SECTION 2. Identified Connecticut Forest Issues

Introduction

The following issues were originally derived from stakeholder input during the planning and research phases of the 2004-2013 Connecticut Statewide Forest Resource Plan (CTFRP). A series of ten focus groups were held targeting different stakeholder groups to define issues and create action steps to combat those issues. The results were used in development of the CTFRP, and have been a guiding force during the implementation of the CTFRP. To fulfill this Statewide Forest Resource Assessment and Strategy requirement, the original issues were put out to a targeted group of stakeholders to reaffirm that the issues were still relevant today. The results are as listed on the following page.

Issue 1. Maintaining Forest Ecosystem Health and Biodiversity[10]

A healthy and diverse forest resource will be able to provide a sustainable balance of benefits and services to residents of the state. In order to do so, forests must be sufficiently extensive, in a healthy and productive condition, and forest cover must be present in key locations, such as riparian zones and on steep slopes. Information provided in Criterion 1 indicates that despite the fairly high percentage age of forest cover recognized in Connecticut, the continuity, distribution and condition of the forest resource across the state is variable.

A. BIOTIC AND ABIOTIC CONCERNS

a. Invasive species (both native and exotic)

"Non-native invasive species pose a serious risk to North American forest ecosystems, threatening to change existing ecological trajectories, suppress rare and endangered native species, reduce productivity and biodiversity and damage wildlife habitat." Chornesky et al 2005

Connecticut has experienced many forest health problems in the last century. Chestnut blight, Dutch elm disease, gypsy moth, red pine scale, and butternut canker have all affected the structure and composition of Connecticut's forests. For example, chestnut accounted for 25% of Connecticut's growing stock before chestnut blight arrived. Now it forms only an understory shrub layer that is periodically killed back. (The Connecticut Agricultural Experiment Station is a leader in research to develop blight-resistant chestnut trees and reintroduce them to Connecticut's forests.)

Several exotic insects have had a recent effect on Connecticut's forests, or pose an imminent threat. One example is the Hemlock wooly adelgid (HWA) a pest of Asian origin that first appeared in Connecticut in 1985, and has since spread over the state. It has killed a large number of hemlocks, particularly in dense stands in the southern part of the state. Hemlock is an important conifer in the state. Remaining hemlock may survive as the initial infestation wave has passed and certain control mechanisms are at work within the environment. The adelgid causes branch dieback and tree mortality, often in combination with elongate hemlock scale (another exotic species) and hemlock looper (a native defoliator). Alternatives for managing the adelgid, particularly in forests, are limited. The Connecticut Agricultural Experiment Station and the USFS have been researching systemic insecticides and have released the adelgid predator *Sasajiscymnus tsugae*.

Several other potential threats, such as Asian longhorned beetle (ALB) while not yet documented on forest trees in the state, have the potential to devastate oaks and other hardwoods if they become established. ALB, *Anoplophora glabripennis*, was first discovered in Brooklyn, NY in 1996, before spreading to other areas. Most recently it has been found in Worcester, MA. The USDA's Animal and Plant Health Inspection Service (USDA-APHIS), working with local and state partners, has quarantined infested areas in the Worcester area, and is attempting to eradicate the beetle by cutting and chipping infested and nearby maple and other host trees. The infestation is estimated to be 12-15 years old, and to date, the quarantine area encompasses 74 square miles with over 16,000 infested trees found and a total of just over 25,000 trees removed from an area

[10] Portions of this write up were taken directly from "Biological Integrity Issues in Connecticut's Upland Forest" by Emery Gluck. The Habitat Newsletter, March 2010. Connecticut Association of Conservation and Inland Wetlands Commissions, Inc. Other portions are from Kirby Stafford's "Forest Health Program Integration" write up.

of about 2 square miles. The risk of this beetle being in or introduced to Connecticut is considered high.

A second Asian insect, the Emerald Ash Borer (EAB), *Agrilus planipennis*, poses a threat to Connecticut's ash trees. This beetle was first detected in southwestern Michigan in 2002 and has been found in 12 other states since then. EAB has killed tens of millions of ash trees in southeastern Michigan alone; with tens of millions more lost in the other affected states and the provinces of Ontario and Quebec. Its arrival in Connecticut is considered likely in the next five years.

Organisms such as ALB, EAB, and the *Sirex* woodwasp, and *P. ramorum* (which were mentioned in criterion 3) will have serious effects on Connecticut's forests if they became established, and the potential consequences to the forest products industry, nursery industry, tourism, and environmental quality are dramatic. At the current time, federal and state quarantine and eradication of ALB and EAB is planned if they are detected in the state.

In addition to these forest pests, numerous exotic invasive plants have gained a well established foothold and threaten to become pervasive in much of the forest. Many are characterized by "hypercompetitive behavior" that includes earlier leaf out than native competitors, the ability to re-sprout vigorously and production of large amounts of seeds spread by wind, birds and deer. Non-native invasive plants that can be ecologically disruptive in Connecticut's forest include winged euonymus (burning bush), tree-of-heaven, Japanese barberry and Oriental bittersweet. In addition to the effect these species can have on forest condition and composition, some of these species present human health concerns. Tree-of-heaven has been documented to cause heart attack-like symptoms if a person's skin is exposed to an excessive amount of the plant's sap. The incidence of black-legged ticks, a major vector for Lyme disease, is greater in dense patches of Japanese barberry. The thickets provide an ideal refuge for the tick-carrying white-footed mouse. Bittersweet vines aggressively climb trees and monopolize forest understories. The vines can bend and break supple trees, while extensive mats in the understory smother tree seedlings and other native understory vegetation.

The foothold invasive plants have gained may turn into a stranglehold without considerable intervention.

Complete control of exotic invasive plants is unlikely without a monumental statewide effort at an exorbitant financial cost. Herbicides provide the most definitive control but their use must be carefully monitored. Uprooting smaller invasives is possible but unlikely to cover extensive areas. The repeated cutting or burning immediately after leaf out can kill a significant proportion of some invasives if done in the same growing season.

b. Deer browse

In addition to aiding the spread of invasive plants by depositing their seeds throughout the forest, an abundance of deer can alter the composition of the forest. They have been known to browse the native understory plants so much that the reduction in native competition provides an opening for invasive plants to germinate, become established and thrive. Preferences of deer among native species can reduce native biodiversity even further. Deer often browse heavily on oak seedlings but avoid other native species such as black birch, which contains a chemical component disliked by deer. Nearly 100 threatened or endangered species are browsed by white-

tailed deer. Where deer have been fenced out, the understory is often found to be lush with native plants.

Deer populations were historically controlled by predators. They were almost extirpated with the loss of mature forests and unrestricted hunting in the late 1800's. Citizens reported only 12 deer in Connecticut in 1893. With increased suburbanization creating significant edge habitat ideal for deer, maturing oak forests, and a decline in hunting, the deer population has grown exponentially. Their population is currently estimated at 65,000. (See Criterion 3 for more details). Significantly expanding responsible hunting and minimizing the conversion of forests to residential subdivisions could help stabilize an excessive deer population and revitalize the plants favored by deer.

c. Native insects and diseases

In a healthy, productive forest native insects and disease factors are usually present but are held in check and balance by other natural factors. When the forest is stressed by external factors, non-native components, overstocking or some other problem, native pests can get out of balance and impact forest composition and diversity. For example, in overstocked oak stands, particularly where shorter-lived oaks such as black oak and scarlet oak are reaching the end of their life-span, *Armyllaria* (shoestring) fungus can cause the death of many trees. *Armyllaria* is always present in the soil, and healthy trees can usually resist the fungus, but trees stressed by overstocking and competition can lose their resistance. There are many native tree diseases that can become problematic when trees and stands are under stress. Common tree diseases that affect the health, form and survivability of forest trees can often be controlled through proper management techniques that reduce stress and provide competitive advantage to desired trees.

Native insect pests have a similar type of impact, normally held in balance but becoming problematic when conditions are less than ideal for the trees in question. An example is white pine weevil. It kills the terminal leader on young white pine trees growing in full sunlight, causing tree deformation. Growing young white pines in partial shade with gradual release can reduce white pine weevil damage dramatically.

d. Age diversity

As described in Criterion 1, the forest resource in Connecticut is predominantly composed of sawtimber-size trees. Tree size is not necessarily a good indicator of stand age, but most Connecticut forest stands originated either from abandoned agricultural land during the last century or longer, or as the result of clearing for charcoal production during the late 1800s and early 1900s. Thus stand ages of 80 to 130 years are reflected quite closely in the sawtimber component of the forests in Connecticut. The high percentage of forest stands in maturing age classes is accompanied by a corresponding lack of balance of other stand age groups. Young seedling and sapling stands must be present in the landscape to develop into pole-sized, middle-aged stands, which in turn must be present on the landscape in sufficient quantity to develop into future maturing stands. Each age-class grouping supports its own unique mix of associated wildlife and herbaceous components, and delivers a unique balance of benefits and services within the environment. The key to biological diversity and forest health is a diversity and balance of age structure in the forest resource across the landscape.

e. Species diversity/composition and the role of disturbance

Some upland forest ecosystems can sustain themselves after disturbances such as fire, hurricanes and tornadoes. Such disturbances create temporary open environments where sun-dependent plants perpetuate themselves, and their offspring are able to outgrow competing shade tolerant species. Native Americans frequently burned extensive areas of the forest to create an environment that attracted game animals, increased berry production, and enhanced numerous other benefits necessary for survival. Pre-settlement forests populated by Natives experienced low-intensity fires with much greater frequency than today's forests. Fires that sustained oak and pitch pine ecosystems for thousands of years are now controlled and extinguished as houses interface with the forest ecosystem to fill the woods. As mentioned above, today's maturing oak forest originated after extensive clearcuts, fires, chestnut blight and farm abandonment from over a century ago. The prolonged absence of similar events, in combination with excessive deer browse, is facilitating the slow transformation of much of Connecticut's oak forest into shade tolerant birch, beech and maple forests. Oak seedlings are found in the understory of an intact forest after an acorn crop but most die out, except on ridge-tops and droughty soils, within a few years due to inadequate sunlight. Survivors are severely hindered by overtopping competitors. The ability of a new generation of oak to graduate to the forest canopy is severely limited under the current conditions in much of Connecticut's forests.

The potential future displacement of oaks has enormous ecological consequences. Approximately 50 animal species depend upon acorns for their primary source of protein. Oak forests host more species and a higher abundance of birds than maple forests. Oaks cumulatively host over 500 species of Lepidoptera, an important food source for birds. Oaks also sequester more carbon than maple trees. While it is predicted that a warming climate will favor oak types over other species mixes, it is evident that oak forests are not sustaining themselves in southern climates similar to that which Connecticut is predicted to have in the future. It seems unlikely that a warmer and wet climate, by itself, would revive oak ecosystems here.

Pitch pine sand plain ecosystems have also been sustained by fire as well as abandoned plowed farmland. Pitch pine-scrub oak barrens have been identified as one of the thirteen most imperiled ecosystems in Connecticut. They have the potential to support a number of rare species, including the Karner blue butterfly (*Lycaeides 112elissa samuelis*), barrens buckmoth (*Hemileuca maia*), and sand-plain Gerardia (*Agalinis acuta*). Connecticut has lost an estimated 95% of its pitch pine sand plains to gravel pits and development. The remnant is succeeding to trees such as white pine, which are shading out the pitch pine. The absence of severe fire or other disturbances have led to the dearth of pitch pine seedlings and scrub oak.

Severe fire and other disturbances historically sustained a small part of the landscape in young forest habitat. Very young forests provide requisite dense shrubby habitat for 22 bird species and four mammal species in New England, including numerous declining species such as blue-winged warbler, chestnut-sided warbler, New England cottontail and bobcat. The unique assemblage of dense cover, herbaceous vegetation, and associated insects is short-lived as the habitat structure changes as the forest ages. Forests as young as eight years of age have already lost habitat value for some species. A frequent occurrence of relatively small but severe disturbances is necessary to sustain populations of animals dependent upon such habitat. The majority of the forest landscape should be made up of sawtimber-dominated forests in order to provide habitat for the bulk of the wildlife species, though perhaps not in the proportion currently

existing in Connecticut. Several species that utilize sawtimber forest for their primary habitat, such as the black and white warbler, also use young forest habitat.

The maintenance of disturbance-dependent ecosystems is a challenge in a mostly suburban state. Many residents are used to the forest resource they have seen around them for years, and are reluctant to see it changed or disturbed, particularly if they do not understand the value of that disturbance. Controlled burns can be an effective tool but there is very limited opportunity to implement them and they pose an element of risk. Mechanical grinders or masticators can create young forest habitat by grinding up a stand whose trees that are approaching 7" in diameter, though the immediate visual impact can be an issue, especially on private land. Mechanical treatments can mimic historic disturbances such as fire to a certain extent, but they are unlikely to capture the full ecological value of a natural disturbance.

Silvicultural systems that mimic natural disturbance, properly planned, implemented and managed, can accomplish young-forest habitat objectives and age structure diversity goals. Raw material for forest products extracted in the process can pay for or defray the expense of such treatments. The services of a Connecticut-Certified Forester are required for silvicultural prescriptions and recommendations.

f. Natural disturbance/extreme weather

As mentioned in the previous section, many forest resource and habitat management activities are designed to mimic natural disturbances, in order to take advantage of the characteristics and adaptations with which native species have evolved. It is worthwhile noting, however, that natural disturbances will still occur, including ice storms, fire, hurricanes, etc. While there may be habitat and forest diversity advantages to mimicking certain natural disturbances, there are some disturbances that do not need to be replicated on the landscape artificially, like large storm events, as they can be expected to occur anyway according to their natural cycle. The challenge for some types of natural disturbances is not in how or whether they occur, but rather the nature of human response. Certainly a degree of response is called for in many cases where storm or other disturbances damage trees, and perhaps create potential property damage or human health risk. On the other hand, not every natural disturbance requires a management response. There are times when the value of blown-down trees as coarse woody debris for wildlife habitat may outweigh their commercial value as forest products, or a natural low-intensity ground fire, when not otherwise risking private property damage, may be allowed to burn a small area. The forest resource in Connecticut has demonstrated numerous times to be resilient and vigorously responsive to disturbances both human-caused and natural, and as long as a disturbance is not one that converts the forest to some other land-use, then functions, benefits and services can be expected to continue from the forest ecosystem.

g. Erosion

Natural soil erosion is virtually non-existent on intact forest land. Soil movement in forested settings is generally the result of an activity that disturbs the organic layer of the forest floor on a slope, such as trail-building or log-skidding. Soil movement from exposed areas becomes a serious issue when mineral soil impacts streams and wetlands as sediment. Compared to non-forest land uses, erosion resulting from forest uses is minimal, most examples of this are related to illegal access or overuse.

B. SOCIAL AND LANDSCAPE-USE CONCERNS

a. Increasing forest fragmentation

Criterion 1 provides a synopsis of the parcelized and fragmented nature of the forest resource in Connecticut, resulting from patterns of land conversion and development. As development starts to devour a continuous forest, only fragments of forest cover remain. Fragmentation results in more edge, more perforations in the canopy, more disruption of forest floor structure and less contiguous or "core" forest area. These landscape changes affect forest health, biodiversity, forest benefits and services in a variety of ways.

Edge habitat occurring at the forest/development interface is inhospitable to many species of wildlife. The edge habitat is well suited for skunks, raccoons, dogs, cats and other animals that prey upon the eggs of ground nesting birds. Also, brown-headed cow birds, a brood parasite that lay their eggs in other birds' nests, are more prevalent the closer to the edge. Brood parasitism and nest predation lead to the inability of smaller fragmented forests to sustain many interior bird species. Additionally, non-native invasive plants are usually more abundant in edge areas of fragmented forests. Generally, habitat quality declines as the size of the forest decreases.

b. Loss of connectivity between unfragmented forests

The processes that drive parcelization and fragmentation, as described in Criterion 1, also result in physically separating forested areas from each other, inhibiting natural processes, interrupting wildlife travel, and causing aesthetic discontinuity.

c. Landowner demographics, objectives, and perceptions

As described later in Issue 3, there are many factors influencing the decisions landowners make about the current and future status of their land. Proactive forest stewardship is complex and demanding and often involves knowledge, skills and information that landowners may not always possess. Landowner motivations and satisfactions may not always correspond with landscape-scale public biodiversity goals. While most landowners consider themselves good stewards and wish to have a healthy, productive forest, management decisions may be recreationally, aesthetically or economically driven as priorities over biodiversity. The transfer of land ownership contributes to problems associated with parcelization and fragmentation. Public forest benefits and services can be considered at risk in many ways due to the fact that most of the forest resource is in private hands and can be sold at any time.

d. Insufficient scientific knowledge regarding the suite of flora and fauna in the state

The quality of information regarding the distribution, abundance, and condition of species in Connecticut varies greatly. It is more difficult to make appropriate management decisions, and determine key habitats for protection without sufficient knowledge.

Issue 2. Promoting Stewardship of Public Forests[11]

a. Promoting The Importance Of Public Forests

The Connecticut Department of Environmental Protection owns and manages over 251,000 acres of public land, the vast majority being forested. The State Forest system is the largest component at about 170,000 acres. The State Parks, State Park Scenic Reserves and Natural Area Preserves total about 36,000 acres. Wildlife Management Areas and Sanctuaries total the rest. All except the Wildlife Sanctuaries are open to the public.

In addition, thousands of acres of forestland across the state, in hundreds of separate parcels, are owned by towns, cities and publicly-owned potable water providers. These parcels may be identified as reserves, preserves, parks, subdivision open-space set-asides, town forests or some other category. They may be held solely by the town or jointly with some other entity, but all have some characteristics in common in that they are held for the benefit of the citizens of the community, they contribute to the character of the community, and quality of life there. Many of these parcels are open to the public and may be used regularly for recreational purposes.

Together, these publically owned lands provide important benefits to all citizens of Connecticut. These benefits come in the form of ecosystem services, social values, and educational opportunities.

Ecosystem services

According to the USFS, ecosystem services (ES) are defined as "goods and services that flow from ecological processes that have immediate or long-term benefit to human society. Ecosystem goods are generally tangible, material products that result from ecosystem processes, whereas ecosystem services are usually improvements in the condition of things of value. This distinction is useful as many ecosystem goods include traditional commodities, such as timber, are easily valued through current markets, while services such as the provision of clean water or biological diversity are not." (ES 6) In addition to providing a variety of ecosystem services, such as clean air and water, wildlife habitat and carbon sequestration, public forests can also be professionally managed to enhance these benefits.

Social values

Public forests provide a large range of social values to the residents of the state. Many use public forestland for some type of recreation (*e.g.* hunting, fishing, hiking, camping, hiking, biking, bird watching), some of which have a substantial economic effect, such as sales of gear and supplies. Public forests often provide the large scenic areas for the enjoyment of all. The commercial products harvested from Connecticut's forests, including timber, firewood and maple syrup have an important economic effect. The production of sawlogs and veneer for mills in the Northeast and for export, provide a significant number of jobs in the forest products industry.

Outreach and education

The State Forests serve as demonstration areas to educate private landowners in forest management. A few towns in Connecticut have followed similar methods, conducting timber

[11] Portions of this write up were taken from Ed McGuire's NESAF's "Public Lands Management in Connecticut" January 2010

harvests, and providing educational opportunities through interpretive trails, signage, and outdoor classrooms.

b. Public Land Management Challenges

Management challenges facing public lands, either municipal or state owned are similar. Many town-owned woodlands face similar problems as state and private lands at the interface of forest land use and residential land-use. Unwanted motorized vehicle access, dumping, invasive species infestations and boundary encroachment are common. Most town governments are ill equipped to manage these problems, and often the resources needed on a large scale for state owned lands is not available. While such forest lands are valuable assets for a town, few public resources are devoted to their stewardship and maintenance. Unlike long-term woodland owners who know their land, have an attachment to it and know how they enjoy it, local governments lack long-term continuity due to changes of board and commission members, elected officials, or others who may have authority over forested parcels. Although local governments find it difficult to keep up with maintenance, and struggle with the protection problem, it is even more challenging for them to engage in any kind of pro-active management of forest properties to enhance or optimize benefits.

Personnel limitations

The number of foresters managing State Forests has been cut in half in recent years.
About half of State Forest land is unmanaged due to lack of personnel.

In addition, few communities have the luxury to devote public funds or personnel time to managing "open space" unless an immediate public benefit can be identified and associated with the expenditure. Managing the town forest isn't "anyone's job."

Constituency support

Although there are constituents out there, the constituent base for promoting forestry and the programs administered by the DEP Division of Forestry needs to be strengthened.

In order to accomplish proactive stewardship on community owned land a local group of interested residents must promote the idea within the community and to elected officials. While some good examples exist of "Friends of the Town Forest" type volunteer support groups, most town-owned woodlands do not have volunteer stewards, local support groups or vocal advocates for their management.

Lack of direction in developing local vision for local public forests

The stewardship of any forest land is a long-term commitment. There is a complex process that involves a balance of environmental, social, economic and legal factors that are often daunting and confusing even to interested residents who may have some background in such matters. Developing goals, visions and management objectives requires guidance and knowledge of options that may not be immediately available within a community. While strong interest may exist on the part of residents to manage town-owned lands, guidance; leadership and technical expertise must be available without requiring a big commitment of local public resources in order to initiate the process. DEP service foresters are available for such assistance but their time is limited.

Few good examples of towns practicing forest management
It has been demonstrated through projects in other parts of the region that local officials and citizen groups can learn about the stewardship of forest land by means of peer-to-peer education. Whether and where towns are actively managing their forest lands may not be known beyond town boundaries. A mechanism is needed for sharing information and fostering learning between communities and making good examples more visible.

Promoting "sufficient" sound forest stewardship
A local public may be interested in permanently protecting forest land and open space within their community. They may have the will and resources to accomplish that goal. Often however, once the land is acquired, a lack of understanding that management practices can enhance virtually any combination of public benefits prevails. It is this lack of understanding that presents a barrier to more active forest management in communities. Advocates for forest management who can clearly communicate positive stewardship outcomes are needed to be readily available to community groups and leaders.

Funding shortages for purchase and maintenance of public lands
Continuing state budget difficulties will keep this as a problem at the state level. A local public may be interested in permanently protecting forest land and open space within their community, for all the right reasons, and may have the will but not the resources to accomplish that goal. Local communities can apply for funding to acquire open space in a variety of ways. State matching fund programs often help, but regular, easy-to-use and reliable programs providing such assistance are needed. Local communities and citizens are often involved with these activities only on a part time basis so the process needs to be made easy.

Active opposition to management on public forests
In general, this has not been a major problem on State owned lands, due to the diligence of managing foresters or biologists to inform the public of any harvesting or other activities proposed, or ongoing. Regardless of how carefully a management plan for a community forest is prepared, or how many public benefits are being derived, there may always be some opposition to the plan or activity in question. Public input and public vetting will improve the odds of public acceptance, but guidance and assistance should be made available for community members who are involved to management planning or community outreach.

Issue 3. Protecting Private Forestlands: Challenges and Opportunities Facing Private Forest Landowners

a. Availability of technical and financial assistance

Technical and financial assistance for private landowners can be separated into two, categories: 1) ongoing management and 2) long term disposition and/or permanent protection (from development).

Technical assistance is available from a variety of sources: governmental, private and educational. As described under Criterion 7, the DEP Private and Municipal Lands program offers, unbiased forestry expertise to private landowners, and cooperates with the USFS Forest Stewardship Program and the Connecticut Tree Farm Program, among others. Programs under the USDA Natural Resources Conservation Service are available to address conservation and management issues. Programs such as the Environmental Quality Incentive Program (EQIP) and the Wildlife Habitat Incentive Program (WHIP) address specific conservation activities with technical expertise to design management practices and provide cost-share funds for implementation.

Educational programs such as the COVERTS Project, with a focus on wildlife habitat, and the Forest Stewardship Short Course, are hosted by UCONN Cooperative Extension along with DEP, CFPA and other collaborators. These are available to private woodland owners every year and provide technical background and management training. Private Connecticut Certified Foresters who work as consultants are hired by private landowners for management assistance and/or technical service under NRCS programs.

Among the many challenges associated with providing management assistance is making landowners aware of the services and programs available. With more than 35,000 landowners holding ten or more acres of forestland in Connecticut, traditional advertising will only reach a small segment of this audience. In addition to initial contacts there is a challenge of keeping the landowner audience apprised of changes in programs and details. While good contact information exists for people who have taken advantage of a public program, informing and attracting new participants is a hurdle that needs to be addressed for public assistance programs. The use of modern communications, such as email list serves and social networks are not being fully utilized.

Permanently protecting or conserving private forestland is a complex process involving technical and legal assistance. Many landowners, while wanting to conserve their forest, can be intimidated by the legal complexities and costs involved. Under Criterion 1, several public programs are mentioned that provide funding assistance to landowners. However, funding varies from year to year, while the process of protecting a parcel by purchase or easement can often require several years. Guiding a landowner through such a complex once-in-a-lifetime experience is a task for someone with a rare combination of appropriate legal, technical and social skills. Some statewide organizations (CFPA, The Trust for Public Land.) have staff with the necessary expertise and some local land trusts also conduct creditable landowner guidance in land protection, but such individuals are rare, and an organized system for assisting landowners with land protection guidance does not exist.

b. Intergenerational transfer

Demographic statistics from the US Forest Service for family forest owners in the Northeast indicate that more than 75% of the non-industrial private forest land area and over 80% of owners are over 55 years old. It is logical to conclude that a large portion of the forest in our area will change hands during the next 25 years. Much of this land will transfer to heirs, but a large portion will be placed on the market. It is estimated that over 20% of forest landowners in Southern New England either already plan to sell some or all of their land, or have made no plans at all for its future disposition. Keeping private forestland intact means that families must be provided with the best information available on options to transfer between generations. For land that comes up for sale, communities must be provided with resources and information to guide conservation decisions.

c. Incentives vs. disincentives

Private forest landowners derive a wide variety of benefits, find many sources of satisfaction and have many reasons for owning woodland. Such reasons range from recreational to family legacy to privacy to investment, and all are valid. The key to protecting the public benefits produced by private forests is enhancing the sources of satisfaction derived by landowners, especially for things like clean water or wildlife habitat or local rural economic enterprise where private and public benefits coincide. Local, state and federal public policy can be used to help landowners keep their woodlands in a healthy productive condition, or conversely, create an atmosphere of undue expense or hardship for landowners. The treatment of income from timber as a capital gain, NRCS cost-share programs, and PA 490 (see Criterion 7, Indicator 18) are all examples of federal and state policies that provide financial incentives on behalf of woodland owners. On the other hand, restrictive local regulations or a social, political and economic culture that favors development over forest conservation can have a disincentive effect for woodland owners, especially when the costs of land ownership are high, compared to income level or degree of personal ownership satisfaction.

d. Expenses vs. revenue sources

It is perhaps unrealistic in Southern New England to expect that forested acreage will "Pay its own way" given the variety of expenses associated with land ownership, versus the limited potential revenue sources available to the typical landowner. Taxes, insurance, and maintenance expenses (roads, trails, fences, gates, fuel, equipment and personal time) can amount to several thousand dollars each year. Occasional needs for survey, contracting work, or legal representation can make forestland ownership cost-prohibitive unless the parcel is also a home site (for which some degree of such expenses could be anticipated) or unless some periodic revenue from the property can be derived.

Potential revenue sources are limited. Hunting or other sportsman leases are rare and income from them is likely offset by a need for additional liability coverage. Ecosystem service payments such as carbon markets are not yet a reality in our region, and cost-share payments under federal programs are only made after the expense associated with a particular product is undertaken. So virtually the only potential source of income from forests is that produced by the periodic harvest of trees or other material as forest products. Timber markets can be volatile and options for marketing wood limited at times. Harvesting is also a complex and somewhat disruptive transaction, but when managed correctly, conducted as part of a long-term management plan, and considered with the capabilities of the land in mind, forest products revenue can help defray the costs of land ownership dramatically.

Trees from Connecticut forests are highly valued and actively sought by the forest products industry. Many good reasons exist for landowners to consider selling trees (timber) for forest products. Ideally, harvesting is a management tool recommended within the context of a long-range, Forest Management Plan prepared by a Certified Forester.
Some reasons for timber harvesting:

- Habitat Management: Create or maintain special conditions needed by certain wildlife species.
- Species Composition: Enhance biodiversity with timber harvests to create desirable species mixes.
- Regeneration: Establish and grow new seedlings successfully by creating the optimal conditions.
- Forest Health: Remove potentially hazardous trees that are extensively damaged by insects and diseases.
- Income: Derive periodic or emergency income.
- Recreation: Create forest trails, paths, campsites and views.

e. Legal and regulatory considerations

In Connecticut, most land-use planning and regulation is conducted at the local level, therefore, some forest-based activities such as harvesting may be subject to local regulation. Certainly any activity that may impact inland forested wetlands or watercourses would be subject to local IWWC Agency scrutiny. Local regulations, even those intended to protect the forest from abuse, must carefully consider the degree of impact to landowner benefits and satisfactions to achieve a proper balance of public and private interests.

Forested parcels that are permanently protected by means of conservation easement generally are owned by one party while another holds the development rights, and as such present a stewardship and monitoring challenge for the easement holder. Each party must understand their rights under such arrangements.

Other legal and regulatory issues associated with private forestland ownership include:

- Boundary identification
- Trespass
- Poaching
- Harvesting regulations
- High property taxes.

f. Unwanted access

The fragmented nature of the forested landscape in Connecticut, resulting primarily from residential development, creates situations in which a woodland ownership can be bordered by many different neighbors and separate parcels. Issues associated with boundary identification and maintenance and access control are common among landowners, many of whom experience problems associated with encroachment, dumping, all-terrain vehicles and other types of trespass.

Landowners throughout the region are concerned about damage and potential liability from trespass by motorized vehicles and the potential for lawsuits resulting from unauthorized access and use of their property.

Issue 4. Providing for Forest Based Recreational Opportunities

Connecticut is the third smallest state in the union, at 5,009 square miles stretching approximately 90 miles east to west, and 60 miles north to south with elevations ranging from sea level to 2,380 ft. The difference in climate, vegetation, and wildlife, as well as the three major river systems, 6,000 lakes and ponds, and Long Island Sound, has historically provided Connecticut's residents and visitors a wide diversity of recreational opportunities across it's varied landscape (SCORP 7, 8).

In regards to available recreational areas, according to the Connecticut Statewide Comprehensive Outdoor Recreation Plan 2005-2010 (SCORP) supply inventory, a total of 328,000 acres of recreational land is designated as such, or 964 acres per 10,000 residents. This recreational land is not distributed uniformly across the state, and varies widely between urban and rural areas, with urban areas having many less acres per residents on average. (SCORP ii)

Connecticut's residents participate in a wide array of outdoor recreational activities. According to the Citizen Demand Survey created to gather information for the SCORP, the top ten activities in descending order of individual recreational activities are: walking/running/hiking, beach activities, visiting historic sites or museums, swimming in freshwater or saltwater, swimming in pools, biking, bird and wildlife watching, sledding, camping, and canoeing/kayaking/tubing (SCORP iv). As evidenced by the information, many of these activities utilize the natural resources of the state as the backdrop to their recreational pursuits.

"Outdoor recreational activities provide a range of benefits both to participating individuals and to the community. These benefits include physical, educational, psychological, community, and economic" (SCORP 1). The link between maintaining and protecting forestland and recreational activities is clear.

There are several limiting factors when considering for the provision of forest-based recreational activities, both in terms of recreation on public lands and private lands, the most limiting being availability.

a. Availability

"Currently, the State of Connecticut and its 169 municipalities are the dominant providers of outdoor recreational opportunities in Connecticut, with non-profit organizations, commercial entities, and the federal government playing important but lesser roles. The DEP owns 66% of recreational areas, municipalities own 17%, and other entities own 17%. The DEP provides major shares of the natural resource based supply of recreation, including 70.5% of hunting activity and 25-33% of boating access, camping, fishing, and winter sports facilities" (SCORP iii).

Unfortunately, "Connecticut's state park and forest system, as well as municipal open spaces, are experiencing greater use by the public as neighboring open spaces diminish. Open spaces such as state parks and forest are increasingly becoming islands of undeveloped land amongst subdivisions, whereas twenty years ago they were part of a fabric of contiguous open space. State parks in urban areas often represent the only significant publically available open space in their regions" (SCORP 11).

This increasing dependency on publically owned lands being the primary and sometimes the sole provider puts an added pressure both environmentally, and economically on the organizations and agencies that care for these lands. This results in multiple use concerns, as more users compete for a smaller land base. Local land trusts, and other non-profits are often significant land holders, but may not allow recreational access open to the public.

There are multiple reasons why the availability of recreational activities may be diminishing on private lands. Many landowners might support the idea of recreational opportunities on their land, but are concerned with the potential for liability issues associated with allowing recreation on their land. Although there is a strong Recreational Use law that has provided liability protection for landowners since 1971, these perceptions linger. Other landowners may be concerned with the responsibilities of ongoing maintenance or the threat of illegal access by rogue users who do not respect the property. Having a solid partnership with an organization that provides maintenance and a physical presence is often critical to ease these concerns.

b. Lack of awareness of available resources

The Citizen Demand Survey compiled for the SCORP document found that "lack of knowledge regarding what is being offered and what is available at individual sites as the primary reasons residents do not take advantage of existing outdoor recreational facilities in Connecticut" (SCORP 159). Approximately 36.3% of respondents stated that they were unaware of activities that were taking place. The second highest ranking reason, at 27.3%, for lack of utilization was the public's lack of knowledge on the locations of recreational facilities'. In an effort to raise public awareness to events and locations to visit, the commissioner has started the No Child Left Inside campaign. This effort is in its fifth year of getting families back into the state parks and forests.

In addition, the DEP's website has been updated to include more detailed maps of forests and parks (see. www.ct.gov/dep/parkmaps). DEP is also supporting the Connecticut Forest & Park Association's "WALKCT" initiative which promotes recreation on both state and private property (see www.walkct.org).

c. Funding and staffing

Another highly visible concern revolves around the availability of adequate funding and staffing for recreational facilities. According to 2004 data, Connecticut allocated 0.09% of budget for operations of it state parks compared to an average of 0.20% by the other 5 New England states, and ranks 46th nationally (SCORP x). In tough economic times, this situation will continue to decline. Lower levels of funding and staffing contribute to less maintenance and services provided at facilities.

"In the Citizen Demand Survey, when asked to identify the factors which keep them from using state and local parks, or which prevent them from using these facilities more often, 15.5% of respondents stated that facilities are not well maintained" (SCORP VI). When asked what their top three actions could be to improve the supply and condition of recreational properties and facilities, 59% stated that improving and maintaining existing outdoor facilities as on the of their top three actions" (SCORP).

A potential opportunity associated with this is the dedicated use of user/registration/permit fees to be returned to associated recreational facilities. In addition, part of the process for

determining policies and budgets, and to better understand the needs of the public, there should be a continuing effort to engage recreational organizations for input.

d. Access

On state owned lands, one of the most apparent concerns brought forth by this increased pressure is the need for additional parking and road access. This need is for all types of parking, whether it is space for additional cars due to the increased usage, or increased parking access during the winter season, or parking for larger vehicles such as horse or snowmobile trailers. Access is not just a concern for users, as there are concerns regarding emergency medical and fire fighting access. In addition, the Americans with Disabilities Act of 1990 has Universal Access requirements for outdoor recreational facilities that need to be addressed for newly constructed or altered public or commercial facilities, trails, picnic and camping facilities (ACCESS). Access to public land has been degraded by unauthorized off road ATV usage.

e. Unmet Trail Needs

Regardless of whether recreation is occurring on public or private land, there are still issues of unmet needs. Two of the largest unmet needs that have been discussed in terms of forest planning are the need for the creation of additional trails (including paved and unpaved multi-use trails, along with single use trails), and areas for off-road motorized biking and all terrain vehicle use. The need for areas for off-road motorized biking and all terrain vehicle use are discussed below (issue f). The trail concerns most likely stem from multiple use concerns at facilities, where competition between users exist, and it is felt that there are targeted user exclusions on some trails. A need for improved trail planning and maintenance directly ties in with this desire on the part of the public for more trails.

f. All Terrain Vehicle/Off-Road Vehicle use (ATV/ORV)

Issues with ATV and ORV use are two sided. There are the issues of those who own these vehicles, and there are the issues of those who own and/or manage lands that are potential use sites (legal or illegal).

Though it is currently illegal to operate an ATV on state land and all roads in Connecticut, "in recent years, the dramatic increase in ATV sales has generated a significant demand for riding areas". "According to SCORP Citizen Demand Survey, the activity with the greatest percentage of unmet needs is off-road motorized biking and all terrain vehicle use. Fifty-two (52%) of those respondents expressing a need for this type of facility said their need is completely unmet, with another 20% finding their need to be only 25% met (SCORP v).

High levels of illegal use on both public and private lands, causes negative impacts on natural resources and other recreational users (ATV 2). "Off-road vehicle use on public lands is a complex issue that is not unique to Connecticut. The use of public lands, particularly DEP managed properties, for off-road vehicles, presents significant and sometimes conflicting responsibilities for accommodating the varied philosophies and demands of divergent user groups" (ATV 2).

g. Recreational club member investments

Often times, recreational clubs invest volunteer time, equipment, and money towards maintaining and improving recreational facilities on both state and private lands. The full extent of their contributions towards facility maintenance is not always understood or appreciated. As

an example, the trail volunteers of the Connecticut Forest and Park Association invested over 12,000 hours maintaining trails on public and private lands in 2009 alone.

h. Lack of umbrella organization to represent all recreation users in Connecticut

There is no one organization that is able to represent all recreation users in Connecticut. Different user groups don't often "talk" to one another, and are often unaware of the common bonds they share. An organization that could facilitate productive working relationships could lead on the ground collaborative recreation projects. In addition, an organization that had the ability to connect different, but compatible recreation opportunities could be an effective lobbying tool for recreation issues.

Issue 5. Supporting a Sustainable Forest-Based Economy

A. *SUSTAINABILITY*

a. Lack of age diversity within Connecticut's forests.

In Connecticut forests today, a beneficial mix of stand age and size classes does not exist. A disproportionate area – 79% of the timberland area – is in mature stands. There is an unusually small amount of regenerating stands, which comprise only 6% of timberland. The overall nature of tree growth, a decline in the abandonment of farmland, and reduced timber harvesting activities have contributed to produce a forest comprised predominantly of mature stands, with a deficit of regenerating stands.

This was not always so. In 1972, the different stand age and size classes were virtually balanced. During the intervening years, the area in mature stands steadily increased. Between 1972 and 1985 the area of intermediate stands remained essentially unchanged, declining only between 1985 and 1998. However, the area of regenerating stands has steadily declined.

These changes have been beneficial to some wildlife. The recovery and return of many woodland species has been remarkable during the last century. Black bear, wild turkey, white-tailed deer and beaver have increased in number. There is now a residential moose population along the Massachusetts border. Maturing forests have made this possible. But the lack of balance between stand age and size classes will eventually affect other species of wildlife, and may bring about population declines. Few deny the social and environmental value of maintaining mature forests. Yet a balance of stand size classes is necessary for health and diversity.

The forest products industry, researchers and managing foresters are acutely aware of the lack of diversity of age and size classes of Connecticut's forest. In the long run, a forest out of balance foretells a depletion of healthy, vigorous growing stock for future generations and will impede the sustainability of a vibrant forest-based industry.

b. Limited markets for low grade material

The market development for low grade timber products has always been an issue in Connecticut. End products that can maintain their wood integrity with common defects (knots) such as pallet lumber, guard rail posts, and timber bridges have low profit margins. The forest products industry carries a very high overhead (equipment, insurance) and cannot sustain high volume, low profit margins. The firewood market takes what could be low grade sawlogs and markets them for consumer firewood. Although this provides an outlet for some of this material, firewood does not produce the jobs that wood products manufacturing does. Low-grade logs that can be processed will produce work in sawmills, marketing, manufacturing and secondary outlets. This in turn provides competition for products, which helps the entire economy.

Connecticut has never had a local pulp market. While northern New England developed markets for chips, southern New England shipped chips for pulp, energy or oriented strand board. There are low grade markets that have potential, most notably the potential demand for wood chips in energy production.

For a decade or more, energy planners in the region have looked at woody biomass as a viable renewable energy source. Its development would re-establish local markets for low-value material, but the issue has sparked debate that initially surprised local planners. Resistance is primarily focused on four concerns: unsustainable harvesting; truck traffic to large facilities would be intolerable; large water demands and returning warm water to rivers would be detrimental; and air pollution would be unavoidable. Suspicion, or outright rejection, of the claim that biomass energy can be carbon-neutral or even low-carbon is also voiced.

These are valid concerns that need to be addressed. Vermont's success in designing efficiently-scaled models for systems that sustainably utilize a region's wood supply suggest that it is reasonable to continue looking at biomass energy potentials in southern New England where relatively dense populations are sited within large forests, and the history of producing heat from wood is well established. The Biomass Energy Resource Center (BERC) in Montpelier, VT is an excellent resource to aid development of small scale biomass facilities, and to help promote the *Fuels for Schools* program which has implemented biomass facilities at 40 schools in Vermont. In Connecticut, Rhode Island and Massachusetts, fewer than six such sites exist in total. The development of small biomass facilities could create well distributed markets for low-value woody material.

c. Gradual loss of historical economic species

The oak/hickory group has historically been the predominant forest type species group in Connecticut. However recent FIA data indicates that red maple has assumed the lead role in total growing stock. The predominant type of harvest on private land (removing valuable timber without taking anything else) results in small forest openings. Small openings in the forest canopy can promote the establishment of valuable northern hardwood timber species (sugar maple, yellow birch), but also can promote more vigorous red maple and black (sweet) birch. Normally, red maple is considered a low-grade timber species and in Eastern Connecticut canker problems put black birch in that category as well.

Red maple and black birch are adapted to a broad range of growing conditions and can be found in heavy concentrations across the state. Red maple, the leading species in terms of growing stock volume increased by nearly 65 percent between 1972 and 1985, and 9 percent between 1985 and 1998. Red maple is a volunteer species on abandoned farmland, especially on moist sites. Cutting practices that remove more valuable species and leave the less-valued red maple probably promoted its volume increase more than any other factor.

d. Outside influences affecting sustainability

Outside influences are affecting the forest products industry. Most are economic in nature and others are more social. Economic issues include increasing prices of fuel, and insurance costs (liability, worker's compensation). Society has induced its own influences, with many young people raised in a rural setting opting for a college degree and higher-paying jobs. Traditionally these folks were more apt to follow their family heritage into the sawmill or logging business.

The adoption of the Connecticut Forest Practices Act required forest harvesters, supervisors and foresters to be certified by the State of Connecticut. Examinations are required for every level, and enforcement for compliance has also limited some people who may have previously made their living in the woods. The industry which had been unregulated now must follow a clear set

of limitations and ethical standards. Some industry personnel have moved their operations elsewhere.

The industry has declined from an infrastructure standpoint. Fewer buyers mean fewer options in markets. Declining demand has also restricted market share.

B. REGULATORY CONCERNS

The regulation of forest practices has been the subject of much debate for more than 30 years. In 1985, a Resource Conservation & Development report identified municipal regulation of timber harvesting as one of the most critical, complex and controversial issues facing forestry. In 1991, the legislature adopted the Forest Practices Act in part to address the issue of municipal and statewide regulation of forest practices. While the DOF adopted and implement regulations governing the certification of forest practitioners in 1996, and the conduct of forest practitioners in 2005, efforts to adopt regulations governing the conduct of forest practices did not advance beyond a public hearing in 1999. The Act permits those twenty municipalities that possessed forestry regulations prior to the adoption of the Forest Practices Act to continue with their regulations. By design, the remaining 149 municipalities were to be covered by statewide forest practices regulations adopted by the Department. Adoption of such regulations, however, has not yet occurred. Since the inception of the Act there has been considerable debate on the exact content of statewide regulations and the lack of uniformity between town regulations. In 2007, an Ad Hoc committee of the Forest Practices Advisory Board reviewed the issue and made several recommendations. In 2010, another such committee will be established to continue to monitor the issue and once again make appropriate recommendations. While the debate over the role of forest practice regulations persists, anecdotal evidence and a 2001 study of municipal officials suggest that the need for statewide forest practices regulations has been tempered by the improved professionalism and performance of forest practitioners as a result of the implementation of certification regulations.

A second and closely related issue is the authorization by the State's Inland Water Resources Act allowing municipalities to regulate activities affecting wetlands and watercourses. Pursuant to this Act, many but not all activities associated with farming and forestry in wetland and watercourses enjoy permitted as-of-right status and therefore are not regulated activities. The permitted as-of-right provision for forestry activities has been the subject of confusion by both the industry and municipalities. Considerable educational and training efforts have been made by the Department's Division of Inland Water Resources and the Division of Forestry on the State's Inland Water Resources Act, and in particular the permitted as-of-right provision. It is essential that these efforts by the Department in collaboration with key stakeholders continue to assure that a uniform and legally correct interpretation of the statute and details of associated case law is conveyed to all stakeholders.

C. REVENUE SOURCES

a. Economy of Scale

As Connecticut becomes more fragmented, the wood products industry deals with smaller woodlots, more landowners who are more detached from a rural economy, and fewer landowners who are willing to practice and invest in forest management activities. Smaller woodlots drive up the cost of doing business because of the cost of moving equipment, dealing with multiple

planning/conservation commissions, and the time involved with closing a deal with multiple owners and meeting a variety of management objectives. The lower economy of scale drives up the cost of doing business, which lowers stumpage value to landowners and creates difficulty in marketing products.

b. Decrease in the volume of timber being harvested from State property

The Division of Forestry has had a net loss of 10 professional forestry/fire positions, 3 clerical positions and 2 maintenance positions over the past 20 years. In the past 24 years, the Division of Forestry has seen a steady decline in employees working within the State Lands Program. One exception to this was for a brief period between 1996 and 2001, which saw a temporary increase with some new hires. The state lands management program has lost staff to retirement and to switches in program responsibility. This decrease in staff has directly affected timber sales production resulting in approximately a 50% reduction in revenue to the state. Some of this revenue loss is due to a decline in stumpage prices. This significant loss of the marketing of stumpage has impacted the industry as a once steady, reliable flow of products is no longer present in the same capacity.

c. Non-traditional revenue sources

Several opportunities exist to support a non-traditional income flow from forestlands. Income that may be derived from these opportunities may help to alleviate pressure to sell property, and also make additional private property available for recreational pursuits. Landowners especially may benefit from land/lease opportunities for recreation (hunting, fishing, skiing, biking), mushroom production, boughs, etc. Markets for biomass or carbon credits may also provide long term opportunities for forest landowners.

Issue 6. Fostering Public Awareness and Support of Forests

Forestry professionals have long known the value of a public informed about the forest, as well as supportive of forest management which helps satisfy the many demands and expectations of the forest resource base. American society is composed of the private landowners that hold the future of most of our forested acres in their hands, and citizens that use the forest.

The benefits of improving public awareness and support of forest conservation and management are clear: Without support, efforts to conserve, manage and foster healthier forests will be under-funded, dropped from legislative priorities, even opposed. Traditionally, when forestry efforts and programs are supported, more acres are conserved and managed as forest, programs are more likely to receive a higher profile, and private landowners are more likely to promote a healthier long-term forest on their land.

A healthy forest base depends on public awareness of the benefits of our forest resources, threats to our forest resources, measures needed to protect and enhance our forests, and overall support of the forestry community's efforts to conserve and manage our resources. Therefore, the forest community and its objectives largely depend on effective education and outreach to its many users. Success in forestry is not simply measured by the latest in scientific research, sound silvicultural prescriptions, balanced management and conservation efforts. Effective communication, education and outreach are critical to the future of the forest and all efforts of the forestry community.

While this is recognized and even inarguable to much of the forest community, there remain many obstacles to successful outreach and education that reflect a lack of unity, consistency, as well as availability and standardization of messages and materials.

a. Education material regarding Connecticut's forestlands (Lack of standardization and availability of educational material)

There are many forest user groups and environmental groups with special interest in the forest resources of Connecticut, in addition to the forest industry, water companies, private landowners and the Connecticut Department of Environmental Protection. Although these different groups predictably have some differing ideas of how forests should be conserved, managed and used, frequently there is a great deal of "common ground" on the central issue of promoting future forest health. However, there is a lack of standardization of the message, resulting in a clouding of facts and confusion of the meaning of "forest health" and how Connecticut should foster it. Some of this may result from distrust issues between various groups, such as between industry and some environmental groups. Most importantly is a simple lack of coordination between these various groups in processing, agreeing on, and disseminating a uniform message. Improved communication and coordination between groups in production and distribution of educational tools would more effectively foster a greater public awareness of Connecticut forest issues. A more accurate, consistent message would reach more people, and ultimately this increased awareness of forests and would garner more public support.

Similarly, a more unified and active constituency of forest users would make a more effective lobby in the state legislature. Few would argue that a larger, unified voice is more easily heard than smaller, separate and conflicting ones.

Another recognized impediment to greater awareness and support is a lack of availability of appropriate educational information. DEP, as well as user groups and many other stakeholders in Connecticut's forests provide information in the forms of hikes, workshops and presentations, brochures/booklets, posters, websites, blogs, articles, etc. However, many of these separate entities provide materials on a limited basis that may not see widespread distribution, or are produced with inadequate and or inaccurate information. As a result, while many citizens may grasp that the forest provides some intangible benefits in all our daily lives, they may not understand the degree to which our forests directly affect our quality of life in many areas, including air and water quality, climate mitigation, and even property values.

b. Lack of funding for outreach programs

A challenge that is obvious in these difficult economic times is a lack of funding of outreach programs. Since the beginning of the recession, dwindling resources have resulted in cuts to programs not considered "essential". The National Environmental Education Fund Act, which in 1996 technically expired, has seen repeated dramatic cuts in the past five years, which has directly affected programs and funding availability for outreach in Connecticut.

c. Lack of environmental educators

Related to the above obstacle is a lack of time teachers have to implement environmental education programs and disseminate related materials. With the current "No Child Left Behind" federal act, school districts' funding is closely coupled with how well their students score on standardized tests. Many teachers and administrators share that this pressures them to teach the content that their students will find on these tests – environmental and conservation content has been left on the sidelines as its content is not tested. Many teachers have had to cancel outdoor and other field trips so their students have time to prepare and study for the test. Even professional development workshops for teachers must show a strong correlation to standardized test content, specifically reading, writing, and mathematics. With this focus on testing and preparing for testing, there is little time or even priority given to environmental education in the schools.

d. Getting youth outdoors

The changing "culture of childhood" is a distinct impediment to the current and future support of forest health objectives. It is widely reported in the media that America is experiencing a national epidemic of obesity, which includes childhood obesity. On average, children of today do not actively play in the outdoors as much as previous generations, a topic discussed at length in Richard Louv's book *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. In his book, Louv cites a 4th grader's reasoning: "I like to play indoors better 'cause that's where all the electrical outlets are." The apparent challenge in this electronic age is to encourage children to spend more time outdoors, a challenge that the Connecticut DEP "No Child Left Inside" program is attempting to address. This objective is critically important to the future of forest management and forest health, as the children of today will become the recreationists, policy-makers, professionals and citizens of the future. A disconnect from the forest environment has obvious negative connotations for the future of the forest.

e. Reaching Private Forest Landowners

Private landowners control 85% of Connecticut's forestlands. Many of the challenges that need to be addressed relate to information not being readily available or accessible. Today it is clear that many private landowners don't understand forestry principles and management techniques,

the effects of fragmentation, and the important role that their forestlands can play on the quality of life for everyone in Connecticut. Positive incentives are needed to outweigh disincentives for retaining and managing private forests. Education and incentives require a combination of materials and programs made available, possible legislative changes, and greater assistance by Connecticut DEP and its partners in facilitating greater private landowner awareness and participation in forestry.

In summary, promoting greater public awareness and support of forests will likely include making the message more standardized and coordinating all stakeholders more effectively through greater communications and partnerships. At the same time, making educational information more readily available, increasing outreach in the educational system and to private landowners, and promoting programs to get kids outdoors as much as possible, are all separate but related and essential for reaching more people and garnering more long-term support for forests. In a time when both financial limitations and pressure on the forest resource are both greater than ever, it is also more important than ever before to support a thorough and aggressive approach to promoting public awareness through greater coordination and partnership efforts, and adequate funding and staffing of appropriate outreach programs. This may become the most critical component of conserving forests for Connecticut's future and promoting long-term forest ecosystem health, as support of the public and forest landowners is essential.

Issue 7. Advocating and Implementing Effective Forest Planning and Policy

Forest planning and policy in Connecticut is dominated by one social-economic force. Per capita incomes outside the major cities is among the nation's highest, which means that rural and semi-rural land values for residential and commercial development are high and rise more rapidly than the economy. The state does have several incentives to maintain forests as working landscapes and open space, including reduced property taxes and reasonable outreach technical support. Timber investments and other reasons for owning forestland make sense as stand-alone economic activities; however, forest use cannot compete with development alternatives in terms of returns to ownership.

Overcoming this economic context is yet more difficult because of the structure of local governance and planning, regional threats from insects and diseases, a less than complete implementation of the state's Forest Practices Act, and inconsistent application of municipal inland wetland regulations that adversely impact forest practices. Sustainable forestry in Connecticut requires decoupling development rights from the bundle of property rights on larger forest tracts. Tax incentives, working closely with local land trusts and a coalition of non-profits, and other strategies will be required to accomplish this shift. Regional movements, like the New England state foresters' forest initiative, the *Wildlands and Woodlands* effort, and *Tree Farm* participation as a means of sustainability certification, will provide new ideas and support to Connecticut efforts to move toward sustainable forests.

Some details on the issues and possible solutions follow in the next sections.

Lack of comprehensive land use plans
A common description of Connecticut is as the most bottom-up state in the union because of its strong legal and political traditions of home rule by the towns. The state eliminated the county layer of government many years ago, so there is no governmental layer between the 169 towns and the state. Some regional thinking, planning, and implementation exist and the legislature and Governor encourage more regional actions. However, regionalization of land-use and resources planning in the near future is highly unlikely. Consequently, several symptoms of poor planning and policy will persist.

a. Inconsistent planning, zoning, and building regulations
In Connecticut, town planning and zoning commissions generally are composed of volunteers. The Town Planner, where one exists, is a professional and often has responsibility for economic development. While considerable guidance and training are available, these volunteer boards tend to develop their own standards of what is acceptable land use and planning for future uses. The variations are amplified if inland wetlands, conservation, or other duties fall to the Planning & Zoning committee.

Building regulations are somewhat more uniform because of fire codes and other standards required for insurance and state support.

b. Ecosystem and habitat issues that cross town boundaries
While there is no necessary requirement to plan across town boundaries, many examples exist where the need was obvious, and local leaders on both sides of the boundary saw an opportunity. In eastern Connecticut, many town conservation and planning leaders receive training to look for

connections that already promote corridors across two or more towns. Public forests, parks, and wildlife refuges are such connecting elements. The Blue Blazed Hiking Trails and the Appalachian Trail are obvious connectors. Rivers and streams, ridges and valleys, and road systems are other natural and infrastructural connectors that lead to cross-boundary thinking about ecosystems and habitats. In some cases, like the regional Highland Studies that connect western Connecticut to other states, research results can encourage thinking beyond local boundaries.

c. Use of open space lands designation within towns

Towns vary widely in their recognition of open space. Passage of Public Act (PA) 490 in 1962 was to encourage retaining farms and forests as open space. Property taxes are levied using values that reflect croplands, pastures, forests and other agricultural land uses as the "highest and best" use value. Several towns also take advantage of the PA 490 open space category, which allows a tax rate higher than agriculture but considerably less than development for residential or commercial purposes. The advantage of this optional category is to encourage smaller open spaces than those required for PA 490 categorization as forest (25 acres) or farmland (usually 10 acres).

Some towns have set open space goals and are actively acquiring land or conservation easements to meet their goal. The strategies vary among towns. Mansfield, where the University of Connecticut, Storrs, is located, acquires open space using funds from bonds. Granby, located just west of Bradley International Airport, works collaboratively with the Granby Land Trust to acquire lands or easements that protect open space in critical areas and corridors. In both cases, the town has permanent open-space goals in the neighborhood of 25%, but history and circumstances have led each to different ways of achieving results. This kind of successful experimentation, coupled with sharing of results by Town Planners, is one of the advantages of home rule and lack of rigid processes dictated by higher levels of government.

d. Interpretation and implementation of regulations

Several inconsistencies flow from the home rule approach to resource planning and regulation. The volunteer boards are often ill informed on facts or scientific knowledge about forests, water, and other natural resources. As is true in many states, water quality issues for domestic use, fish, inland wetlands, and coastal zones direct land use decisions. Coupled with ideological views on any forest harvesting, clearcutting in any case, or specific notions of "proper" silviculture, local boards can misinterpret their authority or simply make rulings with no basis in fact or science.

While forestry practices are permitted "as of right" agricultural practices, that determination is not self executing. Local Inland Wetland Agencies are legally entitled to review any proposed activity which may affect a wetland or watercourse to determine whether such activity is regulated or qualifies as permitted "as of right". An interesting inconsistency often is observed between proposals for clearing for cropland or pastureland and proposed timber harvesting. Many Wetland agencies fail to make the connection that timber harvesting is legally identified as an agricultural practice as is clearing for cropland and, often require the proposal for timber harvesting to include burdensome information and to go through the several week application and permit process, while the clearing proposal will receive the permitted "as of right" ruling quickly.

In some towns, the P&Z committee gets involved in forestry decisions. With the emergence of wetlands issues, however, this overlap of jurisdictions is less frequent. Conservation Commissions and Agricultural Commissions can express interest in forestlands, but in general their interests are in support of forest stewardship and protection of open space.
In a few cases, towns have considered and, in at last one instance, passed town forest regulations. Twenty towns had some regulations before the Forest Practices Act passed in 1991, and they are "grandfathered" in the state legislation. The fact that the DEP has not developed and implemented statewide regulations has prompted some local discussion to try to force the hand of the state legislature and DEP.

One result of a town issuing regulations a few years ago was an ad hoc committee working under the State Forest Practices Advisory Committee to look at potential for agreement on a set of regulations. The committee included practicing foresters, timber harvesters, and a variety of research and other professional forestry interests. The committee did not reach consensus on specific regulations or on the roles of foresters and loggers in marking trees for harvest. However, it did develop a *Timber Harvest Notification* form for use by towns. Landowners would both notify the Inland Wetland Commission with the intent to harvest timber and provide adequate information for the commission to establish whether its concerns justified it having jurisdiction to review a harvest plan before implementation. This is not an official Connecticut DEP form but it has been endorsed for town usage by Connecticut Farm Bureau Association, Connecticut Forest & Park Association, the Connecticut Professional Timber Producers, the Society of American Foresters – Connecticut Chapter, and others. The form is currently circulating to towns in the state. Adaptation and use would be voluntary. For the foreseeable future, using the form would not be required by the state.

Forestland Protection
There are two broad dangers to Connecticut forestlands: 1) invasive species, and 2) parcelization and fragmentation. Like most states, we face invasives that might devastate major species or types in a short time – e.g., Asian longhorn beetle or emerald ash borer – or over long time periods – e.g., invasive plants like wild rose or Japanese barberry or climate change and slow northward shifts in natural ranges of forest species. These threats present technical and policy challenges, but the state can share its results and benefit from the experience of others.

The state is fortunate to have the oldest agricultural experiment station in the nation with the oldest state-funded forestry research program. The Connecticut Agricultural Experiment Station also has quality programs in invasive insect species, invasive plant species and diseases, and Chestnut breeding. The USDA Forest Service Laboratory in Hamden, focused on forest insects, amplifies this expertise.

Additional research resources are at the University of Connecticut and the Storrs Agricultural Experiment Station. The Department of Ecology and Evolutionary Biology is among the nation's top 10 programs, and the Department of Natural Resources and the Environment is a rapidly developing unit. Yale's School of Forestry and Environmental Studies has a research forest in Union, Connecticut, and several other private colleges have research on forest habitats, birds, and habitat ecology. All of these resources are concerned with ecological changes that increase the probability of threats.

The second danger is common throughout the Northeast, Mid-Atlantic, and Atlanta/Southeast and other areas where urbanization of rural lands is forcing land prices up relative to other resource values. Parcelization of ownerships, fragmentation of forest cover and development for residential or commercial land uses follows.

PA 490 was a pioneering effort to encourage forest and farm uses to continue and provide open space values through private land ownership. More recent uses of Forest Legacy, land trust, and other sources of funding to purchase lands and conservation easements are important responses to recognizing that timber values no longer can carry a working forest in the face of high land values for development.

Overall, however, Connecticut does not have adequate resources to protect working and preserved forestlands as open spaces. The annual Connecticut Forest Forum, the Connecticut Forestlands Council, and several emerging policy initiatives, like the Wildlands and Woodlands initiative for New England and the New England State Foresters Forest Initiative may coalesce into more effective policy vehicles for funding and acquiring development rights on private forestlands. If these efforts prove effective, it will be because they shift the action balance from reactive to proactive approaches.

Forest Practices Act

Connecticut passed a Forest Practices Act in 1991. It authorized licensing of professional foresters and supervising harvesters, a forest practices advisory committee for the state forester, an ethics review process, and state forest practice regulations. The first two were in place shortly after passage of the law, but the ethics element took several years to gather consensus and put in place. To date, formal forest regulations have not developed with a consensus to implement. However, the *Notification of Harvest* form was promulgated by a coalition of non-profit organizations and shows some signs of becoming common practice in many towns.

Incentives for Sustainable Forestry

Connecticut has support services for private forest landowners and it has a professional cadre in charge of state forest, park, and wildlife lands. In both cases, the human resources are solid, but considerably less than two to three decades ago. Public funding of forestry and forestry support programs has declined dramatically over the years. Given the poverty, education, and other problems facing the state and the predicted budget shortfalls for the coming decade or more, it is highly unlikely that public forestry programs will increase in strength.

The state already has essentially eliminated the property tax on forestlands. An archaic 10-Mill tax law needs a resolution to preclude some 14,000 acres of larger ownerships being parcelized and fragmented, but hopefully this issue will be resolved this year or next.

The least expensive social mechanism to protect forests as open space is to encourage working forests. The current property tax policy is excellent, but some additional tax incentives would be helpful. A federal deduction for donating conservation easements on land called, the Enhanced Easement Incentive expired in 2009. It allowed the value donated to be deducted over a 16-year period, which is important where large values are involved. This tax benefit can be especially important in Connecticut where the difference between land values for development vs. working landscapes often is enormous. As of March 10, 2010 the House and Senate have both passed a one year extension until December 31, 2010 that would be retroactive to the beginning of this

year (LTA). Opportunities to lower the acreage requirement for PA490 could encourage additional protection of forest lands, as long as the acreage requirements allow for economic feasibility for land management activities.

Another mechanism would be modifying the state tax code to favor donating lands and easements for conservation and open space purposes. Connecticut does not allow deductions for charitable gifts. This proposal would allow deduction of up to half the taxpayer's adjusted gross income for gifts and bargain sale prices on lands and easements over a 16-year period. This is an inexpensive way to capture open space without direct expenditure of public funds.

Some changes are less forest policy ideas than broader changes in social policy that would reduce the incentives to sell parcels and fragment large forest ownerships. These include Smart Growth initiatives, a revised transportation policy, improved city environments, especially schools, and more comprehensive planning and zoning at the town and regional levels help. None of these are the conventional topics of forest policy, which reflects the realities of high rural land values. Forest landowners and professional foresters should look to town planners, regional collaboration, mass transit advocates, land trusts, and environmental organizations as potential allies in changing land use policies.

Payments for the public goods produced by private lands, like carbon sequestration, watershed protection, and wildlife habitat, would encourage working forests. A simple version would pay a set amount per acre annually to any forest owner who has a forest stewardship plan and agrees to a rolling 10-year restriction on development. The annual payment might be significantly higher for owners who place a conservation easement on their property. These payments probably cannot be high enough to compensate for the current low ratio of timber prices to land values in Connecticut, but they would help justify maintaining working forests as open spaces in the state.

Habitat mitigation might develop for some rare or endangered species in Connecticut. In the South, for example, Cockaded Woodpecker habitats can be bought and sold through mitigation. If an owner wants to harvest a woodpecker habitat, she can purchase a habitat guarantee elsewhere to mitigate this loss.

Professor Chad Oliver at Yale suggested another incentive for forest owners. If the state or a town (or a private organization, such as The Nature Conservancy) wants more of a particular forest type, such as an early successional stage or a savannah, it could pay landowners to produce the desired result. The purchase agreements might be for 10, 15 or 20 years – depending on how long a landscape can easily be kept in the desired stage of stand development.

New policies will not be adopted without appreciation for the importance of forested landscapes by taxpayers. To this end, the state could use existing extension, outreach, and nongovernmental organizations to help Connecticut's residents understand and better support working forests. The capacity is in place for such an educational effort. What is needed is effective leadership of a broad coalition of interests.

Carbon Sequestration and Climate Change

Connecticut was a leader in establishment of RGGI (Regional Greenhouse Gas Initiative) that establishes a "Cap and Trade" system for several Northeastern and Mid-Atlantic States. While some carbon-offset credits are possible, the system is primarily concerned with reducing CO2

emissions from large-scale electric power plants that serve the region. Although some evolutions of the system may give more favorable treatment to sequestration of carbon by local forests, this is unlikely to be a major source of incentives to practice forestry over the coming decade or two.

While moving toward maturity, Connecticut forests generally are still sequestering considerable carbon. In a growth curve sense, the biomass and carbon accumulation is around the inflection point of rapid accumulation, not in a stage of rapid decline. This trait suggests some alternative mechanisms to provide benefits to Connecticut forest landowners.

One might be shifting the policy attention from "Cap and Trade" systems to Carbon Taxes. Because taxes have become a dirty word in American policy discussions, we might call this a 'Carbon Tipping Fee," like tipping fees at dumps and recycling centers. The critical element is charging fees for the discharge of CO2 and rebates would be given for sequestering carbon. As Connecticut is growing twice the volume it removes each year, collectively state forest owners would receive a 200% rebate on taxes paid for carbon removals. The measurement of the net and allocation of benefits provide some challenging details, to be sure, but moving to a carbon tax is more equitable and strongly favors forestry over many other carbon-sequestering activities.

Markets for carbon offsets might develop where a Connecticut forest owner could sell the right to harvest for 20 or 50 years. The net annual accumulation of carbon over that period would be sequestered carbon, and not harvesting precludes the immediate and slow flows of CO2 as wood and fiber deteriorate.

State and Local Regulations

The DEP Landscape Initiative summarizes the situation: "Land use decisions in Connecticut are, by custom and by law, primarily made at the local level by volunteer land use boards and commissions. There are many other stakeholders in these decisions, from the developer, to the municipal finance board, to the neighbors and the local voters. Encouraging, supporting and promoting informed land use and development conversations, choices and decisions is a complex but important challenge that is vital to address."

Issue 8. The Importance of Ongoing Forest Research

The time frame associated with forest growth and development, forest influences and forest vegetation responses to disturbance and change demands long-term/multi-year commitments to the pursuit of forest biology and ecology research questions. Public funding for research efforts is often short-term, especially those funding sources that are competitively structured. Developing and sustaining a comprehensive, collaborative (multi-partner) long term research initiative in Connecticut to address key forest resource questions demands the ability to recruit and retain talented researchers, supportive infrastructure, and a commitment to maintain experimental endeavors as needed.

a. Biological Research-The need for more within Connecticut

Forest biology and forest ecology research topics of importance in Connecticut forests include:

- Invasive species influences and control methods
- [Any number of] forest pests and diseases
- Impact of white-tailed deer on forest regeneration and native wildflowers
- "Micro-disturbance" responses related to small-scale management activities on smaller parcels
- Optimum species mix for growth and productivity by forest patch size
- Earthworm, non-native species and atmospheric soil chemistry influences
- Pollinator roles and habitat
- Predator/prey interactions between birds and insects
- Species responses to higher temperatures, higher precipitation and more intense storm events
- Stand-level responses to the above.
- Forest mitigating influences on the above.
- Carbon budgets at all forest growth stages and types.

b. Social Research-Need More Specific To Connecticut and How Social Behavior Impacts Land Management Actions

Social research topics of importance in Connecticut include:

- Demographics of forest landowner population
- Intergenerational transfer
- Local markets for locally grown forest products
- Effective public messages (see below)
- Landowner attitudes about [numerous topics that affect their land and the satisfactions they derive from owning it]
- How state and local regulations influence forest retention/perpetuation

c. Need for effective dissemination/extension of research information

Communications research can address:

- Audience segmentation
- Effective media use
- Message tailoring
- Metrics for gauging responses to outreach efforts (attitude or behavior change)
- Metrics for measuring engagement by individuals and/or groups
- Adaptive management for communication efforts
- Eliciting appropriate emotional responses

Issue 9: The Role of Urban Forestry in Connecticut

Since *urban forestry* concerns itself with the management of public trees outside of the forest, funding is the major limiting factor. It is apparent that many of the trees in our larger, older cities are the legacy of a time when a much larger proportion of the municipal budget was allocated to urban trees. In most Connecticut cities and towns today, those who manage the public trees are barely able to keep up with the problems that arise. Once common practice, proactive management is simply no longer in the budget. More funding would mean more staff, more equipment and, in the end, a healthier and more extensive urban tree canopy.

a. Liability

The benefits of trees in the urban setting are well-documented, as they improve the quality of life in numerous ways. An unhealthy urban forest, however, not only detracts from the quality of life in the community, but also creates great expense for the municipality in tree removals, clean-up, and other *reactive* forms of necessary maintenance due to a lack of proactive management. Even worse, this neglect can result in dramatic levels of liability and potential lawsuits, should significant property damage and injury be correlated to relative care of the trees. In the end, the municipality could pay far more than a properly-funded proactive urban forestry program as a result of the cutbacks. Therefore, increased funding is ultimately critical to the urban forest and its municipality, both in the area of education/outreach, and maintenance budgets.

b. Health Threats

One limitation of the urban forestry program is its tendency to inadequately focus on private trees and private tree owners. Again, increased outreach and communication could broaden the program to target private trees and their owners, which are also critical to a healthier urban forest environment.

Direct threats to the urban forest include several of bio-physical problems – from invasive plants and animals, including new insects and diseases, to storms and increasingly challenging urban environments. Indeed, decades of work can be lost from just one storm or one exotic insect. A single continual awareness of potential problems, a commitment to planning and steps taken for preparedness are all needed to be in a position to deal with these threats when they arise. Meanwhile, there are human-derived threats to the urban forest that need attention.

Humans can threaten the urban forest by neglecting it, by making poor decisions during an effort to manage it, or by setting the urban forest too low on the priority list when compared to other competing needs. Each form of threat brings it own set of problems.

Neglecting the urban forest often means not funding its growth and maintenance. As a result, trees can degrade to a point where they become a hazard to the public, leading to accident and injury, followed by calls to remove large parts of the urban forest. Poor decision-making can lead to poor tree choices, poor planting efforts and the wrong tree in the wrong place. These, in turn, can lead to major wasting of money, time and effort.

In addition, there is a lack of understanding and appreciation for the importance of soils, coupled with the steady depletion of the soil resource in both cities and suburbs. In particular, the stripping away of quality existing soils is often part of the construction process in new developments.

Similarly is a lack of recognition of what trees do, or can do, if properly planted and maintained. Trees are too often seen as simply an amenity and not as a working part of the urban ecosystem, making invaluable contributions to the lives of the people who live and work in proximity to those trees.

Following bad decisions or a bad storm, there is a tendency on the part of the public to move away from trees, due to a loss of confidence in them. Trees can also be an ongoing hazard in a city, especially when maintenance is lacking. Trees can be considered a nuisance, as a source of allergens and litter. Societal growth is also causing a rapid rate of change in the environment that often leads to compromised trees, early tree removal or the neglect and failure of trees not allowed the opportunity to adapt to changes.

c. Education

Access to increased funding would not solve all of the problems of today's urban forest. One consistent limitation to proper urban forestry in both the public and the private sectors is the state of knowledge regarding trees and tree care. Too many people know less than they think they do, and many bad practices are a result. These practices extend to where trees are planted, what trees are planted and their care and maintenance. Ongoing education, particularly of public tree managers, is needed to overcome these problems.

d. Volunteerism

Urban forestry depends upon people, and one of the best ways to advance urban forestry is to encourage more people to be involved with urban trees, in their appreciation, their planting and their care. Despite some progress, urban forestry is still limited in this area. Greater inclusiveness, particularly with regards to volunteer programs, would be very beneficial to any urban forest program. In turn, this highlights the need for better communication programs, at many levels.

Indeed, the need for volunteer input is critical. Often, volunteer and volunteer groups serve to initiate and sustain urban forestry efforts in communities. The emphasis on volunteers brings its own difficulties, including that of keeping volunteer efforts ongoing, especially when the effort is dependent on one or a few people.