FINANCING FOREST CONSERVATION ACROSS THE COMMONWEALTH

USING AGGREGATION AND MITIGATION TO CONSERVE THE FORESTS OF MASSACHUSETTS

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EXECUTIVE SUMMARY

The conservation of the forests and watersheds of Massachusetts is key to the sustained health and well-being of present and future citizens of the Commonwealth. It is similarly key to the provision of the ecosystem services upon which they do now and will for many centuries depend. Recent studies articulate scenarios in which a cross-sectoral coalition achieves -- over coming decades -- the landscape-scale conservation of wildlands, woodlands and wetlands from the Berkshires to Massachusetts Bay, including those owned and managed by state and local governments, by large and small non-profit organizations, by private businesses, and by individuals and their families. Achieving the ambitious landscape-scale forest and watershed conservation goals articulated in these scenarios will require natural capital, human capital, social capital and, inevitably, financial capital.

Identifying new and innovative sources of financial capital that are commensurate with the conservation challenges we face is the focus of this report. Specifically, we examine here in some depth two financing and cost-reduction strategies of particular interest and potential: aggregation for forest conservation, and mitigation for forest conservation. In addition, we give brief consideration to several other strategies of interest, including: optimization in the deployment of conservation budgets of public and non-profit organizations; investment in local forest-based enterprises and economies; investment in watershed-based natural infrastructure; and promotion of low-impact conservation development.

Both aggregation and mitigation are emerging conservation finance strategies – approaches and methodologies that can be used today, in the field – that have the potential to be deployed at a large scale, in urban, suburban, rural and remote locations around the state, and indeed, throughout New England and across the North American continent. It is appropriate that we aim to make notable progress in deploying these methods in the Commonwealth of Massachusetts, where we have a remarkable diversity of landscapes that span the urban-to-remote continuum, and where we have a heritage of landmark conservation achievement stretching back nearly four hundred years. Given our present-day wealth of talented conservation practitioners and natural amenities, we are once again positioned to make historic progress in the field of land conservation.

We have prepared this report so that policy-makers and practitioners can consider the present-day strengths and weaknesses, as well as the prospective opportunities and threats, of aggregation and mitigation as conservation finance strategies. These particular strengths, weaknesses, opportunities and threats are detailed in the pages of this report that follow. Most importantly, the significant opportunities associated with aggregation and mitigation are likely to be realized when considered not as alternative, "either-or" strategies, but rather as complementary strategies for efficiently and effectively financing the conservation of Massachusetts landscapes.

Aggregation strategies are particularly appropriate for assembling for conservation purposes -- in an efficient and cost-effective manner -- regionally coherent collections of working woodlands and wild forestlands, as well as fresh and saltwater wetlands. Mitigation strategies are well-suited for minimizing unplanned development, as well as for generating ongoing funds associated with the land development activities consistently required by our society. Together, mitigation and aggregation can give us a steady supply of lands that can be voluntarily conserved, as well as a reliable source of funding for acquiring conservation benefits. Together, the two strategies offer us a pathway towards landscape-scale conservation efforts, sustained over many decades, that will leave generations in the future with a Massachusetts landscape even more vibrant and valuable than the one we enjoy today.

Aggregation and mitigation are likely to be even more powerful strategies when used to complement additional conservation finance strategies considered in this report. Without doubt, the success of each of these strategies depends on engaged conservationists from the public, private, non-profit and academic sectors. As a reader of this report, you are likely a concerned conservationist active in at least one of those sectors. We invite your comments, questions and critiques regarding this report, as well as your fresh ideas regarding emerging methods for building the natural, human, social and financial capital that will be necessary to conserve our land and water resources for the next four hundred years of the Massachusetts story. Welcome to the dialogue.

BACKGROUND

In the opening passages of the April 2010 *Forest Futures Visioning* report submitted by a blue ribbon Technical Steering Committee to the Commissioner of the Massachusetts Department of Conservation and Recreation, the authors articulate a long-term vision for the forests of Massachusetts in the year 2110, a century from today. Their vision describes a scenario in which "more than half the land area of the Commonwealth will remain in forests, with large blocks of reserves surrounded by parks and woodlands actively managed for a diverse set of ecosystem services. These forests provide numerous economic and social benefits to local communities, the state and nation -- clean air and water, biodiversity, recreation, tourism, climate change adaptation and mitigation, wood products, and a high quality of life for Massachusetts citizens."[1]

The Technical Steering Committee's vision largely concurs with one articulated several years earlier, in 2005, by David Foster and his colleagues at the Harvard Forest in their *Wildlands and Woodlands* vision for the forests of Massachusetts.[2] In that report, the authors urge "the people and Commonwealth of Massachusetts to launch a bold, comprehensive initiative to conserve [the] precious Wildlands and Woodlands and the ecological and social values they possess. We propose a forest conservation strategy that extends a simple design from conservation biology in important new ways. This approach consists of large forest reserves in which natural processes dominate and human impact is minimized (Wildlands), embedded within expansive forestland that is protected from development but is actively managed in an ecologically sustainable manner (Woodlands). Specifically, the Wildlands and Woodlands vision urges that we: add approximately 1.5 million acres to the state's existing protected land base of 1.0 million acres, to reach a target of 2.5 million acres – roughly half the state of Massachusetts…"

The vision articulated by David Foster and his colleagues in 2005 was, in turn, informed by the work earlier in the decade of the New England Natural Resources Center (NENRC), a 40-year old risk-taking, regional non-profit. In 2004 NENRC published an analysis of the Commonwealth's needs for forest stewardship authored by seasoned experts on the subject, including Charles H. W. Foster, Perry Hagenstein and David Kittredge. Kittredge's essay outlining a "Vision for the New England Landscape" [3] as well as a NENRC-sponsored feasibility study of a western Massachusetts conservation project that encompassed both woodlands and wildlands, are integral to the way we now envision our forests.

Achieving the similar visions of the "New England Landscape," *Forest Futures* and *Wildlands and Woodlands* reports will require at least four types of capital. First is the Commonwealth's endowment of *natural capital*, including its extensive forests, which as a result of our great good fortune continue to exist across the state, from Provincetown to Pittsfield, in the early twenty-first century. Second is *human capital*, or the professional knowledge and know-how that the state's professional foresters and students of forest stewardship continue to build upon today. Third is *social capital* – the enthusiasm and persistent will of the people of Massachusetts to see their forests remain intact for many generations to come. And the fourth is *financial capital* – the funding required to consummate many of the transactions that will permanently protect at least one-half of the state's forested landscape. It is financial capital that is the focus of this report.

Specifically, the Program on Conservation Innovation at the Harvard Forest, Harvard University, directed by James N. ("Jim") Levitt, was awarded a grant from the Massachusetts Environmental Trust (MET) in 2009 to conduct a year-long investigation into a small number of selected methods for financing forest conservation in Massachusetts. Levitt's work on the project was supervised by David Foster, Director of the Harvard Forest, the University's 3,500 acre research and educational facility based in Petersham, Massachusetts. Levitt also greatly benefitted from the diligent project research on aggregation performed by Jason Sohigian, a Master's Student in the Sustainability and Environmental Management Program at the Harvard Extension School, and from the careful research on mitigation (as well as the very thorough project communications and management work) done by Kate Isenberg, the Program on Conservation Innovation Research Associate for the 2009-2010 academic year.

The investigation follows up on a prior roundtable session[4] held in 2006 to identify a wider range of financing methods that would advance the aims of the 2005 *Wildlands and Woodlands* report on the forests of Massachusetts. In addition, the results of the investigation are likely to inform a report on Financing Forest Conservation which will be submitted by a legislatively authorized Special Study Commission on Financing Forest Conservation, now expected to be ready in the third or fourth quarter of 2010.

The purpose of this paper is to report on the 2009-2010 investigation associated with the MET grant, and to offer policy-makers and practitioners insight into the history and potential use of two promising approaches to conservation finance. Those approaches are: **aggregation** for forest conservation; and **mitigation and offset policies and practices** for forest conservation. In addition, this report more briefly discusses several other approaches to conservation finance that may be of considerable value in ongoing efforts to conserve the forests of Massachusetts, including: optimization in the deployment of state and local conservation budgets; community and regional-scale investments in watersheds and other ecosystem service resources; community and regional investments in forest-based enterprises and economies; and the development of regulatory, zoning and financing tools that promote low-impact conservation-oriented development.

To begin this discussion, we ask that you consider the significance in the title of this report of the phrase "*across the Commonwealth*."[5] The word *"across,"* of course, implies the wide variety of geographies that span the state, from the scrub oak forests bordering the beaches of Cape Cod and the Islands to the majestic hardwoods and conifers that grow on the slopes of Mount Greylock in the state's western uplands. However, *across* also implies the **crossing of parcel boundaries and economic sectors**. Our task, as we see it, is to consider policies that stimulate forest conservation by the private and non-profit sectors as well as the public sector. Our intent is to encourage **regional conservation initiatives** that cross town lines as well as the parcel boundaries that separate, for example, a state forest from a private landowner's woodlot and a nature reservation owned and managed by a charitable organization. In other words, we hope to focus the reader's attention on all of the conservation as protected wildlands and working woodlands of **all of the forests of Massachusetts**, not just the forests owned and managed by the State of Massachusetts. This is consistent with the perspective enunciated by several speakers at the *Forum on the Forests of Massachusetts* held at the Harvard Forest in the spring of 2009.[6]

We also use the word "*Commonwealth***"** purposefully in the title to this report. As it is used today, the word means "a state or nation in which the supreme power is vested in the people," as used in the official title of our state, the Commonwealth of Massachusetts. The word's origins come from fifteenth century England, when it connoted the "general good" or "common well-being." Our purpose in this report is to identify conservation finance and related zoning and regulatory tools which can contribute to the benefit of not just one constituency, but more to the general good in that it can help address **multiple conservation objectives**, from biodiversity protection to the provision of ecosystem services (including the provision of clean and plentiful water supplies – a primary focus of the Massachusetts Environmental Trust), the production of certified commodities, and the enhancement of treasured amenities, from open spaces in the core of Boston to wilderness sanctuaries that can be reached only through well-planned hikes deep into remote corners of western Massachusetts.

Both aggregation and mitigation – the methods of conservation finance selected as focal points for this report in accordance with the MET Grant for investigation by this report's authors, and approved for that purpose by Massachusetts Advisory Board on Financing Forest Conservation – can facilitate conservation that crosses boundaries on a landscape scale, and that serves to address multiple conservation objectives. Aggregation is an approach pioneered largely in Massachusetts, and is now beginning to be considered for conservation efforts around the nation. Mitigation/offset policies and practices, to the contrary, represents a field of conservation practice in which Massachusetts lags in comparison to a number of other states. Whether invented here or not, both aggregation and mitigation have the potential to play a significant role in Massachusetts forest conservation practice in the twenty-first century.

ORGANIZATION OF THE ADVISORY BOARD ON FINANCING FOREST CONSERVATION

The community of policy analysts, practitioners and citizens in Massachusetts interested in the field of conservation finance has steadily grown over the past five years, since the convening of 2006 meeting of the Wildlands and Woodlands Conservation Finance Roundtable at the Harvard University Center for the Environment. The community has been active, among other venues, at: the finance-oriented meetings of the Wildlands and Woodlands Partnership, held periodically over the past several years; in the public hearing held at the State House in 2008 to urge the legislature to consider the formation of a Special Study Commission on Conservation Finance; and at the Forum on the Forests of Massachusetts held at the Harvard Forest in May 2009.

In organizing the Advisory Board that would participate in the meetings associated with this study, Jim Levitt directly contacted many of those individuals and asked if they might be available to attend and share their insights regarding the conservation finance topics under consideration. In addition, the meetings were open to anyone who he might not have reached who expressed an interest in attending. As a result, attendance at the sessions ran at about 15 to 25 participants per session. The public, private, non-profit and academic sectors were well represented throughout, resulting in lively and wide-ranging discussions. Following below in Figure 1 is a list of the more than three dozen individuals who participated in one or more of the meetings of the Advisory Board on Financing Forest Conservation.

Figure 1: Attendees, Financing Forest Conservation Advisory Board Meetings

Slater Anderson, LandVest
Si Balch, New England Forestry Foundation
Julia Blatt, Massachusetts Rivers Alliance
Will Brownsberger, Massachusetts State Representative
David Cash, Massachusetts Executive Office of Environmental Affairs
Dicken Crane, Holiday Farm
Michael Fleming, Massachusetts Department of Conservation and Recreation
David Foster, Harvard Forest
Michael Gildesgame, Appalachian Mountain Club
Tony Green, The Pinehills
Lee Hartmann, Town of Plymouth, Massachusetts
Bill Hinkley, Massachusetts Environmental Trust
Scott Horsley, Horsely Witten Group
Jennifer Howard, Massachusetts Department of Conservation and Recreation
Kate Isenberg, Program on Conservation Innovation at the Harvard Forest
Robb Johnson, Massachusetts Chapter of The Nature Conservancy
David Kittredge, University of Massachusetts
Wayne Klockner, Massachusetts Chapter of The Nature Conservancy
Jay Kuhlow, Office of Massachusetts State Senator Stephen Brewer
Bill Labich, Highstead
Jim Levitt, Program on Conservation Innovation at the Harvard Forest
Steve Long, Massachusetts Chapter of The Nature Conservancy
Lynn Lyford, New England Forestry Foundation
Bernie McHugh, Massachusetts Land Trust Coalition
Kent Messer, University of Delaware
Robert O'Connor, Massachusetts Executive Office of Environmental Affairs
Robert Pershel, The Forest Guild
Keith Ross, LandVest
Emily Russell-Roy, Pacific Forest Trust
Jessica Sargent-Michaud, Trust for Public Land
Jason Sohigian, Sustainability & Env. Mgmt. Program, Harvard Extension School
Lisa Vernegaard, Trust for Public Land
Thomas Walker, Natural Resource Consultant
Rob Warren, The Nature Conservancy
Suzanne Webber, Massachusetts Woodlands Cooperative
Rick Weyerhauser, Lyme Timber
Bob Wilber, Massachusetts Audubon Society
Leigh Youngblood, Mount Grace Land Conservation Trust
Matt Zieper, Trust for Public Land
Bob Zimmerman, Charles River Watershed Association

The Advisory Board was convened on seven occasions between November 2009 and June 2010. Meetings alternated between sites in Boston and sites to the west and south, so as to conveniently accommodate as many Advisory Board members as possible. Following is a brief summary of each of the meetings.

November 12, 2009: Introduction

When and where: A morning meeting was held from 9 am to noon at the Appalachian Mountain Club Headquarters (AMC) at 5 Joy Street, Boston, Massachusetts.

What: Jim Levitt made a presentation on the organization of the Advisory Board and the proposed schedule of meetings. The Advisory Board considered and approved the proposal that aggregation and mitigation be the focus of in-depth investigation by Levitt and his associates Jason Sohigian and Kate Isenberg, and that aggregation and mitigation be the principal focus of the written report due in June 2010 to the Massachusetts Environmental Trust.

December 14, 2009: Aggregation

When and where: A morning meeting was held from 9 am to noon at the New England Forestry Foundation at 32 Foster Street, Littleton, Massachusetts.

What: Jim Levitt made some opening remarks about the topic of aggregation. Several speakers followed to cover different aspects of the topic. Bill Labich discussed Woodlands Councils as possible precursors to aggregation projects. Leigh Youngblood commented on early experiences with aggregation in the North Quabbin Region. Lynn Lyford discussed the present state of the ongoing Western Massachusetts Aggregation Project, followed by Keith Ross speaking on the future of aggregation. After some discussion, Jennifer Howard presented on aggregation from the perspective of the state, and Mike Fleming offered a view of aggregation as it is relevant to federal forest conservation programs. The group then discussed the key factors for the success for aggregation projects, as well as the apparent strengths, weaknesses, opportunities, and strengths (SWOT) of aggregation as a conservation finance strategy.

January 25, 2010: Investing in Local Forest-Based Economies and Enterprises

When and where: An afternoon meeting was held from 1 to 4 pm at the AMC Headquarters, at 5 Joy Street, Boston, Massachusetts.

What: After some opening remarks by Jim Levitt, Jessica Sargent-Michaud of the Trust for Public Land gave a presentation on the valuation of ecosystem services, and how consideration of such valuations entered public considerations of conservation initiatives. Next, Suzanne Webber of the Massachusetts Woodlands Cooperative gave a presentation on markets for local wood products. This was followed by a brief discussion led by Jim Levitt and Leigh Youngblood regarding ecotourism in Massachusetts at present, and its potential for growth. Next, Dicken Crane presented on the economic activity in the

forestry sector of Massachusetts in particular, and Tom Walker discussed the potential for biomass markets in the state. The meeting concluded with a discussion of key issues facing proponents of forest-based economic development in the state.

March 1, 2010 Low-Impact Conservation Development

When and where: The meeting was held at The Pinehills Summerhouse, on 33 Summerhouse Drive, Plymouth, MA 02360, from 9 am to 1 pm.

What: The day began at 9 am with a tour and brief history of The Pinehills development, lead by Tony Green. After the tour, we reconvened in the Summerhouse. Scott Horsley of the Horsley Witten Group, a consultant to the Pinehills, made a presentation about The Pinehills as an good example of low-impact development. Then, Lee Hartmann, Planning Director of the Town of Plymouth, share his perspective on the development, and on the practice of Smart Growth. Finally, Bob Wilber spoke with the group regarding other low-impact developments that are ongoing in Massachusetts, and about Mass Audubon's house-to-habitat program. We concluded the meeting by considering the potential, as well as the possible roadblocks for future low-impact development projects in Massachusetts.

April 2, 2010 Compensatory Mitigation and Forest Conservation

When and where: The meeting was held from 1 to 4 pm in a conference room on the second floor of the Massachusetts State Offices at 100 Cambridge Street, Boston, MA.

What: Jim Levitt and Kate Isenberg began the meeting with a presentation on compensatory mitigation as it is practiced in various forms throughout the United States. Next, Bob O'Connor presented on the state of compensatory mitigation in Massachusetts. Rob Warren then discussed fee-in-lieu compensatory mitigation for biodiversity, and the work of The Nature Conservancy on the subject. Si Balch and Emily Russell-Roy then presented on compensatory mitigation for forest carbon, and the state of forest carbon markets in the U.S. Finally, Jim Levitt led a discussion regarding the strengths, weaknesses, opportunities and threats regarding the several approaches to mitigation that might be pursued in Massachusetts.

May 17, 2010 Watershed-Based Investments in the Green Infrastructure

When and where: The meeting was held at The Trustees of Reservations Doyle Conservation Center at 325 Lindell Avenue, Leominster, Massachusetts, from 1 to 4 pm.

What: After some brief introductions by Jim Levitt, Matt Zieper made a presentation on Clean Water State Revolving Funds, followed by Bob Zimmerman's presentation on a recent project concept developed by the Charles River Watershed Association. Finally, Kent Messer of the University of Delaware presented on optimization for land conservation. The meeting concluded with a brief discussion of the day's key points

June 17, 2010: Synthesis and Consideration of Draft Report

When and where: from 1 to 4 pm in a conference room on the second floor of the Massachusetts State Offices at 100 Cambridge Street, Boston, Massachusetts.

What: The group, led by Jim Levitt, reviewed a work-in-progress draft of this report, and discussed its findings and recommendations.

What follows are summary findings and recommendations based on the Advisory Board discussions and additional research conducted by James Levitt, Jason Sohigian and Kate Isenberg, the authors of this report. These findings and recommendations, while benefitting from review and comment by members of the Advisory Board, remain the opinions and responsibility of the authors.

AGGREGATION AS A STRATEGY FOR FINANCING FOREST CONSERVATION

Aggregation has been emerging in New England and other regions of the United States over the past several decades.[7] Aggregators across the United States are figuring out, to quote Bill Toomey of Highstead, how to "develop processes so that land trusts can work together on fundraising cooperatively rather than competitively." To cite one recent non-New England example, the Northern Sierra Partnership (NSP) leading a coalition of land trusts and conservation organizations in the vicinity of Lake Tahoe in California and Nevada has recently served as the catalyst for raising $30 million of private donations, on the way to a goal of $100 million, to match $300 million of public funds that will finance the protection of an estimated 100,000 acres of exquisite high mountain landscape.[8]

WHAT IS AGGREGATION?

*Aggregation is a conservation finance strategy that **bundles multiple parcels of land into one package** that has the potential to be protected with improved efficiency and cost-effectiveness. The use of aggregation has the potential to **accelerate the scope and scale of regional land conservation effort**s. Aggregated bundles are typically assembled and protected with the active participation of a third-party consultant, agent, aggregator or conservation finance intermediary.*

*The effort to protect the aggregated parcels can benefit from **reduced costs** (for example, from group appraisals, standard offer agreements, and regionally coordinated stewardship efforts) and **improved access to financial capital** (for example, access to large-landscape government grant programs, access to large pools of philanthropic resources, and the bargain sale or donation of conservation easements by land owners to regionally significant conservation initiatives.*

Aggregation projects typically involve the effort of a consultant, agent, aggregator (for example, a regional land trust), or for larger projects, a conservation finance intermediary (for example, a regional conservation organization such as the NSP that can bring together several aggregating land trusts). The consultant, agent, aggregator or conservation finance intermediary packages multiple parcels of land that can be conserved either through the sale of fee interests in the parcels, or through the sale of conservation easements that restrict development on the parcels. The sale of fee interests or conservation easements is typically made to one or more buyers (for example,

non-profit conservation organizations, governments or private entities) that have a conservation mission.

To offer a concrete local example, consider the February 2009 description of an ongoing aggregation project in Western Massachusetts sponsored by the New England Forestry Foundation (NEFF):

> Most of New England's forest landscape is owned in small parcels by thousands of different families. Protecting numerous small properties on a scale that makes a regional difference is a major challenge. The traditional methods of conserving forests one family or one project at a time will never accomplish the scale of forest protection necessary to ensure clean air and clean water, or to ensure forest-products-based enterprises, for future generations.
>
> To address the challenge, NEFF's Board of Directors recently adopted a new strategic approach. NEFF will partner with local and regional land trusts to go beyond protecting forests one parcel and one project at a time. Inspired by work emanating from the *Wildlands and Woodlands* initiative, NEFF will combine the efforts of many successful land trusts across the region, unified by a common vision of forest protection, to "aggregate" many smaller projects into a much larger package.[9]

As illustrated below in Figure 2, the Western Massachusetts Aggregation Project being pursued by the New England Forestry Foundation is the only the latest in a series of multiple parcel conservation projects that have been initiated in the state over the past dozen years. As described both in Figure 2 and in Appendix 1 to this report, Bill Hull in 1998 effectively collaborated with Keith Ross (at that time an employee of the New England Forestry Foundation acting as a consultant to Hull) to put together the first of these initiatives, called the Hull Peck Project. Hull, with Ross' assistance, combined lands he already owned with woodlands optioned from the Peck family. He sold easements on these combined lands to finance his company's purchase of the Peck's working woodlands. The Hull Peck project stands as an important milestone for subsequent aggregation projects. With one seller of easements, two buyers and several matching funders, the deal had a relatively straightforward structure, as least as compared to subsequent multi-parcel projects.

The Tully Initiative, spearheaded between 2000 and 2002 by Massachusetts Secretary of the Executive Office of Environmental Affairs Robert Durand, was a second early example of an aggregation project. In this groundbreaking effort, the state worked with the Mount Grace Land Conservation Trust as its agent to acquire easements on some 9,100 acres distributed among 104 parcels to protect a critical mass of land resources in the North Quabbin region of the Commonwealth (see Figure 2; see also Appendix 1 for a more in-depth profile of the project). This was the first of several multiple parcel projects in which Mount Grace, led by Leigh Youngblood, played a pivotal role in assembling a coherent package of parcels in a concentrated area.

Figure 2: Recent Aggregation Projects in Massachusetts

	Aggregation projects				
Name	**Hull Peck Project**	**Tully Initiative**	**Quabbin Corridor Connection**	**Southern Monadnock Plateau** (I, II & III)	**Western Massachusetts Aggregation Project**
Date	1998-2002	2000-2002	2002-2009	2007-2010 (+)	2008-2010 (+)
Acres	8,064	9,100	1,700	4,997	12,600
Parcels	49 total: Hull buys 34 Peck parcels, and combines with 15 other Hull parcels	104	18	45	77
Easement Cost/Acre	$500	$1,000	$2,494	$2,907 (phase III costs are projected)	$1,683 (projected)
Total Cost	$4 million	$9 million	$4.24 million	$14.5 million (phase III costs are projected)	$21.2 million
Easement Sellers	Hull	104	18	45	77
Aggregators, Agents or Consultants	**Consultant to seller**: New England Forestry Foundation	**Agent for buyer**: Mount Grace Land Conservation Trust	**Aggregator**: Mount Grace Land Conservation Trust	**Aggregators**: Mount Grace, other land trusts, and towns	**Aggregators**: Mount Grace, EQLT, Franklin LT, NEFF, Kestrel, BNRC, Monterey Preservation LT
Conservation Finance Intermediary	--	--	--	NQRLP (from Mount Grace offices)	NEFF
Easement Buyers and Major Funders	NEFF and the Commonwealth of Massachusetts as buyers, with funding by NFWF, Norcross, Beveridge	State of Massachusetts as buyer and funder	USFS Forest Legacy as buyer, with matching funds or bargain sales by Mount Grace, Mass Audubon, Harvard Forest, MA F&W, MA DCR, two towns, landowners	USFS Forest Legacy as buyer, with matching funds or bargain sales by Mass DCR, Ashburnham Cons. Trust, North County LT, Nashua River Watershed Council, two towns	7 land trusts as easement buyers with matching funds or bargain sales by landowners, MA DCR, private philanthropy, business interests, others TBD…
COMMENT	**> One seller** **> Two buyers** **> Several funders**	**> Many sellers** **> One agent** **> One buyer** **> One funder**	**> Many sellers** **> One aggregator** **> One lead buyer** **> Many matching funders**	**> Many sellers** **> Many aggregators** **> One intermediary** **> One lead buyer** **> Many matching funders**	**> Many sellers** **> Many aggregators** **> One intermediary** **> Multiple buyers** **> Many funders**

A decade after the founding of the Tully Trail, which winds through the parcels that were protected, enthusiasm for the effort still runs high. As noted by Durand himself, "The tenth anniversary reminds us what the cooperation of local, state, and federal government can achieve when working together with private citizens and a fantastic land trust… The land protection work inspired by this trail continues to support the working forests and rich biodiversity that exist in the Tully Valley today."[10]

The first of the projects involving leadership from an aggregating land trust or conservation finance intermediary organization is the Quabbin Corridor Connection (QCC). The Mount Grace Land Conservation Trust, which had gained important experience in multi-parcel project management during the Tully Initiative, served as the aggregator for this project, which was carried out over the course of seven years, from 2002 to 2009.

As noted in the project write-up in Appendix 1, the QCC project was not without its challenges. For example, shifting procedures and standards at the federal level caused the project to take longer than expected, eventually increasing transaction costs. Specifically, Mount Grace project managers did not anticipate the modifications in the conservation restriction (otherwise known as "conservation easement") language that was eventually required by the federal government. Changing requirements, coupled with a shortage of legal staff at the state level required to review the changes, caused significant delays in deal closing dates.

Nevertheless, the Quabbin Corridor Connection Project did achieve its principal aims, garnering $3,000,000 in federal support for its innovative design, as well as about $1,500,000 in matching financing that came in the form of: $375,000 in funds from the Commonwealth of Massachusetts; in-kind donations of legal and stewardship work valued at $119,000; $133,500 from bargain sales by landowners; and gifts of conservation restrictions totaling $873,000 in value.

It is important to note that the project attracted significant in-kind and donated financing due to the potential availability of United States Department of Agriculture (USDA) Forest Legacy Program (FLP) funding from the federal government. In effect, as a pioneering aggregation project in the FLP process, the QCC project raised funding that might not otherwise have been available to a piecemeal, parcel-by-parcel conservation initiative.

The next project considered here (and in Appendix 1 to this report) that involved land trusts working as aggregators is the Southern Monadnock Plateau (SMP) project, organized in three phases by the North Quabbin Regional Landscape Partnership (NQRLP). The NQLRP actually acted in this project as a conservation finance intermediary organization that coordinated the aggregation efforts of several land trusts, including Mount Grace, the Ashburnham Conservation Trust, and the North Country Land Trust, as well as several towns, including the towns of Ashburnham and Winchester, Massachusetts. Jay Rasku, who coordinated the project for the NQLRP, noted that the effort benefitted considerably from the experience gained by Mount Grace in the QCC project. Indeed, the offices of the NQLRP are actually located in space provided by Mount Grace.

Like the QCC, the Southern Monadnock Plateau project has benefitted considerably from the bargain sale and conservation restriction donations from landowners attracted by the scope and scale of the project. The SMP project further benefitted from the clear connection it made to the protection of water resources that flow to several area towns as well as the nearby cities of Fitchburg and Gardner. The connection to water resources helped the project gain access to several significant sources of services and financial support, including the provision of project due diligence by the Nashua River Watershed Council.

The Western Massachusetts Aggregation Project (WMAP), mentioned above, is the latest iteration of the aggregation strategy that has been launched in the Commonwealth. With the New England Forestry Foundation serving as the project leader and conservation finance intermediary, the WMAP shares many of the same features as the QCC and SMP projects. However, the WMAP, rather than relying on principal funding from one source such as the Forest Legacy Project, is seeking major funding from a variety of sources, including private foundations. Notably, the project, as of June 2010, has already raised about one-third of its $21 million goal through commitments for bargain sales, conservation restriction donations and in-kind contributions of due diligence and appraisal services.

As of June 2010, the WMAP is still a considerable distance from its December 2010 fundraising goal, having some $13.5 million still to go. Keith Ross, one of the project's principal architects and prime proponents, remains optimistic, noting that the project is in discussion with a number of promising funding sources. Ross is quoted in the following excerpt, taken from an article on the WMAP project which ran on the *New York Times* website in the spring of 2010. The excerpt, as well as conversations with a number of individuals involved with the project, reflect the reality that a great deal of both human and social capital has to be built to train individuals and organizations to work collaboratively to tackle a relatively large scale project.

> An ongoing 5-year-old project in western Massachusetts laid some of the groundwork. Seven land trusts, led by the New England Forestry Foundation, are working to conserve some 12,000 acres of forestlands, coordinating to buy land or cheaper easements from 77 families' forests.
>
> The price tag for that effort totals about $20 million, according to projected estimates, but currently, the partners are still seeking funding to meet a $13.5 million shortfall. It's not easy work, they say, but the payoff could be enormous…
>
> Coordinating among land trusts that have been quietly competing with one another for funds and are distinct identities is not as easy as picking up the phone. Not all these groups have the same mission, so tailoring projects to overlap and meet joint goals can be a challenge.
>
> Each group is also wary of revealing its funders -- concerned that more groups may inundate the same funders with requests. Hiring a staff member who keeps all funding sources confidential for the western Massachusetts project has been one solution that the coalition of land trusts have used to overcome that obstacle.

That project also crafted a model for how to decide which groups' projects would have priority: It drew straws.

"In New England, almost every town has a land conservation organization and do their projects one at a time," Ross said in an interview. But over time, that can be exhausting, he said.

"Small, individual projects have trouble attracting funding from large organizations or federal or state programs. Plus, if you group projects together, you can get cheaper costs for all the due diligence work -- legal costs, appraisal and the baseline documents. Working together on those things can lower costs.[11]

Ross and others are already thinking about how to build on the lessons learned in the Hull-Peck, Tully, QCC, SMP and Western Massachusetts aggregation projects over more than a decade. As illustrated on the map of the NEFF New England Aggregation Project prepared in October 2009 (see the description of the New England Aggregation project towards the end of Appendix 1 to this report), a group of 15 potential aggregation regions from Maine to Connecticut has been identified for consideration. Collectively, the projects would aim to protect 80,000 to 120,000 acres of land at a total cost of between $48 million and $72 million, at an average per acre cost of about $600. The success of such plans will, of course, depend on the availability not only of financial capital, but also the natural, human and social capital that can be devoted to forest conservation in New England in the early twenty-first century.

AGGREGATION STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

The following assessment is based on the authors' review of aggregation as an emerging strategy for forest and wetland conservation finance, with additional valuable input from the members of the Advisory Board.

Strengths to Date

- *Scale:* The case studies reviewed lend credibility to the argument that aggregation can allow conservation practitioners to accelerate the pace of conservation by allowing them to work at a landscape scale. That is, forests and wetlands can be conserved with greater efficiency and effectiveness by using aggregation than they would otherwise be using a parcel-by-parcel approach. It is important to note that no statistical analysis of the apparently superior effectiveness or effectiveness of aggregation can be made until a statistically significant sample of aggregation projects and their costs (say, dozens of such projects) can be reviewed.

- *Scope:* Aggregation projects, due to their inclusion of multiple parcels and relatively large number of acres included, appear to be more likely to provide a broad spectrum of conservation benefits (for example, biodiversity conservation, ecosystem service provision, sustainably produced commodity production, and natural amenity availability) than could smaller, more isolated parcel-sized conservation projects. Aggregation projects appear to be particularly well suited to the protection of corridors of protected

land which are likely to be critical to effort to provide landscape resiliency to climate change.

- *Clustering and Conservation Planning:* Aggregation projects allow project sponsors to cluster target parcels in relatively close proximity to one another, allowing conservation planning goals to be achieved within a defined territory. The Tully project is a particularly good example of a tightly clustered aggregation initiative that has had a lasting impact on the North Quabbin region of North Central Massachusetts.

- *Provides Access to Financial Capital:* As demonstrated by the Hull-Peck, Tully, QCC, SMP and WMAP project profiles, aggregation projects can provide distinct advantages in providing access to financial capital, whether that access is provided by: high ranking in Forest Legacy Project or other public grant program assessments; the ability of such projects to attract large public, non-profit or private grants; or the ability of aggregation projects to generate in-kind, bargain sale and conservation restriction donation gifts from local conservation organizations and landowners. Such grants or gifts can be of considerable significance to projects such as the SMP and WMAP projects, which have proven themselves able to cover as much as one-third of their capital costs through in-kind, bargain sale and donation arrangements.

- *Can Generate Project Cost Reductions:* As Keith Ross and others have explained, aggregation projects have a significant potential to reduce conservation per-parcel project costs through multi-parcel appraisals, the offering of standard-offer contracts, the pooling of project fundraising expenses, and streamlined monitoring protocols.

- *Facilitates Building of Social and Human Capital for Forest Conservation:* Aggregation projects *per se* involve groups of land trusts, town governments, and private interests working together to achieve a goal of regional significance. In collaborating and sharing best practices, such cross-sectoral and cross parcel-boundary efforts are likely to increase individual knowledge and know-how, as well as the shared satisfaction of working together towards a common and meaningful goal. A valuable research task would be to test whether or not land conservation occurs in geographic clusters due to an increase in social capital – that is, if your neighbor is conserving her land, it would be interesting to know if you would be more likely to do the same. Over the past decade and at present, it is apparent that there have been and are more potential sellers of easements than there is capital to acquire those easements in areas of Massachusetts where aggregation projects are ongoing.

Weaknesses to Date

- *Is Subject to Risks of Bureaucratic Delay.* As described in the Appendix 1 description of the Quabbin Corridor Connection project, aggregation projects, due to their complexity and iterative nature, can be subject to bureaucratic delays, particularly if state or federal guidelines or regulations regarding conservation easements change over time.

- *Is Subject to Funding and Fundraising Risks.* As demonstrated by the Western Massachusetts Aggregation Project, aggregation projects can be subject to delays and risks related to fundraising. It is important to note that this is also true of a wide range of other activities that depend on fundraising from grants and gifts, including parcel-by-parcel conservation projects, construction projects at churches and universities, or long-term capital campaigns of hospitals.

- *Is Subject to Changes in Partnership Participation.* As projects proceed over time, the priorities of different partner organizations may shift. For example, the Massachusetts Chapter of the Nature Conservancy was an early partner in the Western Massachusetts Aggregation Project, but elected to end its participation in early 2010. Such risks are endemic to any coalition-dependent project.

Opportunities Going Forward

- *Is a Replicable, Expandable and Flexible Model.* As can be seen by the continual elaboration of the five multi-parcel conservation projects considered here (including projects that have served as precursors to aggregation, as well as projects that actually involve active aggregators and conservation finance intermediaries) the aggregation strategy is replicable across organizations, expandable regarding the number of partners and target acres involved, and flexible in organizational form. As aggregation projects emerge in New England and elsewhere in coming years we are likely to see additional experimental organizational configurations that may yield a whole new set of best practices in the field.

- *Particularly Suited to Building Human and Social Capital at a Regional Scale.* The aggregation strategy is very well suited to work at the community and regional levels. It is, in fact, designed to engage multiple parties in collaborative efforts. Aggregation efforts may well demonstrate some positive feedback effects, where a community's willingness to protect local land resources builds on itself. Said differently, aggregation may facilitate a network effect in which neighbors join the effort to build a conservation corridor so that they enjoy and add to the regional conservation benefits.

- *Is Potentially Complementary to Mitigation Strategies.* Aggregation and mitigation can be constructively thought of not as alternative, "either/or" conservation finance strategies, but rather as complementary strategies. Aggregation appears to be effective at bring together parcels of land that can be conserved efficiently and economically. Mitigation, in turn, can provide significant flows of funds that can finance the conservation of those parcels that have been assembled by aggregators.

- *Is Potentially Complementary to Low-Impact Conservation Development.* Developers wanting to pursue low-impact conservation developments could partner with aggregation projects to enhance the access of the development projects to the protected landscape.

- *Is Potentially Complementary to the Development of Forest-Based Enterprises.* As above, developers of appropriately-scaled forest-based enterprises, such as projects that

use forest biomass to provide co-generated heat and power to local schools, could partner with aggregators to identify appropriate working woodlands that could supply such biomass on a consistent basis.

- *Is Potentially Complementary to Watershed-Based Investment Strategies.* As demonstrated by the QCC and SMP projects, aggregators can be very effective at protecting contiguous parcels of land that buffer critical watersheds and enhance the quality of local water supplies. Should capital for the protection of water resources become available through programs such as State Revolving Fund program for water protection (provided to each state by the US Environmental Protection Agency), using such funds for aggregation projects may prove to be a highly effective practice.

- *Is Potentially Complementary to "Tree-Growth" Tax Abatement Programs:* In Massachusetts, Chapter 61 property tax programs could potentially be promoted in conjunction with appropriate aggregation projects. Such efforts should be designed in conjunction with local government officials so that their concerns regarding the local tax base are taken into consideration.

Threats Going Forward

- *Lack of social interest in forest and water resource conservation.* It is possible that communities around the state will become increasingly indifferent to the biodiversity, ecosystem service, sustainable commodity production and natural amenity access benefits potentially provided by aggregation project. Such indifference could be detrimental to the emergence of effective aggregation strategies.

- *Exacerbation of bureaucratic, fundraising and partnership risks.* As above, bureaucratic, fundraising and partnership risks could accelerate, also slowing the emergence of effective aggregation strategies.

- *Diseconomies of Scale and Scope.* Many aggregation projects draw their strength from relatively tight clustering and a well-defined geographic focus. It is possible that as aggregation projects gain popularity among conservation practitioners, some new projects may experience diseconomies of scale and scope if they are too widely dispersed, or suffer from a lack of conservation planning.

MITIGATON AS A STRATEGY FOR FINANCING FOREST CONSERVATION

Mitigation as it relates to natural resources is, broadly defined, the practice of addressing the potential or actual environmental "impacts" of a particular human activity or development by implementing a program to avoid such impacts, to minimize such impacts, or to provide new or substitute resources (that is, provide compensatory mitigation) for unavoidable impacts. For example, the National Environmental Policy Act of 1972, one of the pieces of foundational legislation for the environmental practice and regulation in the United States, can be described as instructing project developers to first avoid, second minimize, and then provide compensatory mitigation for environmental impacts.

In a more narrow sense, the word "mitigation" is today used by environmental regulators and practitioners to refer to the third step in this process – the provision of compensatory mitigation, creating new or substitute resources that compensate for unavoidable environmental impacts.[12]

It is important to note that mitigation can be provided to compensate for unavoidable impacts to a wide range of impacts to natural resources and ecosystem services. These include:

- Biodiversity resources, such as breeding habitat for endangered bird species, and corridors for migratory species such as caribou

- Ecosystem services, such water quality, water quantity (e.g., in-stream flow in rivers that are home to endangered species), stream temperature, carbon sequestration in forests, forest cover, and the variety of ecosystem services provided by wetlands

- Commodity production, such as that provided by woodlands or agricultural land, and

- Amenities provision, such as public access to recreational resources, scenic resources, and historical sites.

Project developers and other responsible parties can effectively mitigate for environmental impacts on three general regulatory bases: on a *voluntary basis* (for example, done without requirement, so as to build goodwill among customers); on a case-by-case *negotiated basis* (for example, as sometimes required for zoning-related permits); or on a *mandatory basis* (for example, as strictly required by federal wetlands laws and regulations).

VOLUNTARY FOREST MITIGATION

There are two examples of voluntary mitigation related to forest cover of relevance to this report. The first and most widely publicized is the program undertaken by Walmart in 2005 called Acres for America. The program is summarized by the company on its website:

> At Walmart, we know being an efficient and profitable business and being a good steward of the environment go hand in hand. In 2005, as part of our commitment to protect our nation's natural resources, the National Fish and Wildlife Foundation (NFWF) and Walmart launched Acres for America, with the goal to permanently protect one acre of important wildlife habitat in the United States for every acre of land developed by Walmart. The program was designed to completely offset the company's land footprint in the United States. Pledging $35 million over 10 years to the project, Walmart committed to protecting enough land to account for its stores' current land-use and development through 2015.[13]

The Walmart Acres for America program has been implemented through grants recommended by the National Fish and Wildlife Foundation to projects throughout the United States, including one in Maine known as the Downeast Lakes Forestry Partnership (DLFP). The DLFP has, in total, protected with conservation easements about 312,000 acres of working woodlands

strategically located "between more than 600,000 acres of conserved lands in New Brunswick [Canada] and 200,000 acres of state, federal and Native American lands in Maine, [resulting] in the permanent protection of more than one million acres of essentially uninterrupted habitat across an international boundary."[14]

At the remarkably affordable easement price per acre of $39.43, the $6.2 million donated by Walmart to the Downeast Lakes Forestry Partnership covers the protection of about half (157,240 acres) of the total easement acreage involved in the project.[15]

As a partnership that involves large and small entities in the private sector (Walmart), the public sector (State of Maine, U.S. Fish and Wildlife Service), and the non-profit sector (NFWF, NEFF, The Nature Conservancy and the Downeast Lakes Land Trust), the Downeast Lakes Forestry Partnership clearly cuts across parcel and organizational boundaries to achieve large-landscape conservation results. Furthermore, as the property includes important wildlife habitat, supports sustainable forestry practices monitored by NEFF, assures the provision of ecosystem services across a large landscape, and provides plentiful hunting, fishing, hiking and canoeing opportunities to the public, it protects in perpetuity a wide spectrum of conservation values, offering value to many constituencies in the community.

A second offset program was recently launched by a much smaller corporate interest, Woodmeister Master Builders, Inc., based in Holden, Massachusetts. Woodmeister made a commitment in April 2010 to "preserve one foot of forest for each foot it builds" as part of its "Rational Sustainability" initiative.[16] While the Woodmeister program does not mitigate the impact of land clearing associated with house construction, it does provide a conservation benefit and generates goodwill for the company, setting an important example for other builders.

Still, as compared to the Walmart program, the Woodmeister program has relatively modest acre-for-acre offset objectives. That is, while Walmart aims to protect one acre for every acre developed, Woodmeister is offsetting only square feet built in the building itself, a figure typically smaller than the total acreage impacted or "developed." For example, a 5,000 square foot home on a one acre lot might result in the development, or clearing, of one quarter to one-half acre of landscape, or more than 10,000 to 20,000 square feet of landscape. That one-quarter to one-half acre is two times to four times the size of the 5,000 square feet of built area which Woodmeister has committed to conserve.

NEGOTIATED FOREST MITIGATION

In some towns, cities, unincorporated territories, or entire states, land use or zoning regulations require a developer to satisfy open space (or similar) requirements in order to be granted a building permit. In many of these cases, appropriate mitigation measures are effectively negotiated between the permitting authority and the developer seeking a permit.

For example, in the town of Shutesbury, Massachusetts, located in a bucolic setting between the Quabbin Reservoir and the university town of Amherst, residents have recently passed a zoning ordinance that requires the applicant (for example, an individual or developer seeking a subdivision permit) to preserve by conservation restriction a minimum of 80% of the total

acreage (for instance, of the proposed subdivision) as open space in the town's Forest Conservation District, and a minimum of 65% in the town's Roadside Residential, Town Center and Lake Wyola Districts.[17] That is, for every one acre that is developed in a given subdivision, an additional 4 acres must be conserved by easement as open space. As noted on a Wikipedia web page apparently prepared by a proponent of the bylaw, this method of "Resource Protection Zoning" (RPZ) differs from traditional subdivision and cluster bylaws in a number of ways, including the following:

- RPZ is allowed by right, meaning that developers are not subject to a more onerous permitting process than traditional subdivisions…

- A conservation analysis is performed in accordance with subdivision regulations to ensure that critical resources on the site remain undeveloped. A minimum of 65% of the site must be left as open space, not including wetlands, steep slopes and other unbuildable areas…

- Within the area of the site that is developable, there are no setback or frontage requirements or minimum lot sizes. This allows the developer flexibility in developing the site, and when it is combined with other tools and regulations in the bylaw, the overall impact is maximizing development potential in the most suitable areas of the site, while protecting critical important resources.[18]

The by-law states that if a proposed subdivision plan deviates from the open space provisions, the developer must apply to the Planning Board for a Special Permit. In practice, given the depressed real estate market in central Massachusetts since 2008, no such special permit has yet surfaced. Indeed, the long-term impact of the 2008 Shutesbury Zoning By-Law will not become clear until the economy and the real estate markets in central Massachusetts fully recover over the course of several years.

In another Massachusetts example, the developers of the largest planned development in the state of Massachusetts, known as The Pinehills, had to go through extensive negotiations with both the Town of Plymouth and the Commonwealth of Massachusetts before it was permitted to proceed with its development plan. The result is an award-winning planned community, currently with more than 2,000 residences (including stand-alone homes, clustered attached housing and multi-story condominium residences) that are set among more than 3,000 acres of golf courses and other recreational amenities, agricultural and wooded open space, brooks and ponds, and historic features. The resulting development has pleased not only the developer and local residents, but also town officials. A local newspaper reported in 2008 that "favorable reaction to Pinehills' layout has increased the acceptance of 'smart growth' zoning principals at subsequent projects in Plymouth… Malcolm MacGregor, chairman of the town's planning board, [said] 'We need small villages in areas where there's a lot of dense housing to eliminate potential traffic congestion.' "[19]

In a widely-publicized example in Maine, the Land Use Regulatory Commission (LURC) went through a multi-year adjudication process with the Plum Creek Timber Company to finally arrive at settlement which permits Plum Creek to build the largest development project in Maine's

history, including about 950 housing units on some 20,000 acres of land. In order to acquire the permit, Plum Creek, working with a coalition of organizations including The Nature Conservancy, will arrange for the permanent protection from development, either through easement or fee acquisition, of about 400,000 acres of adjacent working forest and preserved wilderness on or near the shores of Moosehead Lake. At an effective ratio of about 20 acres protected to each acre developed, many conservationists and developers strongly support this settlement. For example, Alan Hutchinson, Executive Director of the Forest Society of Maine (FSM), wrote to FSM friends and supporters after the decision was announced, noting that "the Land Use Regulation Commission and its staff deserve huge credit for their diligence and thoroughness. They have reviewed and analyzed thousands of pages of testimony and technical data, weighed it against their standards and criteria, and have produced a plan that balances the many needs of the Moosehead region and protects the region's natural resources and public values while promoting planned growth."[20]

As of this writing, however, several organizations, including the Natural Resources Council of Maine, are appealing LURC's decision in Maine courts. The final outcome of that appeal will help to establish whether or not the Plum Creek permit sets an historic precedent for what is effectively large-scale mitigation for master-planned development in the Northeast United States.

MANDATORY MITIGATION

The line is somewhat gray between negotiated mitigation, described in the paragraphs above, and mandatory mitigation, required by statute to meet certain regulatory targets. Indeed, zoning laws that trigger negotiated mitigation settlements may have specific mitigation targets (such as in the Shutesbury zoning code), and compliance with mandatory mitigation regulations such as the wetlands mitigation described below may in fact require extensive compliance-related negotiations with regulators. That said, the following section describes mandatory mitigation regimes that generally require compliance in accordance with strict regulatory guidelines.

Mandatory compensatory mitigation has the most extensive history, at least at the federal level, in the context of wetlands regulations. As explained in Appendix 2 (section 2.1) to this report , the modern era of federal wetlands mitigation regulation began in the early 1970s, with the passage of the Clean Water Act. In some 31 states across the nation, wetlands mitigation regulations have led to the creation of mitigation banks, often managed by private-sector third parties, which provide approved wetland credits. These credits represent stores of enhanced wetland acreage that can be purchased by permit applicants to offset (that is, provide compensatory mitigation) for the loss of comparable acres of wetlands impacted in the course of a construction project or development effort. The use of wetland banking continues to gain adherents. Indeed, wetlands mitigation banking is now the preferred compensatory mitigation method specified by recently released U.S. Army Corps of Engineers guidelines.

Unfortunately, in Massachusetts, the first attempt to set up a wetlands mitigation bank – in this case to be managed by an agency of the state government in the Taunton River Basin – was opposed by environmental organizations that argued that the mitigation banking effort would not have its intended beneficial effect. The initiative to create a wetlands mitigation bank in Massachusetts did not succeed, and the Commonwealth to date does not yet have a wetlands

mitigation bank. Future attempts to establish a wetlands mitigation bank in the Commonwealth may fare better, given the Corps established preference to see them used for mitigation.

The initial establishment of a conservation mitigation bank in Massachusetts that addresses the loss of biodiversity habitat critical to the survival of threatened and endangered species in the state has gone more smoothly. As detailed in Appendix 2 (section 2.3) to this report, The Massachusetts Chapter of The Nature Conservancy, in partnership with the Massachusetts Division of Fisheries and Wildlife (MassWildlife) and the Massachusetts Natural Heritage and Endangered Species Program (NHESP), has recently established an Enhanced Mitigation Program (EMP) as part of the state's system of environmental management permitting.

Similar to other mitigation programs, the EMP is part of an environmental management permitting system that requires applicants to first avoid, second minimize, and only then mitigate. The NHESP determines whether or not mitigation is required in any given situation. The permittee decides how to achieve mitigation – with an on-site mitigation project, an off-site mitigation project, or by paying mitigation funds and a fee into the EMP. If funds are paid into the EMP, the permittee can proceed with their development project, and TNC can proceed with those funds to complete the acquisition of conservation land that provides appropriate mitigation. TNC then reports back to MassWildlife regarding its mitigation efforts.

To date, the principal focus of the EMP in Massachusetts has been the conservation of habitat, in Southeastern Massachusetts and in the state's section of the Connecticut River Valley, for box turtles, the single species most impacted by the permitting process in Massachusetts. The first land conservation project to which the EMP provided funds was the January 2010 acquisition of a parcel of property along Black Brook in Middleborough, a town in Southeastern Massachusetts. The Environmental Management Program provided $300,000 of the $885,000 purchase price to acquire 89 acres of conservation land that abuts hundreds of acres of contiguous conservation land. Additional funds were provided with water protection funds provided by the Department of Environmental Protection, by municipal sources, and through private fund raising.

Importantly, the project appears to meet each of the three principal recommendations made in August 2009 report on *The Next Generation of Mitigation: Linking Current and Future Mitigation Programs with State Wildlife Action Plans and Other State and Regional Plans* [21] prepared by The Nature Conservancy and the Environmental Law Institute. That is, the EMP is designed to: help ensure the appropriate application of the avoid, minimize and mitigate protocol; assist in the acquisition of a parcel identified as a high priority through state wildlife planning processes; and it assist in the acquisition of a parcel that is adjacent to other critical conservation lands, helping to build a corridor of conservation lands sufficient in scale and located strategically so as to support the long term health of whole ecosystems.

In addition to using mitigation banks to address the loss of wetlands and biodiversity habitat, innovative agencies and entrepreneurs across the nation have used them to provide compensatory mitigation for a variety of natural resources and processes, including the protection of freshwater and marine fish populations, as well as the attainment of high levels of water quality and water quantity in various river systems and estuaries (see Appendix 2, sections 2.4 and 2.5). The use of

such mitigation methodologies in Massachusetts is an opportunity that has not been successfully pursued.

There are several states other than Massachusetts that have in place, or are in the process of developing, mandatory mitigation programs related to forests. Both New Jersey and Maryland have programs related to mitigation for the loss of forest cover. New Jersey, as explained in Appendix 2 (section 3.1) to this report, has taken steps to ensure that for state projects above a certain minimum size, there will be virtually no loss of forest cover. The statute stipulates that "New Jersey state entities are required to replant trees when trees are removed during development projects involving one-half acre or more."[22] The reforestation is onsite if at all possible, but there are also off-site and fee-in-lieu options. For off-site project, the state Forestry Service can pay a municipality to replant the trees within two years of the initial tree removal that made way for a state construction project.

Maryland has a more expansive law that requires mitigation for the loss of forests throughout the state (see Appendix 2, section 3.2 to this report). Maryland's April 2009 Sustainable Forestry Act requires that there must be forest-related mitigation for some (but not all) projects greater than 20,000 feet in size. The mitigation required varies depending on the project's location. The Act also set a goal for the protection in perpetuity of 2.6 million acres of forested land in Maryland. Mitigation may take several forms, including the payment of a fee-in-lieu cost of thirty cents per square foot. Moreover, in the context of the new law, a new breed of forest mitigation banks is being created in Maryland. In February 2009, for example, the City of Bowie received a proposal to establish a nearly 1 acre bank called the Gallant Fox Lane Forest Mitigation Bank. The bank is mitigating for an ongoing utility project, with the utility project contractor paying the mitigation costs.[23]

California is now envisioning perhaps the most ambitious scheme for forest-related mitigation. As described in Appendix 2 (section 3.3) to this report, negotiations are still underway regarding the inclusion of the forest sector in the state's proposed cap-and-trade scheme. The California Air Resources Board (CARB) has set a Sustainable Forest Target of maintaining or increasing the level of net carbon sequestration in the state's forests through 2020 though "sustainable management practices, including reducing the risk of catastrophic wildfire, and the avoidance or mitigation of land-use changes that reduce carbon storage."[24] The outcome of those negotiations, and the future of the Western Climate Initiative of which California is a key member, may depend significantly on the outcome of the November 2010 race for California's governor and legislature, and on proposed California state ballot initiatives regarding the state's Global Warming Solutions Act.

Massachusetts, as described in Appendix 2 (sections 4.1 through 4.3) to this report, has several possible paths to mandatory mitigation for the loss of forest cover, including the Massachusetts Global Warming Solutions Act, the Massachusetts Environmental Protection Act, the Massachusetts Wetlands Protection Act, and the Regional Greenhouse Gas Initiative (RGGI) of which Massachusetts is a member.

Massachusetts is just starting to experiment with methods for using compensatory mitigation strategies to slow the loss of forest cover, as well as the loss of carbon sequestered in the forests

of the Commonwealth. Experimentation is likely to continue for some time until the state finds the right balance in approach, balancing off voluntary incentives with governmental regulation.

Striking such a balance is an ongoing challenge. Voluntary programs have registered notable successes. It was using voluntarily applied conservation easements, for example, that landowners have protected from development hundreds of thousands of acres of working forestland in New England. Voluntary approaches alone, however, have not been enough to stem the continuing loss of forestland in either Massachusetts or New England. Clear regulations do have important benefits. As the authors of a report from the International Union for the Conservation of Nature note "regulatory regimes create legal certainty, clarify the expectations of companies on the design and implementation of offsets, help ensure a level playing-field and may facilitate the emergence of efficient markets in biodiversity credits."[25]

As Massachusetts and the nation continue to struggle to find appropriate mechanisms for protecting its forests, and for mitigating and adapting to ongoing global climate change, the need grows ever greater for finding the right balance, and for protecting our natural heritage while stimulating sustainable economic growth.

Strengths to Date

- *Successful Voluntary Mitigation Experience to Date:* As the home of the world's first non-profit land trust (The Trustees of Reservations), and of the nation's first Metropolitan Parks Commission, Massachusetts has more than a century of experience with the voluntary conservation of privately-owned open space for the public benefit. A new chapter in the story is being written as private companies such as the Woodmeister Corporation, based in Massachusetts, are voluntarily setting aside a square foot of land for each square foot of built space which they construct. Walmart is pursuing an even more ambitious program, permanently conserving at least one acre of priority wildlife habitat for every acre developed through 2015, including those acres developed in Massachusetts. As far as available online information indicates, Maine is the only New England state in which the Walmart program has actually saved acres to date.[26] The generosity of such voluntary mitigation efforts pursued in conjunction with residential and commercial developments set important precedents for the future.

- *Successful Negotiated Mitigation Experience to Date:* There are several good examples of negotiated mitigation initiatives in Massachusetts to date that have resulted in planned development as well as the protection of significant acreages of working woodlands, recreational open spaces and preserved wildlands. These include: the example cited above at The Pinehills in Plymouth; the successful multi-year negotiation between the Town of Belmont and McLean Hospital that resulted in the protection of more than one hundred acres of protected woodlands near an urban transportation hub; and the successful negotiation between the state, several non-profit organizations and the Makepeace Corporation which resulted in a "three-phase land deal, which involves a purchase by the state of 160 acres in Plymouth and Wareham and two long-term options to purchase thousands of other acres that will be protected under conservation, and will

support smart growth development projects that Makepeace is pursuing elsewhere on its properties.[27]

As also noted above, elsewhere in New England, negotiated mitigation has resulted in even more dramatic conservation results, including the protection of nearly 400,000 acres in connection with the Plum Creek development effort on Moosehead Lake in Maine.

Furthermore, the Town of Shutesbury has institutionalized aggressive forest conservation goals in its new zoning by-laws that require between 65% and 80% of a proposed subdivision to be conserved with a conservation restriction.

The ingenuous solutions arrived at by the public, private and non-profit parties that worked to negotiate several of these deals set important precedents for small and large proposed development projects and conservation efforts in the state in coming decades.

- *Successful Mandatory Mitigation Experience to Date:* The brief experience of the Enhanced Mitigation Program administered by the state's Natural Heritage Program and MassWildlife in conjunction with The Massachusetts Chapter of The Nature Conservancy demonstrates that a well-designed, flexible mitigation banking-like program can efficiently and effectively protect natural resources in the state. The EMP may also be setting an important mitigation precedent for the protection of natural resources threatened by development in the Commonwealth.

Weaknesses to Date

- *Unsuccessful Mitigation Experience to Date.* As detailed above, the state's experience in attempting to set up a wetlands mitigation bank in the Taunton River Basin has demonstrated that significant opposition to such innovative techniques can arise, both at the local level and among some of the state's leading environmental groups. More careful consultation with local officials and potentially adverse environmental groups may yield a more positive outcome as new mitigation ideas are advanced in the Commonwealth.

Opportunities Going Forward

- *Additional Voluntary and Negotiated Mitigation Efforts.* With significant experience with both voluntary and negotiated mitigation efforts in the state, Massachusetts can pursue additional opportunities, including:

    - Promote and offer incentives for voluntary mitigation among "big-box" retailers (similar to Walmart)
    - Promote and offer incentives for voluntary mitigation among multi-unit residential developers
    - Promote and offer incentives for towns that offer flexible zoning regulations favoring clustered housing and transfer of development right programs (similar to those that made The Pinehills project and the Makepeace agreement possible)

- *Consideration of Laws and Regulations Requiring Forest Mitigation*

    - For example, borrowing from the regulatory precedents set in Maryland, New Jersey and California, as mentioned above
    - Create and implement provisions for forest-related offsets through the Massachusetts Global Warming Solutions Act, the Massachusetts Wetlands Act, or the Massachusetts Environmental Protection Act, as mentioned above

- *Consideration of Laws and Regulations that Strengthen Regional Efforts to Reduce the Emissions of Global Warming Gases*

    - For example, strengthen the Regional Greenhouse Gas Initiative to include the ability to provide mitigation credits (carbon offsets) for afforestation and forest conservation,
    - Join the Western Climate Initiative that will likely include provisions for "real, surplus/additional, verifiable and permanent" offsets in the forestry sector (for example for certified afforestation/reforestation, forest management, forest preservation/conservation and forest product-related initiatives.

Threats Going Forward

- *Slow Adoption of Global Warming Solutions in the United States.* Despite significant apparent progress, federal efforts to create cap-and-trade markets for carbon credits were stalled in 2010 in the United States Senate. Political developments in regions of the United States still considering programs that will limit emissions of greenhouse gases may advance or stall in coming months based on public sentiment, the growth or contraction of the economy, and on the results of elections to be held in the fall of 2010. It is unclear how the fate of global warming solutions efforts will impact land conservation and forest mitigation efforts in the near future.

ADDITIONAL STRATEGIES FOR CONSIDERATION

As discussed above in the section of this report on "Organization of the Advisory Board on Financing Forest Conservation," several conservation finance strategies were discussed that are highly complementary to the strategies of aggregation and mitigation. While it is not the purpose of this report to consider these complementary strategies in depth, they are briefly discussed here for the reference of practitioners and policy-makers who may consider their relevance in the future.

OPTIMIZATION IN DEPLOYING CONSERVATION BUDGETS

Dr. Kent Messer of the University of Delaware presented to the Advisory Board in May 2009 his concepts regarding the maximization (or more modestly stated, improvement) of measurable conservation outcomes through the use of linear programming, goal programming and other mathematical simulation techniques.

In one example he discussed, Messer, working with the Conservation Fund, was able to show the County of Baltimore, Maryland, how to use its budget for conserving critical watershed lands more effectively. In a University of Delaware College of Agriculture and Natural Resources news story, the author explains that "Over the past three years, Baltimore County staff estimate that optimization has helped the county protect an additional 680 acres of high-quality agricultural land at a cost savings of roughly $5.4 million compared to the class conservation decisions tools. This amounts to a return on investment of more than 60 to 1. In other words, for every dollar that Baltimore County spent using its optimization model, it has gained more than $60 in conservation benefits." [28]

Messer explained to the Advisory Board that similar benefits might be obtained in aggregation or mitigation efforts in Massachusetts that have multiple parcels (each with a quantifiable set of relevant characteristics) available for protection through the purchase of conservation easements. He urged the Advisory Board to consider that use of Optimization Modeling in the design of future mitigation or aggregation programs.

INVESTMENT IN WATERSHEDS/OTHER NATURAL INFRASTRUCTURE RESOURCES

In May 2009, Matt Zieper of the Trust for Public Land made a presentation to the Advisory Messer on the use of Clean Water State Revolving Funds ("SRF") for forest and other watershed land conservation. Zieper explained that the SRF available to Massachusetts each year are in the millions of dollars, and that some portion of these funds could be made available for the protection of land that provides a reliable source of clean drinking water. To offer an idea of the scale of the Massachusetts SRF, consider the following from the 2009 annual report of the fund: "In FY 2009 the Trust leveraged $26.6 million of Federal and State project funds into $313 million in permanently financed Clean Water loans. In FY 2008 and 2009 the Trust leveraged $39 million of Federal and State project funds into $223.3 million in permanently financed Drinking Water loans."[29]

Zieper and colleagues at the Trust for Public Land are in the process of writing a report on the subject that should be made available to policymakers and the public in the second half of 2010 or first half of 2011.

In addition to Zieper, Robert Zimmerman of the Charles River Watershed Association made a presentation about the opportunity for funding land and forest conservation by investing in gray water recharge project such as the one now being considered by the town of Littleton, Massachusetts. Like Zieper, Zimmerman made the point that the funds that could be raised for such projects could contribute appreciable amounts towards land conservation objectives.[30]

INVESTMENT IN FOREST-BASED ENTERPRISES AND ECONOMIES

The January 2010 meeting of the Advisory Board was devoted to the topic of investment in forest-based enterprises and economies. While there was lively discussion devoted to the topics of eco-tourism and enhancement of value-added forest products, most of the day was devoted to consideration of the prospects for biomass and other wood-to-energy ideas being proposed for

Massachusetts. Subsequent to that discussion, which was led by forestry consultant Tom Walker, a major report on the subject was issued by Walker and his associates.

Walker's team concluded that the beneficial effect of large biomass projects for the state would not likely be positive immediately, and could take decades to begin having beneficial carbon-related impacts. A press release focused on the study explains: "As an example, with an electric power plant that relies on biomass using whole trees from natural forests in the Massachusetts region—and not waste wood from tree work and landscaping that has different carbon cycle impacts—the carbon debt period is likely to last for at least 20 or 30 years before carbon benefits begin to be realized. In contrast, using forest biomass in thermal applications, such as heating municipal buildings or schools, has lower carbon debts and can provide carbon dividends for the atmosphere sooner, generally within 10 to 20 years."[31] The study had an almost immediate policy impact, as explained in a July 9, 2010 news account:

> "Official have been asked [by Massachusetts Secretary of Energy and Environmental Affairs Ian Bowles] to draw up draft regulations that will require biomass fuels to achieve at least 50% reductions in greenhouse gas emissions compared to an equivalent natural gas power station.
>
> And, the regulations would require fuel used in biomass power projects to generate power using combined heat and power (CHP) or equivalent technology.
>
> Biomass fuel would have to be converted to energy at a 60% efficiency per unit of useful energy, with the possibility of increasing the threshold to 80% efficiency by 2020.
>
> The new rules respond to warnings about the sustainability of biomass fuel drawn from poorly managed woodland as published by the Manomet Center for Conservation Sciences last month." [32]

As a consequence of Bowles decision, prospects for the near-term development of large wood-to-energy project that might fund large land conservation initiatives are less favorable.

PROMOTION OF LOW-IMPACT CONSERVATION DEVELOPMENTS

As noted above in the mitigation section of this report, by promoting and incentivizing low-impact, conservation-oriented development of commercial and residential properties, the state could reduce the pressure on its woodlands and wildlands, as well stimulate meaningful conservation initiatives alongside such developments. As noted by Tony Green of The Pinehills, Scott Horsley of the Horsley Witten Group, Lee Hartmann (Planning Director of the Town of Plymouth), and Bob Wilber of Massachusetts Audubon noted at the Advisory Board's March 2010 meeting, there are a variety of local and state level initiatives that could improve zoning requirements associated with such projects, and offer meaningful incentives for low-impact developers (for example, offering incentives for infrastructure costs associated with low-impact projects). There are good precedents for such projects in the Commonwealth, including The Pinehills as well as the recently announced A.D. Makepeace deal mentioned above. The challenge will be to build policy that allows for the more common replication of such precedents.

RECOMMENDATIONS

The focus of this report has been to identify and explore two important methods of financing forest conservation in Massachusetts: aggregation and mitigation. The report has looked at each method in detail, and has considered the strengths, weaknesses, opportunities and threats of each.

The authors of this report recommend that our work be considered by the conservation practitioners and policy-makers of the state of Massachusetts, throughout New England, and beyond, as they continue to strive to protect vital forest resources. We will make ourselves fully available to them as they consider new financing strategies, and recommend policy changes to the Governor and Legislature of the Commonwealth of Massachusetts, and throughout the region. Both aggregation and mitigation hold significant potential for moving forward on forest conservation in an efficient, effective and socially beneficial fashion.

We have, in effect, planted a seed or two that we hope to see grow over time. To quote Massachusetts' most celebrated naturalist, Henry David Thoreau, "we have great faith in a seed."[33] Our aspiration is to see the conservation community of Massachusetts nurture these seeds to fruition, so that a century from today the Commonwealth continues to enjoy a healthy, lush and green, wooded horizon rising above the surface of the land, from the shore lands of Massachusetts Bay to the heights of the Berkshires.

APPENDIX 1 :
AN OVERVIEW OF FOREST AGGREGATION PROGRAMS

Aggregation is a conservation finance strategy that groups a series of smaller parcels into a single, larger project. By grouping properties together, aggregators and conservation finance intermediaries aim to achieve various economies of scale and per acre reductions in conservation costs. Specifically, aggregation programs can potentially reduce conservation easement costs by making a standard offer to landowners for bargain sales (for example, selling an easement at 75% of the appraised value of such an easement), by arranging for group appraisals that have the potential to reduce the per parcel appraisal costs, by offering standard offer terms and conditions that allow for standardized easement monitoring and stewardship, and by achieving economies of scale in fundraising efforts.

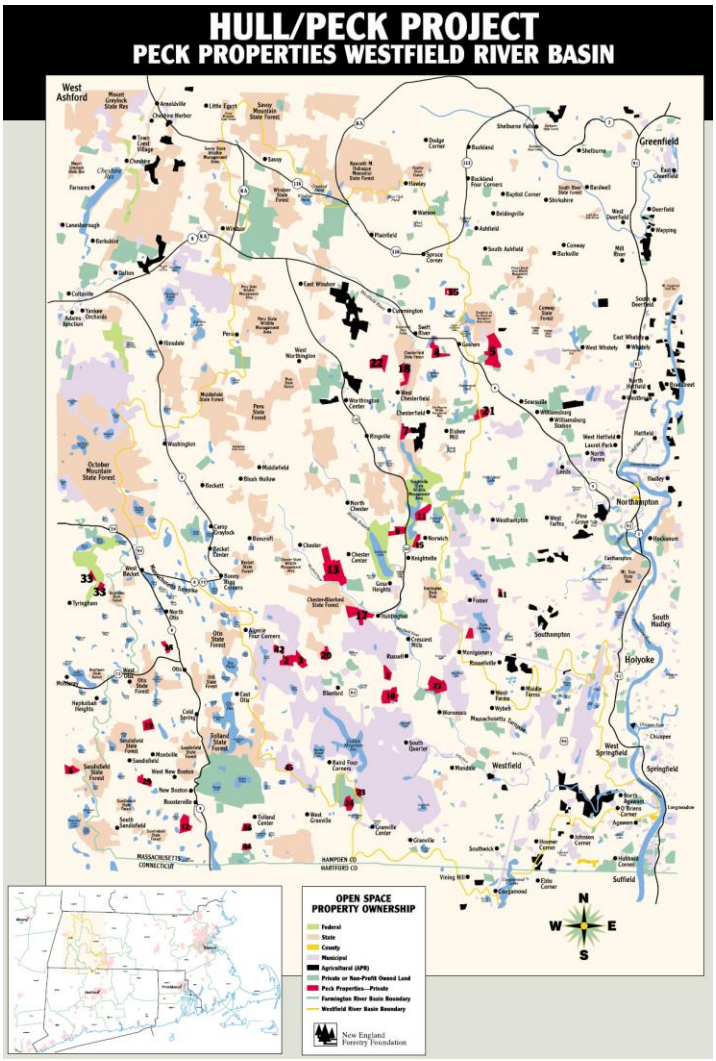
Over the past dozen years, there have been several conservation projects carried out in Massachusetts that have conserved, or that aim to conserve, multiple parcels of land through one consolidated effort. Several – namely the Hull-Peck Project and the Tully Project – were important multi-parcel initiatives that did not actually involve a land trust or conservation intermediary as an aggregator. In effect, they served as important precursors, and partial models, for the aggregation projects that followed, including: the Quabbin Corridor Connection project for which the Mount Grace Land Conservation Trust served as aggregator; the Southern Monadnock Plateau Project (Phases I, II and III) for which the North Quabbin Regional Landscape Partnership served as conservation finance intermediary (coordinating the efforts of several land trusts serving as aggregators); and the Western Massachusetts Aggregation Project, coordinated by the New England Forestry Foundation as conservation finance intermediary, which is ongoing as of the date of this report.

The purpose of this overview is to offer some detail regarding each of these projects, based on both published reports and field interviews. It is with the perspective of such profiles that the report authors and participants in the Advisory Board can assess the strengths, weaknesses, opportunities and threats associated with aggregation as a conservation finance strategy.

The profiles of the projects follow below.

1. Hull-Peck Land Protection Project

The former Peck Lumber Company woodlands in Western Massachusetts had long been a source of quality timber. In 1997, heirs of the Peck Lumber Company were ready to sell their land, some of which the family had held since 1910.[34]



Properties in the Westfield Basin that were
purchased by Bill Hull and protected with easements[35]

Faced with a dwindling land base in southern New England that threatened the future of his forest products company, sawmill owner Bill Hull had a vision that he could procure these lands and practice sustainable forest management to provide his company with a reliable supply of timber.

In 1998, Hull convinced the Peck heirs to sell him an option to purchase 7,000 acres of land. However, the expense of purchasing the 34 properties far exceeded any income he could hope to realize by practicing sustainable forestry, according to a profile by Hull Forest Products.[36]

Recognizing that his company's goal of sustainable forest management was compatible with public goals such as open space protection, wildlife habitat improvement, and air and water quality enhancement, Hull worked with Keith Ross of the New England Forestry Foundation to

convince non-profit groups and state agencies to purchase the development rights to the properties.

Grants from the National Fish and Wildlife Foundation, the Norcross Wildlife Foundation, and the Frank Stanley Beveridge Foundation supported the project, and the conservation restrictions are held by the New England Forestry Foundation, the Massachusetts Division of Fisheries and Wildlife, the Massachusetts Department of Conservation and Recreation, and the Springfield Water and Sewer Commission.[37]

According to a project overview by NEFF, these properties support local forest-based economies in 18 communities and most of the properties are adjacent to other lands already under permanent protection.[38] The forests have been certified for the Forest Stewardship Council's SmartWood program, which is part of the Rainforest Alliance's Sustainable Forestry Division, according to Hull Forest Products.

In total, 8,064 acres of working forestland and valuable wildlife habitat were protected from development, which was the largest single land conservation project in Massachusetts at the time.

The land protected under this project is spread over five watersheds and includes nine miles of frontage on the Westfield River and its tributaries. In total, the Hull-Peck Land Protection Project, which also included some of Hull's Connecticut and Central Massachusetts forestlands, placed land in 18 communities under protection. The total cost was approximately $4 million from state, municipal, foundation, and private funds, at an average of $500 per acre, according to Hull Forest Products.[39]

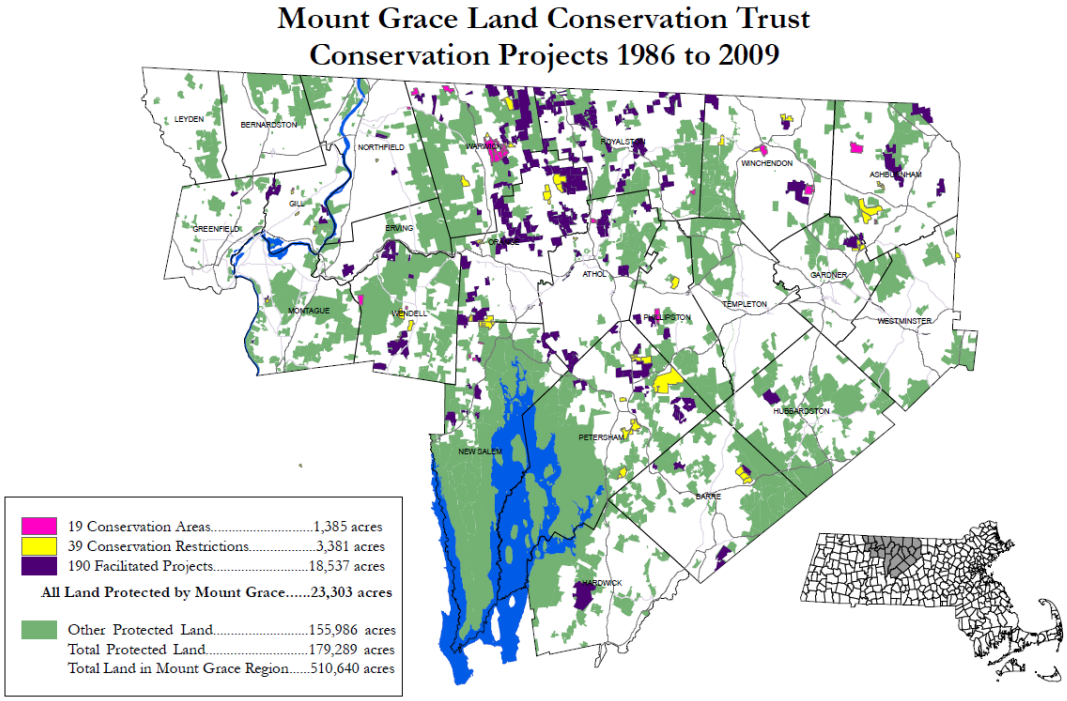
This project has been cited by NEFF as a first example of forest aggregation, since Bill Hull used the funds from the sale of CRs on 15 properties to acquire 34 properties from the Peck Lumber Company. Hull was able to attract funding from a range of national, regional, and local organizations and agencies to purchase the CRs on the 15 properties because it would allow them to accomplish conservation objectives including open space protection, wildlife habitat improvement, and air and water quality enhancement.[40]

As the largest single land conservation project in Massachusetts at the time, it set an example as an early landscape-scale conservation project when organizations and agencies were beginning to wonder how to protect open space and ecosystems while the region was facing parcelization of properties into smaller units of ownership. The Hull-Peck project was an example of conservation at a larger scale that was likely an inspiration and a source of influence for the leaders and decision-makers that initiated the Tully Initiative in Northern Massachusetts.

2. Tully Project

The Tully Valley Private Forest Lands Initiative (also known as the Tully Project) was a public-private partnership in 2000-2002 that resulted in the protection of 9,100 acres in Northern Massachusetts. The project involved 104 landowners and was a partnership between the Mount

Grace Land Conservation Trust, the Massachusetts Executive Office of Environmental Affairs (EOEA), and the New England Forestry Foundation.[41]



The Tully Initiative resulted in the conservation of 9,100 acres from 104 landowners in the towns of Athol, Orange, Royalston, and Warwick in Northern Massachusetts

(Map source: http://www.mountgrace.org/pdfs/Completed%20Projects_FY09_FINAL.pdf)

The Tully Initiative was concentrated in four towns of the North Quabbin Region of Central Massachusetts, which contains a 141,000 acre greenbelt of predominantly forested conservation land. Extending north from the Quabbin Reservoir, this 60 mile circular band of state, federal, and private conservation land encompasses parts of 19 towns.[42] The project successfully consolidated the conservation land by filling in gaps and establishing corridor connections, according to an October 2002 overview included with the Mount Grace Annual Report. The project encompasses land in the towns of Athol, Orange, Royalston, and Warwick, where the average ownership size is 25 acres.[43]

The project was funded by the State of Massachusetts at the level of $9 million, and the conservation restrictions on the properties are held by the Department of Conservation and Recreation and the Department of Fish and Game. "The Commonwealth of Massachusetts was the purchaser, holder, and monitor of any Conservation Restrictions agreed to by interested landowners," according to a summary drafted by the state in February 2001. "Landowners will continue to have ownership of the land and can sell, will, or lease the land, subject to the terms of the Conservation Restriction."[44]

According to an overview by Leigh Youngblood, executive director of Mount Grace, one of the key factors that made the project successful was that it was "initiated and supported from the top" by then Secretary of Environmental Affairs Bob Durand. She also cites "the existence of active land trusts that were willing to facilitate" the project, so the public-private partnership offered "credibility combined with trust and approachability with landowners."[45]

The standard administrative procedures were modified for the duration of this project, so Mount Grace was able to use a common conservation restriction agreement, the project was restricted to a price goal of $1,000 per acre, and the review period was very specific to allow as many projects as possible to close in a short amount of time. One of the most challenging aspects of the project, according to public and private representatives, was the short deadlines that stretched the capacity of land trust and government staff to process so many transactions.[46]

The Tully Initiative led to the dedication of the North Quabbin Bioreserve on December 3, 2002. The area is one of the largest contiguous tracts of forestland in southern New England, and it protects an area large enough to allow landscape-level ecological processes to function.

Mount Grace acted as a broker for the state in negotiating the purchase of the conservation restrictions, which made it possible to negotiate more than 100 agreements in a two year period. "Having a trusted local nonprofit organization as the 'face' of the initiative made the project much more palatable to the landowners," wrote Martha Nudel in an article about the Tully Initiative in the Journal of the Land Trust Alliance.[47]

The organizations and agencies were able to build on an already established working partnership forged during the Tully Loop Trail project. Beginning in 1998, six partners in the North Quabbin Regional Landscape Partnership created a 20-mile trail that weaves through a largely undeveloped area of wildlife habitat and spectacular scenery. Most of the trail was built in 1999, and it links Tully Mountain, Tully Lake, Doane's Falls, Jacob's Ridge, Royalston State Forest, Royalston Falls, and Warwick State Forest.[48]

"None of the organizations would have undertaken a project like the [Tully Loop Trail] on their own. It was just too large. The partnership made this rapid pace of on-the-ground results possible," explained Youngblood when describing how partnerships led to success in conserving landscapes in Northern Massachusetts.[49]

For the Tully Initiative, Mr. Durand set an ambitious goal of 5,000 acres to be protected in the first year, and development rights were purchased for no more than $1,000 per acre. In order to achieve this objective, Mount Grace mailed informational packets to 400 owners of 20 or more acres, and 38 landowners eventually sold conservation restrictions on their property. A total of 540 landowners were approached for the first time or re-contacted during the second year, which saw 61 closings, wrote Nudel in "Better Conservation through Partnerships."[50]

"In the second year, skeptical landowners saw those in the first year getting paid for protecting their land and happy with the process. That was certainly an incentive," explained Youngblood.[51] In addition, one appraisal company handled all the projects and offers were based on these

appraisals. Public agencies had five days to question the appraisals or Youngblood was authorized to use her professional judgment to make an offer, according to the LTA profile. If a landowner in the project area agreed to the price, the project was automatically approved by the state.

A project description from Mount Grace also pointed out that landowners were willing to compromise on the terms of the conservation restriction, particularly on the issues of public access, hunting, forestry standards, and agricultural practices. Finally, landowners were willing to compromise on price, "knowing that all were being held to the same standard."[52]

"Each week, I went down the list of projects with the state agencies and we moved projects forward, almost like an assembly line. Complications were dealt with in short order or the project was eliminated as not being feasible," recalled Youngblood.[53] The time spent drafting standardized easement terms at the inception of the Tully Initiative produced a solid document that landowners considered reasonable, and which allowed Mount Grace to close so many deals in only two years.

Massachusetts Secretary of Environmental Affairs Bob Durand conceived the Tully Initiative during a celebration of a closing of a large conservation project along the Tully Trail. The event was held at a prominent overlook along the Tully Trail, which offered a spectacular view of this breathtaking valley and which inspired Mr. Durand to initiate this ambitious project, wrote Nudel in the LTA magazine.[54] Mount Grace also noted in its October 2002 report that the area was selected because of its undeveloped condition, biodiversity significance, and active network of public and private conservation groups.[55]

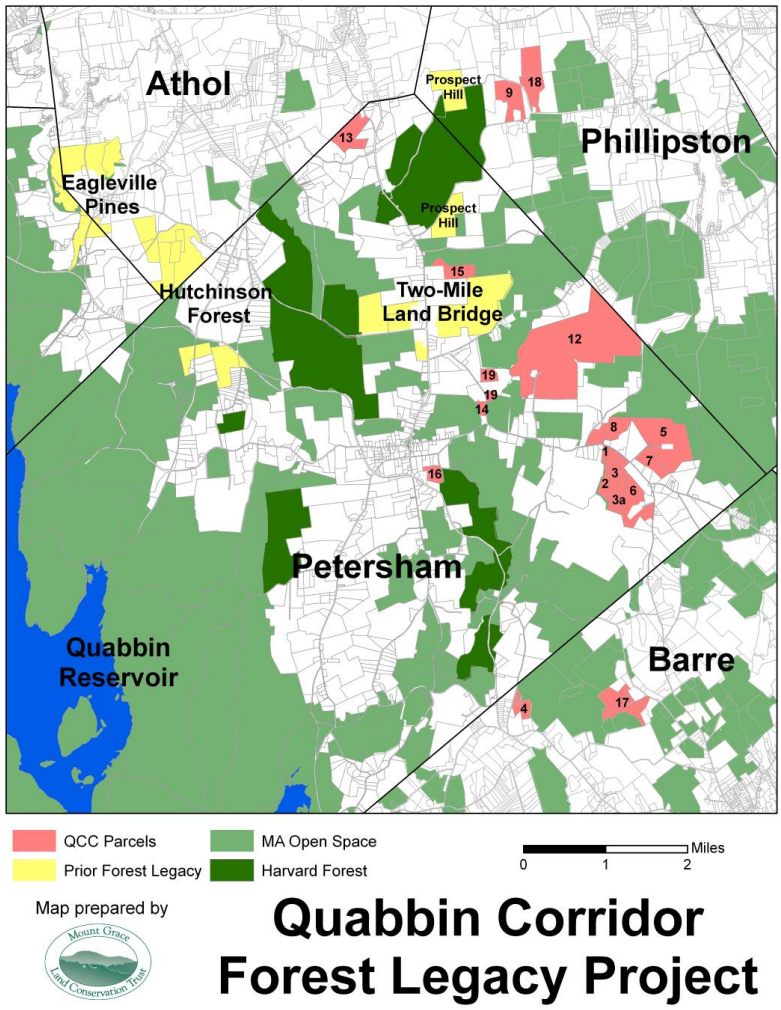
The Tully Initiative advanced the concept of aggregation beyond the beginnings of the Hull-Peck project since it involved many more landowners, which makes it an early example of the kind of landscape-scale conservation that can be applied to other regions that are facing parcelization and small lot sizes.

The success of the project was based on a number of factors and these include the commitment demonstrated by leaders at the state level and the reliance on partnerships and relationships that had been established by land trusts in the region.

In addition, the land trusts and the state streamlined the process in order to allow such a large number of deals to close in a short period of time, and the landowners demonstrated their own commitment to the process by understanding and agreeing to the terms in order to ensure the success of the overall project.

3. Quabbin Corridor Connection

The Quabbin Corridor Connection (QCC) was a project initiated by the Mount Grace Land Conservation Trust that resulted in the protection of about 1,700 acres in Northern Massachusetts. The project involved the purchase of conservation restrictions from 18 landowners over the period of 2006-2009 with funding primarily provided by the US Forest Service Forest Legacy Program.



The QCC project received $3 million in federal funding as part of the Forest Legacy Program, which requires 25 percent in matching funds from program partners. As a result, the State of Massachusetts contributed $375,000, in-kind donations of legal and stewardship work totaled $119,000, landowner bargain sales contributed $133,500, and gifts of conservation restrictions totaled $873,000. [56]

The total project cost was $4.5 million, which means the land and conservation restrictions were purchased or acquired at an average cost of $2,368 per acre. The largest of the properties is 650 acres and the smallest is seven acres, according to a brief project update from DCR Forest Legacy Program Coordinator Michael Fleming.

According to the Forest Legacy grant application, the implementation of the project was time sensitive because several of the parcels were already identified for development, which has been an ongoing challenge to land conservation in Massachusetts. “Two of the parcels were immediately threatened to the extent that the partners to this project have pre-acquired them to prevent immediate conversion to non-forest uses. Without prompt pre-emptive purchases, the

Wilson and Yonkers parcels would be house lots by now. Both lots are 100 percent wooded and had been slated for further fragmentation," emphasized Mount Grace in the application. "Several of the landowners (Dickson, Lindblad, Yggdrasil Trust, Reid, Swan, Buell and Alexandrovich) are looking for retirement income and will likely be forced into development if we are unable to purchase restrictions from them."[57]

Mount Grace highlighted that "all of the landowners are willing and active participants," with seven of them being repeat applicants from prior years. "They are well versed in the nature of less-than-fee acquisitions through public meetings hosted by Mount Grace or private conversations with Mount Grace staff," they wrote, adding that they discussed public access and bargain sales with all of them and had already received commitments for bargain sales from 10 out of 20.[58]

Of the properties proposed for protection, 6.5 acres are mapped as Living Waters Core Habitat, primarily within the rivers and streams, 1,640 acres are mapped as Living Waters Critical Supporting Watershed, 275 acres are mapped as Bio-Map Core Habitat, and 1,200 acres are mapped as Bio-Map Supporting Natural Landscape. "As the majority of the project area is mapped as Critical Supporting Watershed it contributes significantly to watershed and water filtration," notes the grant application.[59]

The QCC project links together 80,000 acres of protected land including properties owned in fee by Massachusetts Fish and Wildlife, Massachusetts Department of Conservation and Recreation, the Quabbin Reservation, Harvard Forest, The Trustees of Reservations, Massachusetts Audubon, the Town of Petersham, and Mount Grace Land Conservation Trust. "Much of the project will directly assist with the perpetual protection of the Quabbin Reservoir, which provides drinking water for Metropolitan Boston," noted Mount Grace in the application.[60]

According to Leigh Youngblood, executive director of Mount Grace, the program was an effective means to increase the annual Forest Legacy award to the State of Massachusetts. Success was based on the project's design to connect the 20 parcels of land in a single nine-mile corridor through the towns of Athol, Barre, Petersham, and Phillipston. The project contributed to an interconnected network of 80,000 acres of protected habitat.[61]

During an interview about the project, Youngblood recounted that two smaller projects were turned down for funding, so Bob O'Connor suggested making it one large project as part of a Forest Legacy application.[62] The USDA Forest Legacy Program awards one project to each state that applies. Mr. O'Connor's objectives were to maximize the level of federal funding while at the same time achieving the landscape-scale conservation objectives that would slow further parcelization and development in the project area.

The project was a partnership involving private landowners, Mount Grace Land Conservation Trust, Harvard Forest, the Massachusetts Audubon Society, two towns, the Massachusetts Department of Conservation and Recreation, the Massachusetts Department of Fish and Game, and the United States Forest Service. Forest Legacy underwrites up to 75 percent of project costs and requires that at least one dollar for every three federal dollars be funded locally, according to a profile of the project published by the Land Trust Alliance.[63]

The project resulted in the expansion and increased connectivity of the existing conservation holdings of numerous public and private entities, and the existence of active land trusts with a capacity to manage the project was a key factor to its success, according to Youngblood.[64]

Youngblood noted that there were challenges, however, associated with shifting procedures and standards at the federal level. For example, Mount Grace project managers did not anticipate the modifications in the conservation restriction language that was eventually required by the federal (in Massachusetts the term "conservation restriction" is used in place of the term "conservation easement," which is often used in other states).

Costs eventually increased as a result of transactional delays, and a shortage of staff to manage document review and closings.

Youngblood noted that landowner-land trust relationships were in several cases compromised by delays and shifting deadlines, and promised bargain sales were lost due to delays and market fluctuation. There was interest among additional landowners, but the project capacity exceeded the level of funding.[65]

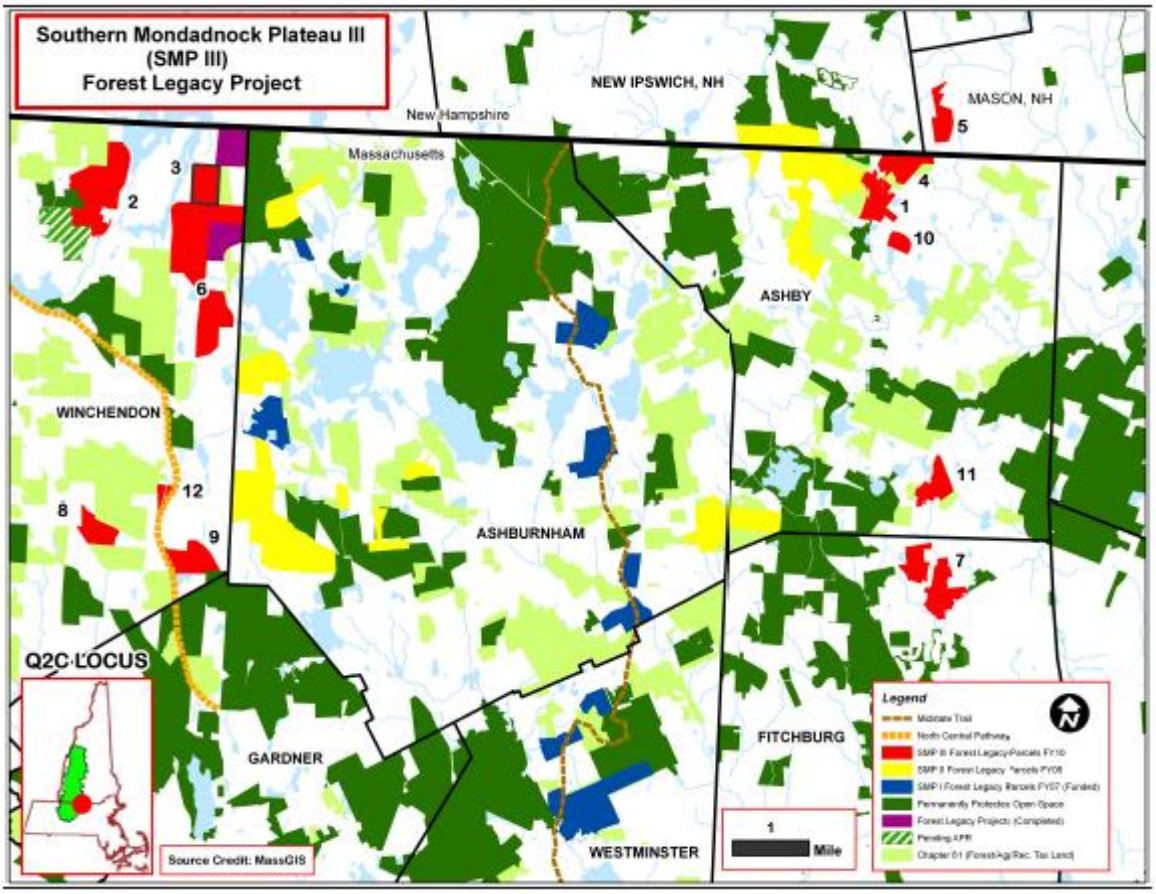
A major factor was that the projects were not selected in partnership with DCR, DFG, and towns, and no additional state agency staff was hired. Overall, the project was constrained by conflicting federal, state, and project precedent rules, noted Youngblood.[66]

The QCC advanced the concept of aggregation that had been built with the Tully Initiative and satisfied the objectives of many of the partners in the region, including land trusts, state agencies, landowners, and local institutions with property adjacent to the project area. By this point, however, the aggregation concept began revealing challenges and shortcomings which the project partners have been since worked to address.

To cite an example, the Forest Legacy Program does not finance stewardship, so the monitoring of the CR's has been identified as a challenge by the land trusts and state agencies. Mount Grace identified more landowners that would be interested in participating in the program if the funds were available, but the capacity to close deals and monitor the CRs has also proven to be a challenge.

4. Southern Monadnock Plateau

The DCR, North County Land Trust and the Ashburnham Conservation Trust (ACT) initiated the Southern Monadnock Plateau (SMP) project with a FY 2007 application to the United States Forest Service's Forest Legacy Program. They were assisted in the effort by the staff of the North Quabbin Regional Landscape Partnership (NQRLP). The project was broken up into three phases designed to conserve a total of 4,977 acres over 45 separate tracts of land. The total cost for all three phases is expected to be $14,470,000, for an average cost of $2,907 per acre.[67]



The first phase of the project was 1,267 acres of land over 19 tracts of land in the towns of Ashburnham and Westminster, Massachusetts. The project was funded by Forest Legacy in FY 2007 and was a partnership between the Department of Conservation and Recreation (DCR), Ashburnham Conservation Trust, North County Land Trust, and the towns of Ashburnham and Westminster.

Overall, the SMP project is a multi-year effort to protect a network of protected forestland linking more than 15,000 acres of state, municipal, and land trust properties in Massachusetts and New Hampshire by placing easements on ecologically important and productive forestland. According to a project brief, the area is under imminent threat of conversion due to increasing development pressure, yet 70 percent of the two town area still remains forested.[68] For example, one parcel that was originally part of this proposal went under agreement with a developer and, because the owners are nearing retirement age, is expected to be sold.

The project brief cites cuts of state funds for land acquisition over the last two years, and how the use of federal funds would make it possible to leverage state funds. Phase one leveraged gifts of four parcels totaling 135 acres from the Ashburnham Conservation Trust and two private landowners. Three additional owners contributed to the project through bargain sales. The total estimated value of gifts and bargain sales was $1,175,000. The landowners were familiar with a

"standard Massachusetts easement" and were "ready and willing to sell conservation easements at or below fair market value," according to the project brief.[69]

Finally, the project was approved by the DCR Lands Committee which authorizes staff to allocate time and state funds when available. DCR also agreed to assist with the due diligence and most of the CR's in Ashburnham. The Westminster and Ashburnham Conservation Commissions also supported the project and agreed to hold the CR's on the properties in their towns.

The second phase of the project involves 1,825 acres of land spread over 14 tracts of land in the towns of Ashburnham and Ashby, Massachusetts, and New Ipswich, New Hampshire. The project was funded by Forest Legacy in FY 2009 and was ranked fifth by the USDA Forest Service Forest Legacy Committee. SMP II builds on the FY 2007 Forest Legacy award to conserve working forests highlighted in the US Forest Service "Forests on the Edge" report as facing the highest threat of conversion due to increasing development pressures.[70]

According to a project brief, the conserved properties protect Drinking Water Supply Protection Areas for four municipalities and is in a US EPA Watershed Initiative Grant Area. Five tracts protect surface drinking water supplies for the cities of Gardner and Fitchburg and the towns of Ashburnham and Winchendon. In all, more than 34,000 residents depend on the surface water supplies protected by the forests in this project.[71]

The 2003 edition of Mass Audubon's "Losing Ground" report identified Ashby as part of the "sprawl frontier," an area west of Boston threatened with development of a high percentage of remaining buildable land.[72] In fact, eight of nine SMP II landowners were approached by developers to purchase land for conversion to residential housing. In addition, two unfunded FY 2007 tracts were not included in SMP II since they were "sold to new owners uninterested in forest conservation," according to the project brief.[73]

Unfunded tracts from the FY 2007 project were included in SMP II and future phases were envisioned if this phase was not fully funded since additional landowners expressed interest in participating in a future Forest Legacy application.

Two of the tracts in SMP II were 100 per cent cost-shared by the landowners who "wish to ensure the success of the project to conserve working forests in the region." In addition, five of the landowners committed to making bargain sales. The total estimated value of gifts and bargain sales of this project was $1,110,000.[74]

DCR, the North Quabbin Regional Landscape Partnership, and Nashua River Watershed Association provided due diligence cost sharing for all 14 tracts. Commitments were secured, allowing the conservation restrictions (CRs) to be held by DCR and the towns of Ashby and Ashburnham.

The third phase of the project, which was submitted to Forest Legacy for FY 2010 funding, was 1,885 acres of land over 12 tracts of land in Winchendon, Fitchburg, and Ashby, Massachusetts, and Mason, New Hampshire. SMP III involves eight landowners and conserves ground and

surface waters in four municipalities, with 445 acres in an EPA Targeted Watershed Initiative Grant area. The land protects ground and surface water for the towns of Ashby, Winchendon, and Mason, and the city of Fitchburg, and the four tracts in Ashby are within a territory designated by Massachusetts as an Outstanding Resource Water Area.[75]

In SMP III, four tracts have been in the same family and actively managed for forestry since the 1870s. Two additional tracts have been in the same family and actively managed for forestry since the 1960s, according to the project proposal. One of the tracts is owned by 85 and 94 year old landowners whose heirs are "interested in developing the property," according to the proposal, and 17 housing lots were sold and developed so 220 acres of the original 350 acre property remain.[76]

According to the proposal, all of the landowners are familiar with the Forest Legacy Program and reviewed the "2008 DCR Forest Legacy Conservation Restriction template." They were ready and willing to sell conservation easements at or below fair market value as soon as funds are available. Five of the eight landowners are taking bargain sales or donating land to help with cost-share in order to ensure the success of the project, and agreements are in place for the CRs to be held by the Town of Winchendon, Town of Ashby, or the City of Fitchburg.[77]

The SMP III funding proposal was submitted to Forest Legacy in Fall 2009. The North Quabbin Regional Landscape Partnership is expecting to receive notification by Summer 2010, according to a project update published in the newsletter of the Mount Grace Land Conservation Trust.

In an interview about the Southern Monadnock Plateau projects, NQRLP coordinator Jay Rasku indicated that the QCC program was used as a model in the development of the Southern Monadnock Plateau project, which was led by DCR.

He added that the bureaucracy of the Forest Legacy program was a challenge, along with the stewardship and monitoring of the parcels of land in the project which often fall on the towns which do not have experience with CRs.[78]

5. Western Massachusetts Aggregation Project

Building on the success of the aggregation initiatives developed by the Hull-Peck project, the Tully Initiative, the Quabbin Corridor Connection, and the Southern Monadnock Plateau, a group of land trusts have initiated a similar program in Western Massachusetts.

This project is a collaboration between seven land trusts in Massachusetts to purchase conservation restrictions on 12,600 acres owned by 77 individual landowners. The land trusts plan to negotiate options to purchase the CRs at 75 percent of the appraised value of the properties.[79]

The properties were selected based upon each land trust's conservation priorities and in support of the broader vision articulated by the Harvard Forest's Wildlands and Woodlands Vision for the Forests of Massachusetts.

As of June 2010, the project partners include the East Quabbin Land Trust, Mount Grace Land Conservation Trust, Franklin Land Trust, Kestrel Trust, Berkshire Natural Resources Council, New England Forestry Foundation, and Monterey Preservation Land Trust.[80]

Fifty-one of the parcels are located within NHESP Living Waters critical supporting watersheds, and the total project area protects nearly 30 miles of waterfront along ponds, rivers, and streams in Western Massachusetts. "The addition of the aggregation project land significantly increases forest stewardship land in the major watershed regions of Western Massachusetts," according to a 2009 project description.[81]

This includes a more than 60 percent increase in the Bashbish Watershed in the southwest corner of the state, a roughly 17 percent increase in the Deerfield and Farmington River watersheds, and a five percent increase in the Millers River watershed in Franklin County.[82]

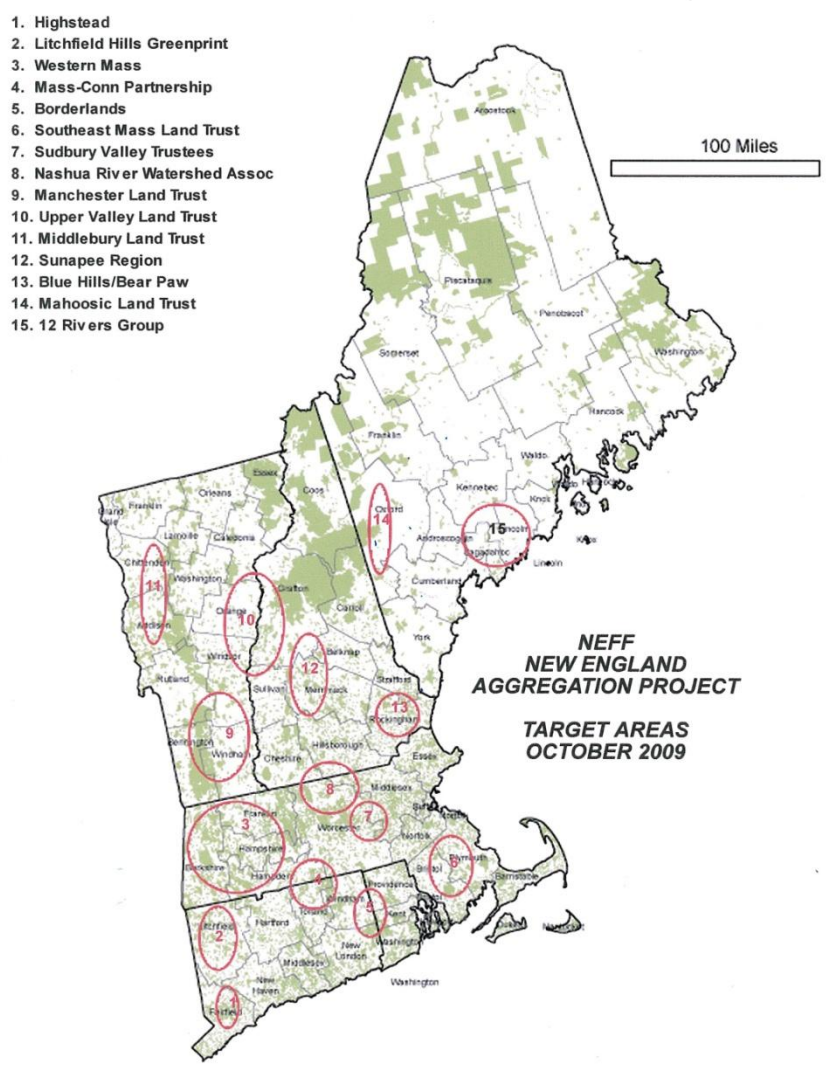
The goal is to secure funding commitments by December 2010 payable over a three-year period to purchase all 77 conservation restrictions, and to utilize bridge financing to close on selected parcels prior to receipt of committed funds. To date, $7.4 million of the $21.2 million necessary to complete this project has been raised by the individual land trusts and the landowners through their 25 percent donation of the CR value. Therefore, the average price to acquire the CR's for the project is $1,683 per acre.[83]

In order to avoid conflicts of interest among the various land trusts, the New England Forestry Foundation is acting as a Conservation Intermediary in this program. In this role, NEFF will be the primary applicant for funding to purchase the CRs and establish a monitoring fund with the Community Foundation of Western Massachusetts.[84] The use of a Conservation Intermediary will allow the land trusts to pursue funding from the same sources and avoid conflicts and competition for resources.

Overall, this aggregation project is expected to increase the pace of conservation by creating economies of scale for costs associated with initial negotiations, appraisals, and due diligence, according to an April 13, 2009 project summary.[85] As individual projects, they are not significant in scale to attract the necessary funding, so aggregating the properties will allow the program to appeal to larger funding sources that are interested in landscape-scale conservation.

6. Potential Aggregation Projects Areas in New England

Building on the success of previous aggregation programs and the current program in Western Massachusetts, NEFF is planning a New England-wide Aggregation Project that will protect 80,000 to 120,000 acres of forest in six New England states, according to an April 13, 2009 project summary.[86]



A map has already been produced which identifies 15 potential sites where properties can be aggregated to achieve landscape-scale conservation. NEFF is planning to seek funding from national foundations, private philanthropists, federal programs designed to combat global warming, and state and local programs, in order to secure funding for the entire program.

The project summary estimated that the total funding necessary for this program would be in the range of $48 to $72 million, assuming an average cost of $600 per acre for CR acquisition, monitoring funds, and due-diligence costs. Private philanthropy from foundations and individuals could serve as bridge financing to meet the time requirements of landowners unable to wait for public funding, according to the project summary.[87]

NEFF identified several key program objectives, which include developing a New England-wide system of cooperation among land trusts to coordinate funding for the permanent conservation of private forest lands, developing a path to sustained funding of forest conservation through climate-change legislation at both the federal and state levels, and demonstrating a replicable model for conservation through cooperation that other regions of the country can utilize.[88]

APPENDIX 2:
A REVIEW OF COMPENSATORY MITIGATION PRACTICES RELEVANT TO MASSACHUSETTS FORESTS

1. Introduction

As noted in the main body of this paper, mitigation as it relates to natural resources is the practice of addressing the potential or actual environmental "impacts" of a particular human activity or development. Such impacts can be addressed by implementing a program to avoid such impacts, to minimize such impacts, or to provide new or substitute resources (that is, provide compensatory mitigation) for unavoidable impacts. For example, the National Environmental Policy Act of 1972, one of the pieces of foundational legislation for the environmental practice and regulation in the United States, instructs project developers to first avoid, second minimize, and third provide compensatory mitigation for environmental impacts.

In a more narrow sense, the word "mitigation" is today used by environmental regulators and practitioners to refer to the third step in this process – the provision of compensatory mitigation, creating new or substitute resources that compensate for unavoidable environmental impacts.

Compensatory mitigation regulations have been used to regulate the use of a wide variety of natural resources and ecosystem services, including but are not limited to, wetlands, biodiversity habitat, water quality and quantity, carbon stored in forests and soils, and outdoor recreational resources.[89] The earliest and most extensive use of compensatory mitigation regulation, at the federal level, has been wetlands mitigation, as discussed below.

2. Compensatory Mitigation for Wetlands and Other Ecosystem Services

2.1: Origins: The Evolution of Wetlands Mitigation Procedures

The national wetland compensatory mitigation program was the first of its kind in the United States. Section 404 of the Clean Water Act of 1972 specifies that any source which discharges into a body of water in the United States must have a permit to do so.[90] When applying for such a permit, a developer must show that he or she has avoided and minimized impacts on wetlands to the greatest extent possible, and only after that can the developer consider mitigating for the remaining unavoidable damages.

In cases requiring compensatory mitigation throughout the 1970s and 80s, the government required on-site mitigation to replace destroyed wetlands.[91] Any development impacting a wetland needed to be mitigated either through the creation, restoration, enhancement, or preservation of a local wetland. This policy was met with only marginal successes, and it became clear that other action was needed in order to protect wetlands.

In 1989, President George H.W. Bush made a commitment to achieve a "no net loss" of wetlands. With new legislation enacted by Congress, he directed federal agencies began to act on this commitment.[92] Under new regulations, three methods were approved for the provision of compensatory mitigation for wetland damage: permittee-responsible mitigation, fee-in-lieu mitigation, and mitigation banking.

Permittee-responsible mitigation is when the developer or contractor is responsible for the creation and care of the wetland mitigation. This is the original type of compensatory mitigation, and is the now the least preferred by the Army Corps of Engineers, because permittee-responsible wetland mitigation is often poorly managed[93] and often does not produce the intended results.

Fee-in-lieu mitigation is when the developer or contractor pays a government or not-for-profit agency to create and care for the wetland mitigation, usually at an off-site location, separate from the area in which a wetland associated with a development is compromised or destroyed.

Mitigation banking, in contrast, typically involves a third-party for-profit company, called a mitigation bank, that buys land, and either creates, enhances, or restores a wetland so that the property meets wetland mitigation criteria established by a relevant regulatory agency (for example, the U.S. Army Corps of Engineers). The third-party mitigation banker then sells credits associated with the wetland it has created, enhanced or restored to a developer or contractor who needs such credits to offset the impact of a particular development.

In the past couple of decades, a number of states have created their own legislation to adapt the federal wetlands standards to local conditions. Florida, for example, having some of the country's most extensive and productive wetlands, has established a methodology, called the Uniform Mitigation Assessment Methodology (UMAM), for determining how much compensatory mitigation is required for a given project. UMAM allows regulators to evaluate the value of any compensatory project, and assesses the qualifications of the proposed mitigation provider.

Florida also allows public-sector organizations to operate mitigation projects, called Regional Offsite Mitigation Areas, or ROMAs. As explained on the Florida Department of Environmental Management's website, ROMAs "are environmental enhancement projects conducted by the department, a water management district, or a local government that serve as mitigation for multiple impact projects. Impact permit applicants pay money to the ROMA sponsor, and the collected funds are used toward the implementation of the larger mitigation project. ROMAs that serve as mitigation for more than five permits or thirty-five acres of impact are operated under a memorandum of agreement (MOA), similar to a mitigation bank permit."[94]

The state of Oregon also has a comprehensive wetlands mitigation program that specifies for developers the mitigation ratios to be use in a given situation, depending on whether a developer is restoring, creating, or preserving wetlands.[95] In a brief evaluation of its mitigation program, the Oregon Department of State Lands noted that as of 2001, most of the compensatory mitigation projects that had been completed did not entirely meet the state standards. This has resulted in a slight net loss of wetland acreage.[96]

The issue of underperformance has been noticed on the national level as well. In 2001, the National Academy of Sciences (NAS) provided a thorough analysis of the state of the country's wetlands mitigation programs. The primary conclusion in the report was that the no net loss goal was, despite progress, not being met.

In response to such critiques of the nations no net loss programs, the US Army Corps of Engineers and the US Environmental Protection Agency (US EPA) in 2008 revamped the federal compensatory mitigation program to make its requirements clearer and more specific, so that a no net loss goal could be more effectively achieved and monitored. A factsheet released by the EPA and the Corps explains that it did so by "creating a flexible preference for the use of mitigation bank credits to satisfy requirements for wetlands compensatory mitigation."[97]

2.2. Wetland Mitigation Banking

Over the past several decades, the growth of wetland mitigation banking has been dramatic. The rapid increase in the use of mitigation banks was stimulated when, in November 1995, the US EPA published in the Federal Register a key document entitled "Federal Guidance for the establishment, use, and operation of mitigation banks."[98] In further elaborating its guidance later in the 1990s, the EPA defined a mitigation bank as, "a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or (in certain circumstances) preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation."[99] Various guidance documents envisioned that, while typically operated by a private-sector organization, mitigation banks could be established by the government, a nonprofit or a for-profit organization which creates revenue from selling the wetland credits of the bank to developers who need to offset for damages.

By 2006, mitigation banks existed in 31 states, and 77.2 percent of the banks were managed by for profit organizations.[100] Mitigation banks are intended to save developers permit time, and to ensure that the conserved areas will continue to thrive under the management of people with a level of expertise in the field. According to the National Mitigation Banking Association, "there are hundreds, if not thousands, of wetlands mitigation banks currently operated across the United States."[101] Conservation banks are now being used to help restore other kinds of natural resources as well. Their growing popularity reflects the fact that mitigation banking is more cost effective as a means of restoring natural resources, can reduce delays in permitting, and can help to assure maintenance of these vital natural areas in perpetuity.

In 2004, the Society of Wetland Scientists published a paper offering a favorable evaluation of wetland mitigation banking. In the report, the authors underscored an additional benefit of wetland mitigation banks; namely, that "advanced mitigation allows wetland functions to be established in the watershed before they are lost; there is no net loss of wetland function in time or in space," due to the fact that wetland mitigation banks must meet a set of standards and be largely approved before credits can be sold.[102]

As noted above, many states have established wetland mitigation banking as a legitimate, and often preferred, form of compensatory mitigation. States such as Florida have a well-established mitigation banking market, with many different private companies as well as several local governments that offer a variety of banking options to their consumers. The Florida Department

of Environmental Protection (FDEP) lists some three dozen mitigation bank providers around the state.[103]

Recently, Massachusetts attempted, unsuccessfully, to begin using mitigation banks for wetland protection. In 2004, Governor Mitt Romney authorized the creation of a pilot wetland mitigation bank in the Taunton River Watershed. BlueWave Strategies, LLC, an environmental consulting firm, assisted the Executive Office of Energy and Environmental Affairs (EOEEA) with the creation of the bank. The bank would have created credits largely for government projects such as roads and other types of infrastructure.

Following the authorization of the Taunton mitigation bank, a Mitigation Banking Review Team (MBRT) was formed to include scientists, public officials, residents, and environmental advocates. After much deliberation, the MBRT chose a specific site for the bank in the Burrage Pond Wildlife Management Area because of its habitat diversity and potential for productivity.[104] The wetland proposed to be created for the bank was estimated to be large enough to provide mitigation for all expected needs throughout the Taunton River Watershed area for several years. By the end of 2006 and in early 2007, a public notification was released describing the mitigation bank and tracing the next steps towards completing the bank. Because this would have been the pilot banking program for the state and only the second wetlands mitigation bank in New England, the bank was intended to be managed as a public sector entity that would direct any profits it earned to the Department of Fisheries and Wildlife.[105] Unfortunately for the designers of the bank, statewide environmental organizations such as Massachusetts Audubon, as well as other local organizations, strongly opposed the mitigation banking idea. They argued that several towns in the Taunton River Watershed would lose all of their wetlands if wetlands mitigation banking protocols were used.

According to Eric Las of Beals and Thomas, Inc., a company which worked on the planning and development of the bank, any wetlands loss in any way associated with the mitigation bank in the Taunton River Watershed would have been appropriately compensated for. The bank would have most likely offered mitigation credits only for specific state projects and wetlands rule violators.[106] There was a public perception, however, that the presence of the wetland mitigation bank would allow for developers to fill in wetlands around the Taunton River without going through the normal permitting process, so long as they gave money to the bank.

According to Las, what most of the public did not understand is that the presence of a bank does not change the wetlands regulations. "Avoid, reduce and then mitigate" rules remain in place. The presence of a mitigation bank simply streamlines the compensatory mitigation process so that offsets are performed more quickly and in a more controlled environment. Moreover, according to Mr. Las, a large area of wetland created and managed by a wetlands mitigation bank is like to be ecologically productive than would be a number of small wetlands created under older mitigation procedures.

The 2008 update of the federal wetlands regulations by the US Army Corps of Engineers may offer some hope to those who hope to create wetlands mitigation banks in Massachusetts. As previously mentioned, the revision makes wetland mitigation banking a favored option for situations in which wetlands mitigation is required by federal law.

2.3 Conservation Mitigation Banks

While wetlands mitigation banks may be the best known example of mitigation banking, mitigation banks also exist to protect wildlife and wildlife habitat in what are called conservation banks or biodiversity mitigation banks. Rather than protecting a landscape feature that provides a variety of ecosystem services, "conservation banking is…where adverse impacts to endangered, threatened or other protected species are offset at a conservation bank where the credits represent individuals or habitat." [107] As with the Clean Water Act Section 404, the federal Endangered Species Act (the ESA, originally enacted in 1973) provides that before an endangered, threatened, or candidate species' habitat can be damaged, the developer must prove that all damage has been avoided and minimized to the greatest extent possible. Only then can offsetting mitigation banking efforts be considered.[108]

An interesting point to note about biodiversity conservation banking is that it changes the incentive system for the ESA in a much more powerful way than does wetlands mitigation banking for the Clean Water Act. Prior to the emergence of biodiversity banks, many landowners who found threatened or endangered species on their property followed the "shoot, shovel, and shut up" method, essentially covering up the presence of a threatened or endangered species to avoid an enforcement action. The emergence of conservation banks effectively offers landowners the opportunity to make the presence of an endangered species on their property a potential revenue stream (as part of a conservation bank), rather than having that species presence become a potential economic burden.

The concept of conservation banking was first put into practice in 1992 in California with the creation of the Coles Levee Ecosystem Preserve (CLEP), located about 20 miles southwest of Bakersfield. While it was not officially called a conservation bank, CLEP acted as such by providing credits for various species. It is now is one of the largest conservation banks in California.

The first official conservation bank in California was the Carlsbad Highlands Conservation Bank, established in 1995. The bank opening coincided with the passage in April 1995 of California's first conservation bank legislation. The Carlsbad Highlands property on which the Conservation Bank was located was owned by Bank of America (BoA), which came to own the site as part of a loan foreclosure. A listed threatened species, the coastal California gnatcatcher, lived on this land, which effectively barred any development from occurring there. Given this state of affairs, Bank of America decided that it would pursue an innovative strategy.[109] Rather than fight the EPA, the bank decided to become a stakeholder in the development of the San Diego Multiple Species Conservation Plan, a expansive conservation effort that eventually included the creation and use of the Carlsbad Highlands Conservation Bank on the land owned by BoA.

In 1999, federal guidance regarding Conservation Banking appeared, as the United States Fish and Wildlife Service (USFWS) issued a document entitled "Method for determining the number of available vernal pool preservation credits in ESA conservation banks in the California Central Valley."[110]

Then, in 2003 the USFWS released "Guidance for the Establishment, Use, and Operation of Conservation Banks," setting out federal rules and regulations or conservation banking. In this document, the Service notes that unlike wetland mitigation banking, the preservation of existing habitat is just as valuable as restoration or creation of new habitat: "an appropriate function of conservation banks is the preservation of existing habitat with long-term conservation value to mitigate loss of other isolated and fragmented habitat that has no long-term value to the species."[111]

The USFWS report mentions that conservation banks can and should be helpful in reducing habitat fragmentation, which is a leading cause of species decline. Beyond gaining profits from selling banking credits and possible tax breaks, the Fish and Wildlife Service notes that landowners could gain revenue by allowing public access for certain activities (hiking, bird-watching, grazing, and the like), providing the activities to not compromise the purposes for which the bank was created.[112] While conservation banking is not as widespread across the country as wetlands mitigation banking, it too has proven itself to be an expedient and efficient way to offset for destruction of endangered, threatened, or candidate species' habitats. From its modest start in California, there are over 70 active conservation banks across the nation as of 2009.[113]

In August of 2009, The Nature Conservancy and the Environmental Law Institute published a highly-regarded study of biodiversity-oriented mitigation programs in the United States entitled *The Next Generation of Mitigation: Linking Current and Future Mitigation Programs with State Wildlife Action Plans and Other State and Regional Plans.* [114] The report's authors recommend that "a more comprehensive approach to mitigation is needed to sustain systems of interconnected, resilient, natural habitats," and make recommend three fundamental changes in approach:

1. **Ensure consistent and rigorous application of the mitigation protocol** (avoid, minimize, compensate) for addressing impacts to wildlife habitat under existing, expanded, and future regulatory programs. We stress… the primary importance of the avoidance and minimization elements of the protocol.

2. **Use State Wildlife Action Plans, other federally recognized conservation plans (such as Coastal Zone Management Plans, Forestry Plans, and Endangered Species Recovery Plans), and regional plans as the framework for a more comprehensive approach to making the "avoid, minimize, compensate" decisions required by the protocol.** Use of this planning context will lead to decisions that provide stronger and more resilient protection for whole watersheds and other natural systems for their multiple benefits.

3. **Give priority in the investment of compensatory funds to projects and activities identified by State Wildlife Action Plans and other plans that are sufficient in scale and strategic in their location to support the long term health of whole ecosystems.** Further benefits can be achieved by anticipating

> compensation needs and accomplishing "advance mitigation" when the opportunities for larger ecosystem benefits still exist.[115]

The recommended changes appear to have been considered in the design of a new effort called the Enhanced Mitigation Program (EMP), a collaborative effort of the Massachusetts Chapter of The Nature Conservancy (TNC), the Massachusetts Division of Fisheries and Wildlife (MassWildlife) and the Massachusetts Natural Heritage and Endangered Species Program (NHESP).

Similar to other mitigation programs, the EMP is part of an environmental management permitting system that follows the "avoid, minimize, and mitigate" protocol. Following a determination by the NHESP regarding whether or not mitigation is required for a particular development project, the potential developer decides how to proceed. If compensatory mitigation is required, it can be accomplished through on-site mitigation, through off-site mitigation, or through the payment of mitigation funds and a fee into the EMP. If the EMP option is used, the permittee can proceed with its project once it has provided the EMP with the specified funds. Using those funds, TNC can then proceed to complete the acquisition of suitable conservation land, and then report back to MassWildlife regarding its mitigation efforts.

The principal focus of the Massachusetts EMP in 2009 and 2010 has been the conservation of box turtle habitat (box turtles living in Southeastern Massachusetts and the state's portion of the Connecticut River Valley being the single species most impacted by developments that are required to go through the state environmental permitting process). The first project which was provided with funds by the EMP program was the January 2010 acquisition of a parcel of property along Black Brook in Middleborough, a town in Southeastern Massachusetts. The Environmental Management Program provided $300,000 of the $885,000 purchase price to acquire 89 acres of conservation land that complements a larger contiguous area of conservation land that spans several hundred acres. Additional funds for the acquisition were provided by the Massachusetts Department of Environmental Protection, local municipalities, and by private donors.

Importantly, the project appears to meet each of the three principal recommendations made in August 2009 report by The Nature Conservancy and the Environmental Law Institute: it helped to ensure the appropriate application of the avoid, minimize and mitigate protocol; it assisted in the acquisition of a parcel identified as a high priority through state wildlife planning processes; and it assisted in the acquisition of a parcel that is adjacent to other critical conservation lands, helping to build a corridor of conservation lands sufficient in scale and located strategically so as to support the long term health of whole ecosystems.

2.4 Fish Banks

Like conservation and wetlands mitigation banking, fish banks are a relatively new concept, but are quickly grabbing national attention. They "involve listed fish species and their habitats" and can fall under both the Clean Water Act and the Endangered Species Act guidelines.[116] The US Army Corps of Engineers, which is in charge of many aspects of the CWA and has already established two fish banks, states that, "[wetlands] mitigation banks should focus on watershed function such as special status species habitat."[117] Moreover, the Endangered Species Act states

that banking can often lead to larger more connective habitats for listed species, and is preferable when onsite conservation measures are not an option.[118] Although fish banks can be effective in improving the health of a fish population, fish banks have been slower to catch on because many agencies believe it is more costly to invest in a fish bank than to self-mitigate, especially in larger projects. They are, however, attracting attention from the state of Oregon, which has started to use fish banks to mitigate for work from the Oregon Department of Transportation.[119]

2.5 Water Quality Trading

The idea of mitigation banking has proliferated to other sectors of natural resource protection, including that of fresh water quality protection. According to the EPA, water quality trading "involves a party facing relatively high pollutant reduction costs compensating another party to achieve less costly pollutant reduction with the same or greater water quality benefit."[120] While the EPA does not refer to water quality trading efforts as "mitigation banking," the concept of water quality trading is very similar to that of wetlands mitigation banking -- the party receiving compensation for having pollution levels lower than what is required is providing the party with more than the allowed level of pollution a service which is, in practice, very similar to the service provided by a wetlands mitigation banker to a developer that is required to mitigate for activities that have the potential to degrade a wetland.

In 2003, the US EPA Office of Water released a Water Quality Trading Policy, following up on issues raised in two earlier (1996) EPA studies on "Effluent Trading in Watershed Policy" and "Draft Framework for Watershed-Based Trading."[121] Even more recently, the federal government has started taking more aggressive steps towards establishing water quality trading markets in the United States. In 2008, the EPA gave out a $3.7 million grant to support various water quality trading projects, research organizations and institutes (including university programs) along the Mississippi River basin. Most of the grantees research individual areas of the Mississippi River Basin and the rivers that feed it to establish whether a water pollution trading program would be appropriate.

Freshwater scarcity is a growing problem both nationally and internationally. Countries like Australia already have sophisticated water quality trading systems in place.[122] With changes in rainfall patterns and increasing average ground temperatures -- problems that are growing more severe with the advent of global climate change – water quality trading systems may well become more prevalent in the United States and around the world.

Section 3: Compensatory Mitigation for Forests

Just as the federal government and various states have been developing compensatory mitigation frameworks for wetlands, biodiversity and water, they are now beginning to consider and implement similar frameworks for forests and forest cover. These programs differ quite significantly from each other. Nevertheless, they often share similar objectives.

Among the several forest mitigation programs that exist, there are two general types: those that compensate for the loss of forest acreage (or forest cover), and those that compensate for the loss of forest carbon stocks. Both types are briefly reviewed here.

3.1 New Jersey's Early Effort to Mitigate for Forestland Loss

New Jersey has an acreage-based mitigation program that applies only to state funded construction projects. The policy was first instituted in 1993, but was relatively lax and very much underfunded until it was revised in 2001. With its current law, New Jersey has taken active steps to ensure that, for state projects, there is virtually no net loss of forest cover. Their law states that, "New Jersey state entities are required to replant trees when trees are removed during development projects involving one-half acre or more."[123] The reforestation is onsite if at all possible, but there are also off-site and fee-in-lieu options. For off-site project, the state Forestry Service can pay a municipality to replant the trees within two years of the initial tree removal that made way for a state construction project.

For the purposes of this law, New Jersey measures its forests in acres of canopy. The state defines a forested area as having an average of approximately 204 trees of at least 2 inches to 2.5 inches caliper diameter per acre. When a half acre or more forest is impacted by a state construction project, the responsible agency is generally required to mitigate for that loss by planting new trees at the required density of trees per acre.[124] New Jersey also takes into account tree type and age and soil type in specifying replanting requirements. Furthermore, the state also requires attention to the survival of the replanted trees. If the Forest Service deems that the reforested area does not have a high enough survival rate, the state entity responsible can be required to repair the situation, possibly repeating the reforestation process.[125]

While New Jersey's program has set a high bar for its state projects, it is limited by its narrow scope. The No Net Loss program only applies to state projects such as highways or county colleges, so projects funded by private developers or municipalities do not have to offset their damage to forests. Moreover, there is no option to achieve mitigation by putting easements on existing older-growth forests that might provide more suitable wildlife habitat or capacity for carbon sequestration.

3.2 Maryland: Forest Mitigation Across the State

Maryland also has a no net loss forest mitigation program, first established in 2001 as an amendment to Maryland's 1992 Forest Conservation Act (FCA). The no net loss program established in 2001 applied to any project larger than 40,000 square feet. It allowed contractors to mitigate existing forest or replant trees at a ratio that depended on the location of the new construction.

In 2007, the Department of Forestry performed a 15 year review of the 1992 Forest Conservation Act. The review tracked acres of forest cleared, protected, and planted in each of Maryland's two dozen counties. It found that: "During the first fifteen years of implementation FCA has been responsible for the review of 199,925 acres of forest on projects scheduled for development. Of those, 120,638 acres were retained, 71,885 acres were cleared and 21,461 acres were planted with new forest. In other words, at least twice as many acres were protected or planted as were cleared."[126] Said differently, however, there was a net loss of more than 50,000 acres of forest cover in Maryland over the period. As forward thinking as the 2001 amendment may have been at the time it was created, many lawmakers in Maryland knew that forests were still disappearing, and that the legislation needed to be strengthened.

At the end of 2008, Maryland set up a task force made up of "foresters, conservationists, landowners, local political leaders and planners, business owners, Maryland Department of Natural Resources (DNR) staff and scientists" to determine the most effective way for Maryland to implement a "no net loss" of forests policy.[127] The purpose of the task force, according to Marian Honeczy of the Forest Service within the DNR, was to figure out exactly what the term "no net loss" was to mean for Maryland. Would it be better to count forest cover state wide or by region? Also, what is the ideal amount of forest cover for Maryland, and how is forest cover to be counted? While not answering each of these questions as precisely as the Forest Service had hoped, the task force did notice many problems in the FCA, and recommended that the DNR close loopholes in the law, increase applicability of the FCA, and "increase fee-in-lieu minimums and options for mitigation banking locally and regionally".[128]

The task force also recommended that Maryland enact a Sustainable Forestry Act which would monitor forest use for future generations and take ecological, social, and economic factors into consideration. Finally the Task Force recommended continued support for existing programs such as Marylanders Grow Trees, as well as the creation of landowner incentives promoting conservation, including the establishment of ecosystem markets, easement programs, and technical assistance programs.[129]

In April 2009, a Sustainable Forestry Act similar to the one that the task force had recommended was passed by the legislature and signed into law. The new law, which became effective on October 1, 2009, replaced Maryland's Forestry Advisory Commission with the Sustainable Forestry Council at the DNR. It also set a goal for the protection in perpetuity of 2.6 million acres of forested land in Maryland.

The new law gave Maryland's no net loss of forests program a boost. The updated act requires a larger fee-in-lieu cost per square foot (from ten cents to thirty cents), and lowered the threshold of *some* projects that fall under FCA jurisdiction to 20,000 square feet from the previous 40,000 square feet.

Moreover, in the context of the new law, a new type of forest mitigation banks is being created in Maryland. In February 2009, for example, the City of Bowie received a proposal to establish a nearly 1 acre bank called the Gallant Fox Lane Forest Mitigation Bank. The bank is mitigating for an ongoing utility project, with the utility project contractor paying the mitigation costs.[130] Several other small forest mitigation banks are being created in Maryland.

The development of Maryland's forest mitigation project may continue in the near future. Reportedly, a new task force may be organized in order to achieve a more concrete vision for the future of Maryland's forests and the No Net Loss of Forest program.

3.3 California: No Net Loss of Carbon in Forests

With its long-standing history of activism in curbing air pollution, the state of California is pioneering a new policy area, developing forest mitigation requirements to offset carbon dioxide emissions and other greenhouse gases (GHGs). There are several pieces of legislation that are relevant to this effort, including: the state Global Warming Solutions Act of 2006 (AB 32); the legislation that directs the activities of the California Air Resources Board (CARB); and the

California Environmental Quality Act (CEQA). CEQA gives authority to the Board of Forestry and Fire Protection to create an avoidance or mitigation of forest carbon loss through land conversion, if the Board deems it necessary; likewise, CARB has the ability to require mitigation in certain circumstances.[131]

The Pacific Forest Trust (PFT), a San Francisco-based conservation organization, has proposed that the forest sector be considered as an integral part of the carbon cap-and-trade program being designed as part of the implementation of AB 32. "Integrating the forest sector into the cap system will help offset emissions from other net emitting sectors, meet AB 32's overall GHG target goals with a broader base of actions across more economic sectors, and facilitate earlier reductions."[132]

Recently, CARB has responded to requests like that of the Pacific Forest Trust to look into the impact of forest emission and sequestration abilities. Currently, California's forests sequester a net 5 million metric tons of carbon dioxide (or equivalent) (MMCO2E), but the forest sector still emits a significant amount of carbon dioxide from permanent land use conversion, wildfires and other sources. CARB has set a Sustainable Forest Target of maintaining or increasing this net sequestration level through 2020 though "sustainable management practices, including reducing the risk of catastrophic wildfire, and the avoidance or mitigation of land-use changes that reduce carbon storage."[133] In their "Sector Review and Emission Reduction Strategies" Report, CARB notes, "tools available to prevent or mitigate conversion include land use planning, conservation easements, and mitigation banking," [134] a sign that California would be in favor of using many of the tools described in previous sections of this paper.

To get a more accurate idea of what a mandatory forest carbon mitigation policy would do for California, PFT performed a cost-benefit analysis of its proposed policy suggestions. The major costs of a forest mitigation policy would be borne by developers and landowners who would be paying for credits either by paying the state or a mitigation bank. By using European Climate Exchange prices, the PFT estimated that between 2008 and 2050, a program like this would generate more than $6 billion dollars in payments either to the state of California or to forest mitigation banks.

California's policy would not necessarily prevent timber harvesting or other forestry practices that result in some loss of carbon stocks. This is because many of the forests in California are still growing and are therefore still increasing their ability to store and sequester carbon.

It is important to remember that legislation such as that proposed by PFT, if passed, would be a part of the Global Warming Solutions Act, rather than part of California's forestry act. It would have the primary goal of reducing GHGs, as opposed to the legislation passed in Maryland, which is more focused on maintaining or increasing forest acreage for soil retention or wildlife habitat.

Section 4: Massachusetts and Forest Mitigation

4.1: The Massachusetts Global Warming Solutions Act

In 2007, the Massachusetts legislature passed a Global Warming Solutions Act (GWSA), which created the Climate Protection and Green Economy Act (Chapter 21N of the General Laws), setting for Massachusetts the required goal of reducing GHG emissions to 80 percent below 1990 levels by the year 2050. A shorter term goal has been set of reducing emissions 10-25 percent below 1990 levels by 2020, with an exact goal to be set by January 1, 2011. [135] The Massachusetts Department of Environmental Protection (DEP) was put in charge of setting the 1990 baseline levels as well as predicting a 2020 "Business As Usual" (BAU) projection. In the report, published July of 2009, the DEP takes a first step towards regulating GHG's in Massachusetts by setting the baseline and discussing how the department went about measuring the BAU projections.

However, the report does not include the forest sector as a carbon dioxide emitter in its 1990 baseline or 2020 BAU projection. Without including emissions from the forest sector (e.g., the carbon dioxide released upon permanent land conversion and the loss of sequestration capacity from tree destruction) the estimates of the baseline and BAU projections do not account for a key contributor to GHG emissions in the state. When responding to the comments made by readers of the document concerning this issue, Mass DEP stated, "The Department appreciates that sequestration and land use change are areas of emerging knowledge and data reporting and looks forward to further input on the methodology between now and 2011."[136] Perhaps, by 2011, the Department will have acquired a better data set so as to be able to include the forest and biomass sector in its emissions goal.

Given that it is highly unlikely that any federal carbon emissions limit will be set in 2010 in the United States, it is unclear at this time what direction Massachusetts will take to limit forest-related carbon emissions or encourage additional carbon sequestration as part of the implementation plan for the Massachusetts Global Warming Solutions Act. Even without federal legislation, however, there are several options for bringing the forestry sector into the implementation plan for the Massachusetts Global Warming Solutions Act.

One possibility is for Massachusetts to join the member U.S. states and Canadian provinces of the Western Climate Initiative (WCI) in their current regional push to regulate carbon emissions. WCI's efforts have gathered momentum in the past year – as noted on July 27, 2010 in a WCI update: "the Partner jurisdictions of the Western Climate Initiative (WCI) released a comprehensive strategy designed to reduce climate-warming greenhouse gas emissions (GHG), stimulate development of clean-energy technologies, create green jobs, increase energy security and independence, and protect public health." [137] The WCI partner jurisdictions, which include seven U.S. states and four Canadian Provinces, will be working "between [July 2010] and the planned program start date of January 2012, [to] address remaining program design issues and take the steps necessary to make regional trading operational. In addition, they will expand their efforts to develop and implement other core policies and programs to increase energy efficiency and fuel diversification in order to reduce GHG emissions."[138]

The role that forest-related offsets will play in the WCI is as yet unsettled. Earlier reports, such as that made by Environment Northeast in October 2008, sound an encouraging note, reporting that "offsets may be used [in proposed WCI rules] to achieve 49% of emission reductions… WCI will allow for a significant quantity of 'real, surplus/additional, verifiable and permanent' offsets to be developed in the following sectors: agriculture (soil sequestration and manure management); forestry (afforestation/reforestation, forest management, forest preservation/ conservation, forest products); and waste management (landfill gas and wastewater management)."[139]

Like federal cap-and-trade related initiatives, the shape and scope of the WCI are still in flux. As of this writing, Meg Whitman, the 2010 Republican candidate for the office of Governor of California proposes to pull that state out of the WCI process. If Whitman were to have her way, that would be a heavy blow to the initiative.

Another possibility is for Massachusetts to expand its offerings of technical support to assist landowners to pursue voluntary mechanisms, such as the carbon markets supported by the Chicago Climate Exchange. The Massachusetts Farm Bureau Federation piloted an early effort along these lines with the support of the Massachusetts Department of Conservation and Recreation. Called the Pilot Forest Carbon Offset and Trading Program, the effort was designed to "enable interested forest landowners to earn revenue through the sale of greenhouse gas emissions credits from carbon sequestered on forested lands that are managed as working forests. Managed forests sequester carbon faster than un-managed forests and this additional carbon sequestration has monetary value, in the form of carbon credits. The credits will be aggregated by CarbonTree, LLC and sold on the Chicago Climate Exchange (CCX) or another approved climate or carbon exchange with the proceeds going to the landowners. The goal of this program is to encourage landowners to commit to manage their forests sustainably via the incentives of payment for the carbon their managed forests sequester."[140]

Yet another path, consistent with the mitigation strategies explored in this paper, would be to require owners of forestland to avoid, minimize or provide compensatory mitigation for any loss of forest cover for each acre, or fraction of an acre, that they disturb, similar to the way that forest cover loss is regulated in Maryland or New Jersey.

4.2: The Massachusetts Wetlands Protection and the Massachusetts Environmental Policy Act

The Massachusetts Wetlands Protection Act is the legislation that guides the wetlands permitting process. The law states that anyone who wishes to dredge or fill a wetland must apply for a permit from the local Conservation Commission, a group of 5-7 appointed volunteers in each of the Commonwealth's cities and towns.[141] Conservation Commissions generally have the power to hold up or deny a permit application if the developer does not show in the course of public hearings that he or she has adequately avoided, minimized or provided compensatory mitigation for the project's potential impacts.[142] Once approved by the conservation commission (and other relevant zoning authorities) and cleared through any relevant appeals processes, construction on the project can commence.

In addition to the local conservation commission process, a developer generally needs to show that a proposed project of a certain scale and type (for example, large industrial projects) must

meet the requirements of the Massachusetts Environmental Policy Act (MEPA). According to the "Revised MEPA Greenhouse Gas Emissions Policy and Protocol," as of February of 2009, any project that is subject to review under MEPA must show that it has taken measures to "avoid, minimize, or mitigate" its greenhouse gas emissions.[143] The policy documents specifies that the MEPA office will "receptive to proposals to mitigate such emissions through off-site measures when avoidance or minimization strategies are not feasible."[144] The Act only considers covers industrial emissions; there are no forestry-related emissions specified in the act. The opportunity exists to revise MEPA so as to require mitigation in cases when forestland is impacted in a relevant project.

A 2010 revision to MEPA does not indicate movement in this direction. As of 2010, MEPA requires that an applicant account for direct and indirect emissions, but does not require that developers take into account: "quantification of construction period emissions, emissions associated with materials consumption and waste generation, emissions associated with water consumption and wastewater generation, and emissions associated with land alteration and conversion of carbon-sequestering biomass to waste or fuel."[145]

4.3 The Regional Greenhouse Gas Initiative (RGGI)

Massachusetts could also employ a forest-related mitigation policy through the Regional Greenhouse Gas Initiative (RGGI). RGGI is an act that is principally focused on power-sector emissions in New England and the mid-Atlantic states. It aims to cut greenhouse gases in the region by installing a "mandatory market-based effort…to reduce greenhouse emissions," in the form of a cap-and-trade system.[146] In September and December of 2008, the RGGI program held its first two carbon credit auctions, bringing in over $95 million for investments in electric and fossil fuel plant efficiencies.[147] In its willingness to use the marketplace to control greenhouse gas emissions, RGGI has been an important step for climate change legislation in the country; however, the documents that govern RGGI only rarely mention the forest sector. Afforestation is the only type of forest project that can be used as an offset mechanism in the context of RGGI. Unfortunately, the opportunity for afforestation is either limited or non-existent in many areas that fall under the initiative's jurisdiction.[148]

One reason behind this exclusion is that the writers of the bill apparently thought that the forest sector and all of the interested groups that come with it would have complicated things too much for the bill to pass in all of the participating states. To rectify this situation, several advocacy groups are pushing for RGGI to expand its scope. In 2007, Environment Northeast (ENE), a Maine-based organization aimed at addressing global warming and clean energy issues for New England and Canada, worked with the Maine Forest Service to "develop a detailed proposal for expanding forest offset opportunities in RGGI," and presented the proposal in the RGGI Working Group in 2008.[149] ENE presented ideas for Massachusetts, Maryland, Maine, New York, and Vermont on how to treat biomass emissions in their RGGI regulations.

Earlier in 2007, ENE released its *Climate Change Roadmap for New England and Eastern Canada*, which presented the first ever plan for a regional 75 percent reduction of carbon emissions by 2050.[150] Beyond its wide variety of recommendations for the energy and transportations sectors, the *Roadmap* devotes a large portion of its attention to forest sequestration options. It specifies that states and provinces should: "(1) improve inventory and

accounting tools to better quantify and track forest carbon; (2) promote forest management strategies that sequester additional carbon; and, (3) minimize carbon loss from land conversion."[151] ENE also pointed out in its *Roadmap* that, "carbon mitigation regimes, including mandatory and voluntary carbon trading programs, are driving interest in the potential carbon impacts of forestry and land use change. Such a trading program is under discussion in the proposed RGGI cap-and-trade system."[152]

In 2009, ENE along with the Maine Forest Service and Manomet Center published forestry-related recommendations for RGGI. They recommend that RGGI -- in addition to afforestation as a form of forest carbon offsetting -- include forest management, avoided deforestation, and urban and community forestry as additional offset mechanisms. However, the lack of federal legislation has slowed many of the efforts of ENE and its partners in pushing for an expansion of forest carbon credits in RGGI. Given the low likelihood of federal legislation on limiting carbon emissions in 2010, it is unclear how far ENE's recommendations may advance in the near future.

Section 5: Conclusion

The recent history of conservation and environmental policy has been characterized by a swing between the poles of mandatory regulation and voluntary incentives. Striking the right balance between those two poles is the challenge facing policymakers and practitioners aiming to use mitigation to protect the forests of Massachusetts, New England, the nation and the world. What happens in Massachusetts in this regard is likely to be closely watched by observers from around the world who have traditionally seen Massachusetts programs as exemplars.

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