including water quality, site productivity, and native biological diversity*
- *Protection of scenic beauty*
- *Identification and protection of cultural resources*

Through VFF, whose mission is "to conserve the health of the forest community, and when appropriate, to promote the careful cultivation of local family forests for community benefits," forests owners have two options. The first option is for a forest to be green certified by the FSC, an independent third party certifier. The second option is

for landowners to sign a conservation agreement in which they agree to manage their forestlands in accordance with VFF's principles; however, the forest is not officially certified.

Monitoring

As described by VFF's guidelines, a forester monitors the Hillsboro Town Forest every 5 years. The conservation commission is currently investigating ways to engage others in this monitoring process. One program they are considering is a model developed and led by Richard Hart of the Forest Guild. In this program, Hart trains students in a youth conservation corps in monitoring techniques for 3-4 weeks during the summer and then serves as a mentor as they monitor parcels throughout the community for the remainder of the season.

Through the unique development of forest health and values indicators, monitoring also takes place at the town level. The conservation commission developed objective measurable indicators over several years with input from town residents and will reexamine them at five-year intervals. The goals of this project have been to educate town residents about values associated with the natural environment, to develop an appropriate set of indicators to gauge forest health, and to inform future revisions of the town plan.

Public forums have provided the backbone for the project. Individuals from the voter checklist were randomly selected and invited to attend these meetings to talk about potential indicators through facilitated small group discussions. During these small group sessions individuals were asked to address questions pertaining to (1) the value of Starksboro's forests and the threats and opportunities that exist, (2) the appropriateness of

proposed measures to monitor Starksboro's forests, and (3) the policy options available to address threats to the associated values. Indicators have included measuring the number of posted acres, the percent of stream corridors with forest cover, the amount of subdivisions created in Forestry and Conservation Zones, and the average tenure for forested parcels, to name a few.

Looking to the future

Planning for the future in Starksboro also involves directly connecting town residents with the natural environment. David Brynn emphasizes the importance of linking people with natural cycles through the creation of community traditions. Engaging community in local natural resource issues leads to a greater awareness of the positive and negative impacts we can have on our surroundings. For example, 3rd and 4th grade students at the Robinson Elementary School were responsible for selecting a single tree in the town forest that provided lumber for bookshelves in the local library. In addition, sap collected in the springtime from sugar maples on the property may soon provide maple syrup for the elementary school.

As a member of the conservation committee and a long-time resident of Starksboro, Robert Turner emphasizes the need to build connections across the community by creating new ties between residents that might not typically interact on a day-to-day basis. This can be accomplished in part through the development and implementation of a broad array of activities attracting town residents from a variety of backgrounds and with a multitude of interests. Turner sees demonstration as just one use of the town forest, but also as a way to engage a different set of people than would be attracted to other outreach activities like a group snowshoeing excursion. He also noted

that engaging community is an incremental process and that it is important to recognize that while interest may wax and wane, if a clear vision is outlined and kept in sight over the long-term, community engagement will gradually increase. Turner's primary concern pertaining to this incremental process is the challenge of finding new ways to cultivate and nurture community leaders to ensure that each new generation is becoming actively involved in the community.

For more information, please contact:

Robert Turner, Starksboro Conservation Commission
R J Turner Company
656 Vermont Route 17
Bristol, VT 05443
(802) 453-2171
rjtco@gmavt.net

David Brynn
Vermont Family Forests
PO Box 254
Bristol, VT 05443
info@familyforests.org

References

Brynn, David. (January 27, 2005). Personal Communication.

National Community Forestry Center, Northern Forest Region. www.ncfcnfr.net/starksboro.html, accessed April 2005.

Town of Starksboro, Hillsboro Town Forest Plan. (February 2002).

Turner, Robert. (January 27, 2005). Personal Communication.

United States Census. (2000). www.census.gov, accessed April 2005

Vermont Family Forests. www.familyforests.org, accessed April 2005.

Musquash Conservation Area, Londonderry, NH
Keeping it Green: Conservation for multiple-use in a rapidly developing region

The Setting

Londonderry, located in southern New Hampshire approximately 40 miles northwest of Boston, is one of the fastest developing areas in the state with a population estimated at nearly 25,000. In 1984, approximately 74% of the town's land area was undeveloped; this percentage has decreased to 38% as of 1996. The town of Londonderry established the Musquash Conservation Area in west-central Londonderry with the purchase 585 acres in 1979. Since that time, the town has acquired additional lands resulting in an acreage that now surpasses 1000. While not technically the "town forest" in Londonderry, the Musquash Conservation Area still serves similar purposes to that of many town forests: for recreation, conservation, and sustainable timber harvesting. Hickory Hill Road, Sara Beth Lane, and Alexander Road provide access to the property. A map and guide for the conservation area developed by the Londonderry Trailways organization is available at the Londonderry Town Hall, Leach Public Library, and online.

Forest Utilization

A large network of trails totaling between 6 to 8 miles in the Musquash Conservation Area is used heavily for recreation, although use tends to be more concentrated during the winter months. While few organized educational activities regularly occur in the conservation area, the conservation commission plans an annual field day during which community members learn about the forest. Deb Lievens, current chair of the Londonderry Conservation Commission, noted that the demonstration of sustainable timber harvesting techniques in the forest provides an excellent opportunity

for others to learn informally about forest management, of particular importance in such an urban and suburban setting.

Conservation Area Management and Planning

The seven-member conservation commission oversees all town-owned lands including the Musquash Conservation Area, and reviews and comments on any town issues if there is a related conservation concern. With guidance from such agencies as the Soil Conservation Service and the University of New Hampshire Cooperative Extension, and input from the community, the conservation commission formulated several management goals for the conservation area in 1983. These are as follows: (1) *improve habitat for as many species as possible and practical,* (2) *develop recreational opportunities*, (3) *manage forestland to meet the above goals, generate income if possible, and improve the forest's health and growing conditions*. The management plan written by the town forester integrates detailed forest mapping, inventorying, multiple-use planning, and silvicultural techniques. Because the Musquash Conservation Area is a certified tree farm, a forester must update the management plan every five years.

Hunting is allowed in the conservation area; however, the use of motorized vehicles is not. In an effort to prevent the use of All Terrain Vehicles (ATVs) and the damage they can potentially cause, the conservation commission spoke with the town council and the local police department about their concerns. Consequently, the police department, with assistance from grant money, purchased an ATV for use on patrols and hired several additional weekend staff members to patrol the area.

Funding

All forest revenues in addition to proceeds from the land use change tax (a tax levied in cases where land is transferred from current use to development) go to the conservation commission with the objective of being used towards acquiring new conservation lands in town. Grants have also funded numerous projects in the conservation area as described in the following section.

Stewardship

Londonderry Trailways (LT), a local non-profit recreational organization, has been very active in promoting and stewarding the Musquash Conservation Area. Formed in 1999, they have approximately 130 members and work extensively with town boards in Londonderry such as the conservation commission, town council, and planning board to assist in the planning and management of town-owned conserved lands. The mission of the organization is to encourage a greater sense of community through the development of a network of walking and biking trails throughout the town of Londonderry, and to promote safe walking and cycling through community education.

In 2002, the organization received a $9700 grant from the New Hampshire Department of Resources and Economic Development Trails Bureau to build bridges, increase signage, and print maps of the conservation area. LT has also worked with the conservation commission in leading numerous volunteer workdays in the Musquash Conservation Area to build boardwalks and bridges, maintain and reroute trails, paint signs, and pick up trash. On average, the group leads 3-4 trail workdays and logs 200 volunteer hours per year on town-owned conserved lands. They have also assisted the conservation commission in writing numerous other grants for conservation area projects.

LT has also been instrumental in assisting other volunteer groups such as the Boy Scouts in completing stewardship projects by writing and prioritizing "to do" lists of projects in the Musquash Conservation Area.

Looking to the Future

The master plan steering committee for Londonderry developed the following vision statement regarding the environment, open space, and recreation in Londonderry in 2003: "Londonderry will continue to create and protect a healthy environment for residents and wildlife, by actively pursuing the opportunities for active and passive recreation and ample agriculture, open space, parks, and recreational facilities." The current goal for land protection is to protect 25% of the town lands, of which approximately 9% are currently protected. This percentage includes areas like ball fields and parks, in addition to parcels such as the Musquash Conservation Area. With the support of Londonderry residents, the town plans to pursue the town's remaining open space aggressively by various means including "policies that support open space preservation and protection, and support of privately-sponsored efforts to preserve and protect open space." Adding additional acreage to the Musquash Conservation Area is of priority.

For additional information, please contact:

Deb Lievens
Londonderry Conservation Commission Chair
(603) 432-9927
dlievens@ix.netcom.com

References

Lievens, Deb. (April 1, 2005). Personal Communication.

Londonderry Master Plan. (1997). www.londonderry.org/page.asp?Page_Id=201. Accessed April 2005.

Londonderry Master Plan Steering Committee Minutes. (November 24, 2003). www.londonderry.org/images/mpmin121803.pdf, accessed April 2005.

Londonderry Newsletter. (April/May 2004). www.londonderry.org/images/News_Apr.pdf, accessed April 2005.

Londonderry Town Council Minutes. (December 9, 2002). www.londonderry.org/images/1209.pdf. Accessed April 2005.

Londonderry Trailways, www.londonderrytrails.org/. Accessed April 2005.

Tarr, Matt. (February 17, 2005). Personal Communication.

Town of Londonderry, www.londonderry.org. Accessed April 2005.

Lyme Town Forest, Lyme, NH
Working Towards a Sustainable Future

The Setting

The town of Lyme with a population estimated at 1700, is located in Grafton County in west central New Hampshire along the Vermont state line. A certified New Hampshire Tree Farm, the Lyme Town Forest totals 372 acres and is located in a fairly remote area (with the exception of the western border) near the northern town boundary. Access to the forest is provided off Orfordville Road, which borders the eastern edge of the forest, and off Mud Turtle Pond Road, a class VI road that passes through the center part of the forest. Guides for both town woodlands containing information on how to get there, where to park, and the forest's history and management, as well as a trail map, are available throughout Lyme and on the internet.

The Lyme Town Forest was established in the early 1990's from property acquired through tax default. As is the case with many forested areas in New England, the town forest was once under agricultural use. Several clues such as cellar holes, barn foundations, stone walls and barbed wire fencing are still in existence and point to this pastoral history. Since that time, the forest has re-grown through the process of succession and was cut again over half a century ago. At present, the acreage is composed of mixed hardwoods, a small wetland and field, two small white pine stands, and a mature stand of hemlocks.

Recreation

The primary activities taking place in the forest are hiking and snowshoeing or cross-country skiing, as well as limited equestrian use. In the western section of the forest, a skid trail receives light use by All Terrain Vehicles (ATVs) and in addition,

snowmobilers maintain a small section of trail in this region during the winter months. Hunting is allowed on both the Lyme Town Forest and the Trout Pond Forest. Recreational activities draw new and long-time residents alike.

Outreach and Stewardship

Once during each winter and summer season the conservation commission sponsors a walk that is typically attended by 10 to 15 people. While there is no use of the forest by the local schools, the Boy Scouts developed a semi-permanent campsite with tent platforms that they use several times a year. During the annual National Trails Day, the conservation commission also sponsors a trail maintenance day in the town forest for which turnout has been quite high, sometimes exceeding 20 people.

Forest Planning

The Lyme Town Forest is one of two town-owned properties, both of which the conservation commission manages. However, the other, the Trout Pond Forest, is not officially registered with the state of New Hampshire, therefore any management decisions affecting it must be addressed and voted on annually at town meeting. Although the conservation commission has authority over the Lyme Town Forest, the selectboard can intervene as necessary. The selectboard would call a public hearing in conjunction with a public comment period for any significant forest management decisions.

The conservation commission formulated management goals for the town forest and manages it to create income for the town through sustainable management of forest resources, as a recreational and educational resource, to conserve and promote wildlife habitat, and to protect water quality.

A local consulting forester wrote the forest management plan in 1995 and updated it in 1996. Specific management objectives include shifting the current even-aged stand to a more uneven aged stand representing a variety of habitats. In addition, the forest plan sets aside an area that will remain uncut in order to achieve old growth conditions. Although town forest literature states that only non-motorized recreation is allowed, use of ATVs and snowmobiles has been light and caused little damage, therefore the conservation commission has been lenient in the enforcement of this rule.

Looking to the Future

In addition to actively managing the Lyme Town Forest, the town of Lyme is taking steps towards protecting and preserving the town's rural character through proactive land use policies. The National Community Forestry Center, Northern Forest Region recognized the town of Lyme in 2001 for their land-use plan, which outlined a zoning ordinance, designed to restrict development on important forestlands.

For more information, please contact:

Lyme Conservation Commission Chair
c/o Lyme Town Office, P.O. Box 126
Lyme, NH 03768
(603) 795-4639

References

Goldburgh, Joan. (February 15, 2005). Personal Communication.

Larson, Lee. (February 18, 2005). Personal Communication.

Lyme Town Forest Guide. (2004). Lyme Conservation Commission.

United States Census. (2000). www.census.gov, accessed April 2005.

(2001). *Who's Planning for Forests?* National Community Forestry Center, Northern Forest Region, 18 pp.

Bangor City Forest, Bangor, ME
An Integral Piece: Restoring connectivity in Bangor

The Setting

At nearly 700 acres, the Bangor City Forest makes up just one of four town owned woodlands, but is by far the greatest in size. Bordered to the north by the Orono town line and to the west by the abandoned Veazie Railroad bed, it contains close to nine miles of recreational trails, five to six of which are handicap accessible. Access and parking are located off Tripp Road at the southern end of the city forest and Kittredge Road to the west, which the city recently expanded to allow for additional cars. Trail maps are available at parking area kiosks for all four town-owned forests and the Bangor City Forest trail map is available also available online. Approximately 30,000 people live in Bangor, and like many communities of its size, it has recently been experiencing significant increases in residential and commercial development resulting in a decrease in open space. As a result, the forest serves as a destination for recreational pursuits, and as a demonstration forest for sustainable timber harvesting.

Most of the Bangor City Forest was acquired because of unpaid taxes prior to 1964, but two parcels have been purchased since then, and two additional parcels are in the process of being obtained by the town. Like many town forests established on marginal lands, the soil is quite poor and conditions must have been difficult on a farm that existed on the property near the end of Kittredge Road at the turn of the century.

Although a capped landfill and a large shopping mall flank the city forest, the forest links to the Orono Bog Boardwalk, built in 2003. With an annual visitation of approximately 5000, the boardwalk attracts visitors from the region (79%), other areas in Maine (11%), and 44 states (9%). The boardwalk meanders through different peat and

bog communities over a distance of one mile along which interpretive stations occur. Groups can arrange guided walks through the bog by contacting the University of Maine.

Recreation

Rolland Perry, the city forester in Bangor for forty years, estimates that the forest receives between 200 and 300 visitors everyday, most of whom are not residents of Bangor. Visits typically last approximately an hour, cross-country skiing and dog walking being the most popular activities. Because of the rapid increase in forest use over the past five years, the city to longer permits hunting.

Four miles of access roads were built within the forest to assist in logging operations. All-terrain vehicles (ATVs) are not allowed, with the exception of the use of a snowmobile to groom trails for cross-country skiing during the winter months. While there have been few problems with illegal ATV use, their occurrence in the city forest is getting even rarer as more people visit the forest and informally monitor it. A rapid increase in visitation initially caused a few conflicts between recreational user groups; however, they were resolved when the city allowed mountain bikers to maintain a primitive trail system through the forest.

Demonstration and Stewardship

Informational signs and maps displayed throughout the forest explain forest management techniques and depict various management areas. In addition, workshops demonstrating various logging techniques have been held in the past. Several groups from local schools visit the forest on a regular basis and Cub Scouts have assisted in trail maintenance activities.

Forest Planning

Recreation, wildlife, and sustainable timber harvesting are the primary management objectives in the Bangor City Forest. The forest's management plan, written by the city forester and updated in 1997, outlines various silvicultural techniques demonstrated on the property. A 2-3 acre arboretum has been established, in addition to several monitoring plots that will be inventoried every five years. A portion of the forest is designated a "no-cut" area and selective cuttings will take place on 125 acres to promote wildlife habitat.

Funding

Any revenues from logging activities in the Bangor City Forest, as well as from the city's chipping operation, go into a forest trust account, which provides ample funding for city forest projects.

Looking Towards the Future

As Bangor faces the associated problems of suburban sprawl, the city is looking to acquire additional lands that will serve to connect the city forest, an adjacent marsh, and the nearby city-owned property of Essex Woods into a single recreational entity, which would provide a buffer zone between residential and commercial areas. However, they have faced several challenges in undertaking this endeavor. Although conservation groups have strongly resisted pressures to expand the Bangor Mall into the adjacent marsh, the recently formed Bangor Land Trust has been unable to offer competitive prices for any land on the market as land values have skyrocketed. Despite these challenges, the land trust has received a conservation commitment of 410 acres adjacent

to the city forest and west of the Veazie Railroad bed. In addition, the city will add 25 acres to the forest in the near future.

For additional information, please contact:

Rolland Perry
City of Bangor
Public Services Division
530 Maine Avenue
Bangor, ME 04401
(207) 992-4514

References

Bangor City Forest Report, http://cityforest.bangorinfo.com/city_forest_report.html, accessed April 2005.

Orono Bog Boardwalk, http://www.oronobogwalk.org/, accessed April 2005.

Perry, Rolland. (February 4, 2005). Personal Communication.

China School Forest, China, ME
A Hands-on Approach to Learning: Turning the inside classroom out

The Setting

The primary and middle schools in China, Maine are located between three main village areas on a property of seventy acres, twenty of which are taken up by recreational fields and the school buildings themselves, and the remaining fifty acres make up the China School Demonstration Forest. Two main trails provide access to the forest: one is a narrow hiking trail from the middle school and the other, a larger woods road from the primary school. Formerly an agricultural area through the early 1900s, the farmer heavily logged any remaining forest before selling the property. The forest has since grown up into a young stand of mixed hardwoods and softwoods that have been managed for sustainable timber harvesting since the mid-1980s. The forest was recognized as a Maine Tree Farm in 1985 and in 1997 received the Outstanding Maine Tree Farm Award.

Education and Outreach

On any typical school day, one is likely to run across a teacher with his or her students out in the China School Forest, a remarkable feat in an era typified by large class sizes, overworked teachers, and frequent testing. The former town forester, Paul Memmer who has since retired, is credited as the visionary for the demonstration forest. The China School Forest gives China's students an opportunity to learn about forests as dynamic ecosystems. Students seek to understand how to make sustainable and wise management decisions regarding a forests' use as a resource for recreation, education, and wood.

Fourteen learning stations were built using guidelines from Project Learning Tree (PLT), an organization developed in the mid-seventies in an effort "to increase students'

understanding of our environment; stimulate students' critical and creative thinking; develop students' ability to make informed decisions on environmental issues; and instill in students the commitment to take responsible action on behalf of the environment." PLT has developed a set of environmental, age-specific curriculum correlated to national and often even state standards designed to increase the students' awareness and understanding of their environment. In addition, they offer educator workshops to assist teachers in incorporating PLT activities into their lesson plans.

China's small class sizes of fifteen to twenty lend themselves to outdoor activities. Classes use the forest year-round, with the exception of deer rifle season. Although hunting is not allowed in the forest, this extra precaution is taken to ensure the students' safety. In addition, during other hunting seasons, each class has the option to wear bright orange vests as an extra safety measure. During the winter months, teachers, with help from town residents and the Parent Teacher's Association, have integrated cross-country skiing on the forest trails into the physical education program at China.

While learning stations provide a broad array of lesson activity suggestions, teachers are encouraged to incorporate their own curriculum into forest-based activities for all subjects including physical education, math, social studies, and language arts during all seasons. A large handicap-accessible tree house provides the backdrop for reading, drawing, and creative writing activities. A primary school physical education teacher takes her students out at the beginning of the period for a short warm-up jog on the trails. New England history is taught at the wood measurement station where a neatly stacked cord of wood provides a visual aid for discussing how timber was cut, measured, and used over the past 200 years.

For each grade, a couple of stations or areas are targeted, which provides teachers with a specific focus. For example, the fourth grade has a geology focus and the fifth grade concentrates on learning about wetlands so they may spend a significant portion of their time studying macro-invertebrates in a pond on the property.

A natural extension of the fifth grade wetland unit was to expand their pond study area that drains into China Lake to the watershed level. To do this teachers developed Lake Day with assistance from the China Region Lake Alliance, during which the fifth grade students go out in pontoon boats (owned and driven by community volunteers) on China Lake and test water quality, among other activities, to gain a larger watershed perspective.

Other members of the community utilize the forest too. Community hikes have been organized in the past in conjunction with the town organized event, China Community Days, and the forest's trails provide avenues for recreation including skiing, snowshoeing, and bird-watching, just to name a few. A second grade teacher has offered a day camp for several summers and the Boy Scouts host a Klondike Derby during the winter where troops from around the state gather in the school forest for a variety of activities including sled building, orienteering, and first aid. Every other year the school forest committee plans and hosts a school-wide School Forest Day where community volunteers including members of the Maine Department of Environmental Protection and Forest Service, as well as employees of area conservation organizations lead educational activities in the forest for all the students. In addition, students from a local private high school get involved in the forest through community service activities such as painting picnic tables or doing general maintenance on some of the structures. A town resident

has also set up a geo-cache in the school forest, which has attracted visitors that may not have otherwise been to the forest.

Forest Planning

Anita Smith, a teacher at China Middle School and co-chair of the China School Forest Committee, became involved in this project through a PLT facilitators workshop she attended at the suggestion of another teacher and the town forester back in 1991. Four years later, interested staff and community members formed the school forest committee. They went to the town selectboard and the school board with their vision for the demonstration forest and asked for permission to go ahead with the project. "We really wanted to make sure everybody knew what our intentions were and tried to build a place where people could have a lot of input" (Personal Communication, Anita Smith).

The committee is composed of two teachers along with other interested community members and is responsible for overseeing the day-to-day operations in the forest, as well as long-range forest planning. While they met every other week during the initial stages of the project, they currently meet a couple times each season, and on an as needed basis. The selectboard, which has the final authority over the forest, makes major management decisions with input from the school forest committee. Due to the presence of the school forest committee, the current town forester does not play a large role in the forest's management.

When the school forest committee was first formed, they attempted to get one teacher from each grade level to serve on it, which they felt would contribute to getting school wide input and support for the project. Because time is often a huge barrier to any project's success, the next step was to identify sections of the current curriculum taught

in the classroom that teachers could take outside into the forest. Project participants identified time as one of the major barriers they had to overcome for success. When everybody involved is incredibly busy, trying to sustain interest in the project, to recognize that it is ongoing, has also been challenging.

Funding

The first projects in the demonstration forest were limited to laying out the trails and doing a small timber harvest. The minimal amount of money received from this harvest was put into a school forest account and used as seed money for road development and trail improvement. A logging operation after the 1998 ice storm also added funds to the school forest account (although there is not a written law to ensure that revenues from the forest stay with the forest committee). Donations are greatly appreciated.

In addition, the parent teacher association, as well as individuals and businesses in the community, volunteered both time and money. Community members helped to design, build, and fund many of the structures for the learning stations. A teacher and former carpenter developed an alternative education program with a group of middle school students who used a service-learning model to build two of the structures: they spent mornings constructing the actual structures, and during the afternoon hours, students used their math and reading skills to determine the supplies they would need for the following day.

Looking to the Future

Plans for the forest's future include setting up Forest Inventory Growth (FIG) plots with the assistance of a local forester. Students would collect data on the plots and

enter it onto a website hosted by the Maine Forest Service. The forest committee's ultimate goal is to develop a natural resource learning center in the demonstration forest.

Staying motivated can be a challenge, but Anita Smith finds her motivation in witnessing the excitement students begin to show for nature and for the environment, and through the realization that many of the students in her first fifth-grade classes are now reaching voting age and applying some of what they learned as decision makers for the community.

For additional information, please contact:

Anita Smith
China Middle School
RR1, Box 1162
South China, ME 04358
(207) 445-2065
asmith@china.k12.me.us

References

China School Forest, www.china-ms.u52.k12.me.us/~schoolforest/, accessed April 2005.

Maine Tree Foundation, http://www.mainetreefoundation.org/programs/fig.htm, accessed April 2005.

Project Learning Tree, www.plt.org/, accessed April 2005.

(2003). *School Based Forest Education in the Northern Forest*. National Community Forestry Center, Northern Forest Region. 34 pp.

Smith, Anita. (February 23, 2005). Personal Communication.

Part III. Creating an Interpretive Guide: Hinesburg Town Forest

The interpretive guide is entitled *Stories in Stone* and has the following theme: *Observing geology and landscape clues can teach us about the history of the Hinesburg Town Forest.* The guide integrates the geologic and cultural history of the town forest and is intended for ages ten and older. It directs visitors to look at the pieces, patterns, and processes that formed the Hinesburg Town Forest through clues in the landscape: characteristics of the soil, patterns of tree species, and cultural artifacts like stone walls and foundations. In addition, the current uses of the forest are given, as well as general guidelines on how to be a good steward of the forest. The trail map included in the guide was produced from GIS layers compiled by a local mountain biking club, the Fellowship of the Wheel. The interpretive guide is located in Appendix E of this document, and is available on the internet through the town of Hinesburg's website, www.hinesburg.org as well as the project website, www.uvm.edu/~rscfar/townforest. In the future, guides may be available at the town forest parking areas and the Hinesburg town offices.

Creating the interpretive guide allowed me to experience first-hand one method of increasing community engagement in a town forest. As noted previously, the Hinesburg Town Forest was especially suited for this study as it is representative of many town forests in New England with a moderate and increasing amount of community interest and activity in the forest, but little opportunity for groups to communicate or coordinate efforts. I found that engaging representatives from groups such as the selectboard, trails committee, conservation commission, and the Fellowship of the Wheel, allowed me to communicate some of the interest and activities in the forest to these different groups. Although coordination was still lacking and communication often untimely, without my

effort to consult these varying groups in the process of developing the guide, communication may have been nearly absent altogether. This will be addressed further in the Section Five.

References

Anderson, Ginger, editor. (1994). Stonewalls and Cellarholes: A Guide for Landowners on Historic Features and Landscapes in Vermont's Forests. Vermont Agency of Natural Resources: 52.

Ham, Sam. (1992). Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets. North American Press: Golden, CO.

Poleman, Walter. (May 6, 2005). Personal Communication.

Trapp, Suzanne, Gross, Michael, and Ron Zimmerman. (1991). Signs, Trails, and Wayside Exhibits: Connecting People and Places. UW-SP Foundation Press, Inc.: Stevens Point, WI.

Wessels, Tom. (1997). Reading the Forested Landscape: A Natural History of New England. Countryman Press: Woodstock, VT.

SECTION FIVE: DISCUSSION

1) ***What biophysical conditions, institutional arrangements, sources of knowledge, outreach events, stewardship and monitoring activities, and leadership qualities do the model town forests have in common and which ones are unique?***

Biophysical Characteristics

The populations of the selected towns varied widely. Bangor, Hartford, and Londonderry all have relatively large populations and are characterized by high development pressures. In contrast, China, Starksboro and Lyme have relatively small populations, although they are increasingly serving as bedroom communities to some of the larger cities located within commuting distance.

The town forests range in size from 70 to over 1000 acres. With the exception of China, Maine[6], all the towns have been investigating ways to acquire additional lands in an effort to protect open space within the communities. The locations of the town forests relative to population centers vary, as does the degree of accessibility to the forest. The latter is characterized by the amount of parking provided, signage, and trail maps in place. None of the towns had road signs indicating how to reach the town forest; they all relied upon residents having prior knowledge or maps to find their way there.

As former farmlands, all of the town forests lands were logged moderately to heavily prior to their establishment. Even though they were in agriculture, the location of most of the town forests on uplands ensured that the farms would have been marginal at best. Most still include cultural artifacts such as stone walls in the vicinity of the forest. A result of the forest's agricultural heritage is their relatively low ecological quality. Many of the farmers, prior to selling the land, cut all valuable timber from the forest.

[6] Because the town plays a minor role in the management of the China School Forest, I did not interview any town officials during my research. Thus, the town of China may also be actively investigating the purchase of additional town lands, of which I am not aware.

Years of farming on thin, upland soils, and no or poor management post reforestation has resulted in a combination of second growth hardwoods and softwoods that are predominantly of an even-age class and very poor quality first growth. They are, however, being managed to promote uneven-aged growth, which improves forest structure diversity and expands the available niche space, making the forest more suitable as wildlife habitat, in addition to improving individual tree health and quality. Many of the forests have streams and vernal pools; however, few have additional water features.

Activities and Events

Many of the subjects interviewed identified a *new guard-old guard* dichotomy of forest use, or *newcomer-old-timer* dichotomy, as one town official referred to it. The *old guard* refers to long-time town residents whereas the *new guard* describes relative newcomers to the area. This dichotomy is seen in the most popular uses of the town forests: recreation and hunting (when permitted). As a generalization, new residents rely on non-motorized forms of recreation that includes hiking, mountain biking, dog walking, cross-country skiing, snowshoeing, and wildlife watching. Community members that have been residing in the area longer generally participate in hunting activities in season in the town forest and motorized recreation such as ATV and snowmobile use as dictated by town forest rules and regulations. Both the Lyme and Hurricane Town Forests allow limited motorized use. Recreational use appears to be more concentrated in the winter months than during the summer.

Many of the conservation commissions lead regular hikes through the town forestlands, which tend to focus on natural history; however, participation in these hikes is generally low to moderate. Other organizations such as local recreation groups and

Boy Scouts sponsor additional activities such as regular volunteer workdays and camping trips.

Institutional Arrangements

The town conservation commission manages the forest with guidance from local consulting foresters in four out of six of the model town forests. The exceptions to this are in China where the China School Forest Committee is responsible for forest management and in Bangor where the Bangor City Forester manages the forest. However, ultimate decision-making authority rests with the selectboard as a conservation commission or forest committee is only an advisory group. In Bangor, the city forester has authority over the city forest.

In most cases, there are avenues for public input into management decisions. Of particular note is the public input process developed for the creation of the Hurricane Town Forest Recreation Management Plan. Individuals from a broad array of stakeholder groups formed a steering committee that met regularly during the planning process. In addition, the town planner created an email listserv and added any resident showing interest in the town forest. It served as a simple method of keeping interested individuals up-to-date of the forest planning process. The town also organized several forums that provided avenues for public comment and advertised these through local newspaper articles and announcements. Those involved in this planning process thought that it was quite successful and virtually eliminated potential conflicts between user groups.

Local consulting foresters wrote most model town forest management plans and updated them at regular intervals between five and ten years, as was dictated by tree farm

certification status for China, Lyme, and Londonderry, or green-certification in the case of the Hillsboro Town Forest in Starksboro, Vermont. Each of the model forests can be considered examples of working forests, and are managed for sustainable timber harvesting, wildlife habitat, recreation, and maintenance of water quality. In addition, educational use varying from demonstration to regular school group visits is a strong management component for five out of six model town forests.

Most of the towns in the study group took advantage of opportunities for partnerships with local schools and universities; state agencies; not-for-profits such as the Vermont Institute of Natural Science and Vermont Family Forests, and recreationally based groups such as the Londonderry Trailways. These groups provided a variety of assistance ranging from advising on technical matters relating to forest management, to providing a volunteer work force for trail maintenance and support for educational programs implemented in the forests.

In all model town forests, with the exception of the Lyme Town Forest, there was a spoken or written agreement that revenues resulting from logging operations in the forests would go either directly towards the forest's management or to the conservation commission's general fund. In addition, the Musquash Conservation Area in Londonderry benefited from New Hampshire land use change tax, a tax levied in cases where land is transferred from current use to development. The Bangor City Forest also benefited from additional funds from the city's chipping operation.

Of particular note were differences in town forest policy across the states. The most notable variation between states was in New Hampshire where any decisions affecting town forests that are not officially registered with the state required a town-wide

vote at Town Meeting Day. Consequently, this policy would likely serve to encourage towns to register their town-owned forestlands with the state to avoid this rigid decision-making process.

Individual Leadership

By the nature of my subject selection for interviews, all of those interviewed could be characterized as "key promoters" of their town forest. While most are members of the town conservation commission, others were teachers, public foresters (city and county), and town planners. Most of the current conservation commission chairs were relatively new to the position, which may be a reflection of the turnover rate and length of term during which the chair serves. With the exception of the latter, key promoters were involved in town forest planning and management for between fifteen and forty years in various capacities. Many of the leaders noted that lack of time was a major constraint to their efforts.

Knowledge

The extent and frequency of school use varied and was a reflection of the forests' management objectives and was largely dependent upon teacher initiative. As mentioned previously, educational programs were often conducted with the assistance of outside organizations such as the Vermont Institute for Natural Science and Project Learning Tree. All town forests had informational brochures and trail maps available either in paper or online, except the Hillsboro Town Forest in Starksboro, Vermont; few, however, had interpretation guides or trails characterized by a distinct theme.

Stewardship and Monitoring

Outside organizations officially recognize four of six of the town forests for their excellent management practices and stewardship through either green certification or tree farm certification. Stewardship activities in all the town forests centered on trail maintenance, which volunteers often carried out annually, or semi-annually. In several of the town forests Eagle Scouts had carried out stewardship projects such as building bridges and trails.

All model town forests relied on informal monitoring; as use increased, monitoring of activities in town forests increased. This appeared to be especially helpful in preventing illegal use of ATVs. As a component of education programs, middle school students studied the ecology of particular areas in two of the forests, although this research was not incorporated into any formal monitoring plan. Formal monitoring of the forest occurs with regular updates to the forests' management plans.

2) *How might these characteristics assist in promoting community engagement, building social capital, fostering sense of place, and increasing forestland stewardship?*

Building Social Capital

Because of their broad array of potential uses as demonstrated in the case studies, town forests attract visitors from a variety of backgrounds. For example, Robert Turner, conservation commissioner of Starksboro noted that managing forests for a wide variety of uses attracts a diversity of community members. As individuals from different backgrounds interact, diverse networks form. The more times these individuals come together in different settings, either at town meeting, school functions, or any other number of community events, the strength of the network increases.

The conservation commission chair in Hartford highlighted an excellent example of this potential for diverse groups to interact. In Hartford, many of the long-time residents are attracted to the Hurricane Town Forest to hunt, whereas new residents of the town are more likely to use the town forest for recreation. As outlined by Briggs (2004), positive interactions between diverse groups can help build social capital. In the same vein, if the town ensures that interactions between various stakeholders are positive, it can contribute to community social capital.

Diverse networks linking town forest groups to other organizations and larger-scale institutions contributes to social infrastructure. This is exemplified by the strong link between the Musquash Conservation Area and the Londonderry Trailways that has successfully engaged residents in forest planning and stewardship. In addition, the model town forests act as venues through which groups such as the Londonderry Trailways, Hurricane Town Forest steering committee, Starksboro conservation commission, or China School Forest committee can take collective action. When these actions have positive results, they build social capital.

Promoting Community Engagement

The Hurricane Town Forest also demonstrates one method of engaging the public in management planning and decisions. With the assistance of a facilitator, a steering committee comprised of individuals representing various stakeholder groups within the community helped to shape the recreation planning and contributed to its positive outcome, building community capacity and social capital in the process. In addition, numerous opportunities for public comment on the recreation plan were held and advertised in a local newspaper.

Green-certification of the Hillsboro Town Forest in Starksboro, Vermont by the Forest Stewardship Council outlines a process for public participation, which ensures community input in the Forest's management. While not specific to the town forest, the Starksboro Conservation Commission engages the community in town-wide forest planning by specifically inviting residents from the town's voter checklist at random to participate in public forums on forest health and values in the town.

Fostering Sense of Place

Town forests also have the potential to connect residents with their town's history and expand their experience of place. Formal place-based education at China and Hartford middle schools, Hartford Area Career and Technology Center, and at Starksboro elementary may increase students' sense of place. In Starksboro, elementary school children learned about their town's cycle of generations, calculating birth and death rates by observing cemetery stones in the Hillsboro Town Forest. Students at China Middle School learn about past land-use by observing stone walls in the forest, which serve as talking points for teachers as they explain the forest's past uses. In addition, community place-based education such as the field trips led by conservation commissions in Hartford, Starksboro, and Lyme may also serve to increase sense of place for participants.

Holding activities and events in the forest, developing and making forest guides readily available, and improving access to the forest itself may encourage visitation and enhance a visitor's experience. Three of the six model forests have a forest guide and or trail map in print and four have information available online. Only one town forest lacks forest information either in print or online.

Increasing Forestland Stewardship

Each of the town forests included in this study serves as a demonstration forest for sustainable timber harvesting, woodlands management, and stewardship. Management plans updated at designated intervals identifies these objectives and helps to ensure they will be met into the future. Visitors to the town forests experience this informally as they recreate, or formally, through outreach programs developed by conservation commissions, local teachers, not-for-profit organizations and other community leaders. For example, the Bangor City Forester leads regular workshops that demonstrate various sustainable logging techniques. In addition, he has put up many informational displays in the forest identifying the different management areas and describing the management techniques in each.

The non-profit group, Londonderry Trailways, has been instrumental in promoting stewardship in the Musquash Conservation Area in Londonderry, New Hampshire by planning, acquiring funds for, and implementing stewardship projects with volunteer help from the organization's members. Additionally, they also provide assistance other groups interested in completing stewardship projects such as the Boy Scouts.

Virtuous Cycles

While community engagement, social capital, sense of place, and stewardship are discussed above as separate entities, along with the conditions of and activities in the model town forests that contributed positively to them, they should not be thought of separately. As illustrated by my project concept map in Section 2 and Appendix A, they form virtuous cycles. As social capital is built, community engagement increases and

sense of community is strengthened, which in turn, builds social capital, and so forth. Sense of place is fostered through in-depth experience and increased knowledge of the place, which in turn, strengthens sense of place and the desire to experience it and acquire additional knowledge. Both of these cycles ultimately contribute to stewardship within the community. The model town forests may serve not only as the setting in which these cycles can occur but also as catalysts for them.

Interpretive Guide: Focus on Process

The Hinesburg Town Forest was an excellent town forest to develop such a project as it is representative of the status of many town forests in New England. While the town of Hinesburg has taken several steps to increase community engagement in the forest, this process has been largely unfocused. The lack of a current management plan outlining management objectives and rules regarding the forests' use may contribute to the apparent lack of coordination between interested groups.

For example, a local mountain biking group with a strong membership base has taken an interest in developing and stewarding the town forest. With grant money from the state, they are hoping to improve the parking areas by putting up kiosks, collecting GPS data for the trails, printing maps, improving current trails, and building new ones. In the meantime, I was working with a member of the selectboard, the town planner, the Chittenden County forester, and the town forest committee chair to develop interpretive materials and a trail map. A local teacher had also planned to do some trail mapping in the town forest with middle school students in conjunction with the Community Mapping Program developed by VINS.

For some time, none of these groups were aware that the others existed. There was no institutional process to ensure communication between groups implementing projects affecting the forest. As a result, coordination between these disparate groups was absent until much later. Finally, once all parties had made contact with various town officials, I was able to coordinate my efforts with those of the mountain biking group, providing a historical context for the forest to include in their grant, and they provided the data to create a trail map suitable for the interpretation guide. The institutional process within each group, however, provided the means to take advantage of individual initiative and group resources such as a strong volunteer base and grant writing experience in the case of the mountain biking group.

The PLACE Institute also provided a format for developing the guide, allowing me to experience the town to a greater depth through field trips to different areas and through the community volunteers' shared perspectives of the town. What surprised me most in my discoveries through the PLACE experience was the divided nature of the community in terms of its physical landscape and its community culture. I was aware that Hinesburg had both uplands and lowlands, but I did not envision such distinct halves comprised of the Champlain Valley and the foothills of the Green Mountains. The divisiveness of the community over planning issues also struck me and provided a more realistic understanding of the community. The program served as a melting pot for ideas, and afforded me the opportunity to share my thoughts on the guide directly with community members. The service-learning model also provided the chance to contribute my skills and expertise in interpretation and natural history to the community volunteers.

Finally, workshops I attended throughout the semester gave me additional research tools and information that could be applied directly to this project.

Study Limitations

Unfortunately, time was a limiting factor in determining the number of case studies that could be developed. While this research provides some insights into the characteristics of town forests and their planning and management that may contribute to increasing community engagement and fostering sense of place, the small sample size may restrict its applicability. By choosing town forests that represented a wide array of planning processes and management objectives, I hoped to capture at least some of the breadth of town forest utilization in New England. However, the nature of a qualitative study and the selection of a purposive sample is not meant to provide a comprehensive representation of the town forests in existence. In the future, completing a quantitative study such as a survey of all town forests may better illuminate the status of town forests on a whole. The same limits apply to my documentation of the process of developing an interpretive guide for the Hinesburg Town Forest. While it has highlighted some of the challenges and rewards in creating the interpretive guide in a real world context, it is only one of many ways to engage community in a single town.

CONCLUSIONS

The case studies depicted demonstrate the potential rewards of town forest ownership and management, from fostering sense of place and community, to building social capital and increasing community engagement. Town forests are examples of community-based forestry when they are managed to promote ecosystem health and community well-being through inclusive, participatory processes. As illustrated previously, specific characteristics of town forests such as biophysical and cultural features, activities and events, institutional arrangements, knowledge, leadership, and stewardship can lead to positive contributions to community by building and strengthening diverse networks, engaging residents, and increasing visitors' experience, knowledge, and sense of place. Among the six model town forests, several characteristics were of note:

- *Dedicated and innovative leadership*
- *Updated forest management plan with community participation*
- *Multiple-use management for recreation, education, wildlife, watershed conservation, and timber*
- *Partnerships with various organizations/institutions*
- *Regular school use*
- *Community outreach*
- *Active stewardship*

For towns that do not currently own forestlands, I recommend that community leaders seek public support for woodland acquisition. As illustrated by the case studies, forest size does not matter; any publicly owned acreage has the potential to contribute positively to community. For those towns that own forests, community leaders should work towards actively engaging the community. Community engagement can take

diverse forms. Field trips, workshops, and volunteer workdays in the forest can increase community knowledge and experience of the forest. Educational opportunities for local school use of forests abound and with dedicated leadership can become a regular component of curriculum. A current management plan can outline a vision for the forest and guide future management decisions. It can also provide an institutional structure for town forest planning, which can increase coordination and communication between various town forest user-groups. Updating a management plan at regular intervals with a professional forester's assistance should be viewed as an opportunity to engage community and generate excitement about the town forest.

Lastly, I would like to acknowledge the dedication and efforts of those working to engage community in their town forest and thank the conservation commissioners, teachers, town planners, and foresters who have provided a wealth of knowledge and experience for my research. The key role these leaders played in promoting their town forest was evident in my conversations with them. I also want to emphasize that the forests depicted in the case studies are just a small, albeit diverse, sample of what is going on in the field, and that they are by no means the only examples of model town forests. In addition, while this project was limited to town-owned forested lands, other lands that may be privately, state, or federally owned, may serve to engage community and foster sense of place in similar ways.

REFERENCES

Ack, Bradley, Daly, Carol, Everett, Yvonne, Mendoza, Juan, Mitsos, Mary, and Ron Ochs. (2001). The Practice of Stewardship: Caring for and Healing Ecosystems and Communities. Journal of Sustainable Forestry. 12(3/4), 117-141.

Baker, M. and J. Kusel. (2003). Community Forestry in the United States. Island Press: Washington.

Baumann, S.E. and J.P. Barrett. (1987). The Need and Activities in Town Forests: A Survey of New Hampshire Town Forest Commissions. New Hampshire Agricultural Experiment Station Research Report 116. 11pp.

Berry, Wendell. (1993). Sex, Economy, Freedom and Community. Pantheon Books: New York.

(1977). The Unsettling of America. Sierra Club Books: San Francisco.

Briggs, Xavier de Souza. (2004). Social Capital: Easy Beauty or Meaningful Resource. Journal of the American Planning Association. 70(2), 151-157.

Choices and Challenges in Town Forest Management. (2003). A Report from a Community Workshop Sponsored by the National Community Forestry Center – Northern Forest Region and the Quebec-Labrador Foundation/Atlantic Center for the Environment. 17pp.

Curry, Janel M. and Steven McGuire. (2002). Community on Land. Rowman and Littlefield Publishers, Inc.: New York.

Datel, Robin E. and Dennis J. Dingemans. (1984). Environmental Perception, Historic Preservation and Sense of Place. In T.F. Saarinen, D. Seaomon, and J.L. Sell, editors. Environmental Perception and Behavior: An Inventory and Prospect. Pp.

131-144. University of Chicago: Chicago.

Dott, Jim. (1996). Seeking Community. Trumpeter, 13(2), 81.

Donahue, Brian. (1999). Reclaiming the Commons. Yale University Press: New Haven.

Eyles, John. (1985). Senses of Place. Silverbrook Press: Warrington, Cheshire, England.

Farley, J. and H. Daly. (2003). Ecological Economics: Principles and Applications. Island Press: Washington, D.C.

Flora, Cornelia Butler and Jan L. Flora. (1996). Creating Social Capital. In Vitek, William and Wes Jackson, editors. Rooted in the Land. Pp. 217-225. Yale University Press: New Haven.

Foster, Charles H. W and David R. Foster. (1999). Thinking in Forest Time: A Strategy for the Massachusetts Forest. Harvard Forest Paper 24. Harvard University: Petersham.

(1998). Stepping Back to Look Forward. Harvard University: Petersham.

Gray, Gerald J., Enzer, Maia J., and Johathan Kusel. Understanding Community-Based Forest Ecosystem Management. An Editorial Synthesis of the American Forests Workshop. Bend, OR, June 1998.

Gress, Jennifer. (2004). Sowing the Seeds of Social Capital. The Journal of the American Planning Association, 70(2), 176-183.

Hay, Robert. (1988). Toward a Theory of Sense of Place. Trumpeter, 5:4, Fall, 159-164.

Jastrzembski, J.P., and J.P. Barrett. (1989). Estimating the Design Capacity of Community Town Forests. New Hampshire Agricultural Experiment Station Research Report 121. 17pp.

Kemmis, Daniel. (1990). Community and the Politics of Place. University of Oklahoma Press: Norman.

Knapp, C. (2003). Making Community Connections. ESRI Press: Redlands, CA.

Kusel, Jonathan and Alder, Elisa, Editors. (2003). Forest Communities, Community Forests. Rowan and Littlefield Publishers: New York.

Leopold, Aldo. (1966). A Sand County Almanac. Oxford University Press: New York.

McBane, C.D., and J.P. Barrett. (1986). Town Forests and Community Life: A Management Guide. New Hampshire Agricultural Experiment Station Research Report 109. 20pp.

McCullough, R. (1995). The Landscape of Community. University Press of New England: Hanover.

McDonough, M., Vachta, K.E., Funkhouser, S.L., and A.L. Gieche. (1986). Creating Community Forestry Partnerships. Department of Forestry. Michigan State University.

Mezibov, Dan and Luke Popovich. (1978). The Society of the American Foresters. Associates NAL Today, 3(3-4), 77-80.

Ostrum, Elinor. (1990). Governing the Commons. Cambridge University Press: Cambridge.

Pretty, Jules and Hugh Ward. (2001). Social Capital and the Environment. World Development, 29(2), 209-221.

Patton, Michael Q. (2002). Qualitative Research and Evaluation Methods. Third Edition. Sage Publications: Thousand Oaks, CA.

Putnam, Robert. (1995). Bowling Alone: America's Declining Social Capital. Journal of

Democracy, 6(1), 65-78.

Raffan, J. (1993). The Experience of Place: Exploring Land as Teacher. The Journal of Experiential Education. 16(1), 39-45.

Rains, Michael T. (1995). Urban Forestry Five-year Plan, U.S. Forest Service, Northeastern Area.

Rohe, William M. (2004). Building Social Capital through Community Development. The Journal of the American Planning Association, 70(2), 158-164.

Seamon, David and Robert Mugerauer, editors. (1985). Dwelling, Place and Environment. Martinus Nijhoff Publishers: Boston.

Selznick, Phillip. Flora. (1996). In Search of Community. In Vitek, William and Wes Jackson, editors. Rooted in the Land. Pp. 195-203. Yale University Press: New Haven.

Sinclair, Steven. (1993). Vermont Urban and Community Forest Program, Department of Forests, Parks, and Recreation. 33pp.

Stedman, Richard C. (1999). Sense of Place as an Indicator of Community Sustainability. The Forestry Chronicle, 75(5), 765-770.

APPENDIX A: CONCEPT MAP

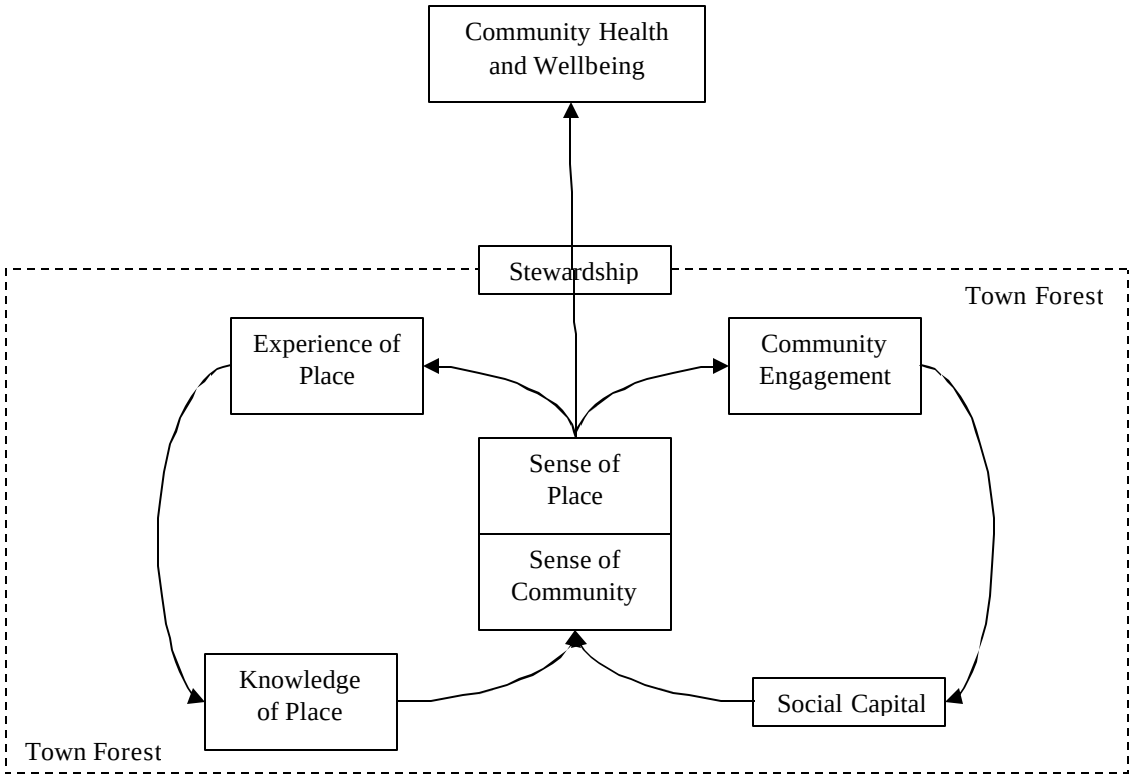


Figure 2 Project Concept Map. This diagram depicts key project components and how they are interrelated.

APPENDIX B: SUGGESTED TOWN FOREST MODELS

State	County	Town(s)	Forest Name	Description	Referred By	Additional Contacts/Resources
CT	Hartford Tolland Fairfield	Avon Tolland Greenwich	--	--	Chris Donnelly Urban Forester, CT Department of Environmental Protection (DEP), Division of Forestry (860) 424-3178 chris.donnelly@po.state.ct.us	Contact tree wardens for more information Robert Ricard – University of Connecticut Extension (see next row) Adam Moore – CT Forest and Parks Association (860) 346-2372 info@ctwoodlands.org Fred Borman – CT DEP, Division of Forestry (860) 424-3634 fred.borman@po.state.ct.us
MA	Middlesex	Weston, MA	--	While Connecticut has a long history of town forests, their management tends to be limited.	Robert Ricard Urban & Community Forestry University of Connecticut (860) 570-9257 robert.ricard@uconn.edu	*Reclaiming the Commons* by Brian Donahue
MA	Worcester Middlesex	Fitchburg Bedford	-- --	"just finished a management plan with interesting ownership issues" - Jane Calvin "interesting issues with military base abutting" - Don Marshall	Jane Calvin Community Action Forester, Eastern MA DCR Urban Forestry (617) 626-1456 urbanforestry@prospeed.net	Mary McCaffrey mmccaffrey@ci.fitchburg.ma.us Don Marshall dmrelion@aol.com Jaci Edwards Jaci929@comcast.net Hugh Putnam (town forest management advocate) 242 Highland St Milton, MA 02186 (617) 696-2885 put4143@aol.com

MA	--	--	--	--	--	Steve Anderson, MA Forest Stewardship Program Steve.Anderson@state.ma.us
MA	Plymouth Norfolk Worcester	Plymouth Walpole Boylston	Plymouth Town Forest Walpole Town Forest Boylston Town Forest	Surrounded by industry on south and west boundaries; gravel mining Stewardship plans, trail-work, signs Established in 1930's	Hugh Putnam (town forest management advocate) 242 Highland St Milton, MA 02186 (617) 696-2885 put4143@aol.com	--
ME	Kennebec Penobscot	China Bangor	China School Forest Bangor City Forest	Small community; located adjacent to school; used extensively in class-work Large community; used as a demonstration forest; active management for harvesting and recreation; connects with the town of Orono's Bog Walk	Jan Ames Santerre, Community Forestry Specialist—Project Canopy (207) 623-2371 canopyinfo@adelphia.net Mike DeBonis, Project Canopy Director Maine Department of Conservation Maine Forest Service (207) 287-4987 michael.debonis@maine.gov	Anita Smith China Middle School RR1, Box 1162 South China, ME 04358 (207) 445-2065 asmith@china.k12.me.us Rolland Perry, Bangor City Forester (207) 942-0220
ME	Sagadahoc Piscatquis Penobscot	Richmond Sangerville Veazie	-- -- -- Buck Hill Parcel	158 acres Small community in central Maine; forest managed for recreation, wildlife, and income generation; 550 acres 80 acres 80 acres Forest management plan developed by Conservation Commission for both parcels; managed in coordination with	Jan Ames Santerre, Community Forestry Specialist—Project Canopy (207) 623-2371 canopyinfo@aldephia.net	-- Dick Drummond, Manager (207) 876-2814 Bill Reed, Town Manager (207) 947-2781; Carol Redelsheimer, Town Forester (207) 944-0736 vztownforester@att.net

				the Chestnut Foundation and the Turkey Federation; one of the properties is the most northern American Chestnut Tree Farm.		
	Oxford	Bethel	--	175 acres		Scott Cole, Manager (207) 824-2669
	Cumberland	Cape Elizabeth	--	1000 acres		Michael McGovern, Manager, (207) 799-5251 cetm@maine.rr.com
	Cumberland	Falmouth	multiple parcels	1600 acres		Skip Varney, Park and Community Programs Director, (207) 781-5253 Svarney@town.falmouth.me.us
	Cumberland	Gray	Libby Hill Town Forest	50 acres		Mitchell Berkowitz, Town Manager, (207) 657-3339
	Kennebec	Hallowell	--	275 acres		Weston Davis, Tree Board Chairman, (207) 621-3945 weston.davis@cmpco.com
NH	Belknap	Barnstead Gilmanton Meredith Gilford	--	--	Karen P. Bennett UNH Cooperative Extension 131 Main St, 212 Nesmith Hall Durham, NH 03824 (603)862-4861 karen.bennett@unh.edu	Sumner Dole, County Extension Forester 36 County Dr. Laconia, NH 03246 (603) 527-5475 sumner.dole@unh.edu
NH	Carroll	Conway	--	1630 acres in total on 13 tracts of land; the Conservation Commission is responsible for managing these properties. "Included in these parcels is 'Whitaker Woods'. I am prejudiced, but this has to be one of the most priceless Town Forests anywhere in N.H. When Jim Barrett did his research project on Town Forests, he drew the same conclusion." –Peter Pohl	Peter Pohl, UNH Cooperative Extension, PO Box 860, Ctr Ossipee, 03814 (603) 539-3331 peter.pohl@unh.edu	Paul Pinkham, Conway Conservation Commission Chairman 1634 East Main Street, Center Conway, NH 03813 pafour@ttlc.net Don Johnson, Forest Land Improvement, P.O. Box 385 Chocorua, NH 03817-0385 (603) 323-8298

NH	Carroll	Ossipee	--	Total Acreage that is being managed under the guidance of forest stewardship plans are four parcels totaling about 300 acres. The management of this acreage is overseen by the Ossipee Conservation Commission. Rich has prepared management plans for these parcels and one or more timber sales have been conducted on each of the four tracts.	Peter Pohl, UNH Cooperative Extension, PO Box 860, Ctr Ossipee, 03814 (603) 539-3331 peter.pohl@unh.edu Shanna Ratner Yellowwood Associates (802) 524-6141 shanna@yellowwood.org National Community Forestry Center, Northern Forest Region www.ncfcnfr.net	Contact Ossipee Conservation Commission for more information.
NH	Carroll	Eaton	--	Total acreage is about 2,078 acres in three contiguous parcels; management overseen by the Eaton Conservation Commission; detailed forest stewardship plan prepared under a special grant from the ice storm of 1998 funds; conducted four timber harvests in 2004; properties have land that is in timber production and lands that are being set-aside as no-cut zones.	Peter Pohl, UNH Cooperative Extension, PO Box 860, Ctr Ossipee, 03814 (603) 539-3331 peter.pohl@unh.edu	Contact Eaton Conservation Commission eatonth@ncia.net for more information. Daniel Stepanauskas, current forest manager Northern Forest Resources HCR 62, Box 42 Silver Lake, NH 03875 (603) 367-8111
NH	Coos	Randolph Gorham	-- --	-- --	Sam Stoddard UNH Cooperative Extension 629A Main St Lancaster, NH 03584 (603) 788-4961 sam.stoddard@unh.edu Shanna Ratner Yellowwood Associates (802) 524-6141 shanna@yellowwood.org National Community Forestry Center, Northern Forest Region www.ncfcnfr.net	-- --
NH	Hillsboro	Amherst Merrimack	-- --	-- Numerous parcels ranging from 20 to	Jonathan W. Nute UNH Cooperative Extension 329 Mast Rd. Goffstown, NH 03045 (603) 641-6060	-- Andy Powell

				500+ acres in size; developing management plans with some active timber harvesting.	jonathan.nute@unh.edu	26 Hansom Rd Merrimack, NH 03054 (603) 881-5238 ajpowell@inr.net
		Mount Vernon	--	--		--
		Francestown	--	Managed for timber harvests, wildlife habitat, educational purposes, historical preservation, and recreational use. Several hiking trails have been developed and they seem to be very well used in every season.		Betsy Hardwick 1312 Cressy Hill Rd Francestown, NH 03043 (603) 547-8773 blhardwick@earthlink.net
NH	Grafton	Lyme	Lyme Town Forest	372 acres; management plan 1/96; active multiple-use management including tours/outreach	Northam Parr UNH Cooperative Extension 3855 Dartmouth College Hwy, Box 5 North Haverhill, NH 03774 (603) 787-6944 northam.parr@unh.edu	Lee Larson Lyme Conservation Commission Chairman (603) 795-2014 lee.e.larson@valley.net
		Canaan	Canaan Town Forest	100 + acres, stewardship plan 12/00		Contact Canaan Conservation Commission for more information
		North Haverhill	Grafton County Farm	450 acres		--
		Piermont	Piermont Town Forest	--		--
		Bridgewater	Bridgewater Town Forest	--		--
NH	Merrimack	Warner	The Chandler Reservation	1500 acres; managed by town forest committee	Timothy Fleury UNH Cooperative Extension 315 Daniel Webster Highway Boscawen, NH 03303 (603) 225-5505 tim.fleury@unh.edu	Call town forest committee for more information
		--	Boscowen Town Forest	438 acres; managed by Conservation Commission		Call conservation commission for more information

		Concord City Hopkinton Bow Epsom Pembrook	-- -- -- -- --	26 lots; 2700 acres total 13 lots; 582 acres total 14 lots, 2467 acres 463 acres 5 lots; 224 acres total		Ron Klemarczyk, managing forester (Concord, Hopkinton, Bow, Epsom) FORECO Box 161 Contoocook, NH 03229 (603) 746-4846
NH	Rockingham	Londonderry	Musquash	"a great example of a working town forest and one that is marketed actively as a place for town residents to enjoy the outdoors. They are constantly adding to the acreage (700+ acres now, I think). Charlie Moreno and Matt Ross just finished a new cruise and a revision of the management plan." – Matt Tarr	Matt Tarr UNH Cooperative Extension 113 North Road Brentwood, NH 03833 (603) 679-5616 matt.tarr@unh.edu	Deb Lievens, Londonderry Conservation Commission (603) 432-9927
NH	Strafford	Durham Rochester (city) New Durham	-- -- --	-- -- --	Don Black UNH Cooperative Extension 259 County Farm Rd, Unit 5 Dover, NH 03820 (603) 749-4445 don.black@unh.edu	Contact conservation commission or selectmen for more information
NH	Sullivan	Cornish Plainfield	Cornish Town Forest Plainfield Town Forest	270 acres at southern boundary of town near southwest corner; purpose is "to preserve undeveloped land for the benefit and enjoyment of the residents of Cornish;" managed for sustainable multiple use.	Steve Wood (603) 542-6454 via Karen Bennett Karen P. Bennett UNH Cooperative Extension 131 Main St, 212 Nesmith Hall Durham, NH 03824 (603)862-4861 karen.bennett@unh.edu	Ginny Prince, Cornish Town Forest Management Committee (603) 675-2129 ginprin@cyberportal.net David Grobe, Plainfield Conservation Commission (603) 675-5550
RI	--	Glocester	Scotstun	Inventory of Forest Preserve completed upon its acquisition. Only trees blocking trails will be cut or removed.	Bruce Payton, Chair of RI Land Trust Council, Member of Glocester Land Trust bpayton@ridem.necoxmail.com	--

		"	Phillip's Woodlot	Recently harvested hemlock invested with Hemlock Wooly Adelgid to gain income from the trees before they became a liability and would have cost money to remove hazardous in the property.		
		"	Sprague Farm Complex	1200 acres		
		"	Phillips Farm, Steere Hill, Heritage Park Tract	About 500 acres; 43 acre WHIP (Wildlife Habitat Incentives Program) Project; fitness/hiking trails created from skid roads. Other programs carried out on Land Trust properties include extensive trails and trailhead parking area construction for educational programs, wildlife habitat openings in old fields and research release of biological controls for forest insect pests. Managing the Land Trust properties to balance the multiple use needs of the user groups in the area, from hiking, cross-country skiing and horseback riding to hunting and bird watching has been a constant challenge.		
VT	Addison	Starksboro	Hillsboro Town Forest	High level of community involvement; Town-wide stewardship indicators; youth engaged through timber harvest education and sugaring (syrup used in school); FSC green-certified; see case study for more information.	Danielle Fitzko, Vermont Urban and Community Forestry Program Coordinator (802) 241-3673 DFitzko@fpr.anr.state.vt.us David Brynn, Addison County Forester (802) 388-4969 david.brynn@anr.state.vt.us Shanna Ratner Yellowwood Associates (802) 524-6141 shanna@yellowwood.org	Robert Turner, R.J. Turner Co.; Starksboro Conservation Commission (802) 453-2171 rjtco@gmavt.net

		Lincoln	--	Both Starksboro and Lincoln have participated in Yellowwood Workshops	National Community Forestry Center, Northern Forest Region www.ncfcnfr.net	--
VT	Franklin	St. Albans	--	--	Jim Tessmann, Franklin/Grand Isle County Forester (802) 524-6501 jim.tessmann@anr.state.vt.us	--
VT	Lamoille	Stowe	Sterling Forest	Good management plan; harvesting; recreation (active mountain biking groups); all revenue goes to conservation commission	Raymond J Toolan Lamoille County Forester (802) 888-5733 ray.toolan@anr.state.vt.us	Mike Snyder, Chittenden County Forester; Stowe resident (802) 879-5694
		Morristown	Sulham & Duhamel Parcels	"All are under management of one sort or another." –Raymond Toolan	Danielle Fitzko, Vermont Urban and Community Forestry Program Coordinator (802) 241-3673 DFitzko@fpr.anr.state.vt.us	--
VT	Rutland	Clarendon	R. Clarke Smith Forest and Wildlife Management Area	"It is under a forest management plan and I have conducted one timber sale (horse logging operation). Many area residents use it recreationally and several of the area schools use it as an outdoor classroom. There is a lot of diversity on the site including large beaver pond/wetland." – Nate Fice	Nate Fice, Rutland County Forester (802) 786-3853 nate.fice@anr.state.vt.us	--
VT	Washington	East Montpelier	E. Montpelier Town Forest	Town forest committee and active conservation commission; three timber sales over the last 20 years, forest plan in effect; great trail system in town and on Town Forest.	Russ Barrett, Washington County Forester (802) 476-0172 russ.barrett@anr.state.vt.us	--
		Berlin	Berlin Town Forest	The town now owns three separate parcels and is looking to add more within the Berlin Pond watershed; three timber sales over the last 40 years; developing a multi-use trail system and working on a forest stewardship plan; natural community map for Berlin Pond watershed available on town website.	Danielle Fitzko, Vermont Urban and Community Forestry Program Coordinator (802) 241-3673 DFitzko@fpr.anr.state.vt.us	Andrea Chandler, Berlin Conservation Commission (802) 229-4411 achan99_98@yahoo.com

		Montpelier	Hubbard Park	Managed by the Montpelier Parks Commission, this city forest/park has had a number of timber sales and forest improvement cutting; an excellent year round trail system that joins up with the Vermont State Capital building.		--
			Berlin Pond Parcel	1300 acres including Berlin Pond that supplies city drinking water; numerous timber sales, improvement cuttings and tree planting over the last 60 years.		--
		Calais	Calais Town Forest	With three separate forest parcels, the town set up a fund for revenues to go to conservation commission; a number of timber sales; working on a trail system; very active conservation commission that received a grant to put together a forest stewardship plan for the various town forests.		--
VT	Windsor	Royalton	--	"Gift of land to town was the impetus for the selectboard creating a Conservation Commission and charging them with developing a plan for community use of the forest. CC is learning as they go. Access, parking, trails, school use, timber improvement are all early goals." – Jon Bouton	Jonathan Bouton, Windsor County Forester (802)296-7630 jon.bouton@anr.state.vt.us	--
		Norwich	Peisch Lot	Home of Milton Frye Nature Area; about 35 acres next to the elementary school; used often by classes; easy access (walk from Village), parking; managed by the Milt Frye Nature Area Committee composed of at least one Conservation Commissioner, Teacher, & others; selectboard has authority; .high quality map suitable for Orienteering meets. CC and MFNAC hold community nature workshops.		--

		Norwich	Gile Mountain	Managed by Norwich Conservation Commission, answering to Selectboard; features a fire tower (VT's tallest on the lowest elevation site), parking lot, trail kiosk, older, more direct trail and a newer, more gradual trail suitable for mountain bikes and cross country skiing; both used heavily, especially in foliage; current trail development, including a trail that connects to the Appalachian Trail, and a shorter trail down the other side of the ridge. Norwich Trails Committee promotes use of public trails in town. Requests for help maintaining the trail and tower usually brings a good number of volunteers (families with children) who are interested in contributing to this public resource.		--
		Norwich	Norwich Fire District	Land originally acquired to protect water supply; currently managed by Lands Committee comprised of representatives of the Fire District Board, the Conservation Commission, and Selectboard appointed representatives from the "village" and more rural sections of town. The Town has forgiven property taxes on the Fire District forest lands in exchange for management by this Lands Committee and a commitment to hold the land for public use.		--
		Hartford	Hurricane Town Forest	Managed by Conservation Commission (supported by Planning Office and Recreation Department); Selectboard has ultimately made policy decisions after thorough public process organized by the Conservation Commission and Planning Dept. Timber Management plan provided through a State Urban and Community Forestry Grant and		Matt Osborn, Town Planner mosborn@hartford-vt.org Chuck Wooster, Hartford Conservation Commission Chairman (802) 295-1456 chuck.wooster[at]valley.net Mike Quinn, Windsor Tree

				developed by a consulting forester. Recreation Plan completed and adopted approximately 2 years ago; Student mapping program (boundaries, trails, orienteering course); also used for vocational classes; timber cuttings for wildlife; see case study for more information.		Warden (also teaches in Hartford) quinnm@hartfordsd.com (802) 674-2522, (802) 295 8662 ext. 220
		Windsor	Paradise Park	Managed by Paradise Park Commission; trails, open field, open-faced shelter suitable for group meetings and even community performances. Easy access on the South from the elementary school, Mt Ascutney Hospital on the West; A recent acquisition provides good access from the east as well as a pond and swamp with unusual plants. Timber sales do take place on occasion, most recently laid out and overseen by the Vermont Forestry Division. Summer youth programs focus on nature education and acclimatization. "In all of these examples, it seems to me there is at least one charismatic (often modest) community leader who recognizes the value of these public lands and is able to form the 'community' that works together to promote care and use of these forests – parks." – Jon Bouton		Mike Quinn, Windsor Tree Warden (also teaches in Hartford) quinnm@hartfordsd.com (802) 674-2522, (802) 295 8662 ext. 220
VT	Orange	Fairlee	Fairlee Town Forest	1800 acres, overseen by Town Forest Board	David Paganelli, Orange County Forester (802) 476-0173 david.paganelli@anr.state.vt.us	--
		Bradford	Low-St. John Forest	76 acres, owned by Bradford elementary school		--
		"	Wright's Mountain	277 acres, overseen by select board		--
		"	Bradford Municipal	Actually in Fairlee and West Fairlee; 591 acres; overseen by Bradford		--

			Forest	Water Commission "All four of these properties are under active forest management and provide valuable landscape stablility, recreational, and educational opportunities in these communities." - David Paganelli		
VT	Caledonia/ Essex	St. Johnsbury	St. Johnsbury Town Forest	"Started out as the Town 'Poor Farm' or as it is still some times call the 'Alms Farm'. In 1922, when women gained the right to vote the newly formed League of Women Voters paid for the planting of the farm to trees. Over a period of several years, they planted about 70 acres (most of the farm) to Norway spruce, white pine, and Scots pine. Over the years, the plantation thinnings provided good stumpage income, perhaps more than property taxes would have provided. This property is essentially within the Village limits of St. Johnsbury making it within walking distance of several thousand people. It is visited in all seasons of the year by hikers taking advantage of the skid roads and laid out trails." – Stephen Slayton	Stephen Slayton, Caledonia/Essex County Forester (802) 751-0111 stephen.slayton@anr.state.vt.us	--
		Hardwick	Hardwick Town Forest	Purchased in 1953; a working farm as late as the early 1950's; interest in reopening a small abandoned quarry was denied but it opened the door to some needed forest management. Timber marked and harvested by Hazen Union Forestry class The lot is remote which makes it difficult for people to take full advantage of the assets that it possesses. However, people of Hardwick are beginning to discuss its future.		--

APPENDIX C: VERMONT TOWNS THAT OWN TOWN FORESTS

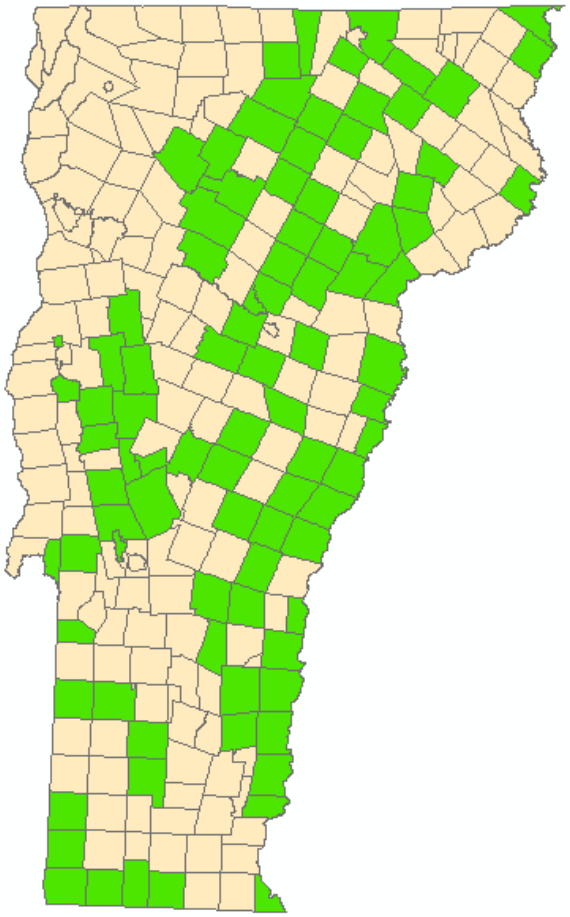


Figure 3 Vermont Towns that Own Town Forests. The map above shows Vermont towns that own town forestlands in green. Data was taken from the Vermont Conserved Lands Database accessed through the Vermont Center for Geographic Information (VCGI) during Fall of 2004. Unfortunately, several towns that own town forests were not included in this data set at the time I created the map, particularly in the northwest. It is therefore incomplete, but still serves to give a general idea of the minimum number of towns that own town forests.

APPENDIX D: SAMPLE INTERVIEW QUESTIONNAIRE

I. Interviewee Background

a. Please describe for me your position and how you have been involved with the town forest.

II. Biophysical Characteristics

a. First, I would like you to tell me a little about the forest.
   i. How many acres is it? Are they contiguous?
   ii. Where is it located, especially in comparison to population centers?
   iii. Describe some of its prominent ecological features.
   iv. When was it established?
   v. What cultural features exist there?
   vi. How would you describe its degree of accessibility?

III. Activities and Events

a. What events take place in or at the town forest? Would you describe them for me? For each event…
   i. Who participates?
      1. How many participate?
      2. Are there any people who participate more than once at a single event or at multiple events?
   ii. Who coordinates the event?
   iii. How often does the event occur?
   iv. Are there other ways participants can get involved in the forest?

IV. Institutional arrangements

a. How are decisions affecting the forest made?
b. Who participates in the decision making process?
   v. How?
   vi. How often?
c. When was the management plan for the forest written/updated?
   vii. What are the management objectives for the forest?
   viii. How were these objectives determined?

d. Does the town work with any other organizations/institutions at any level regarding town forest use and management? If so…
    ix. What organizations?
    x. How are they involved?
    xi. How long has this relationship existed?
e. From where does the town acquire funds for the forest's management, maintenance, programs, etc.?
    xii. How often is the forest logged?
        1. What happens to the revenues?

V. Individual Leadership

a. Are there any individuals in the town who have played a key role in promoting or utilizing the town forest?
    xiii. In what ways have they been involved?
    xiv. For how long?

VI. Knowledge

a. What educational opportunities exist in the forest? Please describe.
b. What are the educational objectives for the town forest?
c. Could you describe the educational programs that are based in the forest?
    xv. Do school groups visit?
        1. If so, how often?
        2. What age?
        3. For what purpose?
d. Is there any interpretation in the forest, formal or informal, personal or non-personal (explain these terms if necessary)? If so, please tell me more about them.

VII. Stewardship

a. Please describe any monitoring efforts that take place in the forest.
b. In what ways is the town forest stewarded?

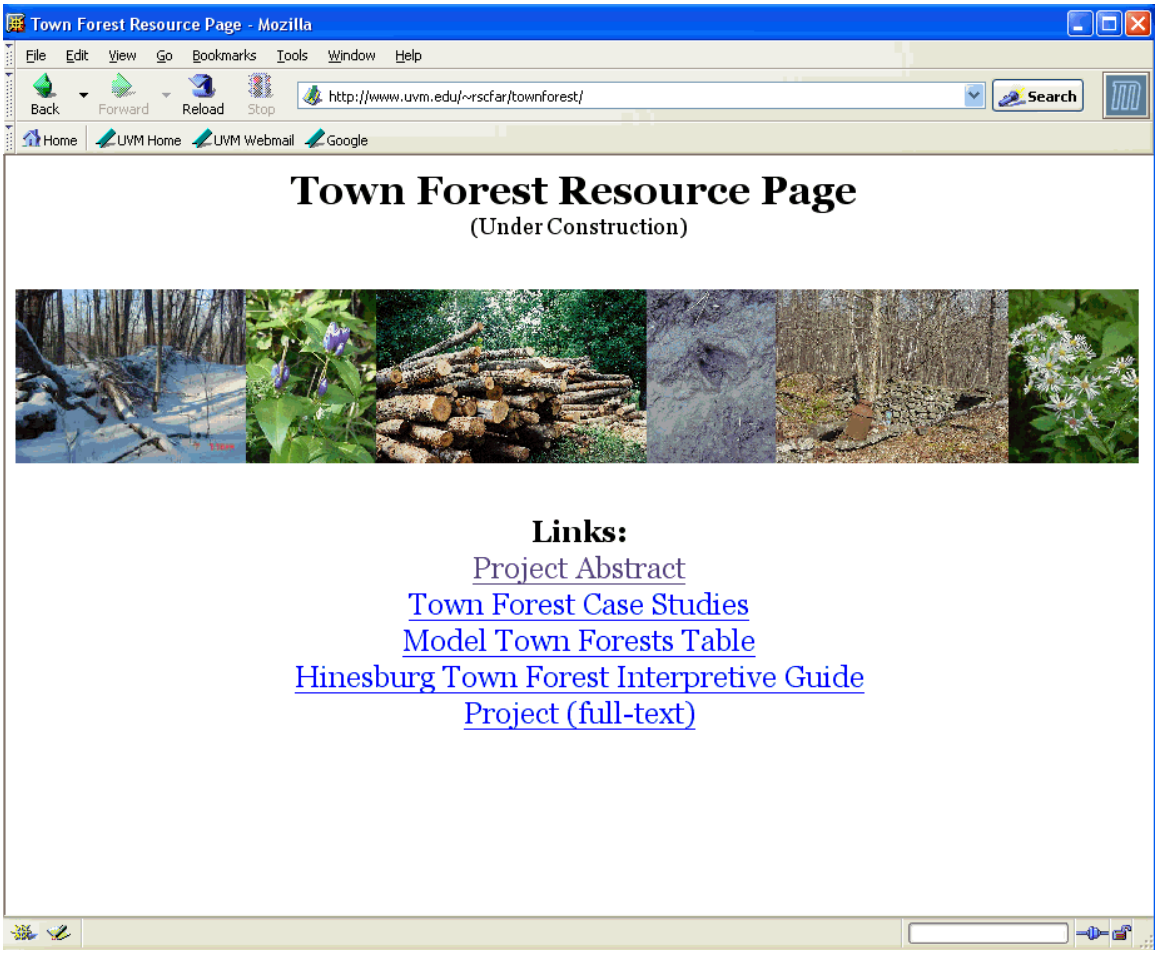
VIII. Closing

a. Is there anything else you feel would be valuable for me to hear?

APPENDIX E: CASE STUDIES SUMMARY

	Education and Outreach		Recreation		Forest Planning			Stewardship Activities	Certified	
	School Use	Community Field Trips	Hunting	Other Non-motorized	Authority	Management	Author of Management Plan		FSC Green	Tree Farm
Hurricane Town Forest Hartford, VT	X	X	X	X	Selectboard	Conservation Commission	Consulting Forester	X		
Hillsboro Town Forest Starksboro, VT	X	X	X	X	Selectboard	Conservation Commission	Consulting Forester	X	X	
Lyme Town Forest Lyme, NH		X	X	X	Selectboard	Conservation Commission	Consulting Forester	X		X
Musquash Conservation Area Londonderry, NH		X	X	X	Selectboard	Conservation Commission	Consulting Forester	X		X
Bangor City Forest Bangor, ME	X	X		X	City Forester	City Forester	City Forester	X		
China School Forest China, ME	X	X		X	Selectboard	School Forest Committee	Town Forester	X		X

APPENDIX F: WEBSITE HOMEPAGE



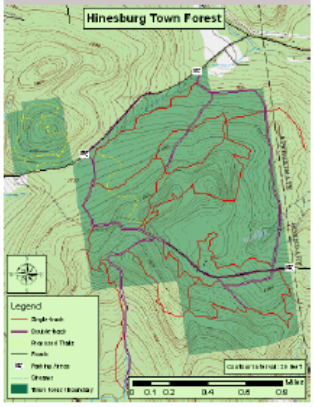
APPENDIX G: INTERPRETIVE GUIDE

The glacier left them behind as it advanced and retreated, burying many below the soil surface. In areas free of vegetation, rocks move upward with freezing and thawing action, so each year, the farmer needed to remove the new stones that had worked their way upwards before plowing. Look closely for other evidence of past human use such as cellar holes and house and barn foundations.

Landscapes change through the process of succession. If most of this land was farmed, why is it now a forest? In the early to mid 1900s, the Town acquired the land that is now the Town Forest through purchase, donation, or as payment in lieu of taxes. Because the land was no longer being farmed, gradually, shrubs and then trees began to take root and grow through the process of succession.

Community members also planted approximately 50,000 pine and spruce seedlings during the 1940s and 50s, which assisted reforestation. Since that time, some areas of the forest have been selectively logged, while others have been left to grow.

The Hinesburg Town Forest is currently being managed for recreation, wildlife habitat, and sustainable timber harvesting. Visitors come to hike, mountain bike, hunt, horseback ride, cross-country ski, snowshoe, and bird watch. Local school groups also visit to learn about the forest.



Thanks for being a responsible visitor to this shared forest by leaving what you find and carrying out what you brought with you.

Please come again soon.

Interpretive Brochure Designed by Bethany Hanna
Map by Brooke Scatchard and Bethany Hanna

THE UNIVERSITY OF VERMONT

For more information, please contact:
Hinesburg Town Forest Committee
Town of Hinesburg
P.O. Box 133
Hinesburg, VT 05461
http://www.hinesburg.org

Stories in Stone

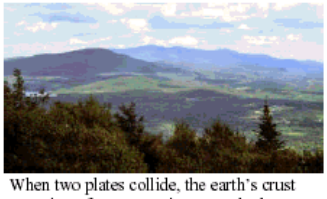
Observing geology and landscape clues can teach us about the history of the Hinesburg Town Forest.

Welcome to the Hinesburg Town Forest! This 837 acre forest is owned and managed by the town of Hinesburg and is open to the public.

Geology is the study of the earth and its life as recorded in rocks. Read on to find out more about how the geology of Vermont has influenced the history of this beautiful forest.

The Hinesburg Town Forest is located in the foothills of the Green Mountains, which have been eroded over millions of years as evidenced by their smooth, rounded peaks. Have you ever wondered how mountains are formed, or why some mountains are tall with sharp peaks and others are short and rounded?

Uplifting and erosion have shaped the Green Mountains over time. Imagine the earth as an apple. The skin of the apple is the earth's crust, while its flesh is the earth's mantle, a fluid made of molten rock. Unlike the skin of an apple, however, the earth's crust is divided into many pieces called plates that are moving very slowly.



When two plates collide, the earth's crust sometimes fractures as it gets pushed upward forming mountains in a process called uplifting. When mountains are newly formed, they are usually tall and jagged. As time passes, they become worn and rounded through the process of erosion, the wearing away of soil and rocks by wind, water, and glacial ice. These same processes also effect the soil and vegetation in the Hinesburg Town Forest.

The most recent glacial retreat nearly 15,000 years ago influenced the soil and vegetation we see today. Look closely at the forest floor. Now, try to find a bare patch of ground—tip-up mounds of fallen trees are good places to look. Reach down, and carefully pick up a small handful of soil. Observe the particles' color, size and shape. Are the particles different sizes? If so, you are looking at soil that is unsorted and may therefore be formed from glacial till.

Fifteen thousand years ago, the glacier that covered Vermont in a mile-thick sheet of ice began to retreat northward. As it retreated, pieces of rock as large as giant boulders and as small as clay were exposed.

The till, formed from the bedrock under the Hinesburg Town Forest, generally produces soils that are poor in nutrients However, like a bull-dozer, the glacier brought calcium-rich rocks from the Champlain Valley to some areas of the Town Forest as it advanced from northeast to southwest, which helped enrich the soils in places. Trees like oak and pine can tolerate soils low in nutrients. Sugar maple prefers soils rich in nutrients. As you travel through the Town Forest, watch for changes in patterns of these trees on the landscape.

Human land-use can also be observed from clues on the landscape. Other patterns in the landscape can be seen by those with a watchful eye. Have you noticed stone walls criss-crossing the forest floor? It may be difficult to believe, but over 80% of the Town Forest was in cultivation or pasture during the late 19th century.

Stone walls helped to keep livestock out of cultivated fields. Imagine the effort of building them! Where did the farmer get the seemingly endless supply of stones?

APPENDIX H: POPULAR ARTICLE

Town Forests: Forests for our Future

State officials estimate that nearly one hundred-fifty town and municipal forests have been established in Vermont over the past century ranging in size from tens to thousands of acres. In total, approximately sixty-thousand acres have been conserved. What is a town forest, you may ask? A town forest, stated simply, is forested land owned by a town. However, like any book that cannot be read by its cover, a town forest is much more than that.

According to Perry H. Merrill, Commissioner of the Department of Forests and Parks for the state of Vermont nearly forty years ago, town forests held great promise for the future. January 8, 1965. "We urge you to do all possible to arouse interest in [municipal forests] among the citizens of your town. Municipal forests are going to have an extremely vital place in the future of any municipality." So wrote Mr. Merrill in a letter to town officials.

Vital *adj*. "essential for the continuation of life." Vital like an organ—heart, lungs, skin—blood pumping through, breath inhaled and exhaled. Those were powerful words. But has Mr. Merrill's prediction come to pass? Do Vermont's municipal forests truly hold *vital* places in our communities and, if so, what role do these *vital* places serve? As a master's student at the University of Vermont, I have been researching the history and present status of town forests in Vermont and attempting to answer this very question.

Prior to the turn of the century, the Vermont countryside, like much of New England, was denuded and state officials began to realize the necessity in supporting

watershed conservation and reforestation efforts. During that time, the landscape was anything but vital; the farms for which the land had been cleared declined as they were out-competed by larger operations in the western U.S. and worn soils became exhausted. Then, in 1915, a turning point in the history of Vermont town forests occurred when favorable state legislation enabled towns to acquire lands, in many cases from former poor farms or ministerial lands, land collected from tax default, and "wasteland" that could serve no other valuable purpose.

The original intentions behind the establishment of town forests were as diverse as their sources. They served to provide income for the town from timber harvesting, for watershed conservation, to enhance wildlife habitat, create recreational opportunities, and to serve as educational forests in which townspeople could learn about forest management, or what might be termed today as multi-use management. Could this be what Mr. Merrill implied when he spoke of town forests as *vital* places?

At just over 800 acres, the Hinesburg Town Forest is tucked away on the eastern edge of town, high above the moist bottomlands of the Village. Hinesburg is located in the southeast corner of Chittenden County, a county that has seen the bulk of Vermont's commercial and residential development, which is reflected in Hinesburg's 267% increase in population between 1960 and 2000. This former agricultural town once supported by a prosperous industrial center in Mechanicsville, now largely serves as a bedroom community for Burlington.

The land use history of the Hinesburg Town Forest may elude those who lack a discerning and experienced eye. Like many town forests in Vermont, the town acquired it in pieces, rather than as a whole. You might imagine it as a patchwork quilt, but now

grown over with maples, white birch, and pines, the former crisscrossed pattern of field boundaries largely obscured. Dilapidated stone walls and gnarly ancient apple trees with their grotesquely twisted branches are intermittently woven into the landscape, serving as a reminder of the former life this forest once lived.

After just a short visit, I was curious to learn more about the Hinesburg Town Forest's history. What was the town's perception of it nearly sixty years ago? Did it hold promise for the future? A trip to Mike Snyder's office, the Chittenden County Forester, and I am up to my ears sifting through old records of the Town Forest pulled from one of the many filing cabinets lining his crowded office walls. I delve into such treasures as one of the earliest maps of the forest, drawn sometime in the fifties, a crude sketch made by one of his predecessors on a large manila envelope with pencil and a red ink pen, its edges ragged with age. Newspaper articles clipped from the Essex Junction newspaper, the *Suburban List*, and the *Burlington Free Press*, dated 1957 and 1967 respectively, describing early community trips to the forest describe community tree planting efforts. A detailed management plan written in 1986 by the former Chittenden County Forester, David Brynn, carefully delineates and describes each stand of trees.

I scrolled through the list of family names in a section of the management plan summarizing the town forest's ownership history—Martin, King, Hollis, Blodgett, Verboom, Smith, Hayden, Sherman, Brown, May—names of those who had once made a living directly off the land, raising livestock, harvesting timber, or removing gravel from the ground and all of whom have since passed on or moved away to warmer climates. The first parcel of land was deeded to the town in 1937 and additional parcels followed over the next 20 years; some were taken for unpaid taxes while others were purchased by

the town outright. Open agricultural land reverted to forest through nature's eternally optimistic process of succession, assisted by a massive reforestation effort between 1941 and 1951, during which townspeople planted approximately 50,000 Norway Spruce and Red Pine seedlings.

Stephen Russell, the current town forest committee chair, a position he has held for close to 20 years and prior to that, one his father had filled, and a long-time resident of Hinesburg, provided an inside perspective on the history of the town forest. He described annual outings to the forest to cut a tree for the year's Christmas festivities and early hunting trips with his dad.

"It was exciting and for years after that we would hunt together…that was one of his favorite recreational pastimes; he used to head out in the woods. He didn't get many deer but that wasn't important. We just had a lot of good days in the woods together."

Stephen Russell has carried on in his father's footsteps as the chair of the town forest committee. "It's our family history, being up there and cutting Christmas trees, doing that with my kids. It is to the point where I really know it quite well, most or all of the 800 acres. And then on top of that, to be able to see a complete cycle of life, of trees; it's neat to be able to do that in your lifetime…It's a special place for me."

Passing on a sense of community and connection to place from one generation to the next, empowering your children by entrusting them with the responsibility of stewarding the land for future generations—perhaps that is what Mr. Merrill had meant when he described town forests as holding *vital* places in the future of Vermont's communities.