Looking to the Future – Massachusetts Land and Parks Conservation and Their Future

A Report from the Executive Office of Energy and Environmental Affairs and its Partners

January 6, 2015

Introduction

This is a story about the land of Massachusetts and the many values it has to the 6.5 million residents who call Massachusetts home. It's also a story about the dozens of dedicated people who work and volunteer to help build parks and conserve land for present and future generations and improve the quality of life in communities. This report is especially written for the new generation of conservationists who are already making their mark in the conservation of land and parks in Massachusetts and their teachers who are inspiring this new generation of young conservationists every day.

Massachusetts Land Overview

- **5 million acres total**
- **6 million residents live on just 1/5 of the Commonwealth's land**
- **More than 1 million acres are protected as conservation or park land**

Cambridge Common Playground. Photo by City of Cambridge

The Commonwealth is home to a diverse landscape, totaling five million acres. One acre is a little bit larger than a football or soccer field or about the size of six basketball or tennis courts. The spruce trees on the windy summit of Mt. Greylock, our tallest mountain, contrast with the sand dunes at Sandy Neck in Barnstable. The "old growth" forests of Mohawk Trail State Forest with trees over 500 years old and 120 feet tall are quite different from the sweet corn fields of Hadley, though they both have rich and fertile soils.

Six million Massachusetts residents reside in approximately one million acres across the state. What does all this land give us? First it provides us a home for more than 6 million Massachusetts residents. That's about one person for each of our five million acres – or six basketball courts for each child on average. Given that most of us don't have that much space to ourselves, there must be a lot of acres with no one living on them. This is somewhat true. The six million Massachusetts residents live on about one million acres. However, over one million acres is permanently protected as conservation or park land and is open to all of us.

But what is happening on the other four million acres without apartments, houses, businesses, roads and parking lots on it? This "uninhabited" land provides us with oxygen, clean water, food and even wood to build our homes. For example, there are three million acres of forest and each acre has about 200 trees – this only counts the trees that are ten feet to 120 feet tall, there are many more than 200 little tree seedlings on most acres of forest. That's about 600 million trees or 100 trees for each one of us. Each mature tree produces enough oxygen for about two

people to breath. Massachusetts is a net "exporter" of oxygen for other states and countries with many fewer trees per person like South Dakota or Kansas.

DCR crews and the Chelsea Collaborative Green Team planting a tree. Photo by Kristina Pires

Trees also remove carbon dioxide ($CO_{2)}$ from the air, the prime cause of the climate change that we're hearing about and noticing in recent years. During photosynthesis, trees take in CO_2 and water (H_2O) to make oxygen, sugar and wood. An average tree removes about one ton of carbon dioxide from the air by the time it turns 40 which is not too old for most trees. That's a lot of benefit from each tree but even our 600 million Massachusetts trees remove only about 10-20 percent of the amount of carbon we put into the air by burning oil and gas to heat our homes, produce electricity and drive our cars.

As our trees take in carbon dioxide to make oxygen for us, they also make the sugar that helps make our maple syrup sweet but also makes up wood, which is primarily made of carbon. Massachusetts has a "forest industry" where trees are grown and harvested locally in Massachusetts' towns like Monroe and Monterey and provide wood for houses, furniture and heat. Foresters who study trees and forests at colleges like UMass in Amherst take great care to make sure each tree is grown and harvested carefully so that room is created for many new trees to take its place. Trees are carefully removed from the forest by harvesters using high-tech machines and brought to sawmills where sawyers use every bit of the tree to be make the wood products we all use.

How do our forests help produce the clean water we drink? In Massachusetts we get about 40 inches of precipitation each year. The forests use about half of that water to create oxygen (remember H_2O has an oxygen atom), sugar and wood. The other half of that water slowly filters through the leaves and into the forest soils where it is "filtered" and is stored at "reservoirs" far below the surface where it is used for well water and supplies the constant flow of streams and rivers. Did you ever wonder how a river or stream can continue to flow even after a long, hot summer – thank the underground reservoir we call *aquifers* for that. These streams also flow to our surface reservoirs like Quabbin Reservoir that supplies most of the Boston area with drinking water. If you add up the half of all the rain and snow storms that the trees don't use but help us filter, that's about one half million gallons of drinking water per acre per year. Since we each use about 80 gallons per day, each acre of forest helps filter the water needs for about 19 people. This filtered water keeps us alive and also is worth quite a bit – remember the last bottled water you bought? Imagine how many of those it would take to fill up one half million gallons.

Low impact harvesting equipment and a new spruce forest after a harvest. Photos by Jennifer Fish.

Community Farming in Holyoke

La Finca is a community farm along the banks of the Connecticut River started by the non-profit organization Nuestras Raices. It was born out of a desire of the community to return to their farming roots to produce healthy food and begin new small businesses. La Finca houses a Beginning Farmers Training Program called Land of Opportunities. Small plots of land (1/8 acre - full acre) are rented to interested community members who are provided with support to start their farm businesses. Once successful on these plots, farmers move on to larger farm areas on the farm. Each summer the farm hosts a summer youth program, Siembra Siempre (always sowing) where 15 young people are employed for six weeks, working on the farm and learning agricultural skills.

Siembra Siempre team takes a break while working on the youth garden. Photo by Jonathan Surrency.

The land provides water, oxygen and wood for our houses and apartments, but what about food? Of the 5 million acres in Massachusetts, there are about half million acres in farms. Unlike the large corporate farms in the Midwest, Massachusetts farms are small and run by families. In fact, there are over 7,700 farms in Massachusetts. You may ask: where are they hiding all those farms? The answer is that they are everywhere and coming to a city near you. While some cities and towns have no farms yet or only a few, towns like Hadley have over 75 farms and Sheffield in

Farming for the Future - Helping Farmers Afford to Buy Their Own Farms

On February 12, 2014, Peter and Lynn Reading became the proud owners of their very own farm. Peter and Lynn, were able to purchased the historic 74-acre Hayward Dairy Farm in West Bridgewater, thanks to the combined efforts of the state and federal agriculture departments and the nonprofit Trust for Public Land (TPL). TPL purchased the property from Tara Realty Associates, a subsidiary of Tedeschi Food Shops, which had previously considered the land for several commercial developments. Following the purchase of the property by TPL, the Commonwealth purchased an Agricultural Preservation Restriction (APR) on the property. An APR means that the state owns all the non-farming value of the land so it can only be owned by farmers for all generations to come. Now, the land is not sold for the value of shopping malls and other development, but only for its agricultural value. Agricultural value allowed the Readings to purchase the property for a reasonable price.

Peter and Lynn Reading at their new C&C Reading Farm in West Bridgewater. Photo by Chris Chisholm.

Prior to purchasing C&C Reading Farm, LLC (new name for the Hayward Farm), the Readings operated Billingsgate Farm. The couple rented farmland in several different towns and would spend much of their day traveling to access their plots. Despite these obstacles, they grew their business from a small farm stand to a robust community farm. Their successful wholesale business includes sales to Whole Foods Market in the greater Boston area and other major grocery chains. Since purchasing C&C Reading Farm, LLC, they have cleared field edges, planted approximately 60 of the 74 acres and installed two irrigation wells.

"Farm land is becoming scarce in Massachusetts and across the country because there is more money in big development," said Pete. "We struggled for more than 14 years to buy a farm, but everything was too expensive. Then we got the opportunity of a lifetime. This is really a dream come true for us."

The Greening of Our Cities

DCR crews and the Chelsea Collaborative Green Team planting a tree in Chelsea. Photo by Kristina Pires.

Massachusetts nurseries, the state's largest agricultural business, grow trees and shrubs for planting in residents' yards and around businesses. In recent years, studies have shown that trees around residences help keep us cooler in the summer by shading homes from the sun and warmer in the winter by sheltering homes from the wind. Trees also keep a whole neighborhood cooler by reducing the "Urban Heat Island" (UHI) effect – where all the pavement and buildings absorb more heat, making cities much hotter than surrounding areas in the summer. The UHI effect is predicted to get much worse as the climate warms. The catastrophe of the Asian Longhorned Beetle (ALB) in Worcester, where 30,000 trees had to removed to stop the spread of this bug, also gave us an opportunity to test the benefit of trees. In the Greendale neighborhood of Worcester, over 700 homes had nearly all the trees removed over the winter of 2009 to help stop the spread of ALB. Researchers at UMass obtained the electricity use for the 700 homes for the summers of 2008 and 2009 and adjusted the "degree days" so they could fairly compare them. They found that with the tree canopy cover in the neighborhood reduced from 38 percent to just 8 percent afterwards, the electricity use increased by 37 percent. The reason for the increase was residents using much more air conditioning to stay cool without the trees. Based on this and other research, state environmental agencies, working with local grassroots organizations, have begun planting 15,000 trees in Chelsea, Holyoke and Fall River with the goal to cover 10 percent of the cities' neighborhoods with new tree cover. When fully grown in 30 years, these trees will save the average household over $200 every year on heating and cooling costs while also helping to create jobs needed to grow the trees in local nurseries and to plant the trees in yards and streets across these cities.

the very southwest corner of our state has 85. What do all these farms grow? The largest amount of land grows hay for cows and horses. Tied for second place is the land to grow fruit, vegetables and dairy products. The crop that brings in the most money to farmers is nursery plants, shrubs and trees. In fact in the past 20 years or so, Massachusetts farms are on the comeback from their peak in the early 1900's when they supplied most of our food. The increase in healthy eating means that many Massachusetts residents are looking locally for their food and

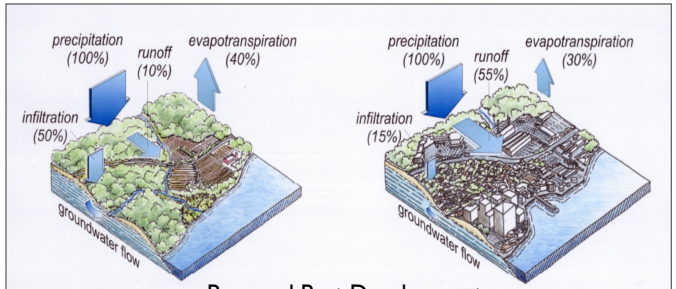
A Food Vision for New England

Groundwork Lawrence Green Team prepares a new urban farm. Photo by Brad Buschur.

Recently, a team of experts from colleges around the six New England states created "A New England Food Vision", which created a roadmap "for 50 by 60" by growing 50 percent of New Englanders' food locally by 2060. The report shows how the two million acres of farmland in New England currently provides only 12 percent of our food – the rest is imported from all over the world at a high environmental cost. For example, the food supplied to the 14.5 million New Englanders is grown on 11.4 million acres – that's an unbelievable 1,100 acres of farmland all over the world to provide food for each resident. On the average, the food we eat comes from 1,500 miles away. The good news is that if we expanded our New England farms from 2 million acres to 6 million acres and put New Englanders on a healthy diet as recommended by the U.S. Department of Agriculture, our individual "farm footprint" could be reduced from 1,100 acres each down to 670 acres and we could grow 50 percent of our food in New England. This small change would save 4.5 million acres of forests around the world – an area nearly the size of Massachusetts – from conversion to industrial farmland and keep those forests working for all of us.

Water Pollution in the 21st Century – Everyone is the Problem and Everyone is the Solution

You now know how important forests and trees are to keeping the water we drink clean. If all land was covered with forest, we'd have very clean water to drink but we wouldn't have anywhere to live or go to school. The challenge in keeping our rivers, streams, ponds and bays clean is how we build and maintain our homes, schools, businesses, roads and parking lots. In the past, sewage was the biggest source water pollution. The passage of the Clean Water Act in 1972 began the upgrade of all our sewage treatment plants for all our cities and towns. At this point, modern sewage treatment plants reduce most of the impacts to waterways. We still need further improvement in reducing the nutrient pollution from these plants that causes algae blooms that reduce oxygen in waterways.



Pre– and Post Development

Today, the largest threat to our waterways is from stormwater pollution. This pollution happens when a rainstorm washes all the pollution that collects on pavement into storm sewers that flow directly into our rivers. The pollution that is washed off pavement includes oil and gas drippings from cars, chemicals left as car tires wear off on roads, dirt and mud on roads and construction sites, pet waste and many other chemicals and pollutants that end up on roads, parking lots and sidewalks. Keeping this type of pollution out of our waterways is a difficult challenge, much more difficult than the decades-long process of upgrading our sewage treatment plants. The solution to stormwater pollution involves adding more green infrastructure and grey infrastructure. The "green" approach means changing how water flows off pavement so it can be filtered by grass, trees and soil and reducing the amount of pavement – basically sending the stormwater to natural filtering areas. The "grey" approach means installing thousands of storm drains that can collect oil and gas to be later cleaned out and storing huge amounts of stormwater in expensive underground tunnels so that it can be treated later in sewage treatment plants. The full solution involves both the "green" and the "grey" solutions.

supporting an ever-increasing number of farmers markets, with 254 at last count and the newest and largest one coming to Boston next year. This means healthier diets for us and more jobs for farmers in Massachusetts.

There are 5 million acres composed of 3 million acres of forests, 1 million acres for our apartments, houses and roads and a half million acres of farms. So you may be wondering, what is on that last half million acres so it all adds up to five? Well, about half is not land at all but our 3,000 lakes and ponds and 11,740 miles of rivers and streams. The remaining portion is unforested wetland areas. Abundant lakes, ponds, streams and wetlands are one benefit of so much rain and snow. Luckily, Massachusetts has lots of forest to help filter this water. The challenge for us is not a shortage of water like in California or Texas, but keeping the water that our forests filter clean from the pollution caused by water that runs off our sidewalks, streets and parking.

Are there other important things that the land of Massachusetts provides other than oxygen, water, food, wood for shelter and a place to live? I guess you might say we're already asking a lot from our land, but there are two more important things our land gives us. First, land offers a place to play and get away from the stress of all that pavement and traffic. That's pretty easy to do if you live in Warwick, Washington or Windsor, but

not so if you live in Chelsea, Charlestown or Cambridge. That's where turning acres into basketball courts and playgrounds comes in handy. Just as important as having land for clean air and water and food is having land for relaxation. A recent survey of residents young and old across the state found that parks and open space near our homes is really important to us. Having a park or trail a short walk from our homes is not only good for our mental health, it's good for our overall health Our land gives us healthy food and clean water and a place to exercise, what more can it do?

How Parks Can Improve Everyone's Health

So we know that on the one-fifth of the state where we live there is about one basketball court's worth of land for each Massachusetts resident on average. However, in our cities the average yard for children to play in is much smaller or may not exist at all. That's where we need to be sure that each resident, especially our children, have close access to a basketball court-sized piece of land, like a park, playground or even a basketball court.

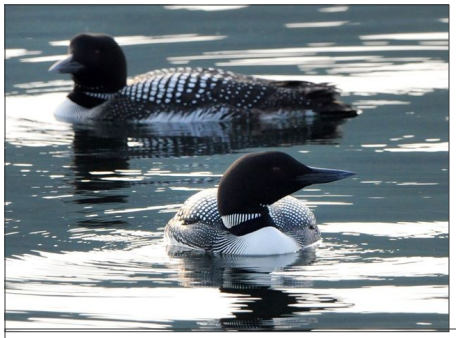
A national study by the RAND Corporation looked at the connection between physical activity in adolescent girls and how close they lived to parks and schools. Researchers found that girls who live close to parks participate in more physical activity than those who live farther away. Another RAND Corporation study found that Los Angeles residents who live near parks visit them and exercise more often than people who live further distances from green spaces. The Center for Disease Control estimates that a difference of 100 calories of exercise per person per day, such as a 20 -minute walk or 20 minutes of sports, could eliminate the nation's obesity epidemic.

Grand opening of Holyoke's new skate park. Photo by Stephanie Cooper.

There are thousands of species of plants and animals that call Massachusetts home and many have been here long before us. We have so much variety in our land, from coastal dunes to rocky mountain tops to lush river valleys, creating variety in the types of plant and animal species. We have so many different collections of plants and animals that we have more "natural communities" than we do human communities. The final value our land gives us is life, from black bears and deer to hundreds of bird species to thousands of insects and delicate flowers to mosses and lichens to mushrooms. What are the benefits of life, also known as biodiversity, to residents of Massachusetts? Now that we've seen how forests and farms keep us healthy and happy, what does it take to help our forests and farms to be healthy and productive? Our forests and farms need lots of species to be healthy. It takes a community of species for a forest or farm to work properly. For example, a forest needs to hold the soil from washing away and that takes more than 200 large trees on an acre, as well as mosses, grasses. seedlings, shrubs and rotting plant materials known as "forest duff." The duff is like a super sponge in that no matter how hard it rains, it keeps soaking up the water without erosion. Each plant has adapted to certain soil types and conditions, so it takes a variety of plants to properly live on each acre of forest. This is in addition to the bacteria, fungus and insects that turn dead plant material into new soil. Wildlife also helps by eating plants, spreading the seeds and pollinating the flowers. And though a field of sweet corn may look pretty simple, even that takes an army of insects, birds, worms,

fungi and bacteria to keep that field growing productively. Biodiversity isn't just nice to have, it's necessary for our forests and farms to keep working.

Why Protect Biodiversity



Loon pair. MassWildlife photo by Bill Byrne.

Even in our modern high tech world, we rely on discovering new products from the natural world such as industrial products, medicines or biofuels. With a changing climate, farmers are moving away from planting one crop on thousands of acres. They are planting a wider assortment of crops, relying on bees for pollination and experimenting with natural pest control. Medicines and drugs are often first discovered in the natural world, such as aspirin and caffeine, before being recreated in laboratories. Medical breakthroughs based on plant extracts are still occurring today. For example, an extract of the Pacific Yew Tree was proven to have significant therapeutic benefit for a number of cancers in the early 1990's. Additionally, cosmetics, cleaning supplies and industrial products are all made with plant and animal-derived ingredients. A recent discovery of a soil microbe at the Quabbin Reservoir was found to consume wood and emit ethanol as a direct byproduct; 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, bird watching, 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 because of the protection of diverse environments.

What does conserving land have to do with climate change? Climate change is expected to have important impacts to our forests, farms and habitats across the state. Intense rain storms are likely to increase causing more flooding, especially where paved and developed areas already increase storm flows. Summer drought conditions will more likely be straining our public water supplies and putting additional stress on plants and animals. Longer growing seasons will mean species normally at home in states to our south will be more at home here. We're already seeing changes to our plant and bird species where we have long term records. Invasive plants and bugs will also expand in this changing landscape – bugs that threaten our hemlock, ash and maple trees have already benefited from the less harsh winters. For farmers, there will be challenges, but also longer growing seasons, allowing them to grow new crops and produce more food. Harvard University and the Smithsonian Institute recently did a study looking at the changing landscape of Massachusetts and how our future actions may impact these changes. Over the next 50 years, how we develop the land will have a larger impact on our forests, farms and habitats than the changes to the climate. They found that by focusing development around our cities where we already have roads, water supplies and other infrastructure, the impact on our rivers, habitats and forests would be significantly reduced. They also found that by increasing "improvement forestry", where local forest products are harvested while improving forest and habitat conditions, our forests would continue to take carbon out of the air at our current rate while

providing more wood for buildings. A similar study for farming was done looking at how New England could produce more of its own food and found that we could significantly increase the percentage of food produced locally by expanding farms while protecting our forests. An important benefit of this would be saving a Massachusetts-sized area of tropical rain forest from being cleared to provide food we can produce locally.

Neighbors Team Up to Protect Leyden's Last Dairy Farm

O'Neil property in Leyden. Photo by Tom Wansleben of Mount Grace Land Conservation Trust.

Neighbors in Leyden, a small town on the Vermont border, joined together two years ago to protect more than one square mile of land surrounding Bree-Z-Knoll Farm, a family-run dairy that started in 1972 as a child's 4H project with two milking cows. Reached by cell phone on his cultivator, farm owner Warren Facey described the family as "very excited about being able to protect this land," adding that "there were 16 dairy farms here when we started and we're the last one. This is an opportunity to invest in the farm and help make sure that Bree-Z-Knoll will be a farm forever. It won't just be growing houses, like a lot of the land out here." This year, the farm will produce approximately 400,000 gallons of milk from 170 milking cows. The family plans to acquire more protected farmland soon with the proceeds from the land conservation project, reducing the current farm expense of leasing cropland.

Protecting Bree-Z-Knoll Farm is the final step in a two-year effort to secure the rural character of Leyden and 28 jobs in this town of 700, which is almost 10 percent of the jobs in town. "From the first neighborhood meeting, it was clear that the people who showed up really cared about their town and each other," said Sarah Wells, Land Conservation Specialist at Mount Grace Land Conservation Trust. "This was a unique experience because we were part of a larger story that involved supporting people's livelihoods. From the farm, to the firewood that the Hall brothers gather in the woods, to the maple taps on Paul and Karen O'Neill's land, to the continued ability of Spirit Fire and Angel's Rest to draw visitors to Leyden, this project made sense ecologically and economically."

Warren Facey looks out across his conserved farm. Photo by David Kotker.

Warren asked his neighbors to join him by protecting their lands as well. In a show of incredible community spirit and generosity, 10 neighbors moved forward in pledging significant gifts of land with help from Mount Grace, Franklin Land Trust and the New England Forestry Foundation. Funding came from the new state Landscape Partnership Grant Program, the new Open Space Institute's Resilient Landscape grant and the generosity of the landowners and town residents. The protected lands offer diverse landscapes created by steep hills and streams. A recent study by The Nature Conservancy indicated the area is likely to be highly resilient in the face of climate change.

What have those dedicated to the conservation of land and parks accomplished recently?

Massachusetts has more non-profit land trusts per capita than anywhere else in the world with over 100 organizations dedicated to land conservation. Most of our 351 cities and towns have active open space or agriculture committees or Community Preservation Committees that work on conservation projects each year. All 351 communities have Conservation Commissions where over a thousand volunteers work on land conservation projects as well as other important environmental protection work. Four state environmental bodies work on land conservation projects – the Departments of Agriculture (farm preservation), Fish and Game (wildlife conservation), Conservation and Recreation (forest and recreation conservation) and the Executive Office of Energy and Environmental Affairs (supporting all of our partners in land and park conservation). Over the past eight years during Governor Patrick's two terms, 127,392 acres (199 square miles) was permanently conserved. That means one in every 10 acres of the 1,283,600 acres of the state's permanently protected open space has been protected during the Patrick Administration. This accomplishment was possible thanks to the tireless work of the "land team", which is made up of community volunteers, staff of dozens of land trusts and state agencies and funding support from the state ($390 million in the past eight years for land and park conservation), local and federal governments, local community foundations and especially local fundraising by land trust and community groups and the generosity of landowners. As you already know, all land does not have the same value to society. Certain land is able to provide more benefits to people such as offering recreation, cleaning water and growing food. The land team uses computer mapping technology to locate land with the highest value for all these attributes. With this useful technology, we can analyze the benefit of protecting this area of land for present and future generations.

Boston's Dennis Street Park – a collaboration of the community, city and EEA. Photo by Aldo Ghirin.

Map and analysis by Ben Smith, EEA

Outdoor Recreation Close to Home: The Patrick Administration has created or renovated over 210 new parks. Together, the parks and conservation land are within a 10 minute walk (1/2 mile) of 1.7 million Massachusetts residents – that's 26 percent of the population. Of those lucky residents, about half live near a new park and half near a new conservation area. That's important because a recent statewide survey in Massachusetts found that eight out of 10 people walk, jog or run outside several times per week – by far the most popular outdoor activity. This survey also found residents prefer to recreate close to home, most walking or bicycling to a park or conservation area for exercise. In the survey, 58 percent of minority residents expect their outdoor recreation to increase in the next five years, which is a much higher

percentage than other residents. The focus of much of the new park construction has been in Environmental Justice areas, which are neighborhoods with higher percentages of minority, low income or non-English speaking residents. Of the 2.2 million residents who live in Environmental Justice neighborhoods, 832,000 or 37 percent live within a 10 minute walk of a new park or conservation area.

Clean Drinking Water: The Patrick Administration has also protected 8,769 acres (14 square miles) that surround and drain into public drinking water wells and 21,880 acres (34 square miles) that surround and drain directly into public surface reservoirs, such as Fitchburg's Scott Reservoir pictured below. Beyond these public water supplies, 76 percent of the 199 square miles is forested, helping clean water resources within those watersheds where residents swim, fish and walk and to conserve the many wildlife species that depend on clean and plentiful water. Overall, about 90 percent of residents get their water from public water supplies, while the rest have private wells. For those who use public water supplies, about a third depend on public wells and the rest on public surface reservoirs. This forested land protects our drinking water from contamination and the forests are an added natural filter for the water we drink as the leaves, trunks and especially the forest soils naturally filter and clean water. The forest floor contains a thick mat of old branches and leaves that act as a natural sponge allowing even heavy rain storms to slowly filter into the soil. The water then filters through many feet of soil and enters underground streams that constantly feed the streams that flow into our reservoirs. That's why our rivers and streams flow in the summer long after the last rain storm. It's these underground "streams" that our public wells tap into. In Massachusetts, we get about 40 inches of precipitation each year. This is more when compared to many other places in the country or the world, like Tucson, Arizona with 11 inches or Cairo, Egypt at just one inch. Of these 40 inches of precipitation, about half is used by the trees to make oxygen, remove carbon dioxide and make wood and half filters through the soils to the underground "streams" to our streams and reservoirs. This means that each acre of forest near a reservoir or well filters and protects 543,000 gallons of drinking water per year. At 80 gallons used per person per day, that one acre provides the drinking water needs of 19 people. As we pay an average of $5 per thousand gallons for drinking water delivered to our homes, each forested acre we protect is providing $2,500 worth of water each year. If we figure the value to us today for this $2,500 value for years and years into the future what is called the *present value* – it is worth over $60,000 per acre to us now. This doesn't account for the carbon removed, wood produced and habitat provided by that acre of water supply forest – overall well worth investing for present and future generations.

Fitchburg's Scott Reservoir. Photo by Brandon Kibbe.

Habitat for Wildlife: The Natural Heritage and Endangered Species Program (NHESP) within the Division of Fish and Wildlife watches over the biodiversity of Massachusetts, so they have experts in all the categories of plants and animals and know much about species with declining or

endangered populations. NHESP developed the award-winning BioMap 2 that maps the most important habitat areas in Massachusetts as a guide to land conservation for all the land team. BioMap 2 includes sophisticated analysis of habitats in the changing climate and incorporates the UMass Amherst acclaimed Conservation Assessment and Prioritization System landscape analysis model that looks at each acre to see its potential as good habitat. From 2007-2014, 81,231 acres of the highest rated habitats in BioMap 2 were permanently conserved by state, municipal and land trust partners. This represents 64 percent of all land conserved during this period. This is a high percentage given the priority to also conserve farms, parks and drinking water supplies that may not be top habitat areas. It shows that the land team is not just protecting any land, but focusing on the very best habitat areas. While the BioMap 2 looks at important habitats across the state, the land team has also selected 10 large forested landscapes that are the most outstanding large habitat areas in the state, called Habitat Reserves. All together these 10 areas include 700 square miles in places like Mt. Greylock, Myles Standish Forest and Douglas Woods. Over the past eight years of the Patrick Administration, 23,805 acres within the Habitat Reserves were permanently protected.

Habitat on the Flagg Mountain acquisition by DFG/DFW in partnership with Franklin Land Trust, Franklin Regional Council of Governments and MassDOT, MassWildlife photo by Ralph Taylor.

Local Farming and Forestry: Massachusetts has hundreds of farm and forest businesses that sustainably grow food and wood. However, only about 12 percent of the food consumed by residents of the six New England states is grown here and only about two percent of the wood used in Massachusetts is grown here. Supporting local farming and forestry businesses means fresher food, more local jobs in our rural towns and a lower carbon footprint for all of us. On the average, food we consume comes from 1,500 miles away, wasting significant amounts of transportation energy. Plus, the food and wood grown elsewhere is often produced in unsustainable ways that have large impacts on the world's health. Land conservation, especially when using conservation restrictions (CR), pays farm and forest business owners the amount they would have received for developing the land to instead maintain the land permanently for farming or forestry use. Conservation restrictions also keep the land in private ownership, paying taxes to communities and creating local jobs while improving the farm and forest land for future farmers, foresters and communities. During the Patrick Administration, Agricultural Preservation Restrictions have been purchased on 11,361 acres of farms by the Department of Agriculture (DAR) and its partners and these farms support about 192 jobs. DAR also offers Farm Viability grants to dozens of farmers to help them with marketing, equipment and other assistance to expand farm operations. Under Governor Patrick, this

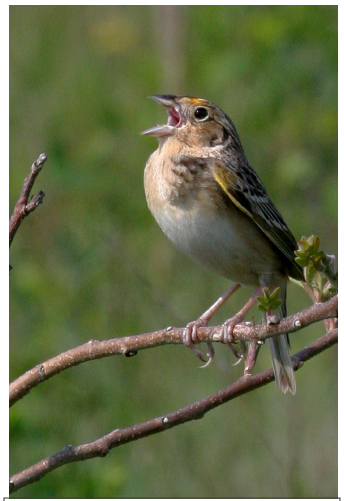
Three generations of the Sibley family celebrate the conservation of the family farm in Spencer. Photo by Charlie Wyman.

program has assisted 135 farms to improve and expand. This program also includes a 10-year covenant to assure the farm stays in farming during this time. These farms protect 12,683 acres and provide 591 jobs. During the Patrick Administration, over 104,000 acres of forest were permanently protected by acquisitions for new state forests or wildlife areas or through CR's on private forest land.

The Working Forest Initiative –Supporting Sustainable Forestry and Rural Jobs

In 2009, the Department of Conservation and Recreation (DCR) launched the Working Forest Initiative, which provides a range of assistance to forest landowners. Since then, 10-year sustainable forest management agreements have been completed with 1,647 private land owners and133 town forests in 69 cities and towns. This is in addition to the 199 square miles of permanently conserved land. These agreements include an inventory of the forest (health, forest types and size, habitat potential and productivity) by a private professional forester. The forester works with the landowner to develop goals for their forest entailing wildlife, forest health, trails and forest products, and develops a plan for reaching their goals via habitat creation, improvement harvests or other actions. The 124,000 acres of forest with 10-year agreements is an area equal to a square of forest 14 miles on a side – only broken up into a 1,780 pieces in almost every community in Massachusetts. Of the 124,000 acres, about 66,000 acres are in BioMap 2 focus habitat areas, 13,000 acres are in the ten Habitat Reserves and 18,000 acres drain directly to public drinking water reservoirs or wells. A new initiative is helping forest owners to create habitat for 12 species of birds with declining populations. This program works with bird experts to analyze private forests for creating habitat for one or more of these birds based on the owner's preference. Then the forest plan focuses on creating that needed habitat (more shelter or food for these species), while often also helping the local economy through the required forestry work.

Private forester Mike Mauri consults with DCR forester Helen Johnson. Photo by Jennifer Fish.



Grasshopper Sparrow. Mass-Wildlife photo by Chris Buelow.

A study of landowners in this program found that more than two and a half times as many did forestry operations to implement the plans compared to the owners not in the program. These forestry operations employed foresters, harvesters and mill workers to turn these harvests into forest products used to construct homes we all live in. A recent study of managed woodlands in New England found that for every 1,000 acres of forest, eight forestry jobs are created for foresters, harvesters and mill workers. Thus, the 124,000 acres in this program support nearly 1,000 jobs. Because these jobs are principally in rural communities, they are a significant part of the rural economy. For example, there are about 125,000 residents of communities with less than 2,500 residents – our small towns. As a rule of thumb, about half of the population is employed so that's about 64,000 rural jobs. The Working Forest Initiative is an important part of the rural economy and helps improve wildlife habitat and forest health, protects our water supplies and keeps forests as forest so the 25 million or so trees in these forests can keep removing carbon and producing oxygen for us all. That's enough trees to supply oxygen for 50 million people per year and the equivalent of taking 50,000 cars off the road each year.

Red oak sawlogs on landing in Phillipston. MassWildlife photo by Bill Byrne.

Creating Habitat and Wood Floors

In 2014, the Division of Fisheries and Wildlife (DFW) opened a new no-net energy headquarters building in Westborough. Flooring and railings for the building came from two harvests on DFW Wildlife Management Areas. The oak flooring came from a harvest in Phillipston that created young forest habitat and enhanced blueberries for a wide variety of birds. The cherry railings came from a harvest in Cheshire to restore abandoned fields and enhance shrubland habitat for declining songbirds like Eastern towhee and brown thrasher and for gamebirds like American Woodcock and ruffed grouse. Massachusetts wood producers did all the harvesting and processing to turn the standing trees into beautiful flooring and railings throughout the building.

Rough cut cherry boards. Photo by Bill Byrne.

EEA land team. Photo by Jennifer Soper.

What Can You Do to Help?

The land team is gaining fresh volunteers and staff from a new generation of land conservationists. Over the next several years, it will become more and more important for these new inspirational leaders to take the reins to lead land conservation as it faces new and complex challenges. Rather than list ideas for how young people can help the land, here are some examples of what a few of the hundreds of young volunteers are doing all across Massachusetts. Many of these young volunteers are choosing to go to college in the environmental field and joining the land team right here in Massachusetts. The future care of our land is up to this new generation and the future looks very hopeful.

Annual Community Open Space Conference organized with the help of MassLIFT members. Photo by Sarah Wells.

Naomi Leigh Desilets. Photo by Russ Anderson.

Conserving Worcester

Naomi Leigh Desilets is a graduating senior in the environmental program at Worcester Technical High School. She interned with Greater Worcester Land Trust and Heifer International, a non-profit that provides farm animals to people all over the world. She also helped with planting and harvesting at the Community Harvest Project and was on the Envirothon Team for four years. She was the class valedictorian and on June 11th she shared the podium with President Obama at her class graduation. She is now majoring in environmental science at UMass Amherst.

Emma Walsh. Photo by Michele Grzenda.

Educating Residents about Conservation Land

As part of her high school senior internship with the Weston Conservation Commission, Emma Walsh designed and installed interpretive signage at three conservation areas in town: Cat Rock an 80-Acre Conservation Area, Jericho Town Forest and College Pond Conservation Area. The new signage includes a trail map along with information on the Conservation Commission, Weston Forest and Trail Association and Weston's Dog Bylaw. Quick Response (QR) codes were developed for visitors to scan with their phones so they can learn more about these organizations and Weston's dog walking rules.

Grace Stroman (right) assisted by Kristina McHalet. Photo by Martha Moore.

Blazing Trails on Conservation Land

Grace Stroman of Reading did her Gold Award project for Girl Scouts on the local conservation land. She researched what was available at each piece of conservation land in town, presented that information at a public meeting and in a book she authored that was published and made available, with copies on loan in the public library. With the help of fellow students, she also created a new entrance to the trail system into the Town Forest, working with the Department of Public Works (DPW) to create a curb cut, clearing a path and painting blazes on trees. Jarrod Talluto-Hayes created a self-guided nature trail through the Town Forest in Reading. He installed sign posts along a loop of trail with identification information of trees along the trail.

Both students are members of the Reading Envirothon team. The Envirothon is an annual competition of more than 40 high school teams that compete in their knowledge of forests, wildlife and soils as well as environmental community involvement.

Jarrod Talluto-Hayes and his fellow trail blazers. Photo by Martha Moore.

Groundwork Somerville expanding an urban farm. Photo by Luisa Oliveira.

Green Teams Create New Urban Farms

The DAR recently launched an Urban Agriculture Grant program to support partnerships with many vibrant urban agriculture programs. Young workers from the Groundwork Somerville Green Team helped with the success of the first growing season at South Street Farm #2, a parcel of land that extended the original South Street farm and expanded Somerville's Food Triangle project. This is one of eight projects funded with DAR's Urban Agriculture grant program. The Food Triangle project has added to Somerville's local food network. The South Street Farm expanded from an existing 4,000 square feet of growing space to a total of 16,000 square feet of growing fields, with a 600 gallon water catchment system and back up water supply as well a greenhouse that enables all-season production. It is anticipated that the expanded South Street Farm will produce more than 1,500 lbs. of food per year

MassLIFT AmeriCorps – Connecting Communities to the Land

MassLIFT is a partnership between local conservation organizations with the federal government to support recent college graduates provide service to communities for land conservation, stewardship and education. The program was launched in 2010 by the Mount Grace Land Conservation Trust (MGLCT), a regional land trust in Central Massachusetts with financial and organizational support from the Corporation of National and Community Service and the Massachusetts Service Alliance. From 2014 to 2015 MassLIFT is hosting 21 AmeriCorps members at 16 conservation organizations across Massachusetts. AmeriCorps members serve for one year and work with communities, landowners and conservation organizations to care for conservation land, complete new conservation projects and coordinate service learning and education projects with schools and communities. **Here are just four stories, in their words, from MassLIFT members:**

Katie Bekel and her GWL Group. Photo by Leigh Youngblood.

Katie Bekel, Service Learning Coordinator, Groundwork Lawrence

With the help of my land trust, I have gained valuable experience teaching individuals of all ages. Before coming to Groundwork Lawrence (GWL), I had some experience working at a youth development nonprofit, but I have since had the opportunity to greatly improve my teaching skills both as a environmental educator teacher in Lawrence public schools, as a leader for GWL's high school employment program Green Team and finally as a workshop leader for community gardeners. This last project has been extremely rewarding for me, because it was forged from my own interests and has been a great way to interact with members of the community and create a collaborative learning environment where gardeners can share their experiences, tips

and advice. I have been interested in farming for some time and this project allowed me to dig into the topics of plant and soil science (that I have never formally studied) in preparation for my workshops. I think I have become more enamored with farming as I have been researching and learning more. It is an interesting field because to succeed you need to have both some practical experience as well as some understanding of the science behind what causes successes and failures.

I have worked with GWL staff to create a series of five workshops that combine a discussion of agricultural and gardening skills and a portion on leadership skills to create both knowledgeable and driven gardeners that can help each other effectively. It has been extremely helpful to learn about the challenges that gardeners face and hear the solutions that they have collectively come up with. Recently, we graduated about eight gardeners that have attended all of the workshops and recognized their commitment to their community formally. I was extremely nervous for my first workshop because teaching adults is very different from teaching students, but I found a great network of people that has taught me a great deal.

Nathan Grady, Children's Literature Project, East Quabbin Land Trust

Nathan Grady. Photo by Leigh Youngblood.

"Where once a beautiful forest stood and supported a diverse array of creatures, there is now an ugly development." "Where once children splashed in the clear mountain stream, there is now just a trickle of sludgy black muck." "Where once the farm was quaint and productive, now invasives run rampant across the abandoned fields." Pretty bleak outlook for children's books morals, huh?

That's what I thought too. In fact, children's books that address conservation ideas and still maintain a positive perspective are surprisingly rare. Yet who will manage the CR's a few decades down the line? Who will carry out the stewardship on all the millions of acres being conserved right now, if not today's youth? You may say, if the children don't find it when they're young, they'll just come to it when they are of age. No problem." Yet almost every major environmental thinker or activist in history, anyone you can name, from John Muir to Aldo Leopold, Rachel Carson to E. O. Wilson cite early childhood exposure to the outdoors and to basic environmental morals as a major influence in their lifelong dedication to preserving and safeguarding the natural world. With that in mind, we at the East Quabbin Land Trust thought it time the conservation movement deliberately reached out to a younger audience and did it with a tale of empowerment instead of despair. Recently, I have been writing and illustrating a story that I hope will do just that — Woody Pondmaker – A Tale of Finding a Home for All Creatures.

Being able to productively merge my artistic side with my passion for conservation is a unique opportunity indeed. This type of diversity of engagement is another in the long list of things that has made my AmeriCorps experience such a rich and worthwhile one. I can only hope

that the product of my service, in this case my children's book, will have as positive an impact on its readers as the process of creating it has had on me.

Sarah Wells, Regional Conservationist, Mount Grace Land Conservation Trust

The first landowners I met with to discuss conservation were the Haughtons. My first site visit was on their property. The first town board members I engaged with were a direct result of this project. The first conservation restriction I read, the first grant I helped with (the first successful LAND grant for this tiny town), the first deeds I researched…all for Haughton's project. Next month, hopefully I'll be attending my first closing. Beyond the crash course in due diligence and "legalese" this project provided me, this is also the first one I feel truly invested in.

The Haughton property, 97 acres in Phillipston, gets a lot of points on the conservation values scorecard. It has BioMap habitat, is adjacent to protected land, contains the shoreline of an incredibly important wetland system and even has an interesting history as an apple orchard. I could recite the book and page numbers of the deeds associated with the project and the project budget is perhaps permanently ingrained in my memory. I also know the name of the family dog (Buffy) and have watched her grow up from an adorably floppy puppy into a rambunctious young dog. I know her favorite stick to play fetch with and I've been regaled with stories about salmon fishing on family trips to Alaska. I've heard Reggie and Mel gush about their grandchildren and their daughter's penchant for painting detailed scenes on large apples. I know that Mel is quite the cook and that Reggie gets a big kick out of setting up wildlife cameras in the orchard and seeing which critters show up. When I stopped by recently to have them sign some forms, they asked if I wanted to come in for dinner.

Serving for a second year was the best choice I could have made. I have had the privilege of learning first-hand that conservation is about relationships. I've gained practical experience in realizing that conservation is not just about land, it's also about trust and mutual investment in reaching the landowner's goals. Five, 10, 20 years from now, I hope to stop by Baldwin Hill, wave to Reggie, Mel and Buffy and take a walk down to the Thousand Acre Brook for a picnic by the water. Maybe the herons will still be there and I'll hear the occasional slap of a beaver tail on the water's surface. I hope I'll still be able to find the patch of big beech trees with smooth bark and hear the sharp cry of a red-tailed hawk soaring overhead. Even if I don't, I'm comforted today by the idea that once this project closes, the herons, beaver, beech trees and hawks will forever be welcome on this land.

Footnote: Since completing her second year in MassLIFT, Sarah has been hired as a Land Conservation Specialist at Mount Grace Conservation Trust and was instrumental in the success of the Leyden Landscape Breezy Knoll project highlighted above and is now working on the even larger and more complex 3,000+ acre Quabbin to Wachusett Project.

Kelly Wheeler, Service Learning Coordinator, East Quabbin Land Trust

As my service in AmeriCorps draws to a close, I am thankful for all I have received in the process. It has given me the opportunity to teach the community about growing their own food, it has given me the confidence to teach others and know that I don't need to have all the answers.

Kelly Wheeler and friends. Photo by Dede Hay.

At the time, I felt passionate about creating change in the food system but I didn't have a strong voice. I decided to start small. I already grew my own food but I felt that in order to achieve real change I needed to educate others. I was petrified to have to eloquently present my message in a way that would be meaningful to people. I didn't think anyone would take me seriously. I felt the best place for the most powerful change would be in the schools. Surely they would want my help to get better foods in the cafeteria and create a student run garden. It turned out that the seemingly simple act of starting a garden and eating the food that grew was too much for many schools to handle. During the past two years of my service at the East Quabbin Land Trust, I have been fortunate enough to build several gardens with youth and teach them all about our natural world. I was able to help them experience not only how to grow their own food but how to cook and preserve it. I have met wonderfully passionate teachers who have spent their own time and money to get garden projects off the ground because they truly believe it to be incredibly meaningful to their students. I have worked with children who have struggled behaviorally in the classroom and blossomed in the garden. And I have seen with my own eyes that children will eat vegetables from the garden that they grew themselves with enthusiasm and pride.

I have also found my voice. Recently, I testified at a hearing to create legislation to label GMO's. Before I met Cynthia and began the AmeriCorps program I was afraid to speak out. Now I realize that the biggest crime is for people who see injustice and wrongdoing to stay silent. Margaret Mead said, "never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has." I am one of 20 AmeriCorps MassLIFT members working all across the state to create positive change in the communities they serve. But we are not special; you too can save the world. Just start small, find your voice and don't be afraid to use it! Thank you to the East Quabbin Land Trust community for all your support.

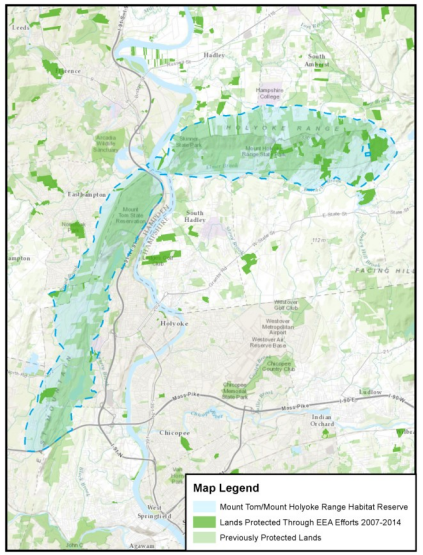
Ben Wright, Land Conservation Specialist, Kestrel Land Trust

In 2011, I moved out to western Massachusetts to work for the regional non-profit Kestrel Land Trust. I had just completed a graduate program in Worcester after four years of working with local land trusts and serving in AmeriCorps Cape Cod. The opportunities for large scale conservation were new to me, having spent most of my time living east of the Massachusetts 495 corridor or in the suburbs of Kansas City beforehand. It was readily apparent though, that Kestrel's ability to accelerate the pace of conservation in this region to 1,000 acres per year would rely on strong state partnership.

Workshops on conservation financing or fundraising often start by describing how small the conservation slice is out of the charitable giving pie. The Patrick administration's commitment to funding state grant programs has been key for this reason, particularly during a recession when donations were scaled back. One of these grants, the Landscape Partnership Grant, has been a real game-changer in western MA. I joined Kestrel just after 3,400 acres were preserved with this grant on Brushy Mountain in Leverett but have been fortunate enough to put it to use, with many partners, to conserve over 1,000 acres along the Mount Holyoke Range.

Located in the heart of the Pioneer Valley, the iconic Mount Holyoke Range crosses five towns as it rises west of the Quabbin Reservoir and descends into valley farmland along the Connecticut River. The new 1,000-acre conservation project represents some of the best lands this region has to offer including rugged woodland slopes and historic farms. Right at the western edge of the Range lays Barstow's Longview Farm, aptly named because it has been a working dairy farm in the historic Hockanum village of Hadley since the early 1800s and is now being preserved with an Agricultural Preservation Restriction. Barstow's has been eager to innovate; they added a store and café in 2008 and just installed the state's second anaerobic digester next-door this past year. Coincidently, that café was one of my first coffee stops as a new resident in the Pioneer Valley. It turned into one of my early farmland projects at Kestrel and the scenic floodplain farm remains one of my favorite spots.

Ben Wright holding a Kestrel chick. Photo by Chris Volonte.



Land permanently protected in and around the Mt. Tom/ Mt.Holyoke Range Habitat Reserve under the Patrick Administration. Map by Ben Smith of EEA.

123 acres of the 7th-generation farm are being preserved with funding from the federal Scenic Byways program, the MA Department of Agricultural Resources, and the USDA-NRCS, but that effort was magnified by the Landscape Partnership Grant, which leveraged matching funds from EEA, DCR, and Kestrel Land Trust to protect many more acres across the Range. The other 880+ acres were aggregated from a dozen different landowners across the Range; a feat that would not have been possible to do all at once without the state grant. Having this type of funding available has spurred Kestrel and other regional land trusts to undertake large scale and long term project planning that hasn't been feasible in years past. The chance to work on these landscape-level conservation efforts has been my favorite part of the job over the last three years and is something I hope more young conservation professionals will have the opportunity to expand.

Contributors to the Report:

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