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How Can Conservation Help? Using Land Conservation to Address Other Economic and Social Issues

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YALE PROGRAM ON STRATEGIES FOR THE FUTURE OF CONSERVATION

How Can Conservation Help? Using Land Conservation to Address Other Economic and Social Issues

2007 Workshop Summary and Background Materials

Pocantico Conference Center, Tarrytown, New York, June 8-10, 2007
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[1] This publication is not intended to provide a transcript of the workshop proceedings, but rather the editor's and authors' impressions of the main themes discussed, as well as some of the major potential areas for further work by Yale F&ES, LTA and other participating organizations. As such, the opinions expressed herein are solely those of the editor and the individual authors and do not necessarily reflect the views of Yale University, LTA, the Rockefeller Brothers Fund or any of the other participants.

SECTION 1: SUMMARY AND INTRODUCTION

Executive Summary

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The June 2007 Pocantico workshop on "How Can Conservation Help?" was a deep dive into possible sources of new partners and approaches for private land conservation. Using the northeastern U.S. as a focus, experts offered powerful insights on how land conservation could help to address regional competitiveness, rural economic development, urban revitalization, energy security, climate change, and human health. The workshop allowed conservation leaders to consider fundamental drivers of land use change and explore ways to surf with those drivers rather than always swimming upstream against them.

The experts' presentations sparked a wide variety of new ideas and connections for using land conservation as a tool for helping to solve other social and economic problems.

While a broad range of topics were covered, three focal points may be particularly useful to summarize:

What major trends in the northeastern U.S. are impacting land use and conservation?

Included are: a growing population and the resulting demand for more housing; the need to attract and retain an increasingly mobile, educated workforce; increased stratification of income affecting the affordability of land and housing; a changing climate and the need for more efficient use of energy, transport and land; new pressures on land from a changing energy base; and increased concern over human health issues, particularly for children.

How might the land conservation community consider surfing with these trends?

Building from the community's core strengths (doing deals, managing land and having bipartisan local appeal), land trusts might consider: helping to catalyze community conversations about their goals for land use; speaking for the values of open spaces; doing new types of deals with a wider array of partners; and managing lands so as to build broader community support.

Where are the current opportunities for actually doing so?

Possibilities include: using conserved spaces to help enhance human health; deciding what types of residential development to support; supporting the creation of population centers within networks of greenspaces and transportation corridors; helping with the greenspace portions of efforts to revitalize underutilized sites; exploring shared interests with Community Development Financial Institutions; supporting policies that pay the managers of natural areas for the services they provide; making the connection between land use and climate change; supporting the siting of renewable energy facilities in the "right" places; partnering with the community-supported agriculture/slow food movement; developing new metrics of success around human connections; re-thinking methods of determining the "appropriate" levels for human use of conserved land; deciding whether and how to make the land trust community more of a player in land use policy; developing tools that can be used by local land trusts in support of these efforts; and, more generally, expanding the conversations with new parties about innovative ways green/natural/open spaces might be used to help solve other pressing issues.

This report includes both the materials prepared by the experts and graduate researchers from Yale, as well as a more detailed summary of the workshop discussions.

Introduction and Background

Conservationists have long wondered how best to mobilize different sectors of society to protect natural places. This workshop took the question and flipped it around, asking instead, "How can conservation promote other social and economic goals?" In other words, what can the land conservation community do to help further essential objectives such as economic opportunity, national security and public health?

Opening Doors with a New Approach

By flipping the question around, several things become possible for the land conservation community:

Broadening the base of support by demonstrating what conservation has to offer potential partners

Privately-funded conservation has had great success in protecting land. More than 1600 land trusts have protected over six million acres in the last few decades. However, there is a realization in the conservation community that the model of "bucks and acres" alone cannot succeed at the scale needed. Despite the conservation community's success at fundraising (The Nature Conservancy alone now has an annual budget of over $1 billion), its funds do not match the resources available to developers, especially as land becomes more scarce and expensive. At the 2006 Pocantico workshop,[1] participants identified a broader base of support as key to leveraging these limited resources for land protection.

While the U.S. population supports conservation, it is but one concern among many. When voters elect public officials, their decisions are often driven by issues

[1] Strategies for the Future of Conservation: 2006 Workshop Summary and Background Materials. *Pocantico Conference Center, Tarrytown, New York, June 8-10, 2006*. Hosted by the Land Trust Alliance and the Yale School of Forestry & Environmental Studies. Bradford Gentry, Rebecca Sanborn, and Gordon Clark. Report 15, Yale School of Forestry & Environmental Studies Publication Series, 2007. Copies can be downloaded or ordered at www.yale.edu/environment/publications. Click on Environmental Politics and Management.

such as the economy, national security and healthcare. Organizations that deal with those issues often have considerable influence and resources. If the conservation community can recognize its potential role in promoting other key American values and build partnerships across different constituencies, it may become even more effective in promoting its conservation objectives.

Gaining a broader perspective on the drivers and consequences of land use change

During the 2006 Pocantico workshop, Richard Rockefeller challenged the land trust community to step back, consider global drivers of land use change, and find ways to "surf with" those drivers rather than swim against them. In order to do so, the conservation community needs to place its own goals in context, recognizing the multiple motivations for and consequences of land use change. New collaborations and opportunities should be a natural outgrowth of this effort.

Ensuring permanence

Permanence was another key issue identified in the 2006 workshop. No matter how robust the legal rights involved, lands will not be indefinitely protected from development or degradation unless the communities in which the lands sit see value in their continued protection. While land use policy is an area that some land trusts are now entering, the increasing incidence of eminent domain being exercised on open spaces, as well as the limits being imposed on land use regulation (e.g., Oregon's Proposition 37), illustrate the need for continued protection of the land at a variety of levels. Connecting the dots between land conservation and other societal goals may help ensure that protected land remains that way into the future.

Striving toward inclusive conservation

Success in land conservation increases people's well-being, both near and far. This has always been a core value of conservation, but the field has struggled to shed its reputation as an elite movement, catering primarily to people who are wealthy, white and older. By forging links between land conservation and broader societal objectives, such as economic opportunity, quality of life, national security, and children's health, conservation can demonstrate its wider relevance. One hope for this workshop was to spark further discussion on how to bring new groups into the conservation community, while still maintaining its central mission – of protecting the natural landscapes that have sustained people spiritually, mentally, physically, socially and economically for generations.

Workshop Organization

The June 2007 Pocantico workshop on "*How Can Conservation Help?*" engaged on all of these fronts:

- identifying new conservation opportunities hidden in the broader drivers of land use change; by

- listening as experts from other fields offer their thoughts on how land conservation might help address a variety of other problems affected by land use; and then
- brainstorming on new ways to use land conservation as part of the solution to these broader issues.

Participants were drawn from two groups: external experts and conservation leaders (see Appendix for list of participants). Experts on each of the problem areas noted above were asked to prepare a short piece on the following question, for circulation to the group: "How might private land conservation help address [the problem on which you are working]?" Their essays (along with background papers prepared by Yale graduate researchers) are included in Sections 2-7 of this report:

Regional Competitiveness: Lynn E. Browne, Federal Reserve Bank of Boston

Rural Economic Development: Keith Bisson, Carla Dickstein and Ronald L. Phillips, Coastal Enterprises, Inc.

Urban Revitalization: Jonathan Rose and Munsun Park, Jonathan Rose Companies LLC

Energy Security: Daniel Reicher, Google.org and Michael Totten, Conservation International

Climate Change: Dan Sosland, Environment Northeast

Human Health: Frances E. Kuo, University of Illinois at Urbana-Champaign

Each expert was also asked to kick off his or her discussion session by suggesting a few approaches for the conservation community to consider (see Summary Agenda in the Appendix).

Leaders of conservation organizations were invited to listen and engage in the brainstorming, as were academics working on strategies for the future of conservation. A facilitator experienced in land issues was retained to keep the discussion focused on generating new approaches to land conservation as part of the solutions to these broader social issues.

The Northeastern United States was chosen as the geographic focus of the discussion, to help ground the notion of global drivers of land use change in a local context. Background information on trends in the Northeast "mega-region" was provided by Petra Todorovich, Director of the America 2050 Program[2] at the Regional Plan Association of New Jersey, Connecticut and New York (RPA).[3] Among the points she highlighted were the following:

- the Northeast mega-region contains 17 percent of the U.S. population, living on 2 percent of the land area.
- 18 million new people are expected to be added to the 49 million already living in the Northeast mega-region, by the year 2050.
- the fastest growth is expected to take place in exurban and suburban areas through the conversion of farmland and forests to housing and other uses.

[2] http://www.America2050.org

[3] The RPA's goal is to move the Northeast from being seen as "old, cold and crowded" to "green, connected and competitive" by campaigning for improvements in the Northeast transit corridors, supporting the Northeast's Regional Greenhouse Gas Initiative (RGGI) to increase energy efficiency and cut emissions, and collaborating with land trusts and other conservation groups to create a Northeast Landscape Conservation Initiative across the region.

- the most productive agricultural land is nearest to cities and most at risk.
- the costs of housing and energy in the Northeast are higher than the national average.
- lower-income families are concentrating in the inner ring suburbs, former manufacturing towns and exurban areas.
- middle-income households are settling at the fringes of metropolitan areas as they travel greater distances to find affordable housing.
- commutes are getting longer throughout the region.

Many of the trends Ms. Todorovich enumerated are echoed in the experts' essays and other background materials in this report (see the following chapters). Together, these provide a clear context within which to discuss land conservation and how it can contribute to solving some of the major issues of the region.

SECTION 2: REGIONAL COMPETITIVENESS

Thoughts on Land Conservation and Regional Competitiveness

Lynn E. Browne
Federal Reserve Bank of Boston

History provides numerous examples of societies that undermined their economies by failing to preserve their land and natural resources. In many cases, individuals could not see the consequences of their actions, because these consequences were not visible at the time and because each individual's contribution to the problem was small relative to the collective and cumulative impact. We still see instances, particularly in the developing world, of peoples failing to preserve resources, with dire consequences for economic activity. And even in the northeastern United States, the collapse of fishing stocks from over-fishing and the impact on local fishermen remind us that we are not immune to these problems.

Fortunately, in the United States, our diversified economy, our mobility, and our technology have enabled us to overcome many of the adverse consequences of our use of land and natural resources. Individual communities may still be at risk, with water supplies being a particular source of vulnerability. But in general, we change jobs, we move on, or we use technology and money to fix the problem. The economy continues to grow and standards of living, at least measured in terms of goods and services, continue to advance.

LAND CONSERVATION AND REGIONAL COMPETITIVENESS

So what is the link between land conservation and regional competitiveness, and more specifically, a region's ability to generate employment opportunities such that residents enjoy low unemployment and high living standards? The thoughts below are based on my observations of New England; however, I believe they also apply to other parts of the Northeast.

The primary link between conservation and competitiveness, in my judgment, is through quality of life. For the 30 years I have been following economic developments in New England, the region's quality of life has been consistently? cited as a critical competitive asset. Key elements of this quality of life are the physical beauty of the region's fields, woodlands, mountains and oceans, and the diverse recreational

opportunities associated with this landscape. Further, these amenities are in relatively close proximity – even within – the region's population centers. A special feature of New England is the hilly terrain and woodlands that can create a sense of seclusion even when one is literally next door to development.

Quality of life helps New England attract and hold workers. Quality of life is believed to be particularly important in helping the region compete for professionals and other highly skilled workers for whom the labor market is national and even international. Quality of life is also a lure for executives who make decisions about business locations. Examples of important location decisions that were strongly influenced by the region's recreational opportunities and scenic beauty include IBM's building a plant in Vermont in the 1950s and credit card bank MBNA's opening a call center in Maine in the early 1990s. The tourist industry in New England is also based substantially on the region's scenic beauty and recreational opportunities. By helping to preserve the New England landscape, land conservation contributes to regional quality of life and thus to economic development.

But how much does conservation contribute? Although quality of life is routinely cited as an important competitive asset, and although marketing brochures promoting New England typically feature the region's beautiful and diverse scenery, assessments of its importance are largely qualitative and subjective. Part of the reason is that many factors enter into quality of life and tastes differ, so that areas lacking in natural beauty and open space may still offer amenities that many people find appealing. Thus, in arguing that land conservation supports regional competitiveness, we may cite economic arguments – and cite them with great conviction – but much of the passion comes from our values and how we personally value open space and natural resources and the ability to use this land in particular ways and not from rigorous studies establishing the linkage.

GROWING CONCERN ABOUT THE HIGH COST OF HOUSING

Concern about land conservation appears to be growing among the public in New England. Although recent rates of population growth and housing construction in New England have been considerably less than in most regions, the cumulative effect of decades of relatively low-density development has changed the landscape considerably, particularly in southern and eastern New England. Much open space has been lost. New England communities are spreading into one another and losing their distinctive characters.

At the same time, there is increasing concern in New England about the high cost of housing. While housing prices in many parts of the country rose rapidly over the past ten years, appreciation was particularly rapid in New England. The region's high cost of housing, it is argued, is a competitive disadvantage. It encourages out-migration, particularly of younger people, and forces businesses to pay higher wages in order to compensate workers for the higher housing costs.

Several recent studies of housing prices have emphasized the role of restrictions on housing construction in driving up costs. Given an increase in demand, prices will

rise more where increasing the supply of housing is difficult. While natural barriers, such as lakes and difficult-to-develop terrain, can limit the supply response, the studies have focused on man-made restrictions on density and the supply of developable land. The conclusion drawn from these studies is that more housing is needed in order to contain the growth in housing prices. They have tended to stress the role of large-lot zoning in restricting construction and have not focused on acquisition of open space. However, since housing is the most likely alternative use for much of New England's most vulnerable open space, arguments that the region's competitive position is being undermined by a lack of housing strengthen the position of those who wish to develop this land.

The concern about the effect of high housing prices on competitiveness is fairly recent. Twenty-five years ago, prices in New England were not especially high compared to other regions. When housing prices did begin to rise rapidly in the mid-1980s, this was seen as evidence of the region's economic success, an indication that people wanted to live in the region. Even in the late 1990s, rising home prices were interpreted as a sign that the region was doing well economically. However, slow job and population growth in southern New England since 2000 have raised anxieties about the region's competitive position. At the same time, Vermont and Maine have become concerned about the aging of their populations, and much of the discussion has focused on how the high cost of land is pricing young people out of their states.

Given New England's slow economic growth and concerns that high housing costs are contributing to this, some of the arguments that are commonly used to justify land conservation can be turned against it or portrayed as elitist. That land conservation makes an area more attractive and that this increased attraction may be reflected in higher property values is no longer an unambiguously positive outcome, as higher housing prices make the area less affordable to newcomers. Similarly, arguments that preserving open space holds down the demand for public services and, thus, is less costly in terms of the long term impact on local property taxes than development can be characterized by opponents as anti-growth – and, in New England, as anti-child, since school expenditures are the most important public service provided by most communities.

Nevertheless, residents of many New England communities are supportive of local land conservation efforts and have voted to increase their property taxes, at least in the near term, in order to purchase and preserve open space. Residents enjoy the direct benefits of open space in close proximity to where they live. Home-owners benefit from any appreciation in housing values attributable to open space. In addition, many accept the argument that, over the long run, residential development imposes more costs in public services than it generates in tax revenues. School costs and the effect on water supplies are particular concerns. However, at the state level there is an increasingly vocal chorus arguing in favor of more housing construction and implicitly, if not explicitly, against actions that would restrict housing supply – builders, businesses concerned that high housing costs are affecting their ability to recruit and retain workers, public officials concerned about slow population growth and a declining share of younger people.

Although New England may be unusual in that housing costs in many communities are high while economic and population growth rates have been sluggish, other regions have similar concerns – parts of New York and New Jersey, parts of California. And even in areas with more robust economies, there is concern that increased demand for housing, both for primary residences and second homes, is pushing up land prices and permanently altering communities and driving younger people away. The Federal Reserve Bank of Minneapolis recently devoted an issue of its newspaper *Fedgazette* to rural sprawl and the loss of farm lands to housing development.

While my location in New England may have narrowed my perspective on this issue, I think that the tension between housing development and land preservation is the key challenge facing conservationists. The recent slowing in the housing market is temporary. Population growth in the United States is expected to remain vigorous for the foreseeable future. The demand for housing will expand relentlessly and the supplies of open space around economic centers will face continuing development pressure. In high amenity, accessible areas where expanding the housing supply is difficult, these tensions will be reflected in high housing prices, giving rise to concerns about regional competitiveness and regional gentrification.

SO HOW CAN CONSERVATION EFFORTS HELP SUPPORT REGIONAL COMPETITIVENESS?

First, land conservation organizations need to be more active participants in conversations about regional competitiveness. They need to be at the table where they can assert the role of land conservation in enhancing quality of life and regional competitiveness. They should not allow the only voices on land use to be those advocating increased development. At the same time, land conservation organizations need to be in a position to hear concerns about high land costs and permitting uncertainties, and they should be prepared to lend their expertise to efforts to mitigate these concerns.

As advocates for the importance of land conservation to quality of life and regional competitiveness, conservation organizations could do more to disseminate information about open space that has been preserved and the various recreational opportunities available to the public. Some of the larger organizations have extensive websites about their properties and permitted uses, and certainly tourist bureaus and business recruitment efforts feature New England's scenic vistas. Nevertheless, one of the remarkable aspects of New England is the array of open space and associated recreational opportunities that exist in close proximity to the major population centers – and many New England residents are not aware of what is almost next door. In some cases, this is intentional. Communities want to restrict access to the land within their borders to local residents. But it is inconsistent to argue for the importance of land preservation to regional competitiveness while many properties that are available to the public remain well-kept secrets. College students are a particularly relevant target audience for such information in a region that is very concerned about out-migration of young people.

Land conservation organizations should also consider how they might participate

in crafting solutions to some of the problems associated with high land prices and the uncertainties of the permitting process. In doing so, they may be able to protect their own interests while also addressing others' legitimate concerns. There are numerous examples of conservation organizations working with land-owners, communities and developers to come up with land use plans for particular parcels that meet the financial requirements of seller and developer while still preserving significant open space for community use. But land conservation organizations might also wish to participate in broader debates over land use and regional competitiveness, where they might be asked to support, for example, policies that address impediments to housing construction but do not provide an explicit tradeoff in the form of open space preservation.

A case in point is smart growth policies. Many advocates of smaller lot sizes and denser development believe they can achieve two goals – more housing in existing community centers and more open space in peripheral areas. But often the tradeoff is simply assumed, with no explicit provision for preserving the land outside the centers from development. Nevertheless, land conservation organizations might wish to lend their support to efforts to increase density in community centers as a means of addressing housing concerns. Similarly, they might give support to policies that expedite the permitting process for businesses in areas that have previously been identified as appropriate for industrial development. But the overarching goal would be to be a respected participant in on-going land use discussions – a participant with its own distinct mission but one that would share its expertise and lend its support to well-crafted policies, even when there is not an explicit quid pro quo.

As part of cooperating with public agencies, land conservation organizations should consider whether they can play any role in development strategies for the region's older industrial centers. Within New England, the pace of economic development has been very uneven. Although economic growth in much of New England has been sluggish recently, over the past thirty years coastal areas and communities in relatively close proximity to Boston and New York have fared better than inland communities. Some formerly prosperous industrial centers have languished. One consequence of this uneven development is that land prices are much lower and open space is much more abundant around these communities. State and local governments have been struggling to boost the economies of these centers for many years, but the widening of the gap in housing and land prices may have increased the feasibility of their economic revival. Land conservation organizations might offer advice about how open space and other physical assets can figure in revitalization strategies – perhaps through marketing these amenities more aggressively or through development of parks and recreational activities.

Acquisition of land for conservation is often contentious. The process is often reactive: a property comes up for sale, and conservation groups and others intervene, frequently delaying the sale while they seek buyers who would retain the land as open space or in some preferred use. Such disputes can contribute to perceptions that a state or region is not friendly to business and that land use decisions are lengthy and fraught with uncertainties. While some disputes are inevitable, it may be possible to reduce the number of confrontations through more planning, more prioritization,

more coordination and more active outreach. The goal would be to identify important properties that would advance conservation goals before they are "in play" and pro-actively reach out to the landowners with the objective of developing options that would provide a benefit to the landowner in return for the land being protected. While some conservation organizations already do this, more could be achieved with greater coordination and collaboration and more looking ahead to identify properties that are not yet targeted for development but could be at risk in the future.

Some conservation organizations have programs that are intended to maintain agricultural or forest property in its former use, thereby maintaining jobs in these industries, as well as providing public access. In these situations, the land generates a financial return, raising the question of whether similar programs might be set in place to benefit an existing private owner in exchange for development rights. These programs often require extensive collaboration among non-profit and governmental agencies, and sharing experiences would be informative.

If land conservation organizations are to be effective partners with government or private developers, if they are to be more pro-active, and if they are to more effectively promote their role in contributing positively to regional competitiveness, they need to be able to bring to the table a high level of expertise in a number of fields. Collaboration among different conservation organizations may be one way of achieving this, with larger organizations providing technical expertise for smaller organizations and smaller organizations gathering information on at-risk properties and serving as local ambassadors for the larger entities. While considerable cooperation already exists, the conservation network appears fragmented and relatively opaque to those not actively involved.

Background Paper
Land Conservation and Regional Competitiveness

Bella Gordon
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In order to maintain competitiveness as a region, the Northeast will need to attract new industries and professionals, buttress traditional land uses that define the region, and retain growth in its cities rather than losing it to sprawl. The conservation community holds resources that could aid the Northeast in staying economically competitive.

CHANGES IN THE THEORY OF REGIONAL COMPETITIVENESS

During the last decade of the 20th century, regional economic development theories underwent significant revision. Earlier efforts to promote regional competitiveness emphasized attracting manufacturing industries, or "chasing smokestacks," primarily through building infrastructure (industrial parks, roads, utilities) and providing incentives (tax breaks, subsidies, business-friendly regulations). Regional competition was seen as a zero-sum game where one state's or town's gain was another one's loss.

Starting in the 1990s these tactics began to change. Manufacturing lost its dominance, and tourism, services, and high technology industries became the new coveted sectors. Innovation, entrepreneurship, smaller firms, research and human capital are currently seen as the keys to growth. The economic development field also moved away from seeing regions as homogeneous entities competing with each other for the same industries to seeing different locations within each region as possessing different strengths that require unique development strategies (Drabenstott, 2006).

These changes have important implications for how conservation might help regional competitiveness. First, attracting human capital is key to the new economy, which thrives on innovation, high tech skills and services. This implies that regional amenities (including environmental amenities) are becoming increasingly important.

And second, instead of striving for a uniform prescription for the entire Northeast, there is a need to identify the indigenous strengths in each locality and specifically target efforts to the most relevant industries.

SOME KEY NORTHEAST TRENDS

Land use

- *Cropland and forests*: Between 1950 and 2000, cropland east of the Mississippi decreased by 22 percent. Though initially this led to an extensive reforestation of the landscape, development is now driving a loss of forest acreage (Brown et al., 2005).
- *Open space*: A higher percentage of the Northeast's land is developed than the U.S. average, implying that social benefits of adding open space might be higher in the Northeast (England, 2002).
- *Sprawl*: The Northeast is experiencing more sprawl than the national average, with population density rates decreasing faster than the already alarming 14 percent U.S. average. In addition to urban sprawl, there has been a significant increase in development of non-metropolitan counties that do not border cities (rural sprawl). Rural sprawl and second home construction are particularly troubling because they often fragment and impact rural and wildenerness areas that are still intact and remote enough to maintain high biodiversity levels (Theobald, 2003).
- *Diverse uses*: 80 percent of Northeasterners overall live in metropolitan areas, but only 23 percent of Vermonters, 36 percent of Maine residents and 56 percent of New Hampshire residents do (Katz, 1998).

Population patterns

- *Population*: Though the Northeast is growing at a slower rate than the national average, it is still poised to add 18 million residents by 2050 (University of Pennsylvania, 2006).
- *Inter-regional migration patterns*: The Northeast exhibits a net out-migration of American-born residents to other parts of the country (though this is counteracted by a net in-migration from other countries). Its edge over other regions in attracting new college graduates has also shrunk (Agrawal, 2006).
- *Intra-regional migration*: While the period from 1950 to 1970 saw migration into the cities where most of the jobs were located, the period from 1970 to 2000 experienced a rural rebound across the country. This time period saw a migration out of the cities as non-economic factors such as proximity to amenities and recreation became dominant (Brown et al., 2005).

Attracting human capital

- The Northeast has a higher proportion of information technology, venture capital and professionals as a percentage of the workforce than the U.S. average.
- The Northeast's high housing costs serve to discourage in-migration.

HOW CAN CONSERVATION PROMOTE REGIONAL COMPETITIVENESS?

Creating desirable places to live, attracting business, skilled workers and retirees

Compared to those of traditional industries, the location decisions of high-technology and services-intensive businesses are less dependent on geographic proximity to physical entities such as raw materials or shipping hubs and much more dependent on a place's ability to draw large numbers of college graduates, highly skilled professionals and research centers. These innovative technology and service businesses have replaced manufacturing firms as the most sought-after targets in pursuit of regional competitiveness. The new ventures' key to success is often human capital.

Factors such as "amenities" and "quality of life" are being shown to have a direct impact in attracting businesses that rely on human capital. Research indicates that amenity value directly impacts a location's ability to attract skilled professionals and college graduates. Places of lower amenity value require higher wages to incentivize relocation and retention of skilled workers compared to places of high amenity value. Environmental amenities such as aesthetics, recreational opportunities and climate are some of the most highly prized amenities. As a group, they were cited as the number one attractor of highly skilled professionals in Florida and small businesses in Colorado (de Brun, 2007).

Along with attracting "producers," regional economies can greatly benefit by attracting rich consumers. Retirees possess attractive characteristics for regional economies and are a fast-growing sector of society. Many migrating retirees have considerable savings that can increase retail sales and the local deposit base. Their spending is pension-based and less subject to boom-and-bust business cycles. Moreover, retirees tend to be positive tax payers due to their light use of local services such as schools and criminal justice systems (Crompton, 2007a).

Conservation efforts stand to attract both highly in-demand professionals and retirees through their provision of recreational, aesthetic, community and health amenities. In addition to attracting individuals, a number of cities attract firms and revitalize urban economies through promoting green spaces. (See Section 4, "Urban Revitalization," for more on these efforts).

Supporting land-sensitive industries

Rural industries: ecotourism, forestry and agriculture. While forestry, agriculture and ecotourism do not account for a high percentage of the Northeast's GDP, they are the mainstay of a number of localities within the wider region. As the new regional

competitiveness model suggests, we need to seek opportunities to capitalize on the comparative advantages and clusters of each locality. Additionally, these industries provide amenities that can be instrumental in attracting other human and capital resources to the region. (See Section 3, "Rural Economic Development," for information on how conservation can help sustain these industries.)

Real estate: raising property values. While conservation may take some land out of economic use, it often increases the property value of surrounding land. Studies have shown that communities increase net revenue by foregoing development in favor of conservation, since most development carries additional expenditures in public services and school costs that exceed the added tax revenue (Crompton, 2007b). However, the increase in property values can also have unintended consequences such as the loss of affordable housing in certain communities. The needs of low-income populations are often ignored in regional economic development, and this must be addressed by the conservation community. (See Section 3, "Rural Economic Development")

Saving money with ecosystem services

When a city builds a filtration plant or upgrades the storm sewers, when a factory has to put in technical controls to reduce air pollution emissions, or when a beekeeper travels across the country to rent out his pollinators to orchards, the beneficiaries of these services pay for them either directly, or in the case of public goods, indirectly through taxes. The dollar amount of GDP rises. When preserved land provides the very same services of water filtration, flood control, air pollution reduction and pollination, no economic value is perceived. This has grave consequences when our cost-benefit analysis registers the opportunity costs of preserving land but not the benefits of the services that land provides. It leads to decisions that are often inefficient. The emerging efforts to quantify the economic value that ecosystem services provide present compelling evidence of ways conservation can save communities money and create value.

Disaster Mitigation

The federal government spends $7 billion on disaster relief yearly. This amount comprises one-third of its total regional economic development budget. Private individuals and companies, as well as states, spend additional funds (i.e. flood and fire insurance). Natural ecosystem preservation, which decreases the incidence and severity of disasters by creating more resilient systems, can provide an alternative to such spending.

Perhaps the most famous example of disregarding the value of ecosystem services for disaster relief has been the wetland destruction in the Mississippi delta, which resulted in much higher losses during Hurricane Katrina than would otherwise have been experienced. In the aftermath, ambitious and very costly plans to rebuild wetlands in order to mitigate future impacts are being discussed.

Fighting sprawl – patterns that promote economic growth and limit services expenditures

The Northeast is facing greater rates of sprawl increase than the already high American average. A number of authors have written about the detrimental effects of sprawl on regional economies. In *Inside Game/Outside Game: Winning Strategies for Saving Urban America* (Rusk, 1999), for example, David Rusk divides metropolitan areas into elastic and inelastic. Elastic cities grow as their populations expand, while inelastic cities export that growth into the suburbs, where the migrants settle at much lower densities. This exported growth is sprawl. Rusk then proceeds to show how inelastic metropolitan regions do less well economically as they see their professionals and middle class residents fleeing to the suburbs followed by the businesses where they work and shop. This leaves destitute inner cities on the one hand, and degrades rural land into low density vehicle-dependent suburban communities on the other.

Furthermore, *The Costs of Sprawl—Revisited* (National Research Council, 1998) makes the point that even if it were determined that Americans preferred low-density suburban lifestyles, we simply cannot (could not) afford them. Sprawl increases infrastructure costs of roads, water and sewer utilities, energy utilities and public buildings; it increases both public and private transportation costs and travel times; it results in higher costs for public services such as law enforcement, schools and governance; and it makes private development more expensive and uses up more land.

Sprawl also has personal and social costs that are often not measured in dollars and cents, but in effect make the lives of the region's residents poorer. These include lowering of landscape aesthetic values, weakened communities, commuting stress, air pollution, isolation, segregation by social class and the disempowerment of non-driving populations (such as children, the elderly and the poor).

While sprawl has a number of positive features, one may inquire whether the majority of these are obtained primarily by shifting the costs to more vulnerable inner city populations. Are the lower rates of crime, better schools, less crowding and lower traffic congestion in suburban areas simply the result of de-coupling the amenities of rich communities from those of the poor ones, to the detriment of the latter?

There are a number of ways that land trusts can (and do) team up with communities to fight against sprawl and promote "smart growth." These include:

- conserving land through private purchases and thus decreasing the amount of land available for development.
- helping to make alternative rural land uses more economically viable through working landscape easements.
- participating in public-private partnerships that can strategically use a combination of zoning, conservation easements, tradable development permits and utility placement to create and preserve an urban growth boundary.

- providing political support for zoning and planning ordinances that conserve land.
- providing technical expertise and research that guides land conservation priorities and smart growth efforts.
- improving quality of life in urban areas by creating green space that may fill some of the needs that drive people to the suburbs in the first place.
- being more strategic about land protection and promoting denser development through prioritization of conservation at the rural-urban boundary.

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The Trust for Public Land website: http://www.tpl.org (contains a number of relevant publications on the benefits of open space and conservation strategies).

SECTION 3: RURAL ECONOMIC DEVELOPMENT

The Community Development/Land Conservation Nexus

Keith Bisson, Carla Dickstein, and Ronald L. Phillips
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INTRODUCTION

One of the issues that has preoccupied Coastal Enterprises, Inc. (CEI) staff in recent years is how to bridge the gulf between environmental and community development practitioners. CEI is a community development corporation (CDC) and a community development finance institution (CDFI). These organizations were born in the 1960s with roots in the civil rights movement. Today there are more than 4,000 CDCs/CDFIs throughout rural and urban America managing and mobilizing billions in capital for worthwhile projects that benefit low-income people and communities.[1] At the heart of their missions is social equity: creating economic opportunity for people and places left out of the economic mainstream. Environmental considerations have tended to take a back seat. And until recently, most environmental organizations have paid little attention to economic development and social equity concerns.

The tide has been changing, and today, the climate crisis challenges these two communities to come together and advocate for sustainable social and economic policies. Both the community economic development and environmental communities are reaching out to each other to meet common goals. They are mobilizing significant investments in many areas that create economic opportunity and meet the broader goals of sustaining the environment.[2] This workshop provides a timely opportunity to explore the growing nexus between the world of community development practitioners and the land conservation community.

In this paper, we first provide some background on our own evolution to embrace environmental goals and undertake "triple bottom line" investing as an example of the growing interest of community development organizations to broaden their focus. We then profile our experience in several projects that demonstrate a nexus with the conservation community. Finally, we offer several recommendations for strengthening partnerships between the community development and conservation communities.

[1] Community Development Corporations were an offshoot of the War on Poverty. CDCs are locally-owned non- profits that invest in housing, community facilities, commercial real estate, job-creating small businesses and other community revitalization assets. Community Development Financial Institutions were formed in 1994 as a result of an act of Congress that established the CDFI Fund of the U.S. Treasury. Backed by federal grants and loans, CDFIs more strictly provide local financing to achieve similar missions of creating access to capital among underserved urban and rural regions. In 2005, approximately 1000 CDFIS comprised of community development banks, credit unions, loan funds and venture capital funds, invested $4.3 billion.

[2] See William J. Ginn, *Investing in Nature* (Washington, D.C.: Island Press, 2005) where he describes many examples of conservation projects that make business sense, preserve the environment, and create economic opportunities for a region's residents. As well, several conservation finance practitioners and CEI were featured in the case book *From Wall Street to Walden*, edited by James N. Levitt and Lydia K. Bergen, (Washington, D.C: Island Press in cooperation with Lincoln Institute of Land Policy, 2005).

CEI's EVOLUTION TO TRIPLE BOTTOM LINE INVESTING

Rural development focus

CEI was founded in 1977 to develop value-added natural resource industries, and small, medium and microenterprise business ventures that would create jobs and self-employment opportunities in primarily rural regions of Maine Since then CEI has diversified its investments to include community facility financing such as child care centers, and affordable homeownership and rental housing serving all of Maine and parts of northern New England and upstate New York. Currently CEI has over $370 million of capital under management or committed. In 2002 the board added the goal of creating "environmentally healthy communities" to our mission statement. The key components of our development model are investment (debt and equity), technical assistance to businesses, and policy development both in Maine and nationally.

The starting point for CEI and other CDCs/CDFIs is the question of poverty. We work in a rural context and advocate for policies and resources for rural people and communities left out of the economic mainstream. Poverty is pervasive in rural America. Nationally, rural child poverty rates increased between 2000 and 2005 in 41 of the 50 states.[3] As well, rural Americans are much more dependent on the Federal Food Stamp program: 22 percent of the nation's population lived in non-metropolitan or rural areas in 2001 but a full 31 percent of food stamp beneficiaries lived there.[4] Maine, a largely rural state, had a 3.3 percent increase in the number of households experiencing hunger between 2000 and 2005 – the highest increase of hunger in the country.[5]

Rural areas face common problems of loss of economic opportunity due to the exodus of manufacturing industries and mechanization of natural resource industries that remain, aging populations and out-migration of youth, low educational achievement, high poverty and unemployment. Forty-two percent of all jobs are low-skilled and vulnerable to globalization.[6] Increasingly, globalization is threatening not only manufacturing jobs but also service industries. The lack of infrastructure and critical mass of population, businesses, and amenities makes it difficult to create a culture of entrepreneurship, innovation and new economic opportunity. A true rural development policy that addresses the particular problems or opportunities of rural areas is lacking at both the state and national levels.

The opportunities in rural areas arise primarily from the natural resource base. Amenity-rich rural areas are attracting population and investment in tourism and second home communities. These areas are poised for even more dramatic demographic changes as some of the 75 million baby boomers choose rural communities for retirement. But the growth is not spread evenly and a gap remains in access to capital for entrepreneurs located in these communities. There has been interest in emerging energy technologies such as biofuels and wind development, and indeed some rural development practitioners foresee renewable energy as the catalyst to transform rural America. Even if renewable energy sectors prosper, they are capital intensive, they create relatively few direct jobs, and depending on their scale, ownership is likely concentrated in the hands of a few.

[3] William P. O'Hare and Sarah Savage. "Child poverty in rural America: New data show increases in 41 states." Carsey Institute. Fact Sheet No. 1, Summer 2006. Available at: http://www.carseyinstitute.unh.edu/documents/rural_child_poverty_fact_sheet.pdf

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[5] "Household Food Security in the United States, 2005 (ERR-29)." (Washington, D.C.: U.S. Department of Agriculture, Economic Research Service, 2005) p.56. Available at: http://www.ers.usda.gov/Publications/ERR29/ERR29.pdf

[6] Robert Gibbs, Lorin Kusmin and John Comartie, *Low-Skill Employment and the Changing Economy of Rural America*. Economic Research Report 10 (October). (Washington, D.C. USDA Economic Research Service, 2005) cited in Amy Glasmeir and Priscilla Salant, *Low-Skill Workers in Rural America Face Permanent Job Loss*. (Durham, NH: Carsey Institute, University of New Hampshire, Policy Brief No.2, Spring 2006 J), p. 2. Available at: http://www.carseyinstitute.unh.edu/documents/PB_displacedworkers_06.pdf

Affordable housing, an important part of a rural development strategy, is scarce for low-income people, especially in amenity-rich rural areas that attract second and retirement home development. In Maine the loss of subsidized affordable housing units is approaching crisis conditions.[7] Maine has consistently ranked in the bottom fifteen states in terms of median household income and its low- and low-to-moderate-income population is proportionately more vulnerable to the phenomenon of expiring use and threat of mortgage prepayment of thousands of units financed by the US Department of Agriculture's Section 515 Rural Development program. These are multifamily properties developed mainly in the 1970s and 1980s with 1% financing through the Section 515 program. Many of the 30-year mortgages are now eligible for prepayment, creating a threat throughout the country of market conversion of these affordable units. At the same time, many of the original owners are aging and have exhausted the original tax benefits of ownership. Rather than face tax liabilities – or face exit taxes by waiting to sell – they are anxious to get out now, potentially leaving many low-income rural families without affordable housing options.

[7] Maine, for example, will experience the expiration of 8,000 government-subsidized multifamily housing units by 2022. In the near term, the rate of expiring units is approximately 500 per year.

Preserving working landscapes

From its beginning, CEI pursued a rural development strategy of preserving working landscapes even though we did not call it that at the outset. Our first investments were in fishing, the nascent mussel and oyster aquaculture industry, small-scale farming and value-added forestry ventures. Traditional natural resource industries provided livelihoods for Maine people and sustained rural communities by retaining local ownership and control of land, farms and businesses. Thriving natural resource industries also maintain the rural landscape that is so important to rural quality of life and the tourist industry. CEI has now directed literally hundreds of millions in capital to "sustainable development" projects in the natural resource sectors. Recent initiatives:

- *Farms for the Future Program* targets business technical assistance and investment to 144 small family farms in order to grow and diversify farms. 18,459 acres have been placed in non-development agreements.
- CEI was one of the architects of the *New Markets Tax Credit (NMTC) Program*, which provides a 39 percent tax credit over seven years to eligible investors. Through partnership with Bill Ginn of The Nature Conservancy, and a former CEI board member, CEI pioneered the use of the credit for sustainable forestry investments that meet triple bottom line investment criteria. Over 2 million acres of northern forest timberland are sustainably managed in part resulting from NMTC financing. This is a new institutional model for CEI and the development finance field.[8]
- A new *Working Waterfront Access Pilot Program* provides grants and technical assistance to private and public entities along Maine's coast to acquire and preserve essential infrastructure for the industry threatened by alternative development.

[8] Ecotrust in the Pacific Northwest has followed CEI's model and used its NMTC allocation for sustainable forestry investments.

Triple bottom line investing

Over the last decade CEI's investment screens have evolved to a point where we are now applying "Triple Bottom Line" (TBL) criteria (i.e., economy, equity, and environment) in calculating the return on our investments. It is not easy to get all three criteria in one investment, and we often settle for two out of the three. In our small business investments, CEI uses an "Eco- Tag" agreement where CEI and the business work together in marshalling technical and capital resources to achieve greater environmental sustainability and efficiency in production processes and the choice of goods and materials in the supply chain. With support from the Ford Foundation, CEI and ShoreBank Enterprise Cascadia have formed a network of CDC/CDFI practitioners engaged in TBL investing that is attracting growing interest.

THE COMMUNITY DEVELOPMENT/LAND CONSERVATION NEXUS

The following are four examples of CEI's engagement with the land and conservation communities that demonstrate what can be done to preserve working landscapes and affordable housing by balancing economic, environmental and equity goals.

Working waterfront in York Harbor, ME

One of CEI's first waterfront loan fund investments was in York Harbor, home to 30 lobstermen and four commercial fishing vessels. However, York Harbor had limited commercial dock space. When one of the town's commercial piers was listed for sale with a small piece of adjoining land, two local lobstermen wished to buy the property but did not have the resources to purchase it.[9] Three years earlier, a substantial pier at another location, which dated back to the 1700s, was purchased and converted into a personal residence and sold in 2002 for over $2 million. The community did not want to see another commercial pier share the same fate. After a great deal of collaborative work between the local historical society, citizen volunteers and CEI, two local fishermen purchased the dock, and the York Land Trust – a local land conservation group – purchased an easement that restricted use of the property to commercial fishing. CEI helped craft the deal and made a loan to the land trust that allowed it to purchase the easement.

Subsequently, 12 other land trusts have showed interest in developing partnerships to preserve working waterfronts. Many of these land trusts also participated in the Working Waterfront Coalition that CEI spearheaded last year to pass current use taxation for working waterfronts and a $2 million bond to capitalize working waterfronts.

[9] Joseph C. Donnelly, Jr., Vice Chairman, York Harbor Board "A Conservation Easement Saves a Working Waterfront Dock." Available at: http://www.wateraccess2007.com/docs/day1/papers/Donnelly.pdf

Community forestry project in Errol, NH

One of our NMTC investments, in partnership with the Northern Forest Center and Trust for Public Land, was a community forestry project called the "13 Mile Woods Project." The Town of Errol, New Hampshire used the NMTC to help purchase over 5,000 acres of forest land through a non-profit entity that will manage and control

the forest during the tax credit period. After that time, the town will take over ownership of the property outright and draw income from it. In addition to the economic benefits for the town, the forest is harvested sustainably, it creates open space for recreation and protects the town from growing real estate pressures, and it protects and preserves wetlands and habitats for rare and threatened species through a conservation easement granted to the State of New Hampshire.

Coastal affordable housing development in Northport, ME

In the coastal town of Northport, Maine, CEI partnered with the Coastal Mountains Land Trust (CMLT) to combine conservation goals with the dire need for affordable housing in coastal Maine. CMLT sold CEI a portion of a 56-acre parcel at a below-market rate to fund environmental and conservation improvements to other Trust land in the area. CEI has built five of 19 approved homes that will be modestly priced. At least seven of the homes are targeted for first-time homebuyers. One drawback of the project is that all homes are on one-acre lots due to town lot size restrictions, which prevented denser clustering; however, the project incorporates underground utilities and includes paved sidewalks to promote pedestrian access to the woods/trails. Overall, 32 of the 56 acres are preserved as undisturbed open space. Plans call for connecting trails, open space, common green space for recreation, social gatherings and meetings, minimal curb cuts and preservation of historical features. On-site sewage disposal will incorporate newer environmentally sound technology and home designs will highlight energy efficiency as much as possible, including solar power alternatives.

Plum Creek affordable housing partnership in the Moosehead Region of Maine

Upon the recommendation of Bill Ginn at The Nature Conservancy, CEI initiated a relationship with Seattle-based Plum Creek, the largest private land owner in the country, in order to develop affordable housing in the communities impacted by Plum Creek's proposed real estate and resort development for the pristine Moosehead Lake Region. Plum Creek owns close to a million acres in the region and recognizes that the success of its proposed project will depend at least in part on the availability of a reliable local workforce. Affordable housing is critical to attracting and retaining that workforce. Here, CEI is navigating the narrow path between large-scale developer interests, environmental interests on the verge of litigation and community protest, and social equity concerns.

Plum Creek agreed to donate 100 acres of land and loan CEI $1.75 million to help capitalize the development of affordable single-family homes. The contribution of land will reduce the cost of a new home in the area by 15-18 percent and make home purchase easier for first-time buyers. The investment has two phases: Phase I is a donation of 25 acres combined with an $800,000 loan which will go forward immediately to benefit the region and address current housing needs. A Phase II donation of 75-acres plus another $950,000 loan will occur only if Plum Creek's re-zoning plan is approved by Maine's Land Use Regulation Commission (LURC). Still,

the agreement will result in immediate benefits for the local communities regardless of whether Plum Creek's plan is approved. In separate negotiations with The Nature Conservancy, the Forest Society of Maine, and Appalachian Mountain Club, Plum Creek has agreed to put land into conservation easements if its re-zoning plan is approved.

RECOMMENDATIONS FOR CONTINUED PARTNERSHIP

Our experience and the examples above demonstrate the value of the innovation and expertise that come from partnerships with the conservation community and the potential to build on these models. There is even more potential for both communities to pool resources and further each other's goals beyond specific applications of land conservation to rural development initiatives. Both communities have access to money, expertise and power that can enhance rural development and land conservation, create greater local ownership and control of land and economic resources, and provide economic opportunities, particularly to the people who aren't part of the economic mainstream.

From CEI's perspective, the conservation community can assist us and other community development organizations in the ways discussed below.

Capital and social investment

CEI's approach to community economic development and working landscape investment and conservation, as highlighted in the case examples above, demonstrates the power of providing loans and grants that support housing and economic development compatible with land conservation goals. Social investments could help raise capital in a variety of forms to help address the significant needs of rural communities. These could include:

- targeted grassroots Revolving Loan Funds for small-to-medium enterprise and microenterprise finance.
- funds to support financing of affordable housing and community facilities such as child care.
- new markets tax credit and venture capital funds for high-impact transactions that preserve working landscapes.

Social investments could go beyond loans and grants to include partnerships with land trusts and the conservation movement as a whole to include land donations that meet affordable housing and land conservation goals. Many conservation and environmental organizations have substantial endowments that could be invested in the work of community development finance that supports economic development and affordable housing. This could represent a new approach to investment, one focused on socially responsible "working funds" that support the outcomes sought by the programmatic mission of any given organization. In exchange, community

development organizations would incorporate mechanisms for ensuring that conservation outcomes are real, measurable, and permanent.

Shared expertise in research, development and technical assistance

Our work, like the work of land conservationists and environmental advocates, is extremely labor intensive, involving many aspects of softer, non-transactional research and development. We look beyond the transaction itself to focus on the impacts it will have on workers, communities and the environment. This intensive work often takes the form of technical assistance to a business, community or landowner. It is costly and requires a constant supply of "core" funding. We need to develop our individual strengths but also leverage each other's expertise in order to accomplish our collective missions more effectively.

Strong community benefit agreements

Natural resources are the main asset that rural communities still have. We can expect more large-scale tourist and real estate development taking place across rural America. However, even if development takes place, the benefits are not necessarily distributed widely. Job quality is notoriously low in the tourism sector, and the jobs created in emerging renewable energy sectors are not likely to match what is lost in manufacturing. If local communities are to benefit, it will be critical that rural development and land conservation interests come together to negotiate strong community benefits agreements[10] that affect the quality of development, preserve land through conservation, and distribute wealth and assets for the community and citizens. We should think more about applying models that redistribute resources such as the Alaskan Permanent Fund that the State of Alaska has set up to distribute dividends from oil royalties from the Alaskan pipeline to its citizens. Or we should look at other fair exchange models where private businesses that receive government subsidies give citizens equity that is managed by a community trust.[11]

Engagement in public policy

The land conservation, environmental, and community development fields have broad constituencies that could be marshaled to help support programs at the state and federal levels to benefit rural communities where most land conservation takes place (e.g., USDA Rural Development, Farm Bill, etc.). Ideally the partnership would develop a unified policy approach that supports healthy, equitable and livable communities for all, going beyond the obvious overlap of interests in working landscapes and land conservation to support broader rural development strategies.

[10] Community Benefits Agreements are legally binding contracts between two private parties (e.g., developers and community development organizations) to ensure that development projects benefit local community residents. See Greg LeRoy and Anna Purinton, *Community Benefits Agreements: Ensuring That Urban Redevelopment Benefits Everyone*. Neighborhood Funders Group, August 2005. Available at: http://www.nfg.org/publications/community_benefits_agreements.pdf.

[11] See Deborah Olsen, "Fair Exchange: Providing Citizens with Equity Managed by a Community Trust in Return for Government Subsidies or Tax Breaks to Businesses." *Cornell Journal of Law and Public Policy* 15: 2, 2006. Available at: http://cog.kent.edu/lib/OlsonFairExchangePaper.pdf

Background Paper
Land Conservation and Rural Economic Development

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The rural economic and natural landscapes of the northeastern United States have undergone a transformation in recent decades. The ongoing transition away from a natural resource-based economy and toward one based on natural amenities marks a strategic period in which the land conservation community could aid in rural economic development.

TRENDS IN RURAL ECONOMIC DEVELOPMENT

Transition from a labor-based to service-based economy

While historically a significant part of the Northeast's economy, agriculture and forestry have witnessed a sharp decline in recent decades as the economy has transitioned from one traditionally based on labor to one driven by capital, services and technology. This trend has corresponded to a decrease in demand for manpower as farms have become increasingly mechanized and farmers have migrated to urban areas in search of economic and social opportunities (Brown et al., 2005). Croplands were converted into alternative land uses that promised higher economic returns.

During the period from 1950 to 1980, migration from rural to urban areas posed challenges to cities that had limited infrastructure and were unable to support increasing populations. The quality of life in many urban areas declined. With the expansion of interstate highways and changing industry dynamics, much of the region's cropland became residential developments built to accommodate urban residents who sought a higher quality of life in rural areas (RPA, 2004). The growth of development outside of urban centers became pronounced in New England, even more so than in other regions of the country (Brown et al., 2005).

Development driven by natural amenities

In the 1970s, the Northeast was witnessing both urban and rural sprawl. Development was decreasingly linked to proximity to cities and increasingly linked to open space and recreational opportunities (Brown et al., 2005). Homebuyers began placing increasing importance on non-economic factors (e.g., natural amenities and recreational activities) in their land purchase decisions. The Northeast, boasting forested landscapes, stunning mountains, and plentiful inland lakes, developed at even more rapid rates than in the past.

In the early 1980s, New England experienced a real estate boom driven by the second home market. This created demand for natural amenities that resulted in some cropland in the region transitioning to forest cover. The development brought with it problems such as increasing demand on rural public services and an increase in land value. Coupled with the loss of jobs from industry changes, many rural populations found it more difficult to acquire affordable land and housing on which to support their families or communities.

HOW CAN CONSERVATION PROMOTE RURAL ECONOMIC DEVELOPMENT?

The land conservation community can help to create viable rural communities that support a healthy economy while benefiting from the preservation of the Northeastern landscape. The land trust community can:

- offer landowners conservation easements to supplement their incomes and decrease taxes.
- help to provide natural amenities and high quality of life to rural residents, while attracting resources from metropolitan regions.
- aid in lobbying for public funding programs such as the Forest Legacy Fund and Forest Land Enhancement Program.
- support affordable housing efforts.
- utilize its extensive national and regional network to develop important collaborations across state boundaries.

A land-based resource economy under threat

The region's accelerating development and recent transition toward a service-based economy have created alluring revenue alternatives to the area's historical agriculture and forestry sectors. In turn, this has resulted in a loss of agriculture and forest land that traditionally have defined the region, provided local jobs, attracted tourists and changed the portfolio of environmental services provided by the landscapes.

Agriculture

While only one percent of New Englanders are farmers, 12 percent of New England's rural population works on a farm or in farm-related activities (USDA, 2005). However, New England is losing farmland at alarming rates. For instance,

Connecticut lost 12 percent of its farmland between 1997 and 2002 and other New England states mirrored this trend (Deininger, 2005). As development encroaches, farmers are searching for new ways to supplement their incomes so they are not forced to sell their land as property values and taxes rise.

Forestry

Forest-based manufacturing in the Northeast contributes over $15.5 billion to the region's economy and provides hundreds of thousands of jobs. However, the region's forest industry has been in decline for the last 30 years, with painful consequences for rural communities that depend on it for their employment base and livelihoods (NESFA, 2004). Between 1994 and 2004, production in the pulp and paper industry declined by 18 percent. Many forest-based companies have witnessed a recent sell-off of forest properties due to fluctuating timber prices and rising taxes.

Supporting land-use sensitive industries

The natural landscapes of the Northeast provide an important economic base for employment and recreation. The conservation community is rising to the challenge of keeping working lands profitable for landowners by offering conservation easements to supplement income. The number of easements granted in the Northeast has risen dramatically in the last 20 years. The additional income and tax reduction often makes the difference between landowners keeping their land and having to sell it.

A survey taken of farmers who have placed easements on their land showed that 78 percent did so in order to keep the farm in their family. Out of the farmers surveyed, 35 percent used the money to pay off their debts, 28 percent saved their money or invested it in their farm, and 18 percent used it for their farming operation. Some even bought additional land or farm equipment (Lynch, 2007). These easements benefit local rural communities, keeping land intact and rural employment in farming and forestry available.

Tourism

Most recreation and tourism activities in the Northeast are linked to forested areas and have been a growing component of the Northeastern economy, consisting of about 6.5 percent of the regional GDP. For northern rural states such as Maine and Vermont that have many environmental amenities but less overall development, the contribution to the economy is even larger.

The natural landscape of the region is an attraction for tourists and second home buyers alike. However, natural amenities that provide potential revenues are increasingly threatened by development. Most of the development occurring in the Northeast is preferentially occurring in or near forestlands. The conservation community has an obvious role in ensuring well-protected and stewarded lands that provide recreational uses such as fishing, hunting, boating and skiing. The land trust community may also play an important role through interstate partnership building and government lobbying.

Economic development assistance

Private efforts, while important, are not in themselves sufficient to protect large landscapes. Large-scale efforts to maximize the value of green space will require the willingness to utilize both public and private tools for land conservation. Public programs such as The Forest Legacy Fund, Forest Land Enhancement Program, Farms for the Future and the Farmland Protection Program have proved important funding sources to promote sustainability of working and recreational forests.

Historically, the land trust community has served as an effective lobbying group to support public measures to provide benefits to responsible landowners. For example, the American Farmland Trust and the Trust for Public Land recently teamed up to lobby for a 10-fold increase in funding for Farm and Ranch Lands Protection Program in the new farm bill (www.lta.org).

The New Market Tax Credits (NMTC) is a public funding program that aims to catalyze business investments in urban and rural low-income communities. The program offers qualified businesses access to development funds at low rates in hopes that their businesses will help stimulate economic growth and job creation in lower-income communities. A substantial portion of NMTCs used in the Northeast has been allocated to natural resource-based development projects such as forestry.

Once a public measure has been passed and funding is available, land trusts often play a key role in the effective implementation of these programs. Public funds are often very slow to mobilize. Land trusts can provide funding to hold a farm or forest area off the market until public funding sources can be pushed through. Moreover, the land conservation community has been instrumental in identifying important areas for conservation.

Protecting the Jobs and Landscape of Mount Katahdin

In 2002, The Nature Conservancy and the former Great Northern Paper Company placed more than 240,000 acres of forestland around Mount Katahdin under a conservation easement. This easement ensured no future development on land that connects nearly 500,000 acres of conservation land, running from Canada through Maine, New Hampshire, Vermont and New York. The conservation easements guaranteed public access, traditional recreational uses, sustainable forestry and no future development. The Conservancy purchased $50 million of Great Northern Paper's debt, retiring $14 million of it and refinancing the balance at less than half of the note's current rate. This provided low-cost, long-term financing to Great Northern Paper with the aim of maintaining the regional economy. The Conservancy then used New Market Tax Credits to attract an investor who bought the loan from the Conservancy. The area continues to work toward a diversified economic base that includes sustainable forestry, tourism and outdoor recreation. (Ginn, 2005)

Affordable housing

With increasing populations and a growing demand for second homes, real estate prices have skyrocketed in the Northeast. Recent cuts in government funding have compounded the difficulty many Northeasterners face in trying to purchase a home.

Facing the adverse effects of sprawl and the costly second home market, community land trusts (CLTs) work to ensure access to affordable land and housing for rural communities. Increasingly, the land conservation community is aiding CLTs in accessing public and private funding to finance and allocate "easement restricted" land for affordable housing.

As development continues in the Northeast, the land conservation community will serve as a strategic partner for CLTs to acquire affordable land and ensure housing for rural communities.

Ensuring Affordable Housing in Vermont

In 1987, the Vermont Land Trust led the way in the creating the Vermont Housing & Conservation Trust Fund. Bringing together a coalition of land conservation and affordable housing organizations, VLT, along with the Burlington Community Land Trust and other partners, has been instrumental in conserving more than 333,000 acres of land and creating over 6,600 units of perpetually affordable housing throughout Vermont. Instead of buying and holding land, VLT has used resources to buy undeveloped properties at the edge of urban areas and resell them with strict conservation easements that restrain future development. (www.vlt.org)

Environmental services

The Northeast is expected to experience increasing population and development in the coming decades. Greenways and forests will be needed to reduce conflicts between expanding development and public water supplies and wildlife habitats. Conserved areas can also provide services in the form of air and water quality, storm water and erosion control, and temperature moderation.

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SECTION 4: URBAN REVITALIZATION

Green Urbanism: Revitalizing Cities

Jonathan Rose and Munsun Park
Jonathan Rose Companies LLC

OVERVIEW

It is estimated that the population of the United States will grow by 94 million people over the next 30 years. As a nation, we have a choice – we can either plan where this population will be located to best serve our environmental, social and economic objectives, or we can allow it to follow current settlement patterns, which means sprawling across precious farmlands, forests and watersheds. Concentrating this population growth in existing cities is the most responsible choice that we can make.

And we do have enough urban land to accommodate much of this growth. For example, we have over a million acres of urban brownfields. If these brownfields are developed at a density of only twenty units per acre, they can accommodate 20 million homes, or close to 50 million people. And at a density of 40 units to the acre, the entire new population can be housed on brownfields. In addition to brownfields, there are vast swaths of underutilized urban land that could be developed more densely.

Our nation is facing trillions of dollars of deferred infrastructure maintenance. It would be much more economically prudent to invest in, upgrade and modestly expand our existing infrastructure rather then to build new infrastructure to bring development to undeveloped and rural areas. This will both revitalize our cities and reduce development pressure on lands that should be preserved. Infrastructure is also more robust when it is part of a network, which is more likely in denser urban settings. And networked infrastructure has more potential to be "smart," lowering operating costs and increasing efficiency.

This new population will also be younger, and more likely to have immigrated to this country. The prosperity of the nation is tied to our educational advancement. Those populations are best served by access to the rich educational opportunities offered in urban areas. People choose to live in the suburbs for many reasons. A prime driver, better public schools, has become less important, as a great percentage of our households lack school age children. However, if our cities are to provide a realistic alternative to the suburbs for families, they must be known for superb public pre-K-12 education.

GREEN URBANISM

People also move to the suburbs because of the aspiration to be closer to nature and the perception that cities lack nature and are unhealthy and unsafe places to live. Both to compete and to make cities healthier, we need to restore the elements of nature within our cities. This should happen on many levels, by greening urban buildings with green roofs and backyard gardens, by greening neighborhoods with parks and playgrounds, and by connecting larger urban areas to rural reservoirs of nature by restoring river corridors, waterfronts and urban wildlife refuges.

We are seeing what we are calling a new Green Urbanism emerging that addresses these concerns: green because the buildings themselves are green, filled with daylight and fresh air; and green because the context is green, gardened, and often tended by the hands of its residents. Green urbanism follows the basic ecological principle that organic systems are integrated at multiple scales. Thus, our vision of green urbanism proposes that we garden individual buildings, communities and neighborhoods, and that we link neighborhoods with green pathways to larger parks and reserves of nature. Its ultimate goal is to be restorative of both people and place.

In urban apartment buildings, outdoor space was traditionally provided by terraces and balconies. These have always been very popular with consumers. But contemporary urban developers, recognizing the desire of residents to connect with nature, are now paying greater attention to communal contemplative and green spaces. Developers are greening roofs, filling lobbies with trees, fountains, and gardens, and creating quiet meditative "Zen gardens" as building amenities.

Dense, green urbanism is actually the greenest and most energy efficient way of dealing with 21st century population growth, and suburban sprawl is the least. If we combine the energy used by a home and the energy used in the transportation getting to and from the home, we see that a green urban multifamily home consumes one quarter of the energy (62 million BTUs) used by a typical suburban home (240 million BTUs). So location and energy consumption are deeply causally related.

By investing in the healthy greening of our cities, a green urban agenda also advances the goals of the land conservation community. And there are many ways that the land conservation organizations can help. The land conservation community can continue to be supportive in the creation of quality green urban spaces that include urban parks, waterfronts and greenways. For example, the Trust for Public land has perhaps the longest running national urban land program, developing inner city parks and community gardens. The National Audubon Society has also been focusing on building inner city centers with strong education programs. The coalition of organizations around the Hudson River Greenway will create a continuous walkable and bikeable pathway from Yonkers to New York City when it is completed, serving millions of residents in the region. Conservation groups have similarly joined forces to protect the Hudson River and its environs further to the north. Another notable example is the Bronx River Alliance which was created to serve as a coordinated voice for the Bronx River to protect and restore the river corridor and greenway so that they can be healthy ecological, recreational,

educational and economic resources for the communities through which the river flows.

A critical next step is that the land conservation movement as a whole needs to join with those that have been involved in investing in our cities and regions. They include the environmental justice movement, regional planners and many others who advocate for regional plans that tie housing, land conservation, transportation and education together.

INVESTING IN INFILL AND TRANSIT-ORIENTED DEVELOPMENT TO REDUCE SPRAWL AND ENERGY CONSUMPTION

Forty percent of greenhouse gas emissions come from land use, buildings, and the transportation to get to them. We know that with current, affordable strategies, we can reduce our greenhouse gas emissions in these sectors by almost 75 percent if we move from a development pattern of single family sprawl to developing greener buildings situated in denser, urban transit-based locations. These solutions are not radical. They simply take political and community will.

The land conservation community can also be useful by actively supporting dense projects that are in areas served by transit, and are also ideally in infill areas and are served by existing infrastructure. It is also critical that the land conservation community support compact, affordable housing, mixed income, and mixed use projects in these locations that are served by transit. There is often a lack of alignment between the proponents of quality, mixed income, multi-family developments and the land conservation community. This is unfortunate, as there could be greater opportunity to develop high-quality, innovative projects in smart locations with the support of all sectors from the housing, transit and land conservation communities. For example, Scenic Hudson has been actively engaged in both land conservation and supportive infill, supporting both the revitalization of cities such as Yonkers, New York, and the day-lighting of the long buried Saw Mill River to bring a finger of nature through the city. In towns that are not directly served by a public transit system, but are nonetheless experiencing growth, we encourage land conservation groups to continue to actively work with planners in towns and cities to support and encourage zoning that encourages higher density compact, mixed income developments within the town center.

New light rail systems are now being planned and built around the country. Stations will be placed in locations that are currently underdeveloped. Many transit systems propose that these stations be surrounded by parking lots for commuters. We believe that this park-and-ride strategy only perpetuates sprawl. The land conservation community's objectives would be better achieved if these stations were zoned for higher density development.

Many of our cities encompass overlooked natural areas. For example, New York City's harbor is home to Gateway National Recreation Area, which includes the Jamaica Bay Wildlife Refuge. The preserve, a rich breeding ground for the Hudson River Estuary, is home to twice as many species as live in the Galapagos. But few

residents know about the preserve and it is difficult to get to. Washington DC's "jagged city edge" is in fact Rock Creek Park, an underutilized, mostly natural area. We need to develop transportation and information linkages to these extraordinary resources, and better connect our urban residents to them.

Where the land conservation movement has been effective and can continue to be effective is in leveraging its body of tools, including the transfer of development rights, conservation easements and land trusts. As landowners face the pressures to sell their properties in heated residential marketplaces, the conservation community can partner with investment partners, developers and the local municipalities to preserve lands, create zoning that encourages compact development in appropriate locations, and target development in such zones. This requires a coordinated package of parties, innovative financing and policy actions. We are beginning to see such collaborative partnerships take place and are hopeful that the land conservation community will continue to reach out to and encourage such partnerships with developers and municipalities.

POLICY CHANGES TO PROMOTE MORE COMPACT, SUSTAINABLE DEVELOPMENT PATTERNS

For the past 75 years, federal policies have encouraged sprawl and dispersed development patterns. Policies like 90/10 Interstate Highway funding, tax deductible interest on home mortgages, and federal sewer and water grants have promoted suburban and exurban sprawl. By establishing simple locational priorities for the use of these funds, the federal government can prioritize the allocation of these funds in ways that discourage sprawl and promote more compact and efficient development patterns.

We recommend that the federal government (particularly the Department of Housing and Urban Development and the Department of Transportation, along with the EPA, the Department of Agriculture and the Department of Interior) create stronger incentives for green, higher density mixed-income development at transit nodes. Some of our suggestions for federal policy changes:

- Congress should shift DOT policies and funding priorities to provide a quantum increase in the level of funding to develop, improve and expand regional mass transit systems. DOT should encourage states and localities to maintain existing highway systems with funding from user fees (tolls) and provide higher levels of federal funding to states and localities that "tax themselves" to provide increased local funding for transit systems. New or improved highways should be required to include bus rapid transit or light rail rights of way for future transit.
- DOT should require communities to commit to providing appropriate zoning to support dense, mixed income, green housing or mixed use development in transit locations as part of New Starts applications (in the Land Use rating section). In most cases, park and ride transit systems should be discouraged.

- DOT, HUD, the EPA, the Department of Interior and the Department of Agriculture should require the integration of all plans that they require communities to produce to receive federal funding into one common, integrated GIS platform, For example, DOT's Transportation Improvement Plans (TIPs) by MPOs, HUD's Comprehensive Housing Affordability Strategy (CHAS) and the EPA's State Revolving Loan fund plans, and planning for DOI land conservation grants should be integrated into one unified regional plan so that transportation, housing, infrastructure and land conservation plans are no longer considered in isolation and these plans promote more mixed-income housing adjacent to transit stations.
- Cities need green pathways that encourage walking, biking, etc. HUD, DOI, EPA and DOT should create a green infrastructure program that funds the creation of green walkways in inner-city neighborhoods, along waterways, along old rail lines, etc. These green walkways should be designed to connect pedestrians and nature to transit systems.

The land conservation community should support such major policy changes at the federal and state levels. This support would demonstrate that there is a broad-based coalition behind such needed change. Some states have or are beginning to see such broad-based coalitions among the land conservation, housing, community and transportation groups. Envision Utah is one such example. The burgeoning Smart Growth Alliance in New York State also builds a coalition among land conservationists, developers, and others around the state to effect major policy change and to direct or redirect state funding toward regional smart growth.

CONCLUSION

The last three decades have seen extraordinary suburban and exurban development, which have severely impacted natural lands. The only way to reduce this impact as our country continues to grow is to shift the pattern of development to urban areas and new transit villages. To achieve this, the land conservation community has to overcome its aversion to density, and recognize that density in the right places is the solution. We need to insure that these denser communities also share in the bounty of nature with green roofs, parks, gardens, playgrounds and regional walkways, restored water fronts and reservoirs of nature.

Background Paper
Land Conservation and Urban Revitalization

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Throughout history, cities have been in flux, with economic activity and population constantly shifting from one location to another. In recent decades, the urban centers of the Northeast have undergone shifts as they have witnessed the arrival of rural immigrants, the rise of sprawl, the decline of neighborhoods and most recently, urban revitalization. As municipalities are increasingly recognizing that green space plays an important role in the revitalization process, the land conservation community stands as a strategic partner in urban revitalization.

TRENDS IN URBAN REVITALIZATION

"Cities have been the principal source of innovation, job and wealth generation since the beginning of recorded history."
– Jane Jacobs (1961)

The decline of the urban center

Since World War II, there has been a shift in population from traditionally compact urban cities to low-density suburbs. This trend has largely been driven by the expansion of federally subsidized highways, automobiles, cheap home mortgages and regional economic growth. As residents moved to the suburbs, they took with them the tax base that supported police, sanitation, road repair and other municipal services in the city. The quality of life in many cities deteriorated.

In 1950, 69 million people lived in 157 urbanized areas in the United States, covering 12,715 square miles. By 2000, those same 157 urbanized areas contained 155 million residents in 52,399 square miles of developed land – double the population occupying more than four times as much land (Rusk, 2003).

Attracting people back to urban centers

To lure residents back to urban centers, local government, developers, businesses and community groups are revitalizing run-down urban areas and attempting to improve the quality of city life. Beginning around 1990, many municipalities began shifting away from designing cities for the automobile and back to designing cities for enhanced community interaction (Sherer, 2006). They have done this by:

- requiring developers to include open space in their projects.
- attracting service and technology-based companies to the area. In order to do so, municipalities are forced to demonstrate that their city is a desirable place to live and work.
- emphasizing green space. Some cities, such as Pittsburgh and Boston, have transformed abandoned properties into public parks to promote densely settled, multi-use, pedestrian-friendly neighborhoods.

Many elected officials and developers are now rethinking notions of sprawl and engaging in discussions of Smart Growth. In many cases, green space rehabilitation has been a key ingredient in reversing the pull of sprawl (Blaha, 2007).

HOW CAN LAND CONSERVATION HELP TO REVITALIZE NORTHEASTERN CITIES?

"There are no great American cities in North America or anywhere else in the world that do not provide great park and open space amenities."
– John Crompton (2007)

Urban forests, parks and green space can serve as a powerful tool to:

- catalyze urban development activity;
- establish frameworks for this development;
- add financial value to surrounding investments;
- enhance public and alternative transportation; and
- provide environmental services (Garvin, 2002).

While many city officials, local communities and developers are increasingly realizing the importance of green space in revitalizing urban centers, these players may lack the resources and/or skills to effectively acquire or implement green use strategies on their own. The land conservation community can provide vital support by:

- leveraging funds and aiding in the transaction process of acquiring land for green space.
- forging partnerships among government agencies, community organizations and civic leader to strengthen the efficient design and management of green space.

- providing technical assistance on park and forest systems and their relationship to populations (Ernst, 2004).

A catalyst for markets

Historically, green space has served as a catalyst for (re)attracting markets and development activity. Following the example of European predecessors, major cities in the United States such as Atlanta, New York, and Boston have invested capital in landscaping public open spaces for the specific purpose of attracting markets and generating further real estate development.

While city parks and open space attract users for specific reasons (recreation, pedestrian corridor, tourism, etc.), these users have social and economic effects that spill out into the neighborhood. Well-designed and conserved green spaces serve as catalysts in intensifying and distributing commercial and development activity.

Framework for growth

Urban planners throughout Europe and the United States have utilized parks as a means to guide development. Green space can be a non-prescriptive and market-based complement to regulation.

Urban parks and forests serve as a mechanism for accommodating increasing populations and expanding economies by providing a framework around which to reconstruct existing districts (Garvin, 2002). Moreover, parks and green space can serve as corridors connecting neighborhoods and knitting together multiple urban areas and activities into a textured landscape. This network of vegetation and neighborhoods provides cities with the flexibility to respond to increased population and market demands.

Security of financial value

While urban forests and parks are commonly associated with recreational and health benefits, they are not widely recognized for their role in enhancing and securing financial investments. Urban planners, for over a century, have utilized green spaces for this specific reason. In 1883, Horace William Cleveland argued for the creation of Minneapolis park system:

> "In the ten years succeeding the commencement of work on Central Park in New York the increased valuation of taxable property in the wards immediately surrounding it was no less than $54,000,000, affording a surplus, after paying interest on all the city bonds issued for the purchase and construction of the park, of $3,000,000 – a sum sufficient, if used as a sinking fund, to pay the entire principal and interest of the cost of the park in less time than was required for its construction." (Garvin, 2002)

Increased property value and thus higher property taxes are often sufficient to finance green space and parks.

Land values of properties surrounding high quality parks have demonstrated that they continue to increase with time. Typically property owners surrounding these parks either develop their properties in a manner that justifies the increased value or they sell them to somebody who will. Moreover, development plans that allow for public green space enhance the perception of security in financial investments, as designated parks and forests reduce the uncertainty over future land use (TPL, 1999).

Enhancement of public transportation

While not yet ready to end their love affair with the automobile, Americans are facing rising environmental and social challenges due to their current dependence on this individualistic and fossil-fueled form of transportation.

In addition to providing corridors for community and economic activity, expanded and connected networks of green space provide an opportunity to promote bicycle and pedestrian routes while connecting neighborhoods to public transit depots. Furthermore, few large preserves of land are currently accessible to people who do not have cars or live nearby. There is an opportunity to open the benefits of conservation to a new group of people by enhancing public transportation, while decreasing the number of cars on the road.

While a constituency currently exists to improve mass transit, it will become much larger and more widespread if combined with the constituency for protecting open space and recreation (Garvin, 2006). There might be opportunities for land conservation to partner with or lobby the transportation authorities for an increase in public transport.

Ecosystem services

Vegetation in urban areas provides many environmental and economic benefits that can improve quality of life for city residents (Nowak et al., 2007). Historically, cities around the world have conserved and restored trees in urban areas in an effort to protect the environmental services they provide. These services include:

- *Regulation of climate:* Urban forest and trees can be seen as potential "climate lanes," affecting air temperature, wind speed, radiation absorption and reflection and heat storage. Trees act as a thermal shield by buffering temperature variations between their canopy and the ground (Beatley, 1999).
- *Reduction in building energy use:* Data shows that 50 million shade trees planted in strategic, energy-saving locations could eliminate the need for seven 100-megawatt power plants (McPherson et al., 1994).
- *Improvements in air quality:* Trees also reduce the concentration of air-suspended particles and CO_2. Moreover, the high concentration of water in leaf tissue allows vegetated areas to behave as thermo-regulators. This can moderate the concentration of local temperature-dependant air pollutants (Nowak et al., 2007).

- *Improvements in water quality and quantity:* Many growing metropolitan areas are integrating parks and open space as buffers to protect streams, canals, rivers and lakes (Ernst, 2004). Major American cities, such as Boston and New York, bought land in source areas over a century ago in order to provide lasting protection of water resources to sustain their population.
- *Control storm water runoff:* Less paved and impervious area aids water in percolating into the ground, thus maintaining groundwater levels and decreasing storm water runoff (Nowak et al., 2007).
- *Reduction in noise:* Trees and shrubs can serve as buffers that reduce noise levels by five to ten decibels. On highways, it was found that deciduous noise buffers can reduce transportation noise by 50 to 70 percent, and coniferous trees by 70 to 80 percent (Grey, 1986).

The mix of built surfaces and green spaces in urban areas affects how energy and water are allocated and cycled through urban systems. These factors can have a large impact on economic costs to municipalities and their residents. A survey carried out by the Trust for Public Land found that for every 10 percent increase in forest cover in a water source area (up to 60 percent forest cover), the water treatment and chemical costs decreased by approximately 20 percent (Ernst, 2004). Urban planners should design green space networks in metropolitan areas that capitalize on the economic benefits and environmental services of urban forests and green space.

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SECTION 5: ENERGY SECURITY

Two Perspectives on Land Conservation and U.S. Energy Security

Daniel W. Reicher, Google.org and Michael Totten, Conservation International

HOW CAN PRIVATE LAND CONSERVATION HELP IMPROVE U.S. ENERGY SECURITY?

Daniel W. Reicher, Google.org

The nation's energy security challenges include rising oil dependence, increased imports of natural gas, and an aging electricity system. One of the answers to these challenges lies in development of renewable energy sources – solar, wind, biomass, geothermal, hydropower – to produce green electricity and clean transportation fuels. However, if these abundant indigenous sources are to provide more than a tiny fraction of U.S. energy, they will require development of millions of acres of public and private land.

- Deriving 20 percent of U.S. transportation fuels from biomass by 2020 (a goal of a number of recent initiatives) will require millions of acres of agricultural and forest lands.
- Producing 15 percent of U.S. electricity from wind, solar, biomass and geothermal sources by 2020 (a current U.S. Senate proposal) will require millions of additional acres of land across the nation.
- Related infrastructure – transmission lines, pipelines, roads, etc. – will require significant additional acreage extending over long distances.

The land conservation community could be pivotal in the successful development of renewable energy projects and the many environmental, economic and security benefits they provide. Some areas of focus might include:

- Development of siting guidelines for renewable energy projects that balance land conservation and energy security/climate goals.
- Support for easements and other measures that would allow for renewable energy development on conservation land.

- Models for how renewable energy project investments might help pay for related land conservation.
- Co-location of forest carbon sequestration and renewable energy projects.
- Development of more uniform and efficient approaches to analysis of the impacts of renewable energy projects on wildlife and biodiversity more generally.
- Support for use of federal Conservation Reserve Program lands for production of cellulosic ethanol feedstocks, such as switch grass.
- Consideration of the role that bioengineered plants and organisms will play in the development of biofuels and biomaterials production.
- Consideration of the potential impacts that a major U.S. commitment to biofuels will have on biodiversity in the tropics.
- Development of a national database of land devoted to renewable energy projects.

A BRIEF PROPOSAL: WIND DEVELOPMENT AND ECOLOGICAL RESTORATION IN THE GREAT PLAINS

Michael Totten, Conservation International

More than 90 percent of U.S. *terrestrial* wind resources occur in the Great Plains. According to energy expert Charles Komanoff,[1] to provide 100 percent of current U.S. electricity consumption would require 400,000 two-megawatt-capacity wind turbines strategically placed over the Great Plains' 1.2 million square miles.[2]

The actual footprint of these turbines, hypothetically squeezed into one space, would occupy just 6 square miles – about the size of a single large Wyoming strip mine. And even when spaced for optimum wind capture, they would occupy just 2 to 3 percent of the Great Plains (37,500 mi^2). And even then, the other 90 percent of the land surrounding the wind turbines would continue to be available for ranching, farming and restoration of native prairie grasses (35,000 mi^2). For rural communities, this could be an extraordinary financial boom. With a farm or ranch typically receiving a several-percent annual royalty from the wind farm, the income would, on average, exceed the earnings from farming or ranching.[3] This amount of land is very modest relative to the income that can be generated. Currently, farms and ranches occupy 70 percent of the Great Plains, yet they generate only about 5 percent of the region's GDP.

According to scientists studying the Great Plains, this scenario could result in two additional revenue streams:

1) restoring the deep-rooting prairie grasslands that absorb and store soil carbon and stop soil erosion (hence generating potential revenue from selling soil "CO_2 sequestration" offset credits in the emerging global carbon trading market);

[1] "Whither Wind?" *Orion Magazine*, September/October 2006. Available at: http:// www.orionmagazine.org.

[2] Stanford Atmospheric scientist Mark Jacobson uses 200,000 five-MW turbines in his analysis. He has written extensively on this strategy, with very compelling data. See Mark Z. Jacobson, Wind Versus Biofuels for Addressing Climate, Health, and Energy, March 5, 2007, Atmosphere & Energy Program, Dept. Civil & Environmental Engineering, Stanford University. Available at: http://www.stanford.edu/group/efmh/jacobson/E85vWindSol.

[3] In the United States, for example, Class 4 winds produce roughly 20 kWh per m^2 per year. Assuming that the royalty rate to the landowner is 2.5 percent of revenues generated, the wind royalty amounts to about $200 per hectare per year. For comparison, net U.S. farm income in 2000 was about $125/ha, half of which was direct government payments ($60/ha). R.H. Williams, Nuclear and Alternative Energy Supply Options for an Environmentally Constrained World: A Long-Term Perspective, prepared for the Nuclear Control Institute Conference Nuclear Power and the Spread of Nuclear Weapons: Can We Have One Without the Other? Washington, D.C., April 2001. Available at: http://www.nci.org/conf/williams/williams.pdf.

2) Re-introducing free-ranging bison into these prairie grasslands, which naturally co-evolved for millennia (hence generating a potential revenue stream from marketing organic, free-range beef).[4]

This strategy would have other co-benefits including restoring key wildlife and biodiversity habitat, as well as migratory bird staging areas.[5] Such a multi-faceted carbon mitigation strategy may also be one of the more resilient climate adaptation strategies to address the region's likely increase in severe climate-triggered droughts.

The strategy would also have water conservation benefits as well. The wind farms would require two orders of magnitude less water per MWh generated than large-scale coal or nuclear projects. And the deep-rooted native prairie grasses that the strategy would support are designed to retain moisture through even the worst of prolonged drought conditions.

The Great Plains' huge wind resource, wind farms' small footprints, and using excellent GIS mapping tools, can result in siting that minimizes ecological damage. Indeed, recent computer-based tools, like Google Earth, could be used to show a ranking of preferred development sites, based on something like the Appalachian Mountain Club's ranking system:

1. *Unsuitable* – lands where development is prohibited (Appalachian Trail corridors, for example) or "high conflict" areas.
2. *Less Than Ideal* – federal or state conservation lands rated "medium conflict."
3. *Conditionally Favorable* – Conservation or open space lands rated "low conflict," or open space or private lands rated "medium conflict."
4. *Most Favorable* – Unrestricted private land and "low conflict" areas.

The key issue that would have to be addressed to move this proposal forward is the development of transmission capacity. Generating hundreds of thousands of megawatts of electricity from wind in the Great Plains would require the siting and construction of hundreds, and perhaps thousands, of miles of new transmission lines. This is a complicated undertaking that would require significant additional commitments of land and extensive siting processes. However, given the compelling benefits of the proposal, this may well be an infrastructure challenge worth taking on.[6]

[4] See Great Plains Restoration Council, http://www.gprc.org; Bison Restoration Developments among Inter Tribal Bison Cooperative Members, http://www.bisoncentre.com; Samuel D. Fuhlendorf and David M. Engle, Restoring Heterogeneity on Rangelands: Ecosystem Management Based on Evolutionary Grazing Patterns, *BioScience*, August 2001, V. 51 No. 8; Alan K. Knapp et al., *The Keystone Role of Bison in North American Tallgrass Prairie*. Bison increase habitat heterogeneity and alter a broad array of plant, community, and ecosystem processes, *BioScience*, January 1999, V. 49 No. 1; Bruce Rutley, A Strategic Plan for Research and Development Needs of the Canadian Bison Industry, 3rd edition, Bison Research and Development Working Group, Alberta Bison Research Centre, September 2003, available at http://www.bisoncentre.com.

[5] S.C. Forrest et al., Ocean of Grass: A Conservation Assessment for the Northern Great Plains, Northern Plains Conservation Network and Northern Great Plains Ecoregion, 2004,WWF-US, available at http://www.worldwildlife.org/wildplaces/ngp/pubs/ocean_ of_ grass.cfm.

[6] There are 351,000 miles of transmission lines comprising the United States grid system, yet having insufficient lines in the Great Plains keeps the region essentially isolated from transmitting its vast wind resources into this national grid system. See Commissioner Jon Wellinghoff, Demand Response: From Water Heaters to Cash Back Hybrids, March 14, 2007, available at http://www.ferc.gov; and National Wind Coordinating Collaborative, http://www.nationalwind.org.

Background Paper
Land Conservation and Energy Security

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The twin specters of global warming and global instability that plague American use of fossil fuels have created a strong impetus for both increased energy efficiency and a switch to renewable fuels. The land conservation community has the opportunity to have a positive effect on each of these goals through creating synergies with emerging alternative energy sources and by promoting smart growth, which is associated with shorter travel distances and more efficient public service delivery.

TRENDS IN ENERGY USE

60 years of American energy

- American energy consumption has more than tripled since 1949 (EIA, 2006).
- In the last 60 years, the United States went from being a net energy exporter to importing 30 percent of its energy. This number is still growing (EIA, 2006).
- 86 percent of American energy is derived from fossil fuels (EIA, 2006).
- The top five exporters of oil to the United States are: Canada, Mexico, Saudi Arabia, Venezuela and Nigeria. Each supplies more than a million barrels a day (EIA, 2006).

What we use energy for

- *Houses and cars:* The residential and transportation sectors are the largest consumers of energy in New England, although the commercial and industrial sectors are significant contributors as well (EIA, 2007).
- *Fuel efficiency can't keep up with travel profligacy:* Vehicle miles traveled (VMTs) grew 76 percent between 1980 and 1999, which resulted in an increase of 31 percent in the amount of energy consumed for transportation.

This growth occurred despite considerable technological efficiencies in fuel technology. Both of these values are projected to continue to increase (Southworth, 2001).

- *Lost in transmission:* Both in New England and in the United States as a whole, a fifth to a quarter of all energy consumed is dissipated during transmission. This amount is twice as large as the amount of electricity actually delivered and used (EIA, 2007).

New England particulars

- *Less coal, more oil and biofuels:* The New England energy mix includes a significantly smaller proportion of coal, a particularly dirty fuel, than the rest of the United States. This is due to higher use of petroleum and biofuels. New England use of biofuels is 30 times higher than the rest of the United States (EIA, 2000).
- *New England is cold:* Compared to the U.S. average, New England uses less electricity due to milder summers which require less air conditioning. However, it does use significantly more petroleum for heating in the winter (EIA, 2000).
- *Renewables outlook:* New England has good potential for wind energy, wood biomass use, flat-plate solar collectors, and low-temperature earth energy (EIA, 2000).

HOW CAN CONSERVATION PROMOTE ENERGY SECURITY?

Inefficient use of land often corresponds to inefficient use of energy. A sprawling landscape is associated with longer car commutes, more wasteful delivery of public services and large energy-inefficient houses. In combating sprawl the conservation community stands to make many energy gains.

Decreasing vehicle miles traveled

The energy security community and the conservation community find a mutual enemy in sprawl. The Transit Cooperative Research Program (TCRP) in its "The Costs of Sprawl" series has identified a strong correlation between low density development, leapfrog development, spatially segregated land uses, and dominance of vehicle use as a primary form of transportation (Burchell et al., 2002). Low density and leapfrog development are clearly undesirable to the land conservation community. Low density's inefficient use of land results in the conversion of overall larger areas to urban land uses, while development that leapfrogs outside the immediate urban growth boundary serves to fragment remaining undeveloped land.

Meanwhile, spatially segregated land uses and vehicle dominance present problems for energy security. The former increases total miles people need to travel in their daily lives and the latter increases the proportion of those miles traveled by car. Both factors create cultural and structural changes such as the ubiquitous

commercial strips that serve the car culture and make driving even more desirable. This synergistic effect results in continued growth in VMT's (vehicle miles traveled) and energy spent on fuel, so much so that 28 percent of all energy consumed is being used on transportation and the energy use of this sector has one of the higher growth rates among the sectors. (Southworth, 2001; EIA, 2007) These numbers do not include the costs of building and maintaining roads, activities that carry high energy costs, not to mention economic costs.

There is growing evidence that high density and mixed use development decreases within-community vehicle miles traveled. Thus, by addressing sprawl through mechanisms identified above (see Section II, "Regional Competitiveness"), the land trust community is also promoting energy security. Meanwhile, better public transportation and the creation of greenways, bike paths, and green streets that are pleasant to walk on can decrease VMTs within a community (see Section IV, "Urban Revitalization").

Increasing energy efficiency in delivery of public services through smart growth

In addition to increased VMTs, sprawl also creates inefficiencies in the provision of public services. Some of these costs are transportation-related – bussing children to school, garbage collection, police patrol presence, even pizza delivery – all require longer driving distances in low-density neighborhoods. Others, however, have to do with transport of a very different kind – delivery of electricity, drinking water, and telephone and cable services (Litman, 2004)

A fifth of New England's total energy consumption is energy lost during the generation and transmission of electricity; the number for the United States as a whole is 27 percent. These numbers are higher than the total amount of electricity that is actually delivered and used, which is on the order of 11-12 percent (EIA, 2007).

Sprawl increases the amount of electricity lost in transmission because the distances from the power plant to the residential units that use that electricity are longer. Additionally, low density areas have a large number of dispersed single housing units rather than larger housing units, thus creating a need for small widely dispersed loads. This configuration results in less efficient delivery of energy by the electric grid. Similarly, drinking water, sewers and telephone wires are likely to exhibit higher energy delivery costs with longer travel distance and more dispersed distribution.

Building smart: house size and type, shade from trees, heat islands

The size and nature of a house has a great impact on the amount of energy it uses. Thus a household living in a 2,000 square foot house will use 38 percent more energy than the same family sharing a 1,000 square foot house. Likewise, households living in multi-family houses use 22 percent less energy than those living in comparable detached single-family homes. The difference between detached single family homes and those sharing a wall with another house is 9 percent (Rong, 2006).

Land conservation results in smaller houses both by promoting smaller footprints on the land and by counteracting sprawl. Sprawl has a direct correlation to the nature

and size of houses built. Compact counties, for example, were found to have five to seven times the number of households residing in multi-family or attached houses, compared to sprawling counties. Houses in sprawling counties also have an average of 19 percent more floor area than equivalent compact county houses (Rong, 2006).

There are also other less obvious energy benefits of compact development. One of these is the heat island effect found in cities. Though most often viewed as a problem, it actually saves cities energy. The heat island effect results in more energy spent on air conditioning but less energy needed for heating. Since New England has cooler summers and colder winters than the rest of the United States, the energy savings of the cities' warmer temperatures are even more than the 3 percent country net average savings on home heating and cooling (Rong, 2006).

Additionally, urban conservation endeavors that promote tree planting near city houses can save on air conditioning and heating costs. Judicious choice of tree type and position can ensure that the house is shaded in the summer, but allows sun energy through in the winter due to loss of leaf cover and a change in the sun's angle. Strategically planted trees can also minimize heat exchange between houses and the atmosphere by making heating more efficient in winter and cooling more efficient in the summer through an insulation and windbreak effect (Rong, 2006).

Partnerships between conservation and renewable energy

There are many interesting opportunities for collaboration between land conservation and renewable energy. There are also some potential conflicts between the two, which would benefit greatly from increased communication and search for compromise solutions.

Biomass trends: One of the main sources for renewable energy that the United States is turning to in its attempt to wean itself off of foreign oil is biomass. About 3 percent of the U.S. energy supply already is derived from biomass. Much of this, however, is waste produced and consumed by forestry-related industries (such as paper production). This is especially true in New England where biofuels account for a much higher percentage of total energy supplies than in the U.S. in general, primarily due to this component. (EIA, 2002)

The hottest topic in biomass, however, is replacement of petroleum by biofuels. Currently, most biofuels are in the form of corn ethanol (3.4 billion gallons of ethanol are already being blended into gasoline yearly), but other sources such as switch grass, wood cellulose, and even algae are being studied for possible use (Pimentel, 2005). The federal government is driving efforts for adoption of these technologies through various sorts of subsidies and R&D support (Shapouri, 2004).

The use of biomass for energy production, however, is still a somewhat contested field. There is much controversy regarding the net energy ratio that is achieved by various sources of biomass (Tenenbaum, 2005). Additionally, there are concerns raised in regard to land use changes motivated by biomass use. Some see a switch to corn ethanol as a driver of rising food staple prices, contributing to food insecurity in developing countries. Others are worried that the land recruited into growing increasing amounts of corn (this year farmers planted a record acreage of corn, 15

percent above that of the previous year) will be at the expense of other crops and of land and soil conservation. Indeed, agricultural interests have started to put pressure to release land from the Conservation Reserve Program in order to make it available for corn ethanol production. Though the Department of Agriculture refused to release land currently enrolled in CRP, future enrollment into the program has been halted (New York Times, 2007). Meanwhile, there is concern that future efforts of wood production for use as biofuels will consist of developing fast-growing, short-rotation, possibly non-native and genetically-engineered monoculture plantations that deplete forest nutrients in an unsustainable way. These are clearly not ideal conditions for land conservation. Improved collaboration between the alternative energy and land conservation community is needed to create win-win situations and efficient compromises to these conflicts.

Wind power: A similar mix of conflicts and synergistic benefits exist for wind power. Wind power is compatible with land conservation in the sense that it does not require conversion to urban land uses. Many in the land conservation community, on the other hand, are concerned about the scenery values of landscapes (windmills are often placed on highly open and visible areas such as ridges) and the effect on wildlife species, such as bats and birds.

Why renewable energy is important to the conservation community

The development of biofuel and wind energy sources could benefit the conservation community. Just as ethanol production increases the need for farmland, the possible future use of wood cellulose would increase the value of forests. Moreover, wind farms create an added value for open "un-built" landscapes. Increased use of these energy sources can help reverse the current trends of farmland and forest conversion to urban land uses. Though the resulting land might not have the same conservation value as non-working landscapes, it is better than pavement. Additionally, climate change is one of the largest threats to habitats worldwide and its mitigation through alternative energy should be welcomed by many in the conservation community.

How can conservation promote renewable energy?

The conservation community can, in turn, add to the incentives of setting aside land for biofuel production through augmentation of landowner profits by way of working landscape easements. This creates a partnership where neither the renewable energy production nor conservation needs to pay the full cost of the land. There is also an opportunity to galvanize political and consumer support of the land conservation community members for renewable energy. Having the advertised support of the conservation community may improve the image of renewable energy projects and can make it easier to market them to consumers.

Conflict resolutions: compromise and win-wins

Both communities stand to gain from a continuing conversation and consideration of the other's concerns. Some examples might include:

- Uning reforestation rather than conversion for wood-based biofuel stocks – this solves the dilemma of converting native forests into exotic tree plantations or coppice systems.
- Collaboration on identifying the most important conservation areas and those most suited to multiple uses. For example, tree plantations can be used as a buffer area surrounding a core high value conservation areas.
- Choosing policy alternatives that help ensure that increasing crop acreages for biofuels are not diminishing currently conserved areas, but rather preserving farmland that would be lost to urban conversion. One way to do this is to make sure conservation prices (such as through CRP) stay competitive with ethanol production. If farmers are to be paid to conserve their land while demand for corn rises, returns on rural land could increase enough to help keep more of it from being developed.
- Promote rational biofuel policies that support high net energy ratio fuels rather than focusing on low net energy/high environmental impact feed stocks with influential lobbies (i.e., corn).
- Promote use of small dimensional wood for biofuel energy production which can also promote forest health in regions where fire has been suppressed.
- Use agroforestry systems that plant trees as windbreakers, decreasing erosion and nutrient run-off, while providing important habitat for many species. The windbreakers or hedgerows could also be managed in a way to maximize biomass which can be harvested on a regular basis for biofuel use.
- Increase urban trees and park areas and using urban tree cuttings and lawn leaf litter as biofuels.

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SECTION 6: CLIMATE CHANGE

Forests and Climate Change in the Northeast

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CLIMATE CHANGE AND THE REGION

Changing climates, particularly temperature increases and related impacts, pose a serious challenge not only on a global scale but in our region. Based on data taken from ice core samples in Antarctica, temperature changes on Earth have fluctuated widely, but these fluctuations have closely tracked levels of carbon dioxide (CO_2) in the atmosphere (Figure 1). Measured in parts per million (PPM), CO_2 levels have fluctuated in the range of approximately 50-250 PPM over the past 400,000 years.[1] However, in the 200 years since the Industrial Revolution, PPM levels have begun to increase well above historical limits. Current PPM levels are approximately 380 PPM and estimated to continue to rise unless action is taken to curb the emissions of pollutants like CO_2 that contribute to global warming and the greenhouse effect. Scientists believe that limiting CO_2 levels to 450-550 PPM will be required in order to avoid the worst impacts of warming.

The projected impacts of global warming in the Northeast range from increased sea level rise, causing erosion and flooding of beach front property and possibly large areas of major cities, to serious health impacts from increased high heat. The regional climate has already experienced some changes. In the state of Maine, U.S. EPA estimates that average rainfall in parts of the state are 20 percent lower over the past 100 years and average temperatures have increased over 3° F.

To avoid the worst impacts of warming, global emissions of CO_2 and other pollutants need to be cut 75 percent by 2050 in developed countries. In the Northeast, states including Connecticut and Maine have adopted these greenhouse gas reduction targets, as has the regional Conference of New England Governors and Eastern Canadian Premiers. Because most emissions come from the energy sector, primarily through the production and use of electricity, as well as the transportation sector, these sectors have attracted the greatest attention for emissions reductions. They are also the sectors with the largest increases in annual emissions, attributable to factors such as increased demand for air conditioning in the summer and increased use of vehicles.[2]

[1] Fedorov, A. V., P. S. Dekens, M. McCarthy, A. C. Ravelo, P. B. deMenocal, M. Barreiro, R. C. Pacanowski, S. G. Philander. 2006. The Pliocene Paradox (Mechanisms for a Permanent El Niño). Science 312, 1485.

[2] An extensive discussion of the ways to reduce emissions in the electricity, transportation and land use sectors can be found in Environment Northeast's *Climate Change Roadmap for New England and Eastern Canada*, available at http://www.env-ne.org/ENE_Climate_Change_Roadmap_New_England_Canada.htm.

- Forests and land use have received less attention but are critical sectors for climate change mitigation and emission reduction activities. Forests store or sequester carbon, making the vast forest cover in northern New England and upstate New York a key part of the climate solution at the state and regional level. State and regional climate emissions goals assume that the forest sector will continue to play an important role in sequestering carbon. However, development trends or unsustainable harvesting practices are two factors that could increase the rate of forest conversion and reduce the forest stock. Avoiding forest conversion and finding ways to increase carbon storage are therefore two key strategies to address global warming.
- In addition, forests are directly linked to energy and transportation issues through biomass energy and markets for biofuels developed from forest materials. Forests offer the potential for wood-based products to substitute for more energy intensive alternatives. However, in order to provide the greatest climate benefits, forest materials must be harvested in a sustainable manner that pays attention to the need to grow trees for long enough periods of time to offset the carbon emitted from the use of the harvested material.

FORESTS AND CLIMATE CHANGE

Forests play an important role in the global carbon cycle. Trees and other plants convert atmospheric CO_2 to stored carbon through photosynthesis. Forests function as a natural mechanism to remove CO_2 from the atmosphere. There is an estimated 3,941 to 5,544 million metric tons of CO_2 equivalent ($MMTCO_2e$) stored aboveground in forests in the six New England states. Annual sequestration is estimated to remove between 25.5 and 41.28 $MMTCO_2e$ of additional carbon per year, equivalent to between 12 percent and 20 percent of New England's current annual carbon emissions.[3]

Forest products can provide additional carbon benefits if derived from sustainable harvesting. Durable wood products, such as construction lumber, can store carbon over many decades, while the regenerating forest from which it was harvested continues to remove carbon from the atmosphere. Significant emissions reductions occur when lumber is used in the place of concrete, bricks, aluminum, plastic and steel in building construction, as the production of these other materials is much more energy-intensive.

While in recent decades, the loss of forests to development has been balanced by the reforestation of abandoned agricultural lands, the trend now is towards a net loss of forests in high growth areas. This means that more of the region's emissions will remain in the atmosphere. Conversely, minimizing forest loss and increasing the ability of existing forests to sequester carbon could trap even more emissions than today.

The Maine Forest Service estimates that the average carbon stock per acre ranges from 138 to 310 $MTCO_2e$ for various ages and forest types in Maine, plus an average of 112 $MTCO_2e$ per acre in soil organic carbon.[4] The clearing of land for residential

[3] USDA Forest Service, Forest Carbon of the US, 2003 (1997), Sampson, N., via the Northeast Forest Carbon Project, 2006 (2004).

[4] Average based on Smith, James E.; Heath, Linda S.; Skog, Kenneth E.; Birdsey, Richard A. 2006. Methods for calculating forest ecosystems and harvested carbon with standard estimates for forest types of the United States. Gen. Tech. Rep. NE-343. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station.

development may remove as much as 50-67 percent of above ground biomass, while removing 22-25 percent of soil carbon.[5] Assuming a similar average for the region as a whole,[6] there could be annual emissions of 6.1 to 14.3 million $MTCO_2e$ from forest conversion in New England. This threatens statewide and regional climate change goals. For example, while efforts are underway to reduce CO_2 from vehicle emissions through tailpipe regulation, electric hybrids and other technology improvements, GHG emissions from forest conversion in Maine are roughly the equivalent of adding as many as 400,000 cars to the road each year.

A recent study of exurban development in New Hampshire highlights the potential scale of this problem. The development of a house lot resulted, on average, in the loss of nearly 60 Mg C per lot over 50 years. The authors estimate that if each of the 6,500 homes built in New Hampshire each year causes this same scale of loss, the total carbon emissions from home development equals nearly 8 percent of the state's total carbon emissions from fossil fuels each year.[7]

[5] AFWG Baseline v.7 p 39, Canada Greenhouse Gas Inventory. 2000. p. 74.

[6] In fact the North East State Foresters Association gives a slightly higher average of 388 $MTCO_2$-e per acre, (December 19, 2002. Carbon Sequestration and Its Impacts on Forest Management in the Northeast.).

[7] Weinert and Hamburg. Carbon Stock Changes and Greenhouse Gas Emissions from Exurban Land Development in Central New Hampshire. Brown University. Unpublished thesis (master's or PhD?)

FOREST LOSS IN THE NORTHEAST

In New England, the rate of land conversion from rural timberland to residential and commercial development is estimated at 60,800 acres per year. Land trusts have been very effective at protecting large areas of the region through purchase and easements. However, the cost of easements limits the amount of land that can be conserved. For example, easement purchases in Maine range from anywhere between $39.42 to $750 per acre,[8] and the county-wide average selling price for undeveloped land ranges from $592.01 to $2,208.33 per acre. The conservation community, and forest landowners, are eager to explore potential revenue streams from ecosystem services.

[8] Peterson, T. 2004 Cost Estimates for Forestry Greenhouse Gas Options, a draft memo to the Maine DEP.

POTENTIAL MARKETS FOR FOREST OFFSETS

The Regional Greenhouse Gas Initiative (RGGI) is an agreement between Northeastern and Mid-Atlantic states to reduce carbon dioxide emissions. The program is designed to reduce emissions from electric power plants in the region through a market-based cap and trade program. RGGI provides some flexibility to electric-generators by allowing plant operators to meet some of their reduction targets through "offsets". Offsets are initially limited to five project types, including afforestation (planting trees on land that has been non-forest for at least 10 years). States have agreed to consider other offset types, specifying forest management as a potential new category. The state of Maine is leading a process to consider a protocol for forest management offsets, as well as a protocol for forest conservation (avoided deforestation offsets).

By preventing the conversion of forests to development, avoided deforestation projects would prevent the sort of emissions described above. If accounting rules can be developed that can properly measure the development trends in particular geographic areas, there will be a significant potential for revenue from avoided deforestation offsets. There is also opportunity in the region to generate offsets from

forest conservation efforts and improved forest management. A forest management project can increase carbon benefits in three ways: 1) by increasing the production of forest products that will have either long-term storage or substitution benefits; 2) by increasing onsite storage of carbon; or 3) by some combination of the two. Ideally, a project would both increase onsite storage of carbon (which produces other environmental benefits, as well as being easier to monitor and verify than off-site carbon) and increase or maintain the amount of timber going into forest products (which will help prevent market leakage).

Research from the Maine Forest Service and Environment Northeast indicates that it is possible to sequester additional carbon in certain forest types in Maine through altering harvesting practices. This research modeled the impacts of different harvesting regimes on northern hardwood poletimber stands in Maine. 107 $MTCO_2$/acre can be added over 93 years by switching from heavy harvesting when stands reach small sawtimber sizes to management regimes that mimic natural stand development. Such a management regime would maintain total harvest levels over the 90+ years but result in more carbon sequestration, even higher than passive management due to increased storage in product and landfills as well as substitution benefits from burning biomass.

OFFSET REVENUE

In addition to the emerging regulatory market in the Northeast (RGGI) and in California, a voluntary market already exists. The current price for a $MTCO_2e$ on the Chicago Climate Exchange (CCX) is approximately \$4.40,[9] while the price per ton of "quality" carbon credits via The Climate Trust is approximately \$6.00-8.00 per $MTCO_2e$.[10] Ducks Unlimited has initiated a series of sequestration projects whose average costs range between \$3-10 per $MTCO_2e$.[11] The demand for offsets under RGGI may initially be weak, as recent research has shown that emissions allowances may be over-allocated. However, in the long term, the price could reach \$10 per $MTCO_2e$.

Assuming \$5 per $MTCO_2e$ and a conservative estimate of 50 $MTCO_2e$ per acre in additional carbon from changing management practices, carbon revenue could reach \$250/acre. Assuming a loss of 100 $MTCO_2e$ per acre of development, carbon revenue could be as high as \$500/acre for avoided deforestation. If carbon payments are made only as carbon is sequestered, initial payments may be very low. The net present value of NPV of \$250 per acre spread over 92 years is only \$66.08, assuming a 4 percent discount rate and that carbon payments are spread equally. The NPV of \$500 per acre over 92 years is \$132.04.

Based on the average stumpage revenue/acre/year of \$12.50, the Maine Forest Service estimates the price per $MTCO_2e$ would need to be \$16.43 for a landowner to forgo timber revenue altogether.[12] However, a forest management offset project could combine timber revenues with offset revenues.

[9] CCX website, August 10, 2006 end of day summary: http://www.chicagoclimatex.com.

[10] Michael Ashford, personal communication, March 2006.

[11] Ducks Unlimited. 2005. Ducks Unlimited's Carbon Sequestration Program. Available at http://www.ducks.org/conservation/CarbonSequestration.asp.

[12] Based on numbers provided by Ken Lautsen and Dave Struble of the Maine Forest Service.

CONCLUSION

Offsets are only part of the solution for addressing the role of forests in climate change. Other strategies will be needed to prevent conversion of forests to development, and to keep forest management a viable part of the New England economy. However, offsets are a way of integrating land use into a regional system that requires vigorous accounting and actual targets. Furthermore, reductions in the forest sector could be cheaper and easier to implement than the most expensive power sector reductions. This could provide flexibility while technological innovations in the transportation and power sector are developed and provide impetus to safeguard our current forest cover for its climate and ecological benefits.

Background Paper
Land Conservation and Climate Change

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TRENDS IN CLIMATE CHANGE

"Two of the biggest challenges facing our region are sprawl and climate change," Gina McCarthy, Commissioner of Connecticut's Department of Environmental Protection, remarked recently, adding "They are related." According to the 2007 report of the Intergovernmental Panel on Climate Change (IPCC), there is a high probability that North America will experience serious impacts from global warming, including violent storms, heat waves and drought. The Northeastern Atlantic coast, for example, will face climate change threats in the form of sea level rise, temperature extremes, droughts and frequent storms (IPCC, 2007b). The impacts of climate change in the Northeast are already being felt.

Overall, New England and upstate New York have warmed by 0.7°F in the last century. Two respected climate models[1] project significant warming over the next century in the Northeastern U.S. (6-10°F) and an increase in precipitation for the New England region (NERA, 2001). The predicted temperature increase in either model would be greater than any climatic variation experienced in the region in the past 10,000 years. A recent analysis carried out by New England Governors and Eastern Canadian Premiers (NERA, 2003) concluded that weather extremes and changing weather patterns in New England will adversely affect the following sectors:

- **Biodiversity**: Changing climate patterns could alter the survival of millions of flora and fauna species. The distribution and range of various species in the United States have already shifted northward and upward in elevation (Parmesan and Galbraith, 2004). Moreover, alterations in competitive predator/prey relationships threaten local or regional biodiversity and hence the resilience of ecosystems. There is a growing consensus that climate change will compound existing threats and accelerate the rate at which biodiversity is lost (Parmesan and Galbraith, 2004).

[1] Hadley Centre for Climate Prediction and Research (HADCM2) and the Canadian Centre for Climate Modeling and Analysis (CGCM1).

- **Northeastern economy:** A climate-induced change to the distribution of regional flora and fauna species, such as the commercially-important sugar maple, could significantly affect the Northeast's forestry, agriculture and fishing industry. For instance, while crop yields could increase due to longer growing seasons, moisture loss and pest populations may also increase as a result of moderate temperature increase (2 - 3°C) (Stern, 2007). Moreover, warmer temperatures will require securing irrigation systems and water supplies.
- **Recreation and tourism:** Milder winters, unpredictable weather patterns, decreasing air quality and changing plant and animal dynamics will affect tourism and investment opportunities. Two obvious ways that climate change might impact New England's tourism will be damage to the ski industry and fall foliage tourism. State offices of tourism in the region indicated that fall foliage tourism accounts for approximately 20-25 percent of total annual tourism in Vermont and Maine (Norris, 2006). A 50 percent drop in fall tourism could correspond to nearly 20,000 jobs lost if fall tourism accounts for just 10 percent of the region's total, which is a conservative estimate (Norris, 2006).
- **Energy:** Possible impacts of climate change – such as ice storms, soil erosion and subsidence, and heat waves – can cause major disruptions in energy supply, such as major increases in the energy used for air conditioning.
- **Health:** Climate change will increase the risk for a number of adverse health outcomes in the Northeastern U.S, including heat-related illness, respiratory disease, and vector-borne diseases.

Climate change stands to cause economic loss, ecological degradation and social disruption. Several Mid-Atlantic and Northeastern states have recently agreed to create the Regional Greenhouse Gas Initiative (RGGI), a regional market-based strategy for reducing carbon dioxide emissions. Early development and implementation of mitigation and adaptation plans may enhance the competitive advantage of Northeastern U.S. industries. The land conservation community can provide an important supportive role to Northeastern public and private stakeholders that are engaged in the climate change discussion.

HOW CAN CONSERVATION HELP THE NORTHEAST MITIGATE AND ADAPT TO CLIMATE CHANGE?

The 2007 IPCC assessment report noted that approximately 20 percent of greenhouse gases emitted from human activities were due to forest loss and land use change (IPCC, 2007a). Moreover, the loss of intact forest and increased environmental degradation is directly linked to vulnerability to natural disasters. A strategic approach to forest and land conservation could serve not only as a mitigative measure to decrease climate change risks, but also as a means of adaptation to potential adverse social, economic and environmental impacts.

The NEG-ECP's regional climate action plan sets mitigation/adaptation goals that call for the expansion of land conservation techniques such as conservation restrictions to protect greenspaces, forest resources and ecosystem services (NEG-ECP, 2001). The land conservation community can aid in implementing these conservation techniques through land acquisition, training, partnership building and lobbying measures. Overall, protection of forestland is seen as a climate change strategy for the important role that forests serve in:

- Mitigation: Reducing atmospheric carbon dioxide through sequestration
- Mitigation: Diversifying and maintaining the region's energy portfolio
- Mitigation: Promoting alternative transportation
- Adaptation: Maintaining biodiversity and ecosystem resilience
- Adaptation: Protecting vulnerable areas
- Adaptation: Securing community health

Mitigation: carbon sequestration

Forests are increasingly recognized for their role in sequestering and storing carbon dioxide. All trees and plants convert carbon dioxide gas into stable carbon compounds (such as wood, leaves and soil) during their growth process. Restoring and conserving forests in the Northeastern U.S. would develop and maintain regional carbon sinks.

Pacific Land Trust reports that managing existing temperate forest could lead to an additional 25 billion metric tons of carbon stored globally over the next 50 years (Wayburn, 1999). The land conservation community can assist landowners to manage Northern forests to serve as a critical complement to reducing regional GHG emissions. Moreover, these protected forests have the potential to qualify under RGGI as a viable carbon emission offset.

Mitigation: diverse energy portfolio

As part of the Northeast's climate adaptation action plan, NEG-ECP calls for increasing the region's renewable energy portfolio standard, requiring suppliers to collectively provide 10 percent of energy generation from a renewable source by 2010 (NEG-ECP, 2001). Land conservation can aid in both protecting the generation of renewable energies and providing space for renewable energy projects. Many forms of renewable energy – wind, hydroelectric, solar – depend on well-chosen and stewarded lands. For example, the preservation of riparian forests is instrumental in ensuring quality and abundant water supply for hydroelectric plants.

Joining the Climate Change Discussion

The Nature Conservancy (TNC) notes that climate change poses one of the greatest long-term threats to biodiversity. Over the past 50 years, TNC has invested billions of dollars in nature conservation across the country and realizes that their investments are at jeopardy due to climate change impacts. TNC just announced that they will join the U.S. Climate Action Partnership (USCAP), an influential new alliance of more than two dozen major companies and environmental and conservation organizations. This partnership is working with policy makers to call for a mandatory reduction in U.S. greenhouse gas emissions. Until joining USCAP, The Nature Conservancy has been working with policy makers in the Northeast to establish a model rule to reduce emissions for RGGI. (www.tnc.org)

In a mitigative capacity, trees play a role in reducing urban heat islands and cooling ambient urban air temperatures, thus decreasing dependence on energy cooling systems and reducing human health risks.

Mitigation: alternative transportation

The transportation sector is a major source of carbon dioxide and fossil fuel emissions. As discussed in previous sections, the integration of forests and green space into land-use planning can aid in developing inter-connected regional, state, provincial and local greenways. These greenways can serve as alternative and complementary travel modes that promote travel by means of mass transit trains or non-fossil fuel alternatives (i.e., walking, biking) (Garvin, 2006).

Adaptation: biodiversity and ecosystem resilience

In the face of climate change risks, land conservation will prove key in ensuring species diversity and a resilient natural environment. Forest tracts can serve as robust corridors between habitats and reserve networks along climate gradients. Promoting dynamic design and management plans for nature reserves may enable land managers to facilitate the adjustment of wild species to changing climate conditions. These land corridors can alleviate the stress due to both climate change and other anthropogenic factors, thus helping reduce their combined effect on various species (Parmesan and Galbraith, 2004).

Adaptation: vulnerable regions

Land conservation in areas that are highly vulnerable to climate change, such as high-risk shorelines or waterways from development, can serve to maintain ecological resilience, avoid flooding and ameliorate initial climate impacts. Moreover, forests and green space can play an important role in framing responsible growth in both urban and rural areas, by forming buffer zones for protected areas and directing development away from these high-risk and vulnerable areas.

Adaptation: health

Changing temperatures, precipitation patterns and increased environmental degradation could expose communities to additional heat stress, the spread of vector-borne diseases and the alteration of ecological conditions that are important for food and water security. Land conservation that results in highly resilient ecosystems can:

- Reduce the heat island effect in cities;
- Decrease the amount of suitable habit for Lyme-disease ticks, mosquitoes, forest pests and the spread of vector-borne diseases;
- Reduce air pollution and ground-level ozone;
- Diminish the onset and severity of respiratory disease associated with wild-fires;
- Reduce runoff and flooding;
- Increase water quality and storm water drainage.

REMAINING QUESTIONS

Considering the perceived risks and future impacts of climate change:

- What mitigation measures are being prioritized by the Northeast? How are these measures, directly or indirectly, related to land-use?
- What areas in the region are considered highly vulnerable to climate change impact? Are land trusts currently working in these areas?
- How does the land conservation community view their role in the climate change discussion?

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The Regional Greenhouse Gas Initiative website: http://www.rggi.org

Environment Northeast website: http://www.env-ne.org

Pacific Forest Trust website: http://www.pacificforest.org

SECTION 7: HUMAN HEALTH

Conservation at the Crossroads: A View from the Side of the Road

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The purpose of this meeting is to consider some of the larger forces shaping land use change and to find ways to enhance the effectiveness of private land conservation within the context of these larger forces. I am a scientist and know very little about conservation. But in my work, I do see some of the larger forces that shape your work, and as I see it, conservation is at a crossroads – a choice point, where the road not taken can mean the difference between conservation fading to a mere shadow of its former self, and conservation blossoming into something much larger and more comprehensive than it has ever been.

As a scientist studying the relationship between people and nature, I've observed the emergence of two major developments in the last ten years or so, each of which has potentially profound implications for the future of conservation. The first development is societal. It has the potential to tremendously shrink, or tremendously expand, the conservation movement. The second development is scientific. It has the potential to profoundly reshape and expand conservation. The purpose of this paper is to describe these two developments and their implications for the conservation community, as well as to share some ideas for making the most of these new realities.

MAJOR DEVELOPMENT #1: NATURE IS DISAPPEARING FROM CHILDREN'S LIVES

As those of you who have read Richard Louv's *Last Child in the Woods* know, nature is disappearing from children's lives. Nature is increasingly being erased from neighborhoods – whether it's the undeveloped wooded area, the nearby farm, or the dead end with its little grove of trees, it's all disappearing. And if a child is lucky enough to live near one of these places, it doesn't make much of a difference because he or she is not allowed to play outside and has too many scheduled activities to just play outside – and in any case, it's so much more interesting indoors, in the basement, where the Nintendo and the TV and the Internet connection are, so why

go outside? Increasingly, nature is something children see on TV, something they *visit*, something they learn about in school – not an intimate, direct, daily part of their lives.

This may be somewhat familiar to you. Perhaps you've seen it in your own life and your children's, or grandchildren's, lives. The "wild" places, or seemingly wild places, that you grew up with are gone – replaced by housing and 7-11s and strip malls. And you may be well aware that your kids are growing up without any wild places nearby at all. What is surprising and disturbing to me, though, is to give talks to audience after audience and to discover how universal this pattern is. Ask adults, and almost to a person, they will say they grew up largely outdoors, and had a special, natural place. Ask them about their young children or grandchildren, though, and almost none of these kids have places of their own. In other words, it's not just *your* wild place that's gone, it's almost all of them. It's not just a handful of children here and there who are growing up without a connection to nature, it's an entire generation.

Herein lies both the crisis and the opportunity. The crisis is this. If we don't stop and reverse this trend, where will the next generation of conservationists come from? Or the generation after that? Study after study has asked, what makes a conservationist or an environmentalist? And study after study traces the love of nature back to childhood, and childhood experiences of nature. As they say, you can't love what you don't know. So it may have struck you as hyperbole when I said I thought this development had the potential to tremendously shrink the conservation movement, but I really think it does. When almost no one has grown up with nature, who will be willing to pay sky high prices to conserve it? I believe the fact that nature is so thoroughly absent from today's children's lives raises truly chilling prospects for the future of conservation.

Fortunately, as dire as this crisis is, the opportunity it represents is equal in magnitude and urgency. What Richard Louv has discovered is that the disappearance of nature from children's lives may be one of the most powerful, most universally compelling arguments for conservation ever. In the two years since *Last Child* came out, a national grassroots movement has emerged, and the individuals and groups driving it are as diverse a group as you could possibly hope for – as Rich puts it, "developers and environmentalists, corporate CEOs and college professors, rock stars and ranchers." And not only are they diverse, but they're energetic. State and regional campaigns, sometimes called Leave No Child Inside, have begun to form in at least 24 urban regions and states, including Cincinnati, Cleveland, Chicago, the San Francisco Bay Area, St. Louis, Florida, Colorado, Kentucky, Texas, and in Canada as well. Currently, at least four states – California, Connecticut, New Mexico, and Washington – are considering or have passed legislation to help reconnect children with nature.

Thus after years of arguing for conservation and having arguments so often fall on deaf ears, here at last is an argument which seems to galvanize audiences into action and successfully drive policy. There is a big wave here, and the conservation community has the opportunity to catch it, ride it, and shape it. To some extent, the conservation community has already begun to, and in the last section of this paper, I'll offer some more ideas for doing so.

MAJOR DEVELOPMENT #2: SCIENTISTS ARE FINDING THAT NATURE IS AN ESSENTIAL COMPONENT OF A HEALTHY HUMAN HABITAT

As I mentioned, the first major development I've observed in the people-and-nature area is societal; the second is scientific. It has to do with the impacts of nature on human health. You are probably already familiar with some of the indirect health benefits of greenspace. Clean air, clean water, and a reduced heat island effect are believed to pay off in many ways, including fewer respiratory ailments, hospitalizations, and mortalities during heat waves, reduced water-borne diseases, lower rates of cancer and fewer asthma attacks. But in the past 20 years, scientists all over the world have been looking at the direct health benefits of greenspace and contact with nature, and the findings have been transforming our understanding of the relationship between people and nature.

Some of the individual findings in this emerging body of literature are momentous in their own right. Take just three examples:

- First, a series of three studies has found that spending time in "green" outdoor settings reliably reduces attention deficit symptoms ("ADHD" symptoms).[1]
- Second, a study of over 3,000 senior citizens found that those with access to green walkable streets and spaces had significantly lower mortality rates, regardless of their socioeconomic status and original health status. And not only did these seniors live longer, but they also fared better on measures of independent living.[2]
- And third, a study of over 7,000 children found that, in urban areas, the greener a child's neighborhood, the less likely they were to be overweight.[3]

Each of these findings suggests that greenspace plays a significant role in addressing a key societal challenge. ADHD afflicts one in 14 children. In the United States, the total cost of excess healthcare and work loss for ADHD sufferers and their family members in 2000 was $31.6 billion.[4] A rapidly aging population will provide daunting challenges to overburdened healthcare and social services systems: currently, roughly 12 percent of the population is 65 and older; by 2030, this group will represent nearly 20 percent of the total U.S. population.[5] And childhood obesity is now epidemic in the United States – over the past three decades the obesity rate for children aged 6-11 has more than tripled[6] and one in six children is overweight.[7] Conservation can help address these key societal challenges.

Moreover, the findings on ADHD, mortality in the elderly, and childhood obesity are just part of the larger body of evidence linking "contact with nature" with human health and well-being. Here are just some of the more exciting findings. In the physical health arena, access to nature is linked with better overall self-perceptions of health,[8] fewer health symptoms,[9] fewer ailments,[10] less demand for health care service,[11] and faster recovery from surgery,[12] as well as lower blood pressure and

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cholesterol levels,[13] more rapid recovery from elevated heart rates,[14] and enhanced survival rate after a heart attack.[15]

Beyond these physical health-related measures, exposure to nature has also been linked to healthier patterns of behavior and functioning – better concentration,[16] greater impulse control,[17] and better delay of gratification,[18] more creativity,[19] less aggression and violence,[20] and more effective, proactive patterns of coping.[21] Not surprisingly, then, access to green and exposure to green is consistently linked with subjective measures of well-being. Increased self esteem[22] and decreased feelings of depression and anxiety,[23] greater enthusiasm for one's work,[24] and lower levels of psychological distress in response to stressful circumstances[25] have all been linked to exposure to nature.

Not only does greenspace impact individual health, it also fosters healthier communities. In greener neighborhoods, residents are more likely to spend time outdoors,[26] get to know their neighbors,[27] and form supportive social networks;[28] children play in more healthy and creative ways,[29] vandalism, litter, and loitering are less frequent,[30] and violent and property crimes are less frequent[31] – even with income held constant.

Thus a large and diverse body of evidence is now pointing to a conclusion that Thoreau, Muir, and Olmsted suspected long ago: nature is a necessary component of a healthy human habitat. Further, the available evidence suggests that "Vitamin G"[32] is helpful in many forms, in both small and large doses, and is needed on a regular, perhaps daily basis.

The potential for these scientific developments to reshape and expand conservation seems clear. The protection and creation of healthy human habitats might become an important part of conservation's mission. And to the extent that policymakers tend to view protecting greenspace as a kind of charitable, sentimental but ultimately unnecessary endeavor, scientific evidence on the role of greenspace in human health offers a new and compelling argument for conservation. When conservation is understood to be a public health measure, it seems plausible to imagine a greatly expanded scope for conservation. Rather than being relegated to the odd parcel here and there, a new goal would be to integrate nature into the human landscape in a truly comprehensive way, from the regional scale, to the neighborhood, to the view out the window.

MAKING THE MOST OUT OF THESE DEVELOPMENTS; OR, HOW CONSERVATION CAN HELP

What can the conservation community do to make the most of these developments, for the benefit of both land and people? Here are some ideas.

1. The conservation community might help fund or create informational campaigns to change policymakers' and the public's understanding of the role of greenspace and conservation in human health.

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2. The conservation community might take each conservation project as an opportunity to foster stewardship, attachment, and a sense of identity with the land within the local community. The more engaged a community is with its land, the more health benefits it derives from that land – and the more a community develops a sense of identity and attachment toward its land, the more likely it is to fight to protect that land.

3. The conservation community might work to provide local communities with a concrete, vivid, and compelling vision of a green future, as well as leadership toward such a future.

4. The conservation community might work to transform poor urban neighborhoods, bringing the health-benefits of greenspace to some of our most disadvantaged communities, and fostering a new connection between urban children children and the land.

5. The conservation community might work with residential developers to create "child- and nature-friendly communities," reconnecting children and nature.

6. The conservation community might work to reclaim lost and wasted urban lands, turning local blights into community assets. Brownfields, abandoned river fronts, and vacant lots might be transformed into vehicles for delivering Vitamin G.

7. The conservation community might work to enable, and manage, appropriate human access to wild, remote places. There is little point in conserving pristine parcels only to have them overrun; at the same time, wise management of human access to such parcels can yield a constituency willing to sustain and protect those parcels in the face of ever-mounting development pressures.

8. The conservation community might work to maximize the human "felt" benefits in every parcel. The more different benefits a parcel yields, the more ways it provides a dose of Vitamin G, and the more health benefits it can provide to more individuals. Ultimately, the more benefits that locals experience from a greenspace, the more reason they have to protect those benefits, and that greenspace, in the future.

Background Paper
Land Conservation and Human Health

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HUMAN HEALTH TRENDS

The field of environmental health is increasingly redefining itself beyond a traditional focus on environmental contaminants to include subjects ranging from a "toxic" physical and cultural environment that drives obesity to the effects of landscape fragmentation on infectious disease.

- Hurricane Katrina drove home the potential scale of the impacts of flooding that results from poor planning and preparation.
- An obesity epidemic whose costs now exceed those of smoking has turned attention from weight loss to obesity prevention through environmental design.
- Emerging infectious diseases such as Lyme disease and West Nile virus have forced an examination of the relationship between land use and disease.
- The United States now has 6.3 million cases of childhood asthma, with asthma the number one reason for school absences (EPA, 2007). While the causes of the increase in asthma are unclear, it is clear that poor air quality exacerbates asthma. Over 60 million people nationally live in counties classified under the Clean Air Act as federal non-attainment areas for PM2.5, PM10, or both (EPA, 2004).
- Vehicle Miles Traveled (VMTs) are increasing nationally, causing air pollution, traffic fatalities, a decline in civic engagement, and a decline in physical activity. In 2001, the average American adult drove 39 miles per day, an increase from 19.5 in 1969 and 35 in 1990 (U.S. Department of Transportation, 2003). Americans drive a total of 4 trillion miles each day, an increase of 32 percent since 1990 (U.S. Department of Transportation, 2003). This increase in VMTs has negated the impact of declining national traffic fatality rates per mile traveled.

- The increase in car transit limits opportunities for safe bicycling and walking to work, school, and civic engagements.

Trends such as the use of Ritalin and antidepressants in children have provoked interest in the effects of exposure to nature on health endpoints such as autism and ADD, given that these disease trends have paralleled the decline of children's outdoor play. Research faces the complications of numerous confounders and the difficulty of identifying and quantifying health endpoints, but the body of evidence demonstrating the effects of green space and the outdoor environment on physical and mental health is slowly growing. For instance, exposure to green space, even in the form of windows, has been shown improve recovery rates in hospitals.

Children are often an emphasis of the new focus on environmental health, for several different reasons: children have heightened susceptibility to environmental exposures; health conditions and behavioral habits established in childhood lay the foundation for adult health; and the "free choice" arguments used frequently by industries such as tobacco and fast food fall flat when considering children bombarded by advertising. Not the least, the topic of children's health has the power to mobilize diverse constituencies.

New England trends

Air pollution: The Northeast is the only region in which particulate emissions increased over the period 1999-2003. Two counties in EPA Region 1, New Haven and Fairfield counties in Connecticut, are classified as non-attainment areas for PM 2.5, the most dangerous size of particulate emissions.

Obesity: New England tracks only slightly below the national average of 65 percent of adults being classified as obese based on BMI. The health risks of obesity range from diabetes to heart disease to risk of certain cancers. Caloric imbalance that stems in part from lack of exercise is a primary driver of the epidemic. According to the 2000 Behavioral Risk Factor Surveillance System, over 75 percent of New England residents are at risk for the health implications of lack of exercise (Willett and Demolky, 2002).

Infectious diseases: New England is the origin of Lyme disease, which is driven by changes in land use that affect populations of deer and other host species. West Nile virus, which arrived in New York City in 1999 traveled through New England, and reached California by 2002, is also influenced by land use changes that influence the distribution and densities of mosquitoes and their avian and mammalian hosts.

HOW CAN CONSERVATION PROMOTE PUBLIC HEALTH?

Changes in land use can adversely affect human health and well-being through a variety of mechanisms, on varied spatial and temporal scales, and across urban-rural and socioeconomic gradients. Understanding these complex relationships poses a great challenge to the scientific and public health communities. Even given uncertainty, it is clear that conservation presents an opportunity to improve public health.

Conservation relates to health in these general areas: water quality and flood prevention; air quality; mental health; social capital; physical activity; traffic accidents; and ecosystem integrity.

Water quality and flood prevention

The positive health effects of land conservation on water quality and storm water drainage are well-documented. Conservation of land can protect drinking water quality and quantity and reduce flooding, mitigating associated risks of infectious disease and flood-related accidents. Urban communities in particular stand to gain from the effects of conservation on water.

Air quality

Land conservation can reduce ground-level ozone, reduce heat island effects, and (if associated with lower traffic flow or if green space supplants industry) reduce particulate emissions and other criteria and hazardous air pollutants. This diminishes the onset and severity of respiratory diseases including asthma. When assessing the impact of conservation on air quality, it will be important to consider the impact on several spatial and temporal scales.

Mental health

Green space appears to have numerous positive effects on mental health. Green space can promote mental health through enabling exercise, through decreasing noise, and through other intangible mechanisms. Frances Kuo of the University of Illinois, in her research on green space in low socioeconomic-status urban areas, demonstrated a positive effect of green space on ADHD. Other research shows positive effects of green space on recovery rates in hospitals.

Social capital

Social capital, a measure of societal connectedness widely discussed by political scientists such as Robert Putnam, has begun making its way into the epidemiological research, in spite of the great challenges associated with measuring it. Lack of social capital helps explain events such as the large death toll (nearly 15,000) in France as a result of a 2003 heat wave, in which many elderly died alone in their apartments. Social capital is also thought to explain at least in part the precipitous decline of men's health (from 75 to 60 years) in Russia since the fall of Communism, due to a drastic decline in social networks for men. A sizeable body of research links social networks to survival and recovery rates across diseases. If conservation results in community space or programming that fosters social capital, it can improve health. This impact is likely to be greatest in areas where green space is lacking or where safety concerns inhibit the use of existing green space.

Physical activity

Lack of physical activity is a major risk factor for heart disease, the nation's number

one cause of death. It is a leading contributor to obesity, which brings with it a multitude of health and economic costs. Access to desirable and safe places to exercise promotes physical activity. If conservation land provides opportunities to exercise where none existed previously, it can improve health. This is especially the case if conservation land increases opportunities for utilitarian exercise, such as walking or biking to a destination such as school, work or downtown. In 2003, nutrition expert Walter Willett of Harvard Medical School and Serena Domolky, coordinator of the Working Group on Prevention and Control of Overweight and Obesity in New England, authored a strategic plan for addressing the problem of overweight and obesity in New England. Increasing exercise is a primary component of the plan, and they highlight the positive potential of land use planning for influencing exercise patterns. They specifically recommend an open space/cluster approach to development as one that encourages intermodal transportation and promotes exercise (Willett and Demolky, 2002).

Traffic accidents

If conservation (a) increases the safety of biking and walking routes and (b) decreases traffic flow by increasing alternative transportation, it will prevent traffic accidents. The effect of density on driving behavior is highly contextual, but higher density is closely correlated with lower Vehicle Miles Traveled, suggesting the positive impacts of clustered development combined with conservation. One National Resources Defense Council study in Northern California found that a doubling of density, combined with alternative transportation measures, resulted in up to 30 percent fewer VMTs (Holtzclaw, 2004).

Ecosystem integrity

Habitat fragmentation and changes in land use change the distribution and density of species and how they interact. This in turn influences the development and spread of disease, which has been increasing in rate. A growing field of eco-epidemiological research seeks to understand the link between land use change and infectious diseases such as Lyme disease, malaria, and arboviruses such as West Nile and Eastern Equine Encephalitis. For example, forest-residential edge might be a predictor of human risk for Lyme disease, in which case large tracts of conservation land could mitigate disease risk (Patz et al., 2004).

REMAINING QUESTIONS

Given the effects of land use on public health, the potential to use public health as a lever for land conservation presents a tremendous opportunity.

- What are the case studies in which public health has effectively produced support for land conservation?
- What are the best practices of conservation organizations associated with engaging the public health rationale?

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SECTION 8: CONCLUSION

Integrating the Discussion

Bradford S. Gentry
Yale School of Forestry & Environmental Studies

As evidenced by the material provided in Sections 2-7, an incredibly wide range of topics was covered during the workshop discussions. The purpose of this effort was to expand the participants' perspectives, shifting from "How do I conserve land as an end in itself?" to "How might I think about land conservation as a means to help address other pressing social and economic issues at the same time?" For this reason, it may be useful to summarize the different conversations from the workshop in terms of three major questions, which mark the transition from the traditional view of land conservation to a broader, more integrated perspective. Each of the following questions is considered below:

- What broader trends in the Northeastern United States are impacting land use and conservation?
- How might the land conservation community consider surfing with these trends?
- What are some of the current opportunities for actually doing so?

This section then concludes with examples of some of the follow-up activities already being undertaken by the participants.

WHAT MAJOR TRENDS IN THE NORTHEASTERN UNITED STATES ARE IMPACTING LAND USE AND CONSERVATION?

Growing population and the resulting need for more housing

Eighteen million new people are expected to be added to the Northeastern mega-region by 2050 – and they have to live somewhere. New housing will be needed, particularly housing that the average citizen can afford. Land trusts risk political marginalization if they oppose all new housing everywhere.

The need to attract and retain an increasingly mobile, educated workforce

As the region's economy continues to shift from manufacturing to a service and financial base, it needs to ensure that it can attract the skilled workers needed to drive

the new economy. Quality of life is a key consideration for these individuals and their families. Easy access to intimate open spaces – including lands managed by the land trust community – is an under-publicized ingredient of the attractions offered by the Northeast.

> *A study by the Wells Fargo Bank on why companies locate to the San Francisco area found that the environmental quality of life – including conserved landscapes – was the single most important factor. – Laurie Wayburn*

Increased stratification of income, raising affordability issues for land and housing

Land and housing prices are going up in coastal and other high-amenity areas while lower-income families are concentrating in the inner ring suburbs, former mill towns and exurban areas. Jobs are needed in these areas, beyond those generated by the owners of second homes. In addition to raising the cost of conserving land, these trends pose a variety of other issues for land trusts, ranging from keeping working lands affordable for farmers and foresters to finding affordable housing for their own employees within the communities in which they work.

A changing climate and the need for more efficient use of energy, transport and land

More efficient energy use can help reduce both the high cost of energy in the Northeast, as well as regional emissions of greenhouse gasses. Over 30 percent of the region's greenhouse gas emissions are from transportation. Finding ways to attract more people to population centers, thereby cutting commutes and reducing the development pressure on more rural areas – including those of high conservation value – becomes a critical need.

> *For every $1 saved in housing costs by moving further out, $0.77 is lost in transportation expenses. – Jonathan Rose*

New pressures on land from a changing energy base

New energy production and distribution facilities are inevitably coming to the Northeast, whether they be coal, renewables (such as wind, biomass, tidal) or nuclear. They will need to be sited somewhere – hopefully in areas of relatively low or compatible conservation values. Some, particularly biofuels, will also need to be grown and harvested in ways that enhance rather than degrade open space and do not create additional economic stresses on the farming community. Political and regulatory processes will be key to determining how the benefits and burdens of these developments are allocated across the landscape.

Improved understanding of the human health benefits of open space

Kids and water are two key drivers of political action. While the links between water protection and funding for land conservation are increasingly well understood, those

between child development and exposure to greenspace ("Vitamin G"[1]) are surprisingly less so. As more studies are released showing improved cognitive development and other health benefits from access to green spaces of all types, powerful new opportunities arise for land conservation.

[1] As used by Frances Kuo in Section 7, "Human Health."

> *Cognitive functioning improves after exposure to nature exercises the mental muscles. – Frances Kuo*

HOW MIGHT THE LAND CONSERVATION COMMUNITY CONSIDER SURFING WITH THESE TRENDS?

Given these broad forces at work in the Northeast, how might land trusts and other conservation organizations consider adjusting their strategies? What are the best ways to work with – rather than against – these forces in achieving conservation goals?

The answers must build from the core strengths of the conservation movement. Land trusts are focused on solutions, traditionally asking what deal can be put together to protect a given parcel. In doing this work, they have accumulated resources and skills that are directly applicable to broader social and economic issues. For example, as land trusts acquire more land, they are shifting more financial and personnel resources to the stewardship of protected lands – these stewardship decisions hold tremendous opportunities for aiding local communities, if the lands are used skillfully. In addition, and least utilized to date, land trusts have developed uniquely bipartisan support in their communities – precisely because of their focus on solving problems affecting specific pieces of land and not engaging in partisan politics.

Finding ways to engage on the broader trends in land use described above while enhancing these core strengths is the key challenge facing land trusts. Some possible ways forward include the following:

Helping to catalyze community conversations on land use goals

The bipartisan appeal of land trusts may well make them uniquely well placed to work with other local organizations to help catalyze local and regional dialogues over communities' hopes and dreams for their land. Many of the trends discussed above are not well addressed with a site-by-site approach, whether that is through individual easements or building permits. Rather, they will require actions that cut across political boundaries, landscapes and ownership patterns, and therefore must reflect the priorities of the many different interests affected – across organizations, economic classes, ethnic groupings, land uses and scales.

In the Northeast, few venues now exist for such conversations at the local or regional level. Some take place in zoning proceedings, others in legislative committees, a few in regional planning efforts. Given the decision-making authority being exercised in those processes, however, specific rules must be followed and rights granted or denied – leaving little, if any, space for broader reflections on what the communities would like from their landscapes.

Land trusts, working with other local groups, may well be able to help catalyze such conversations to understand and articulate broader visions for land use. Simply making connections across the range of individuals and groups interested in land, but who rarely share their views outside of contested hearings, may well be a valuable exercise – particularly given the new opportunities for partnerships that may emerge. Listening to and reflecting on the variety of voices and perspectives offered will be key. Any shared understandings that emerge from these meetings, such as where certain types of facilities are more or less appropriate to be sited, can then be used by the land trust and others to help inform their more traditional work. Given the bipartisan, but otherwise narrow political base of many land trusts, finding partners with credibility across other parts of the local community will be critical to the effectiveness of any such conversations.

We can't just say not there, but also ok here. – *Ernest Cook*

Speaking for the values of open spaces

The work of land trusts and other conservation organizations is increasingly affected by political and regulatory processes – from the siting of interstate transmission lines to the adoption of rules for U.S. carbon markets. Affected parties intervene in all of these proceedings to protect their interests, but a dwindling number speak for open spaces: the timber companies are selling their lands to pension fund managers; farms are decreasing in number; other environmental groups are often more focused on reducing exposure to toxics or the use of fossil fuels; second home owners are rarely politically active in or even considered part of the local community in their vacation areas.

Given the long-term perspective of land trusts as stewards of open space, as well as their bipartisan political support, they may offer an effective voice for open spaces. They have a deep store of knowledge about open spaces in their communities. If land trusts focus on the links among health, education and the day-to-day economic "drivers" faced by the average citizen, they may be able to help articulate how community values apply across these landscapes. This knowledge could assist decision-makers in identifying which activities are best suited for particular sites, as well as understanding what options and trade-offs are involved. Furthermore, land trusts should inform policy choices more directly by speaking for the land. In this way, they can help ensure that the values of green spaces are reflected in the political calculations that affect land use. Land trusts can do this either alone, or in partnership with environmental, smart growth, community development and other advocacy groups.

Engaging the land trust community in policy is the key to the future of land conservation. – *Rand Wentworth*

Doing new types of deals with a wider array of partners

Thinking more broadly about how conservation might address other issues will also point to new partners and sources of support for conservation activities – particularly as stewardship becomes a larger part of land trust work. These partners could include community development financial institutions or green developers looking to renew village centers, the organizations striving to keep farmland available locally, climate advocates promoting policies that pay land owners for maintaining their forests, elementary school teachers using open spaces to promote the cognitive development of their students, the wood products industry working to substitute timber for more energy-intensive materials, farmers providing locally grown food to local schools and many others. Such partnerships can generate new sources of funding for land acquisition and on-going management, both of which are critical needs for the conservation community.

> *Land trusts need to build greater community relevance into their work if they (and the lands they protect) are going to flourish beyond this generation.*
> *– Judy Anderson*

Managing lands to build broader community support

The most effective way to build and ensure support for open space over time is to encourage the use of conserved lands by local communities, in a manner consistent with conservation goals. As the focus of land trust work expands to include more stewardship activities, it will be necessary to differentiate the degree of protection appropriate for different sites. Understanding and managing the liability risks associated with public use will also be important.

> *How much public benefit is there from open space with little or no public access?*
> *– Kim Elliman*

Many of the groups identified above as potential new partners in doing deals are also potential partners in managing lands, through activities ranging from educational or recreational programs to leases for sustainable farming or forestry activities. The goal should be to maintain each parcel as a treasure in the eyes of the local community, so that many others will help to manage and protect the land over time. This will require continuing engagement with community members as their needs evolve. Conserved lands, when used for educational or community gathering activities, can become special places that cross socio-economic boundaries, deepening local connections and helping to ensure their continuing value.

> *Land conservation should be seen as a tool for building civil societies.*
> *– Jim Levitt*

WHAT ARE SOME OF THE CURRENT OPPORTUNITIES FOR THE LAND CONSERVATION COMMUNITY TO WORK WITH THESE TRENDS?

Different opportunities for moving from these broad approaches to specific actions will exist at different times and places, depending on the latest events or popular interest. Possibilities that seem the most promising at this time in 2007 include:

Using conserved spaces to help enhance children's cognitive development

The "no child left inside" movement inspired by Richard Louv's book, *Last Child in the Woods*, is rapidly gaining momentum among educators, children's psychologists and others interested in children's health.[2] Children benefit from regular access to greenspaces – from the wilderness areas, to farms, to the tiny pocket park next door. Land trusts and others in the conservation community should be actively seeking ways to help provide those open spaces across scales and communities, through acquisition, restoration or allowing the use of already-protected areas. The political attractiveness of helping to enhance children's cognitive development – as well as of increasing opportunities for exercise and other health benefits – makes this a potentially powerful new avenue for conservation organizations. It also allows land trusts to work with schools and educators in a constructive way, going beyond the more traditional "cows don't go to school" arguments against new housing.

[2] See, for example, http://www.cbf.org/site/PageServer?pagename=act_sub_actioncenter_federal_nclb_points.

> *How do we make access to greenspace a part of daily life? – Frances Kuo*

Deciding what types of residential development to support

More housing is coming to the Northeast. Lower priced housing needs to be included. Individual land trusts and the conservation community as a whole should decide how they want to weigh in on these needs. This may be on a project-by-project basis (such as through limited or green development) or through broader engagement on planning, regulation and policy-making (such as debates on large lot zoning, tradable development rights, and regional development incentives).

> *If we don't densify, we will sprawlify. – Jonathan Rose*
> *The land trust community needs to come to terms with density. – Rand Wentworth*

Assisting in the creation of population centers within networks of greenspaces and transport corridors

New urbanists, community development organizations, climate advocates, health experts and the smart growth movement are all working to build denser housing nodes within networks of greenspaces, linked by a variety of transportation options. They are doing so for many different reasons: increasing the supply of affordable

housing; rebuilding the social capital of village-style living; reducing the use of fossil fuels and carbon emissions; protecting farms by focusing development in village centers; and increasing access to "Vitamin G."

Land trusts and other conservation organizations should engage with these efforts as well, whether that means speaking for the value of open space in planning and policy deliberations, pushing green building standards (such as LEED) to require land offsets for new developments, helping to acquire sites in the greenspace networks, or linking already-protected sites (urban parks, farms, forests and wilderness areas) into these efforts.

> *We can't save the wilderness unless we save the city – Darby Bradley*
> *Long commutes kill community capital. – Jonathan Rose*

Helping with the greenspace portions of efforts to revitalize underutilized sites

Among the most readily accessible sites for mixing green space with new developments are the inner ring suburbs, rural villages and abandoned industrial sites that dot the Northeastern U.S.. Prices are lower and opportunities to include open spaces are high. Many of these areas are sited along rivers, offering restoration opportunities as well. Including greenspace networks will increase the amenity value of the developments, attracting more investors. New opportunities for "green collar" jobs associated with those open spaces – from farming to carbon forestry to ecotourism – can also help drive the revitalization efforts.

> *The one million acres of greyfields and brownfields that exist could take most of the new development needed. – Jonathan Rose*

Exploring shared interests with Community Development Financial Institutions (CDFIs)

CDFIs exist to provide public and private financial support to projects that create jobs and provide housing for lower-income communities. Given the increasing nexus between working lands (forests and farms) and land conservation, there should also be increasing amounts of overlap in the agendas of CDFIs and conservation organizations – such as in workforce housing, access to land for farmers/foresters, and the creation of new "green collar" jobs in urban or rural areas. Where common interests can be found, new types of CDFI financing, like the New Markets Tax Credits, may be brought to bear on land conservation. CDFIs are also active on the policy front, from advocating for new types of public finance to trade policies that support the economic health of working lands. Finally, CDFIs may be partners in hosting community dialogues on broader issues affecting land use and the environmental, economic and social health of communities.

The mission of the Vermont Land Trust is evolving to using land conservation as a means for promoting the health of both natural and human communities.
– Darby Bradley

Supporting policies that pay for the services provided by natural areas

Markets for "ecosystem services" are growing, both in size and political interest. These services include carbon sequestration, water conservation and biodiversity protection – all provided by maintaining areas in a predominantly natural state. However, the success of markets for ecosystem services, like any market, is driven by the level of demand – the actual willingness of people to pay land managers for the services provided. Absent government or other public action to create such demand, ecosystem services usually go uncompensated. Even the value of traditional products from natural areas is often much less than that for residential development – $200/acre for timber in the Northeast, as opposed to $1,000/acre for development.[3] Not surprisingly, much more is spent on development each year than on conservation – approximately $1 trillion versus $0.004 trillion.

[3] Kim Elliman, OSI.

How do we create private economic benefits consistent with land conservation?
– Laurie Wayburn

As such, a variety of efforts are underway to convince federal and state governments to adopt more policies to pay the managers of open spaces for these services. These include: the Farm Bill now pending in Congress (payments for habitat conservation); the various pieces of climate legislation now under discussion in Washington, D.C., as well as in California and the Northeast (recognition of emission reduction credits from forestry activities); the regulatory proceedings underway to create water quality trading zones for water bodies affected by nutrient loading (creation of credits through the protection of riparian buffers); and Endangered Species Act enforcement efforts (promotion of "habitat banks" for endangered species). In addition, the high price of oil is making the production of biofuels from agricultural or timber products more attractive, posing both great opportunities and risks to conservation organizations.

As these markets develop, the financial resources available for conserving new land will increase. Land trusts and the rest of the conservation community should be speaking for the land, and the services provided by natural areas, in these policy debates.

Making the connection between land use and climate change

Forests and other open spaces are both sources of and sinks for carbon emissions. Emerging U.S. climate legislation needs to include these areas, supporting the maintenance of intact forests and grasslands. Furthermore, new markets for biofuels are emerging, creating new incentives and risks for managing forests and grasslands.

The species mix on already-protected land will also evolve with the changing climate, shifting the conservation values across a land trust's portfolio and highlighting the need for resilient land reserves.

Land trusts will be affected by all of these changes. As a result, they should be involved in developing the responses. Possibilities include: reducing emissions from the conversion of forest and farm land; sequestering carbon in trees, soils and forest products; and substituting forest or agricultural products for more energy-intensive building materials and fuels.

> *Land is part of the climate solution.* – *Dan Reicher*

Supporting the siting of renewable energy facilities in the "right" places

While much more should be done to increase energy efficiency, new energy production and transmission facilities will also need to be built. In the Northeast, if these new power plants are not renewables, they are likely to be coal or nuclear. Finding ways to push these new facilities toward sites of lower conservation value will be critical.

Given their information base and bipartisan appeal, land trusts may be uniquely well-positioned to help identify more and less appropriate sites for consideration by developers, environmental advocates and regulatory officials. Should a renewable energy facility then be proposed for an appropriate site, assuming it meets acceptable operating standards, the conservation community should also be open to offering statements of support for its construction and operation.

Partnering with the community-supported agriculture/slow food movement

In addition to the "no child left inside" movement, the community supported agriculture (CSA) and slow food movements also need access to open space. Both movements support consumption of locally grown foods, with the corresponding advantages for local economies, energy use, taste and health. Their membership is growing in the Northeast and elsewhere. Land trusts should explore partnerships with these organizations for the acquisition or stewardship of farmland.

Developing new metrics of success around human connections

Traditional measures of success in the conservation community focus on "bucks and acres" or "wildlife corridors." While the preservation of open spaces needs to remain the core focus of land trusts, demonstrating the value of that work to people is critical to ensuring that the land remains protected over time. As efforts to do so expand – from demonstrating the economic value of open space to encouraging its use in children's education or as a base for building social capital – new measures of success will be needed. These measures should focus on the connections between open spaces and human well-being, as well as between open spaces and wildlife.[4]

[4] For example, see the "Whole Measures" developed by the Center for Whole Communities (http://www.wholemeasures.org).

Laws don't protect land, people do. – Judy Anderson

Articulating New Methods for Determining "Appropriate" Levels of Human Use

Most land conservation efforts are aimed at eliminating or at least reducing substantially the impact of human use and development on natural areas. As more land trusts acquire land to be managed forever, however, critical questions arise about how much use by humans is consistent with the conservation purposes for which the land was acquired. Answering these questions in a way that protects wildlife, yet still builds human connections to the land, becomes one of the key balancing acts for the conservation movement. No easy answers exist: some depend on the species and habitats affected; others on the values of the individuals and organizations involved. Time needs to be spent understanding and articulating the different trade-offs that can arise, as well as outlining options at the local level.

Deciding whether and how to make the land trust community more of a player in land use policy

Crisis management is the key working style for land trusts ("The bulldozers are at the gate, how do we stop them?") Apolitical deal-doing around specific parcels of land has enabled land trusts to build local credibility across political parties. But doing private deals in crisis mode does not provide much experience for the long-term engagement and broad coalition building necessary to influence local, regional and national land use policy over time.

On the other hand, the deal-making skills honed by land trusts can be a great asset in efforts to build the types of public-private partnerships necessary to acquire and manage open space over time. And the decentralized nature of the land trust community is a good match for the localized decision-making that dominates land use in the United States. For these reasons, translating land trusts' skills into effective influence over time, without losing the core strengths of the land trust movement, is a key opportunity.

Developing tools that can be used by local land trusts in support of these efforts

The decentralized nature of the land trust community brings both great strengths and weaknesses. The strengths include credibility at the community level, where most decisions are made about land use. At the same time, most land trusts have no paid staff. The very local nature of their work reduces their resources and availability to engage in broader efforts.

As such, the land trust community will need replicable tools, such as talking points and sample legislation, if it is to engage with issues on a broader scale. Advice and guidance is needed on how to link with other groups, catalyze conversations and speak for the land. Shared examples and anecdotes – of collaborations with unusual partners or unusual uses of conserved land – will help spark ideas of what might work in one's own community.

Expanding the conversations with new parties about innovative ways of using open spaces to help solve other pressing issues

The papers in this volume and the workshop itself are just a start. The land conservation community should continue to expand its efforts to identify the trends affecting land use and conservation in different parts of the country, as well as the other groups working to address those trends. It should then engage broadly with those groups, to identify other innovative ways of using preserved land to address social and economic issues.

> *How do we rebrand conservation from an exclusive club to a staple of everyone's daily life? – Jaime Carlson*

The solutions-focused expertise of land trusts offers hope, which in itself is an extraordinarily valuable commodity. Land trusts should use their expertise in crafting solutions that work as a beacon to attract new supporters and resources, and then to channel them into efforts to capture the wide range of values provided by open space.

> *The next generation of conservation leaders should take care of nature by taking care of people. – Frances Kuo*

Next Steps: Specific Examples of Follow-Up Activities

In alphabetical order:

Judy Anderson/Community Conservation Consultant

- Sharing information with a number of academics related to cognitive development, children and green spaces;
- working to change the paradigm in the conservation community that climate change is "not our job";
- engaging in discussions with agricultural land trusts related to energy generation (methane gas digesters, solar, wind) and composting within property protected by conservation easements;
- exploring community land trust models for affordable housing as part of the discussions about how best to keep rural woodlands and farmlands affordable.

Land Trust Alliance

- dedicating its annual "leadership group" meeting to discussing the implications of climate change for the work of the land conservation community.

Maine Coast Heritage Trust

- focusing its 2007 board strategy session on the implications of climate change for its work.

Open Space Institute

- inviting the RPA to present its findings on land use trends to the OSI board and retaining RPA to provide a build-out analysis of a key region; forwarding the workshop materials to an environmental advocacy organization working on regional planning for open space protection, regional transportation planning, and land use/ build-out/ protected corridors.

Pacific Forest Trust

- being invited to speak to the energy and climate group at Google.org; working with a coalition of land conservation organizations pushing for the inclusion of forest carbon credits in U.S. climate legislation;
- engaging with donors to traditional climate advocates about the importance of including forest carbon in their work.

Trust for Public Land

- supporting the formation of the "City Climate Change Collaborative" (initiated by the Jonathan Rose Company), bringing together organizations with expertise in energy, transportation, housing and land conservation to advise cities on integrated climate change strategies;
- developing a program called "Healthy Parks, Healthy Communities" to engage public health advocates in campaigning for new and improved parks and trail systems; publishing a report on the economic benefits of land conservation, as well as creating a model for determining the economic impacts of open space at the regional level.

Vermont Land Trust

- working to produce green-certified hardwood flooring from timber harvested on lands owned by VLT or over which it holds a conservation easement.

Yale Program on Strategies for the Future of Conservation

- sponsoring a research internship on the effects of public access on bird nesting sites;
- publishing its study of a land manager's perspective on markets for ecosystem services;
- working to support inclusion of forest carbon credits in U.S. climate legislation;
- investigating the links between community development financial institutions and working lands;
- working with Yale University's sustainable food project to understand the implications for farmland in the New Haven region;
- deciding which of the other action items from the workshop to pursue; considering focusing the 2008 Berkley Workshop on the demographics of land use;
- sponsoring a Conservation Finance Camp in the summer of 2008.

SECTION 9: APPENDIX

List of Workshop Participants

Ms. Judy Anderson
Community Conservation
Consultant

Mr. Forrest Berkley
Maine Coast Heritage Trust
Board Member

Mr. Darby Bradley
Special Assistant for Donor and
Government Relations
Vermont Land Trust

Dr. Lynn E. Browne
Executive Vice President
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Federal Reserve Bank of Boston

Ms. Jaime Carlson
MEM/MBA Joint Degree Candidate
Yale University

Mr. Ernest Cook
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Center for Conservation Finance
The Trust for Public Land

Mr. Tom Curren
Project Director
Northeast Land Trust Consortium,
A project of the Pew Charitable Trusts

Dr. Tom Daniels
Professor of City and Regional Planning
Department of City and Regional
Planning
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Dr. Carla B. Dickstein
Senior Vice President
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Coastal Enterprises, Inc.

Mr. Kim Elliman
Chief Executive Officer
Open Space Institute

Mr. Jay Espy
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Mr. Bradford S. Gentry
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Yale Program on Strategies for the Future
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Dr. Frances E. Kuo
Director
Landscape and Human
Health Laboratory
University of Illinois at
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Mr. James Levitt
Director
Program on Conservation
Innovation at the Harvard Forest
Harvard University

Mr. Daniel W. Reicher
Director of Climate Change and
Energy Initiatives
Google.org

Mr. Jonathan F. P. Rose
Founder and President
Jonathan Rose Companies LLC

Dr. David Skelly
Professor of Ecology
School of Forestry & Environmental Studies and Department of Ecology & Evolutionary Biology, Yale University

Mr. Marc Smiley
Facilitator
Marc Smiley Organizational Development

Mr. Daniel Sosland
Executive Director
Environment Northeast

Mr. Daniel Spethmann
Leader of New Business Development
Temple-Inland Corporation

Ms. Petra Todorovich
Director
America 2050 Project
Regional Plan Association

Ms. Laurie Wayburn
President
Pacific Forest Trust

Mr. Rand Wentworth
President
Land Trust Alliance

Summary Agenda for Workshop

Workshop on "How Can Conservation Help? Using Land Conservation to Address Other Economic and Social Issues," June 8-10, 2007, Pocantico Conference Center, Tarrytown, New York. Co-sponsored by the Program on Strategies for the Future of Conservation at the Yale School of Forestry & Environmental Studies and the Land Trust Alliance

Friday, June 8

Welcome reception, remarks/introductions
Brad Gentry, Yale University

Projected changes in land use patterns in the Northeastern U.S.
Petra Todorovich, Regional Plan Association

Saturday June 9

How can land conservation help enhance regional competitiveness?
Expert perspective: Lynn Browne, Federal Reserve Bank of Boston
Conservation organization perspective: Kim Elliman, Open Space Institute

How can land conservation help increase rural economic development?
Expert perspective: Carla Dickstein, Coastal Enterprises Inc.
Conservation organization perspective: Darby Bradley, Vermont Land Trust

How can land conservation help enhance urban revitalization?
Expert perspective: Jonathan Rose, Jonathan Rose Companies LLC
Conservation organization perspective: Ernest Cook, Trust for Public Land

How can land conservation help increase energy security?
Expert perspective: Dan Reicher, Google.org
Conservation organization perspective: Jay Espy, Maine Coast Heritage Trust

Sunday June 10

How can land conservation help improve human health?
Expert perspective: Frances Kuo, University of Illinois at Urbana-Champaign
Conservation organization perspective: Judy Anderson, Conservation Consultant

How can land conservation help mitigate and address the impacts of climate change?
Expert perspective: Dan Sosland, Environment Northeast
Conservation organization perspective: Laurie Wayburn, Pacific Forest Trust

Discussion of ideas for next steps
Brad Gentry, Yale University

Biosketches of Report Authors

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Jonathan F. P. Rose's business, not-for-profit and public policy work all focus on creating a more environmentally and socially responsible world. The national real estate firm he founded, Jonathan Rose Companies LLC, carries out the firm's mission of repairing the fabric of communities by collaborating with cities, towns and not-for-profits to plan, develop or acquire environmentally responsible projects, creating vibrant, diverse cultural centers with a balance of jobs, housing for all income levels, open land and mass transit. Mr. Rose serves on the Boards of the Enterprise Foundation, Natural Resources Defense Council, the Brooklyn Academy of Music (BAM), the American Museum of Natural History, the Urban Land Institute and the Garrison Institute, which he co-founded with his wife, Diana. He also serves on the Leadership Councils of both Yale's School of Forestry & Environmental Studies and School of Architecture, the Lincoln Center Building Advisory Group, Chair of the Trust for Public Land's National Real Estate Council, and is Chairman of the MTA's

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Michael Totten is the Senior Director for Climate and Water, at Conservation International's Center for Environmental Leadership in Business. Michael has nearly 30 years of expertise in business and the environment, climate change, and water issues. Michael was Co-Director of the World Resources Institute's Management Institute for Environment and Business, and prior to that, he co-founded and served as Executive Director of the Center for Renewable Energy and Sustainable Technology. He also worked as senior environmental adviser to U.S. Congresswoman Claudine Schneider, for whom he drafted a major bill that was proposed to address climate change. Michael holds a B.A. (honors) from Yale University, and a Secondary Education Teaching Credential from U.C. Irvine Graduate School of Education.

Daniel L. Sosland is executive director and founder of Environment Northeast, a non-profit research and advocacy organization with offices throughout New England and in eastern Canada. He directs a professional staff trained in environmental science, law and policy and economics working on climate change solutions, sustainable energy policy, clean air and forestry issues. Under his direction, ENE has successfully worked to advance energy and climate change solutions through state legislation and regulatory proceedings. He conceived of and is co-author of the Climate Change Roadmap for New England and Eastern Canada and Climate Change Roadmap for Connecticut. Prior to joining ENE, he was senior attorney at Conservation Law Foundation in Boston and Maine, where he was director of the group's energy project. He began his career as an attorney in New York City and holds degrees from Cornell Law School and Brown University.