

100,000 Acres of New Conservation Land and 150 New Parks: A Legacy for the Next Generation



April 2014

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Bean Allard Farm—courtesy of the Trust for
Public Land

Contributors to the Report:

EEA: Tom Anderson, Stephanie Cooper, Melissa Cryan,
Irene DelBono, Kurt Gaertner, Arthur Hughes, III, Bob
O'Connor, Dominique Pahlavan, Celia Riechel, Krista Selmi,
Nicole Sicard, Ben Smith, Maeve Valley Bartlett

DFG/DFW: Christy Edwards, Sarah Haggerty, Craig Mac-
Donnell, John O'Leary

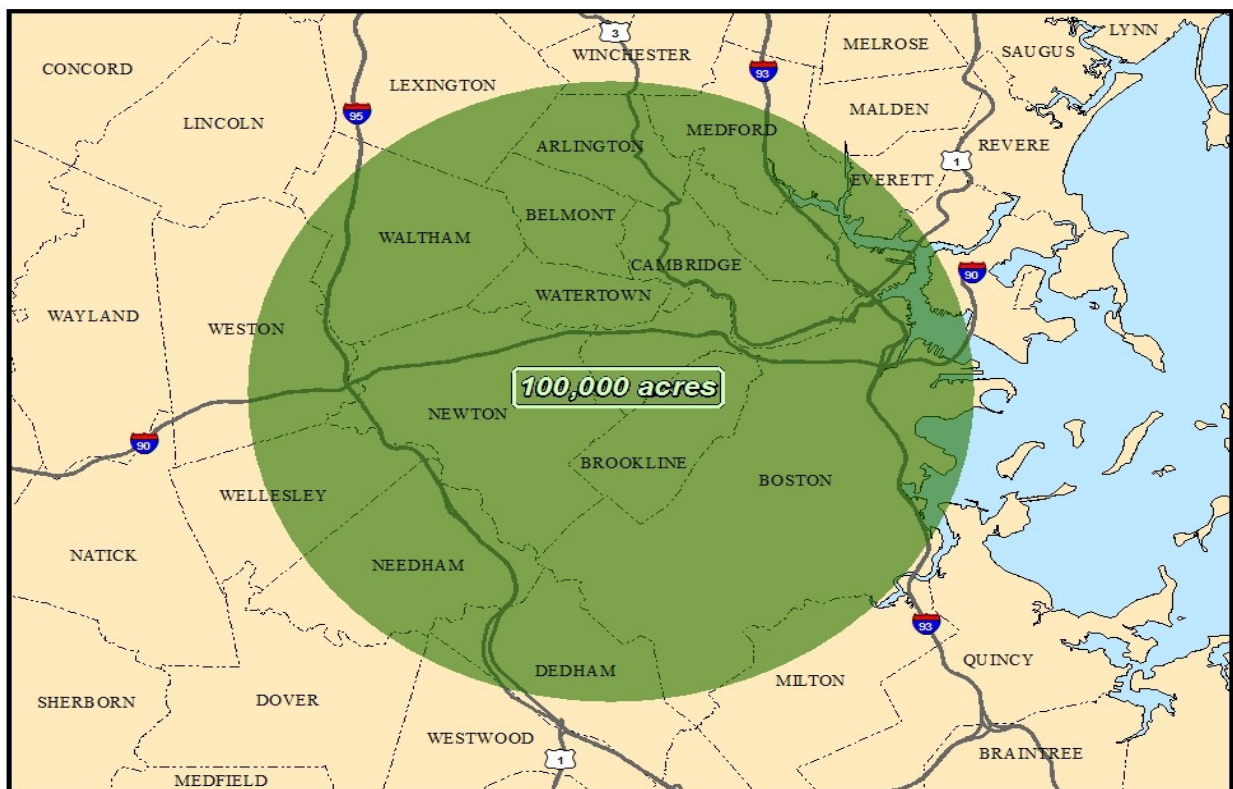
DCR: Peter Church, Michael Downey, Dan Driscoll, Jennifer
Fish, Mike Fleming, Jim French, Thom Snowman, Jonathan
Yeo

DAR: Catherine DeRonde, Ron Hall, Craig Richov

Partners: Jay Ash, City of Chelsea; Brad Buschur, Ground-
work Lawrence; Al French, Bay Circuit Alliance; Rob Moore,
City of Haverhill, Mark Robinson, Compact of Cape Cod Con-
servation Trusts; Kristen Sykes, Appalachian Mountain Club



Secretary Sullivan and Governor Patrick at Massa-
chusetts Food Day
Photo courtesy of Matthew Bennett



How large is 100,000 acres? Greater than the City of Boston.

Fellow Residents of the Commonwealth:

I am extremely proud to present this report celebrating the milestone of 100,000 acres of land protected under my Administration. During this time, we have built more than 150 parks in communities throughout the Commonwealth. This new open space and these parks are within a ten-minute walk for about 1.5 million residents. We have focused special effort on our Gateway Cities, where open space has been more limited than other areas. As a result, 40 percent of residents living in environmental justice neighborhoods are now within a ten-minute walk of new green space.

These incredible accomplishments would not have been possible without the involvement of a number of partners including land trusts, communities and individual citizens. Across this Commonwealth, people have come together to protect the places they care about and ensure that kids have places to play in their neighborhoods.

The results are compelling. For the first time, we have more protected open space than developed land in the Commonwealth. This statistic has an economic angle to it as well – businesses want to locate in Massachusetts because we offer a great quality of life that attracts people from other states. And, in terms of public health, nearby access to parks and open space helps kids and adults to stay active and healthy.

In the following pages, you will learn about acquisitions, grants, conservation restrictions, working farm and forest covenants and agreements that have collectively conserved land and developed parks in more than 310 communities. Under the themes of “Connecting People to the Outdoors,” “Supporting our Natural Resource Economy,” “Protecting our Drinking Water Supply,” and “Conserving our Natural Heritage,” this report tells the great success story of land protection in the Commonwealth.

Connecting the Next Generation to Environmental Work

Groundwork Lawrence’s Green Team provides hands-on environmental and health/wellness learning opportunities for Lawrence youth. As a paid position, members of the Green Team (GT) addresses the need for meaningful employment among these low-income youth, who would otherwise be required to choose from far less fulfilling part-time employment opportunities. GT teaches them about the many elements necessary for a healthy and sustainable community and engages them in transformative projects that improve neighborhoods and raise public awareness about the importance of environmental, economic, and social justice considerations.



Groundwork Lawrence Green Team
Photo courtesy of Groundwork Lawrence

Youth are exposed to a variety of complementary academic and professional endeavors, including exploring natural resource areas both inside and outside Lawrence, as well as increasing their healthy living competency by integrating healthy living educational concepts and physical activity into their day. In the summer months, GT engages 10 youth in two cohorts (20 youth total). One cohort, ‘So Fresh’, focuses on food, nutrition, gardening, and health and the other, ‘So Green’, on conservation, citizen science, stewardship, and biology. This diversity in programming

enables Green Teams to engage youth in a program that best fits their interest areas, while ensuring they are exposed to both tracts.

The program costs about \$74,000 annually in wages. This includes wages for twenty GT members and four young adult team leaders in the summer, and ten GT members throughout the academic year. During the summer, GT members work fifteen hours per week and twenty hours per month in the school year. Additionally, GT members are required to complete seventy-five hours of volunteer service annually.

A Visionary Trail that Connects the Greater Boston Region

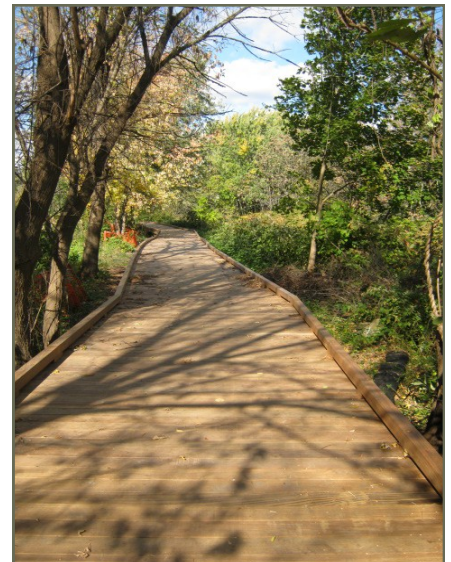
Another major regional conservation success at “connecting people to the outdoors” has been the Bay Circuit Trail and Greenway. This 230 mile trail connects Plum Island to Kingston Bay. Originally envisioned by Charles Eliot and Benton McKay (the visionary of the Appalachian Trail) in the 1920’s, the trail was meant to form a wide arc around the Boston region, providing close-to-home recreation and access to the outdoors to those throughout the metropolitan Boston area, as well as NH, Western MA, and RI. The trail was re-kindled in the 1980’s with a partnership among the Bay Circuit Alliance (BCA), DCR’s predecessor and the National Park Service. Through the leadership of Al French, Executive Director of the BCA, a partnership of hundreds of volunteers and dozens of local land trusts, municipalities, regional recreation and conservation organizations, the BCA has blazed the trail that Benton McKay envisioned. The trail traverses dozens of protected lands, and state and municipal lands connecting open space over 100s of miles. The BCA is working hard to fill the very few remaining gaps. The greenway surrounding most of the trail offers walks in amazing natural areas for residents from the north to south shore and Boston (via public transit or a short drive). Currently, the 231 miles of trail encompass 119,000 acres within a 10 minute walk of each side of the trail. Of that greenway 36,800 acres are permanently protected (31%) and the trail is within a 10 minute walk of about 150,000 residents, including 25,000 residents of environmental justice neighborhoods. Conserving the greenway is an ongoing project but progress is impressive due to the work of the partnership with over 1,200 acres (2 square miles) of new land in the greenway and 2.5 miles of trail permanently conserved in the past six years! The future of the alliance is bright with an agreement finalized in 2012 by the AMC and TTOR to lead the BCA, continuing Benton McKay’s vision for the next generation.

Together, we are doing the important work to leave things better for future generations. We take this responsibility seriously. It informs our land acquisition and preservation efforts, and is part of a broader strategy of investing in our people and our communities, building a stronger economy and a more vibrant Commonwealth for everyone.

I offer my deepest thanks and appreciation to landowners, conservation organizations, municipalities and land protection staff of the EEA agencies for their work.

Sincerely,

Richard K. Sullivan, Jr.
Secretary



Alewife Greenway
Photo courtesy of Dan Driscoll

Chelsea's Formula for Doubling the Number of Parks

Although fully built out generations ago, Chelsea continues to renovate and construct new parks to support neighborhoods. Over the last 15 years, nine new parks, including a new waterfront access park that incorporates vestiges of its working past, and three waterfront paths have been added or are in the process of being built. Additionally, the City is currently studying a potential trail along an abandoned rail corridor, as well as examining potential open space and recreational uses under and adjacent to Route 1 and the Tobin Bridge. One site is being looked at for the community's first skate park.

Many of the parks have been reclaimed commercial and industrial sites, as the City has sought to eliminate blighted historical uses in favor of parks that promote the vitality of the otherwise residential neighborhoods that hosted them. Central to the City's efforts has been the partnership of local and state collaborators, and the support and encouragement of neighborhood residents. Most prominent has been the work of the Chelsea Green Space and Recreation Committee, The Neighborhood Developers and EOEEA. While the latter has provided critical funding support, the City's local partners have helped envision open space, locate additional funding options and invite neighborhood residents to the planning process and to actually build several of the parks.

Despite their modest size, the new parks have been well received, as evidenced by their usage. For example, Kayem Park (named after the legendary hot dog producer which has been in Chelsea for over 100 years), at less than $\frac{1}{4}$ acre, has been overrun, in a positive way, by young children and their families in a neighborhood underserved by open space. The city's largest park, the one acre Chelsea Commons Park, is an intergenerational park that features a therapeutic trellis for seniors and the disabled and a year-round, outdoor skating rink for the entire family.



Box District Park, Chelsea
Photo courtesy of The Neighborhood Developers

The City's philosophy is to both identify neighborhoods in need of additional open space and examine each parcel that is available or otherwise underperforming in order to find additional opportunities to add to the City's park system. Several sites are at various stages of identification, planning, acquisition and development, including one in final design now that will recognize Chelsea's Latino connections by celebrating local resident and former Heavyweight Champion of the World, John Ruiz.

Connecting People to the Outdoors

Since 2007, the Patrick Administration has worked with municipalities, land trusts, and landowners to conserve 100,000 acres of land and build or restore 150 parks in 2,000 separate projects. As you will see in the following pages, these projects protect water supplies, wildlife habitat, save and create jobs in farming, forestry and tourism and have many other public benefits. However, perhaps the most important public benefit of all this collaborative work is improving the quality of life of our residents by providing close-to-home places to recreate and enjoy a break from the stresses of modern life. As the Massachusetts Constitution (amended as Article 97 through extensive public process in 1972) states:

The “Buy Local” Movement – A Massachusetts Agriculture Success Story

The local agriculture movement is exploding in Massachusetts with demand for locally grown crops outpacing supply even while the number of farms, farmers and farmers markets continues to increase. In the late 1980s, Massachusetts agriculture was declining with the number of farms, farmland and farmers declining. The development boom of the 1980s was reducing farmland at an alarming pace. Predictions were dire. Then the grassroots “buy local” movement was launched by local farmers and communities supported by the state’s “Local Hero” campaign. The results of this movement are an incredible success story with a complete turnaround in Massachusetts agriculture. Farmers who could not compete for industrial agriculture wholesale prices are now leading the nation in the value of their “direct sales” to consumers via farmers markets, farm stands and “Community Supported Agriculture” (CSA), which sell “shares” to community members in exchange for future fresh produce. Here are just a few of the indicators of this success:



Wayland Winter Farmers’ Market
Photo courtesy of Richard LeBlanc

- Number of farms up from 6,100 to 7,700 (2002-2011)
- Number of micro-farms (less than 9 acres) increased 1,429 to 2,199 (2002-2007)
- Number of CSA farms increased from less than 40 to 153 (2007-2012)
- Number of farmers’ markets increased from 139 to 254 (2007-2012)
- Market value of products sold up from \$384 million to \$489 million (2002-2007)
- MA is now ranked 9th in the U.S. in total dollars of direct sales
- MA is ranked 2nd in the U.S. in value of direct sales per farm (\$25,356 per farm)
- Organic farms and agrotourism operation and income are up significantly

The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of the agricultural, mineral, forest, water, air and other natural resources is hereby declared a public purpose.

The 150 parks and 100,000 acres of land conserved in the past six years are within about a ten minute walk (1/2 mile) of 1,477,000 residents and about a five minute walk (1/4 mile) of 569,000 residents. Based on conservative estimates of park visits per day, these new parks have more than 1 million visits per year. One of the goals of EEA’s parks programs is to provide parks in cities with few outdoor recreation opportunities for their residents. EEA maps Environmental Justice neighborhoods (areas with lower income, higher percentages of minority or non-English-speaking residents) across the state. Within these neighborhoods there is a new park or conservation area within a 10 minute walk of

Forestry Economic Development via Wildlife Habitat Improvement – A Success Story

In 2009, DCR launched the Working Forest Initiative and began funding Forest Stewardship Plans for forest landowners. Since then 843 plans have been completed on 77,643 acres including 655 plans on private forests and 72 plans on town forests in 41 communities. The landowners sign a commitment to implement the sustainable forestry practices in the plan in partnership with a private professional forester and keep their land forested for at least 10 years. Over 90% of the forest owners also enroll into the MA Forest Tax Law which reduces property taxes on private land and adds further protection for the forest. At a state cost of less than \$15/acre, this program has many benefits to rural economies including – supporting 74 private forester businesses, creating work for harvesters and secondary processors and improving the quality and economic value of the forests for future generations.

A survey of these landowners (440 responses) showed several interesting findings. Most landowners joined the program to enhance wildlife habitat and reduce taxes. Landowners invested \$2,300 in their forests after the state invested \$1,297 in the average plan. Since completing their plan, 40% of landowners began working on the permanent conservation of their forests and 27% began considering this move and 85% intend to pass their woodlands on to their family members. After the plan, 35% of landowners increased the time they spend on their land in activities like walking, cutting firewood, watching birds and removing invasive species. Fully 42% had completed a timber sale since getting the plan and nearly half did the sale to improve wildlife habitat and 14% enrolled in wildlife habitat improvement programs at NRCS and DFW. Most significantly,



Working Forest Habitat Tour
Photo courtesy of Jennifer Fish

during the recent recession (fiscal 2008-11) which devastated the forest industry, the Forest Stewardship owners increased the volume in timber sales by 237% at a time when statewide timber sales volume were down by 38%! The percentage of Stewardship timber sale acres and volume as a percentage of the entire state has gone from 1.5% in 2003 to 11.5% in 2011 – making up ½ of the increase that has statewide harvest acres now near to pre-recession levels. All this occurred while the price of standing trees have been at record lows. This was all possible because landowners primary goals were to increase wildlife habitat or improve their woods - not maximize revenue! In 2013, DCR is expanding this successful program to include “bird habitat assessments” so that landowners can improve habitat for their favorite birds – all while supporting their community’s economy.

653,000 residents. For our 26 Gateway Cities, 542,000 residents (32 percent of all residents) live within a 10 minute walk of a new park or conservation area. Within the Environmental Justice neighborhoods in the Gateway Cities, 360,000 residents are now within a 10 minute walk of a new park or conservation area (40 percent of all residents of these neighborhoods).

The 100,000 acres protected in the past six years range from urban conservation areas of less than an acre to the Paul C. Jones Working Forest project encompassing more than five square miles. These conservation and park projects, which are found in 310 communities - including 50 of our 51 cities, also protect over 19 miles of river and lake shoreline, six miles of marine coastline and 17 miles of regional and long-distance hiking trails.

Another way EEA supports local parks and walking trails is via investments in DCR’s system of greenways and bike trails. These investments range from several new greenways in the Boston area, such as the Neponset River, Alewife, Watertown, Mystic River and Charles River greenways, as well as greenways across the state, such as the Mass Central Rail Trail, Blackstone River Greenway, Ashuwillticook Rail Trail and the Columbia Greenway. Collectively, these projects total a state investment under the Patrick Administration of over \$30 million through 2013.

Providing parks with facilities appropriate to the interests of the neighborhood can have a life-changing effect on quality of life. Another approach to “Connecting People to the Outdoors” that has

been extremely successful are teen environmental employment programs run in cities like Lawrence and Boston. Connecting young people to the outdoors while teaching them new job skills can have life-altering effects.

Conclusion

We are proud of our park and land conservation accomplishments, most of all for the tangible, positive impact they bring to communities and residents across the Commonwealth. This investment has immediately improved the daily quality of life of nearly 1.5 million people – 23 percent of the state’s population – in only six years, and it will continue to yield benefits perpetually. The 1.5 million residents benefit by visiting the nearby parks and conservation land (estimated at more than one million visits per year); the exercise and health benefits from walking to and from the parks¹; the increased property values parks provide, the reduced crime, the increased air quality, the reduced stormwater costs, and the overall improvement to the neighborhood. The scale of this success and impact underscores the certain value of potential future investments, and the very real possibility of ensuring that every resident is within a 10-minute walk of a new park or conservation land. This is a successful investment in the health of our residents as well the environment.

¹ A 2012 statewide survey found 76 percent most often use recreation facilities within five miles of home and 41 percent reported walking or jogging to parks most of the time and this figure is significantly higher in Gateway Cities. Several studies (American Journal of Preventative Medicine and RAND Corporation) found that proximity of places for physical activity significantly increase physical activity and health measures.

Supporting our Natural Resource Economy

Massachusetts is home to some of the most productive farm and forestland with the deep rich soils in the Connecticut River Valley among the best farmland in the world. Our rich forest soils also grow valuable species like white pine, red oak and sugar maple that could be the basis for a much stronger local rural economy. Our farm “buy local” initiative has fueled resurgence in farming in Massachusetts with significant increases in the number of farmers, farms, farmer’s markets, farmstands and “Community Supported Agriculture” (CSA) farms. Even the loss of farmland from development has slowed due to the creation of new farms on fallow sites and active programs for the permanent conservation of farmland.

The outlook for the forestry sector has been quite challenging due to the impact of the recession on homebuilding and the price of wood products to landowners, harvesters and mills. One bright spot has been DCR’s Working Forest Initiative (WFI), which has funded Forest Stewardship Plans on 834 forests totaling 77,643 acres from 2009-2012. During the 2007 to 2010 time period, the statewide acres of forest harvests (as measured by “cutting plans” filed with DCR) fell from 31,360 acres to 20,400 (35% decrease) and the volume of harvests fell from 68.2 million board feet to 42.4 million board feet (38% decrease). However, since the WFI began in 2009, the statewide figures have climbed back to 26,750 acres of harvests and 50.2 million board feet. This increase is principally due to a large increase in harvests on private



Working Forest
Photo courtesy of Jennifer Fish

forests under the Forest Stewardship Program which increased by 230% during the recession principally for wildlife enhancement forestry.

Farm and forestry businesses are the economic backbone of our small rural communities. Working farm and forest conservation easements and grants in these communities should be seen as much investments in economic development as in land conservation. New regional planning efforts for our rural regions are acknowledging this fact by creating a new zone beyond "Priority Development" and "Priority Protection" zones found in the plans endorsed by the state in eastern areas. These emerging "Working Lands Enterprise Zones" show that large farming and forestry areas and associated infrastructure are economic engines for the rural economies and need to be supported and maintained

Haverhill's Working Forest Initiative

The City of Haverhill, with assistance from the Department of Conservation and Recreation, has established a Forest Management Committee. The Committee is reviewing more than 1600 acres of municipal forest land and assessing its values and characteristics in helping the City meet such goals as protecting water quality, preserving wildlife habitat, providing recreational opportunities, and producing locally-grown timber products. The City established a Municipal Open Space Management Fund to facilitate the Committee's efforts. Any revenues generated from timber sales are deposited into this fund for the City's use in managing and improving Haverhill's open spaces and parks.

The Committee is following a three-step approach towards active management of these forests. The City has contracted with New England Forestry Consultants to work with the Committee to prepare Forest Stewardship Plans for these forests. The City has additionally contracted with the Massachusetts Audubon Society's Ecological Extension Service to conduct wildlife habitat analyses on each property. Together the City is working with NEFC to use these two plans to prepare Forest Cutting Plans that meet the ecological needs of the forest.

In 2012, the City completed a Stewardship Plan for its largest and most popular conservation area – Winnekenni Park – and the abutting Plug Pond Conservation Area. Additionally, the wildlife habitat analysis and Cutting Plan were both completed in 2012 for Haverhill's Clement Farm Conservation Area. The Clement management project has been bid and the harvest will likely occur in 2013. With the bidding of the Clement project, Haverhill also created a "Home Fuelwood Program". This program will be used to auction seven cords of hardwood fuelwood from the Clement property to seven Haverhill residents. The Clement logger is responsible for transporting tree-length rails to the City's public works property, whereupon seven one-cord piles will be bid upon and removed by Haverhill residents in an effort to provide affordable, locally-grown fuelwood to the community.

Public awareness and education are centric to the Committee's efforts. While the Fuelwood Program will highlight the importance of harvesting local timber products, Haverhill strives to include the community in its planning process. With the drafting of each Stewardship and Cutting Plan, the Committee has conducted public meetings followed by site walks on each of the subject properties. The City encourages the public to attend these events to learn not only about the specifics of management on these particular properties, but to also learn more about the general benefits of proper forest stewardship. In 2012, the Committee extended its public outreach efforts by partnering with Haverhill Community Television. Haverhill's local access channel is working with the City to create a video that may be used by HCTV, in Haverhill's schools, and by other media outlets to highlight the benefits of stewardship, not only in the City's forests, but also on private property. Planned segments include an introduction to stewardship; the following of a harvest from pre-cut conditions to the following season; and final destinations of forest products, such as sawmills and the local Fuelwood Program.



Haverhill FMC Members
Photo courtesy of Rob Moore

Paul C. Jones Working Forest

Of particular significance this year was the completion of the Commonwealth's largest private land conservation deal since the 1920's. The partnership between DFG/DFW, Kestrel Land Trust, Franklin Land Trust, U.S. Forest Service, and North Amherst-based W.D. Cowls, Inc. resulted in the protection of 3,486 acres of working forest land in the towns of Leverett and Shutesbury. Now known as the Paul C. Jones Working Forest, it is the largest Conservation Restriction on a contiguous block of privately owned land in Massachusetts' history.



Governor Patrick's Brushy Mountain Event
Photo courtesy of Christy Edwards

The majority of funding for this \$8.8 million dollar project was provided by a \$5 million grant from the federal Forest Legacy grant program. An additional \$1 million in funding came from the Executive Office of Energy and Environmental Affairs Landscape Partnership grant program, together with \$839,600 in private grant funding from the Open Space Institute, \$500,000 in DFW land stamp funds, and \$1,460,400 in DFG open space bond funds.

The 5.4 square mile area encompasses almost all of Brushy Mountain and includes additional adjacent parcels. The Conservation Restriction ensures that the property will not be developed, protecting critical wildlife habitat and providing public access for hunting, fishing, hiking, and other recreation. Motorized vehicle use (except for snowmobiles on formally designated trails, motorized wheelchairs and owner forestry-related vehicles) is not permitted. The forests will continue to be sustainably managed by W.D. Cowls as it has been for decades providing for diverse wildlife habitat and supporting local forest harvesting and processing jobs.



just as our
commercial/

Blandford Farm Viability
Photo courtesy of Rick Chandler



Norton Town Forest
Photo courtesy of Jennifer Carlino

traditional
industrial zones

do. An examination of dozens of municipal plans for these small communities shows that most often their top priorities are preserving the rural character and supporting "home-based businesses".

Our most rural towns make up a significant portion of the state but a small portion of population and jobs. For example, while the Commonwealth's population is now over 6.5 million with over 3.3 million jobs, the 69 towns (20% of municipalities) with less than 2,500 population and less than 100 residents per square mile (two federal definitions of "rural") have about 125,000 residents and about

64,000 jobs. EEA's working farm and forest programs have created or retained over 1,000 jobs since 2007 mostly in these small communities (56 percent of land conserved was in rural areas with population densities of less than 250/square mile). This jobs program costs the state approximately \$60,000 per job which is in line with other job creation/retention programs. However, in addition to creating and retaining jobs, this investment has also conserved forest and farmland, which provides many other public benefits and will permanently maintain this land use so that these jobs will be there for our rural communities in future generations.

The Economics of Conservation

Forests and Filtration Avoidance: DCR/MWRA Watershed Land Acquisition Program

Nearly 2.5 million Greater Boston residents enjoy the benefits of one of the world's premier, award winning reservoir water supplies. The Quabbin and Wachusett Reservoirs, managed by the Massachusetts Department of Conservation and Recreation (DCR) and treated and distributed by the Massachusetts Water Resources Authority (MWRA), are just one of eight large metropolitan surface reservoir supplies in the U.S. that are exempt from the EPA's filtration requirements set forth by the 1986 Safe Drinking Water Act. An exemplary watershed source protection program is one of the main reasons that MRWA ratepayers saved an estimated \$250 million in filtration plant construction costs as well as \$4 million in annual operating costs.

Land acquisition is a critical component of this source protection effort. DCR has based its acquisition and watershed management strategies on the understanding that the finest drinking waters in the world are a product of the natural filtering processes of an undisturbed forested landscape. The replication of these natural processes using infrastructure-based treatment and filtration is inferior to, and more expensive than, the incomparable benefits derived from watershed land protection. Over the past two decades, DCR has spent approximately \$130 million, provided by the MWRA, to acquire interests in more than 22,000 privately held acres. These purchases targeted the most highly sensitive lands for water quality protection. This ambitious land protection program ensures that the integrity of the natural landscape will be protected in perpetuity from the persistent threats of urbanization that can compromise water quality. As a result, ratepayers have saved hundreds of millions of dollars in capital improvements and annual operating costs associated with filtration.

The beneficial economics of land conservation in guarding a pure, reliable and safe drinking water supply while holding down burdensome costs in delivering this vital utility to consumers is crystal clear. The math can be complicated, but simply stated the \$130 million spent on land acquisition over the last 20 years has resulted in an approved filtration waiver and savings of approximately \$200 million (\$250 million for filtration plant construction plus operating costs at \$4m/yr for 20 years minus the \$130 million in land acquisition costs). That's a lot of green – in both cash and conservation.



Quabbin Reservoir Stony Lane Farm
Photo courtesy of Stephanie Selden

100,000 Acres and 150 Parks

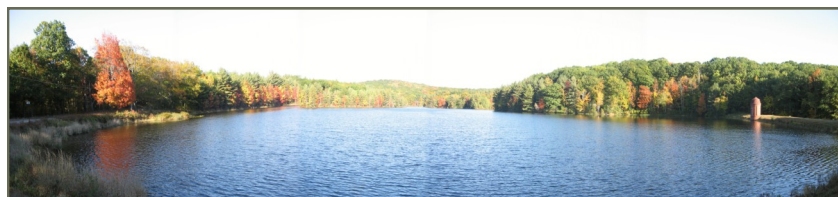
EEA's Working Farm and Forest Programs – 2007-2012

Program	# Projects	Acres Conserved	State \$ (millions)	Jobs Created or Retained
DAR – APR	142	8,394	56.9	264
DAR – Farm Viability	93	9,179	5.0	462
DCR – Forest Stewardship Agreements	843	77,563	1.1	624
Total	1,078	95,136	63	1,350

(DAR estimates based on thorough survey for FY 2011 and DCR based on recent research finding of 8 jobs per 1,000 acres of working forest).

What is the value of the water protected and filtered by one acre near a well or reservoir?

In Massachusetts we get 40 inches of annual precipitation of which half filters through the forest and soils to reach streams and aquifers for the water supply (the rest is used by the forest to create oxygen and remove carbon dioxide or evaporated). This means each acre filters and protects 543,000 gallons of drinking water per year. At a usage of 80 gallons per person per day (our current water conservation goal), each acre of forest protected near a well or reservoir would filter and supply the annual water needs of an average of 19 people. So the 25,000



Fitchburg's Scott Reservoir
Photo courtesy of Brandon Kibbe

acres protected from 2007-12 will protect the water supply needs for about 478,000 residents! However, this clean water filtered by each acre is only really protected when all the critical lands surrounding the well or reservoir is protected.

At the retail rate MWRA charges of \$5 per thousand gallons delivered to consumers, each acre is providing more than \$2,500 of water to consumers each year. So on average, each acre would pay the value of its acquisition in less than two years.

Beyond the jobs created or retained in rural towns, the products from working farms and forest provide food and shelter for residents as well as additional jobs in secondary processing. For example, a tree harvested and processed locally into flooring or furniture can have an economic multiplier of more than 20 to 1 because this is a labor-intensive sector.

Farming and Forestry Land Conservation – Land Quality 2007-2012

Natural Resources	Land Trust and Municipal CR's	State Permanent Acquisitions	Forest Stewardship 10-Year Agreements	Total Acres
Prime Forest Soils	15,042	42,517	55,750	113,309
Prime Agricultural Soils	7,201	19,859	17,206	44,266

Another aspect of the DCR WFI is helping cities and town improve stewardship and management of their Town Forests. Since 2009, WFI has funded 72 Forest Stewardship Plans on 18,000 acres of Town Forests in 41 communities. The management generally focuses on wildlife habitat

enhancement, but often involves educating residents about where their local wood products come from. In addition, the proceeds of forestry often help with land management projects such as invasive species removal and trail building such as has occurred in Northampton and Marlborough. Overall, in the 2010-2012 period timber sales occurred on more than 4,000 acres of municipal forests yielding 9.8 million board feet of lumber, 8,100 cords of firewood and 40,780 tons of chips for heating and landscaping.

Conclusion

Our rural economy constitutes a small but a critical part of the Commonwealth, with less than 5 percent of all jobs occurring on the majority of the land area. Creating or sustaining 1,000 jobs - as was accomplished by EEA programs in rural areas over this six year period - has a 50 times greater impact on the overall job pool versus creating 1,000 jobs in urban/suburban areas. Creating or sustaining 1,000 rural natural resource jobs also conserves over 100,000 acres of prime forest-growing soils, nearly 50,000 acres of prime food-growing soils as well as thousands of acres that protect drinking water supplies and offer outdoor recreation to Commonwealth residents. Continued support of our rural natural resource job base at the current level would build this sector into one of the largest rural job pools. In addition, it could simultaneously protect our best forest and food-growing sites and help secure our future drinking water needs. At the same time, supporting working lands jobs also boosts the tourism economy that depends on the quaint farms and forests across our rural regions.

Protecting our Drinking Water Supply

Unlike many parts of the world, Massachusetts is blessed with abundant precipitation – plenty of water to quench the thirst of its 6.5 million residents. With climate change predictions, we may have intense storms to contend with, but our precipitation will be more than adequate. As the third most densely populated state, our challenge is protecting our water supplies from contamination from the impacts of residential, commercial and industrial development – urban runoff, septic systems, sewage treatment and other contamination. Another unintended consequence of unplanned development is the loss of “recharge” for our aquifers, rivers and streams and excessive withdrawal from over-taxed basins in urban and suburban areas – all causing shortages for people and wildlife amid all the rain and snow!

Conserving forest land in the sensitive zones close to public wells and reservoirs is extremely effective in reducing contamination and treatment cost for water suppliers. A study done by the American Water Works Association and the Trust for Public Land on 27 water supplies found that for each 10 percent increase in forest cover on the watershed surrounding a drinking water reservoir, water treatment costs were reduced by 20 percent. Forests serve as natural filters and, while increased treatment costs must be paid each year, the cost of conserving land is a one-time expenditure.

About 90 percent of our residents get their water from a public water supply – about 1/3 from wells and 2/3 from surface reservoirs. For public wells protecting land within Zone II areas (groundwater areas the well draws from when in maximum use) is the best way to protect the supply. Zone II's for all public water supplies total 465,000 acres (9 percent of the state) and before 2007, 359,984 acres were protected (77%). From 2007-2012, 6,154 acres or 1.3% of all Zone II's were protected. An additional 2,786 acres in Zone II's were added to 10-year Forest Stewardship agreements by the DCR Working Forest Initiative.

Surface drinking water reservoirs include three protection zones (A, B and C) with Zone A's immediately adjacent to the reservoir and tributary streams. Collectively surface water protection zones make up 598,495 acres or 11.2% of the state and currently 350,322 acres (59%) of these zones are protected land including 19,009 acres protected from 2007-2012 (3.2% of the zones). An additional 9,984 acres in these zones (1.7%) were added to 10-year Forest Stewardship agreements by the DCR Working Forest Initiative.

Partnerships to Protect the Few Remaining Water Supply Lands on Cape Cod

The US Geological Survey issued a report in 2000 stating that only five percent of the land mass of the Cape was still available for potential new municipal wellfields, owing to geology and land development constraints. The conclusion was that more needed to be done to protect the existing public water supplies, since making new ones was highly unlikely.

In 2006, EEA provided a \$500,000 Drinking Water grant to the Town of Brewster, enabling it to purchase 59 acres of forest and bogs along the town boundary with Dennis. The Dennis Water District operated its Main Wellfield on the adjoining property and contributed \$1,000,000 to the deal. The Town of Brewster paid for the rest of the \$3.6 million project with Community Preservation Act funds. Without the state grant, it is unlikely that Brewster voters would have supported such an expensive purchase to protect the Dennis water supply.

Similarly, an EEA Drinking Water grant awarded to the Town of Chatham in 2010 enabled that town to work cooperatively with Harwich to protect 39 acres in Harwich that protected wellfields in both towns. These two towns had never worked with each other before on an open space project. One Selectman said, “I want this project to succeed so we can work together on other, thornier issues.” (This year the two towns are opening a new regional high school.) The \$500,000 grant was a key to making the \$2 million land deal succeed. Both two-town water supply projects could not have been completed without the technical assistance provided by the Compact of Cape Cod Land Trusts.



Chatham's Drinking Water Supply
Photo courtesy of Mark Robinson

Drinking Water Supply Protection Grant Program

The Drinking Water Supply Protection Grant Program has protected 2,503 acres with a state investment of \$11.1 million in 47 projects that were matched by \$26 million in local funds. The vast majority of these acres are within the protection zones. The average per acre state cost for this program is \$5,400 per acre versus the overall average for conservation of the 100,000 acres of about \$2,800 per acre. By keeping up the pace of conservation achieved over the past six years, an additional 150,000 acres within these zones could be protected by 2050, leaving 197,000 acres still to protect. At an adjusted average of \$4,000 of state funds to protect one acre within a drinking water zone, it would cost an additional \$21 million per year over this 37 year period to complete the protection of all the drinking water zones for the 5.9 million residents dependent on public water supplies or about \$3.58 per consumer per year. Meanwhile, the undisturbed forest on each acre of critical protection land near a well or reservoir filters and protects an average of \$2,500 of drinking water per year or \$18.2 billion of drinking water protected by the 197,000 acres during the 2013-2050 period. The cost of not protecting one acre that becomes developed and is then a source of contamination for the water supply can be a negative value (cost) to consumers many times greater than the benefit (savings) of protecting that forested acre.



Keyes Brook Gorge Bridge
Photo courtesy of Jim French

Conclusion

Working to protect our public drinking water supplies is a critical priority – both for public health and economic reasons. Contamination from unprotected land can result in large increases to treatment costs or even actual loss of water supplies. In fact, such contamination is responsible for the shut down or remediation of over 249 water supplies in over 102 Massachusetts communities. This is a strong rationale for continuing to focus on protecting water supply protection zones for wells and surface reservoirs – the current approach would result in the protection of 86 percent of protection zones for wells and 78 percent of those for surface reservoirs if extrapolated to 2050.

EEA's Drinking Water Supply Protection grants have helped municipalities to protect 2,503 acres of these lands through 47 grants for a total state investment of \$11.1 million that leveraged \$26 million in additional local funds. When it comes to drinking water, "an ounce of prevention" is well worth the investment given the future expense of water supply remediation or development of new sources, especially given projected shortage of available land.

Conserving our Natural Heritage

Massachusetts is blessed with a great diversity of ecosystems including 1,500 miles of coastline, 4,000 lakes and ponds, our rugged Berkshire mountains, globally rare pitch pine barrens and 27 major river watersheds. Massachusetts is on the cutting edge in the study and conservation of these varied habitats producing nationally acclaimed guides to protecting our biodiversity (Protecting our Natural Heritage, BioMap, Living Waters and BioMap 2) and studying the impacts of climate change to our ecosystems with the work of BioMap 2, EEA's Climate Change Adaptation Report and the Manomet, DFG, TNC partnership studying ecosystem change and management priorities.

BioMap 2 guides all conservation for habitat conservation in Massachusetts and so serves as the best measure of our progress toward conservation of our natural heritage. The BioMap 2 Core Habitats best reflect the land needed by state listed rare and endangered species, as well as species of conservation concern that are showing signs of decline. BioMap 2 Critical Natural Habitats are large undisturbed areas that represent our major habitat areas that are still fully functional and unfragmented by development. Core and Critical Natural Habitat are co-equal in their importance to conserve our natural heritage.

Why Protect Biodiversity?

For many, the need to protect biodiversity is based on the assumption of the intrinsic value of all living things. But philosophies vary between cultures, geographic regions, socioeconomic classes and from one individual to another, so philosophy is a difficult basis for agreement. Remember, what is a pesky insect to one person is inspiration to a fly-fisherman.

There are additional, more concrete reasons why protecting biodiversity is an imperative today. The broad array of products and ecological services produced in varied ecosystems is only just beginning to be recognized. From the most basic—food and agriculture—to the technical (industrial products, medicines, biofuels), we all depend more and more on products extracted from diverse environments.

With climate change, introduced pathogens and changing human tastes, farmers are beginning to move away from monoculture farming and are embracing biodiversity in their fields. They are planting a wider assortment of crops including heirloom varieties, recognizing the value of natural pollinators, and experimenting with natural pest control, usually dependent on plant-derived pesticides or the use of natural predators and parasites. Medicines and drugs are often first discovered in the natural world (think aspirin and caffeine) before being re-created in laboratories. And medical breakthroughs based on plant extracts are still occurring today. For example, in the early 1990s an extract of the Pacific Yew Tree was proven to have significant therapeutic benefit for a number of cancers. Additionally, cosmetics, cleaning supplies, and industrial products are all made with plant and animal-derived ingredients. A recent discovery of a soil microbe at Quabbin Reservoir that consumes wood and emits ethanol as a direct bi-product is another reminder of how important preserving biodiversity is to our health and economy.

Here in Massachusetts, the value of biodiversity also lies in the economics of the outdoor recreation industry. Many parts of this industry are dependent upon the continued existence of biodiversity within the state. Fishing, hunting, birdwatching, whale watching and other outdoor activities bring tourists from out of state to our beaches, mountains, forests and valleys. Hikers, campers and other vacationers are attracted to our state specifically because of the protection of diverse environments and the aesthetics they provide.

The economics and human benefits of protecting biodiversity are clear and can only be sustained through a long-term commitment to maintaining diverse ecosystems, for the loss of biodiversity is the loss of our future potential.



Loon Pair
Photo courtesy of Sarah Haggerty

Climate Change Vulnerability Assessment

The paleoecological record shows that the past distributions and representations of major vegetation communities and wildlife habitats in Massachusetts have been greatly affected by climatic shifts. We know from the climatic record that the climate is currently changing, with a shift toward increased temperatures and precipitation. Climate models tell us that unless greenhouse gas emissions are greatly reduced this shift will accelerate over the next century. If the state's temperature and precipitation change to the degree projected under even relatively modest emissions scenarios, then there is a high risk that we will experience major shifts in habitats and species. While the Commonwealth has shown remarkable success in preserving species, habitats, and biodiversity in the face of many serious stressors, many of these gains could be jeopardized by the climatic changes predicted by the climate models. It is important that we understand how future climate change might affect our valued habitats and species, which habitats and species are likely to be most vulnerable, and how we can continue to hedge against expected challenges to these resources by ensuring that our conservation and management policies and tools are climate-smart.

To address this information need, the Massachusetts Division of Fisheries and Wildlife and the Manomet Center for Conservation Sciences began work on the Massachusetts Climate Change Vulnerability Assessment in early 2008. Funding was provided by the Wildlife Conservation Society. This Vulnerability Assessment effort centered on addressing four conservation questions:

- How vulnerable are Massachusetts' ecological resources (i.e., habitats and species) to climate change?
- How will the distribution, composition and condition of these resources be affected?
- What are our options for managing change and preserving valued resources?
- How should we plan future land acquisition strategies under climate change?

An Expert Panel Approach was used to evaluate the effect of various climate and non-climate factors under two emissions scenarios for most of the key habitat types identified in the Massachusetts Wildlife Action Plan (Table 1).

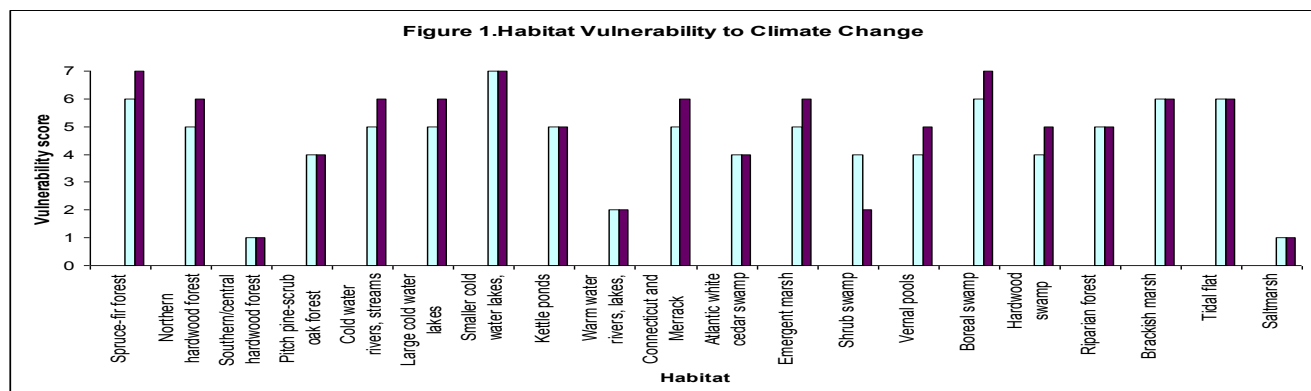
Results

Vulnerability of each habitat type was ranked on a scale from 1-7: Likely to be eliminated from the state (7) to likely to increase greatly in the state (1).

Figure 1. Habitat Vulnerability to Climate Change (note: the leftmost bar in each pair represents a doubling of CO₂, while the right bar is a tripling).

Forested Habitats
Spruce-Fir Forest
Northern Hardwood Forest
Southern/Central Hardwood Forest
Pitch pine-scrub oak Community
Freshwater Aquatic Habitats
Coldwater Rivers and Streams
Large Coldwater Lakes
Smaller Coldwater Lakes and Ponds
Warmwater Ponds, Lakes, and Rivers
Coldwater Kettle Ponds
Connecticut and Merrimack Main-stems
Freshwater Wetland Habitats
Emergent Marsh
Shrub Swamp
Spruce-fir Boreal Swamp
Atlantic White Cedar Swamp
Riparian Forest
Hardwood Swamp
Vernal Pools
Coastal Habitats
Intertidal Mud/Sandflats
Saltmarsh
Brackish Marsh

Table 1



Within these two focus areas, 869,219 acres or 39% of the total of 2,234,990 are currently conserved, with 64,598 or 2.9% conserved from 2007-2012. Of this figure, 14,660 acres was protected by land trusts and municipalities via conservation restrictions without financial assistance from EEA. An additional 42,268 (1.9%) of Core and Critical Natural Landscape was added to 10-year Forest Stewardship Agreements by the DCR Working Forest Initiative since 2009 with improving wildlife habitat the key goal in many of these plans. The effective use of the BioMap 2 as a guide across EEA agency acquisitions and grant programs is evident by these figures with about 65% of the 100,000 acres permanently conserved in these two habitat zones and over 100,000 acres included BioMap 2 when both permanent and 10-year conservation tools are included.

Over the past six years, 25,254 acres within the Natural Heritage and Endangered Species Program Priority Habitats were protected. These habitats have been carefully mapped as land needed to conserve state-listed rare and endangered species. Each habitat area is tailored to the life needs of the rare and endangered species occurring there.

Looking to the Future

At the current pace and approach to land conservation, about 388,000 more BioMap 2 focus areas would be protected by 2050. At the current pace, an additional 12 percent of these focus areas would be included in Forest Stewardship agreements with wildlife habitat improvement a primary goal. By increasing the Working Forest Initiative investment in Forest Stewardship agreements with private forest landowners by less than \$300,000 per year, the remaining 750,000 acres of Core and Critical Landscape focus area would under professional stewardship in partnership with our private landowners.

At the current pace of land conservation, three of the ten most outstanding forest ecosystems, our Habitat Reserves, would be completely protected by 2050 and four more would be within 10,000 acres of being protected. Only our two largest Habitat Reserves (Mohawk and Westfield River) would need significant more permanent conservation. These two Habitat Reserves have had the bulk of the acres for the Forest Stewardship agreements for the Habitat Reserves in the 2007-2012 period (72%) and about 25 percent of the unprotected forest in these Reserves would be under 10-year agreements and professional management in partnership with landowners by 2050 at the current pace.

Conclusion

In 2007, EEA designated ten Habitat Reserves that represent the most pristine large, forested ecosystems in the state. DFW analysis looked at many candidate sites for the quality and undisturbed nature of the landscape. Since 2007, EEA programs have focused on conservation of land within these ten areas. During that time, a total of 19,250 acres have been conserved. An additional 8,390 acres within the Habitat Reserves have been included within the Forest Stewardship Program, improving the habitat and stewardship of these areas.

Due to excellent partnerships with land trusts and the federal government, a total of 15,000 acres have been conserved in four of the Habitat Reserves – ranging from 2,000 to more than 5,000 acres in each. These include the Ashburnham, Westfield River, Mohawk and Mount Washington Reserves. At the current pace of conservation, Habitat Reserves like Ashburnham, Douglas, Mount Washington and the Holyoke Range would be completely conserved in 30 to 40 years, leaving an incredible legacy from our generation to the next, and beyond.

Supporting our Land Conservation Partners

The past six years have been extremely busy in the land conservation and parks communities. Nearly 3,000 projects were completed by the team consisting of EEA, DFG/DFW, DAR, DCR, DEP, dozens of land trusts, 310 municipalities, several federal agencies, 72 private consultant forestry businesses and hundreds of landowners. The 100,000 acres consists of 2,034 separate map tracts, with about half directly connected to already protected conservation land and half beginning new conservation land initiatives. During the past six years, there have been three 100,000 acre milestones reached:

- 100,000 acres permanently conserved from 2007-2012;
- 125,000 acres added to the Forest Stewardship Program with 10-year commitments from landowners (2004-2012);
- 100,000 acres in over 4,000 Conservation Restrictions approved by EEA under General Law Chapter 184 since the law passed in 1969 – these are projects completed by land trusts and municipalities.

Added to these impressive accomplishments are the conservation projects completed by land trusts and municipalities that are “fee acquisitions” that do not get assistance from EEA grants or agencies. These projects are added to the MassGIS protected datalayer when they are sent to EEA so it is more difficult to estimate how many acres in this category were protected in the 2007-2012 period but it is likely 10,000 or more acres.

EEA supports its many partners in this extremely complicated endeavor in many ways including:

- Offering grants to land trusts and municipalities during the 2007-2012 period:
 - LAND – 92 municipal projects from 2007-12
 - Conservation Partnership – 79 land trust projects
 - Landscape Partnership – a new program that has already awarded ten grants to land trusts, municipalities and EEA agencies;
 - PARC – 181 municipal park projects
 - Gateway Parks – 32 municipal park projects
 - Land and Water Conservation Fund – 6 municipal projects
 - Small Community Grants – 9 municipal appraisal and Open Space and Recreation Plan projects
- Reviewed, assisted and approved 864 Conservation Restrictions;
- Estate Planning Program—offered dozens of workshops to facilitate conservation
- Forest Stewardship Plans – funded 824 plans and 10-year conservation agreements on 77,643 acres;
- Farm Viability Enhancement Grants funded 114 grants
- Landowner technical assistance with US Forest Service Grants
 - New England Governors Conference focus landscapes
 - Buy Local Wood
- In addition to the thousands of donations by individuals to land trusts, dozens of private foundations such as the Fields Pond Foundation, the Open Space Institute and many local community foundations. Contributed significantly to these projects.

Partnerships

The 100,000 acres of land conserved and the 150 parks constructed that are highlighted in this report include over 3,000 separate projects! Projects range from a gift of a Conservation Restriction over a few acres of important wildlife habitat to the acquisition and development of a multi-million dollar Gateway Park in a city center. However, all of the projects have one thing in common – they could not be accomplished by our skilled and dedicated state land and park staff alone. Almost every project succeeded thanks to the invaluable assistance of dozens of partners including the municipalities that received grants and the land trusts that often assist with projects.

The 3,000+ land conservation and park projects include over 1,200 grants, all of which require municipal or land trust leadership in negotiating the acquisition, overseeing the myriad of due diligence and overseeing the park construction necessary to complete each project. Beyond the dedication and expertise of municipal and land trust staff, funds are raised via local Town Meetings and hundreds of individual and corporate donations to support land trust projects. Of the more than 800 Conservation Restriction projects completed by land trusts and municipalities and approved by the Secretary, about 500 were completed by land trusts and 300 by municipalities. The 1,200+ projects completed by DAR, DCR and DFG/DFW also often involve partnerships with local communities (most APR's for example) and land trusts. Other key partners in our conservation endeavor are our federal partners including the National Park Service, Natural Resources Conservation Service, Fish and Wildlife Service, Forest Service and National Oceanic and Atmospheric Administration.

Community and national foundations and private funders such as the Open Space Institute, Fields Pond Foundation and The Conservation Fund also provide invaluable funding assistance to land trusts in accomplishing many of these projects. Hundreds of local residents have donated to make many of these projects a reality. Finally, the generosity of landowners are the foundation upon which land conservation is built. The hundreds of outright gifts and bargain sales of conservation land by private landowners are truly amazing.

The new Conservation Land Tax Credit Program, a partnership of landowners, land trusts, municipalities, EEA and its agencies, exemplifies the generosity of landowners. Since the program launched in late 2011, EEA has received over 170 applications for gifts of land. The program is so popular that its \$2 million annual cap is booked for calendar 2014 and nearly booked for 2015. Since 2011, land valued at \$21.3 million has been donated at a cost to the state in tax credits of just \$3.8 million, a leverage of \$5.60 of donated conservation land for each state dollar spent. While the statistics cited in this report document a legacy of conservation, the legacy that all the partners are leaving through their dedication is a better world for those that follow us.



Frohloff Farm, Ware
Photo courtesy of Cynthia Henshaw

