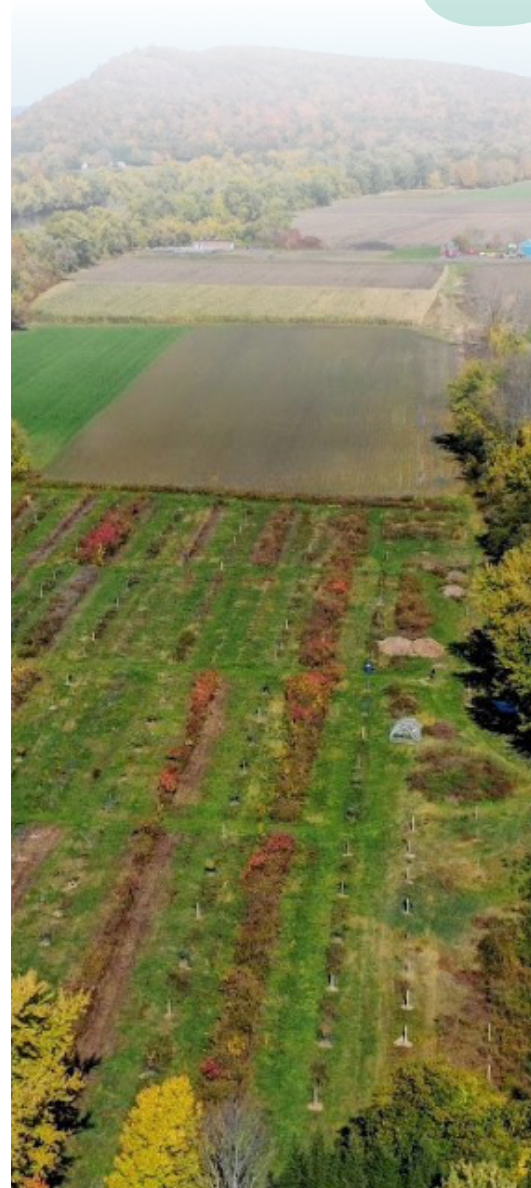
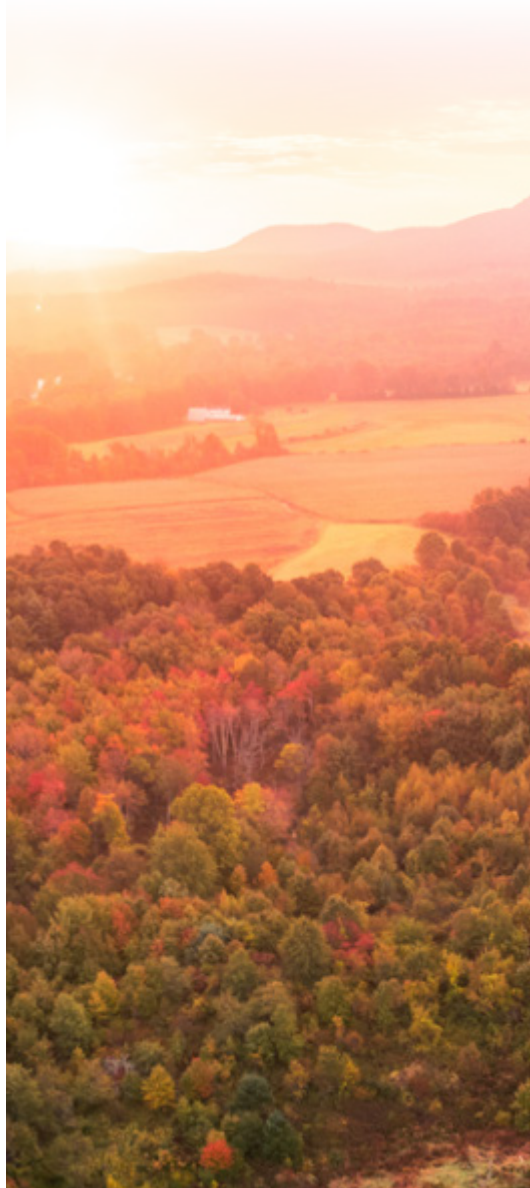




**Resilient Lands  
Initiative**

# Expanding Nature's Benefits Across the Commonwealth

A Vision and Strategy







## Resilient Lands Initiative

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A Vision and Strategy

JANUARY 2023



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# Executive Summary

The Resilient Lands Vision is to protect and improve the quality of life for residents of every Massachusetts community through land conservation and stewardship initiatives that conserve and enhance the health of the forests, farms, and soils. These critical resources protect human and natural communities, provide drinking water and food supplies, enable healthy outdoor recreation, power a green economy, support municipal fiscal stability, protect wildlife habitat, sequester and store carbon, and reduce vulnerability to climate impacts such as urban heat islands, flooding, sea level rise, drought, and air and water pollution. The economy of Massachusetts, along with the health and welfare of its residents, depends on these “goods and services” that natural systems provide. Striving for an overall expansion of nature across the Commonwealth, particularly in areas with Environmental Justice populations and especially as climate impacts increase, is critical to the future quality of life for all Massachusetts residents both now and in the future.

## Overview

The planning phase of the Resilient Lands Initiative (RLI, or “Initiative”) involved 12 Steering Committee meetings of about 40 individuals with “land values” expertise, as discussed below, and 14 focus groups that included 270 advocates, volunteers, field practitioners, farmers, foresters, and landowners. The University of Massachusetts Amherst Donahue Institute facilitated the 14 focus groups and developed eight topical research and policy briefings on the land values. The findings from the focus groups and research briefings informed the work of the Steering Committee to develop this plan. In addition, two open public listening sessions were held to receive feedback on the final draft iteration of this plan. This Initiative is distinct because both visioning and future implementation are approached through two lenses: 1) justice, equity, diversity, and inclusion and 2) climate change. The Initiative strives to be more inclusive of the needs of residents who are often at the margins of land conservation and restoration plans, especially in Environmental Justice (EJ) neighborhoods.<sup>1</sup>

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<sup>1</sup> For a summary of the state definition of Environmental Justice Populations see: <https://www.mass.gov/info-details/massgis-data-2020-environmental-justice-populations>

The Resilient Lands Initiative is a broad-based effort to select the most effective land conservation, stewardship, and restoration policies and programs to 1) reduce the impacts of climate change on residents, particularly in EJ neighborhoods; 2) make more local, fresh food available, especially in food deserts; 3) provide new jobs greening EJ neighborhoods, 4) plant river and stream buffers to reduce flooding and improve water quality; 5) implement climate-smart farming and forestry practices; 6) enhance the resilience and carbon storage capacity of farms and forests; and 7) protect the Commonwealth's best remaining habitats, watersheds, and water supplies. It strives to accomplish these things alongside other important objectives, including providing a sufficient and sustainable housing supply. The Initiative takes a "menu-based" approach, offering many potential actions to choose from as future capital budgets are developed, legislative agendas and regulatory updates considered, and decisions on policy and programmatic options contemplated.

The recommendations focus on conserving those natural landscapes that are most critical to nature and to human well-being, and on improving the quality of life in our cities and towns through a range of greening initiatives. For example, the No Net Loss of Farms and Forests Strategy, which is the first in the nation, reduces the loss of land and natural resources to sprawl development in rural and suburban areas via smart growth incentives that concentrate needed housing growth in suitable locations and that focuses farm and forest expansion projects on greening EJ and other underserved neighborhoods to make these often densely populated areas cooler, greener, and more livable. In this way, the RLI conserves natural landscapes, encourages housing production in suitable locations, provides rural natural resource jobs, enhances community stability, and expands the range of benefits that conserved landscapes bring to people as the climate changes. These benefits are critical to reducing our vulnerability to climate change and adapting to its impacts, including extreme heat and precipitation, drought, and air pollution.

The RLI will be enhanced by working in partnership and complementing other initiatives within the Executive Office of Housing and Economic Development (EOHED), the Department of Public Health, and the Massachusetts Department of Transportation. For example, the RLI's No Net Loss of Farms and Forests Strategy is a much stronger initiative and far more likely to succeed when the agencies work together to ensure that the Commonwealth's land conservation plan and Housing Choice Initiative complement each other. No Net Loss and the MA Housing Choice goal of adding 135,000 new housing units by 2025 can be advanced at the same time. For instance, promoting land conservation and development that follows smart growth principles will result in more multifamily housing projects that are efficient to build, utilize less land, and result in walkable neighborhoods. Already transit-oriented development has built hundreds of new housing units near train stations while minimizing disturbance to natural landscapes. Throughout this plan, opportunities for the RLI to complement other important initiatives will be highlighted and explained.

Thus, while the RLI is principally a plan for land conservation and stewardship, it also recognizes and embraces the need to provide for housing and other development. In concert with EOHED, communities, and others, Energy and Environmental Affairs (EEA) will work to utilize existing and new programs and policies across state government to enhance sustainable housing production.

By implementing the RLI strategies and through skilled management and restoration over time, it is possible to enhance the benefits the land provides. In addition to reducing impacts to communities from climate change, actions like strategic land conservation, restoration, and stewardship will increase farm and forest production of local products, enhance public health with close-to-home outdoor recreation and cooler neighborhoods, and improve water quality and supply, watershed health, and coastal resources that support our state's sustainable "blue economy" (tourism, commercial and recreational fisheries, and aquaculture). Creating or restoring greenways to provide natural flood control and stormwater mitigation, building urban parks, and restoring land to reduce heat and flooding impacts will also create hundreds of new "green" jobs. Conserving and restoring the health of rural, suburban, and urban wildlife habitats are also crucial to providing essential services for nearby and downstream communities and, equally importantly, for wildlife.

Going forward, the Resilient Lands Vision will be implemented by the Commonwealth in partnership with communities and the diverse stakeholders involved in the RLI through state programs, agency actions, and grants. It will encourage a whole-landscape and -watershed approach to climate resilience, recognizing that projects are often best done at a multi-municipal level. Natural systems do not follow municipal boundaries, and a watershed approach helps ensure healthy ecosystems that are able to adapt to climate change.

Realization of the Vision will be pursued by the Executive Office of Energy and Environmental Affairs in consultation and cooperation with other state agencies, cities and towns, land trusts, regional conservation partnerships, public health committees, watershed organizations, regional planning associations, and educational institutions, all working to expand the implementation of landscape-scale land conservation, restoration, and stewardship projects. By conserving, restoring, and stewarding nature, the Commonwealth is taking an extremely cost-effective approach to reducing the impacts from climate change while providing cleaner and cooler air, safe and sustainable drinking water, abundant outdoor recreation and exercise areas, more local jobs, additional local food and wood products, more stable tax bases, and resilient fisheries and wildlife habitats for future generations. The RLI includes nine important land values.

The implementation of the Resilient Lands Vision will be facilitated by the Steering Committee and focus group members who represent government, nonprofit, educational, private, community, and volunteer sectors. These land values include: 1) *urban parks and public health*, 2) *forests*, 3) *farms*,



*4) habitat, 5) water supply and watersheds, 6) reducing climate impacts to people, 7) economic stability, 8) outdoor recreation, and 9) teaching and respecting the cultural values of the land, especially those of Indigenous Peoples.*

As this Vision is implemented, the importance of communicating clearly and in terms that resonate with people not previously involved with land conservation is well understood. As discussed in the Collaboration section of this document, the Steering Committee will work with agencies and stakeholders in the housing, economic development, transportation, public health, and many other areas of interest to realize the goals of the RLI, alongside other goals such as the provision of diverse and affordable housing, over the coming decade.

## **The Resilient Lands Initiative: A Companion to the 2050 Decarbonization Roadmap and Clean Energy and Climate Plans**

The Massachusetts 2050 Decarbonization Roadmap (“Roadmap”) analyzes, and the Clean Energy and Climate Plans (CECP) select, strategies to move toward net zero greenhouse gas emissions from all sectors by 2050. Massachusetts is required by statute to reduce direct emissions of greenhouse gases by at least 85%, and to reach net zero by 2050 by offsetting any remaining emissions by sequestering carbon or otherwise removing it from the atmosphere. Many of the strategies in the RLI support this goal by helping to offset the final 15% of carbon emissions that will likely remain in 2050. However, another key value of the RLI is as a companion to the CECP and Roadmap focused on a vision of climate resilience that keeps the ecosystems of the Commonwealth intact and uses nature for the benefit of the residents. Even with a focus on decarbonizing Massachusetts, there will be significantly increased stressors on people and natural systems in the coming decades, including increased heat, droughts, and large storms. In this way, the RLI is a strategy to fully use land restoration and conservation to reduce these stressors and improve the quality of life for residents and ecological integrity of habitats in the mid- to late part of this century, even as the policies in the Clean Energy and Climate Plans reduce climate impacts.

## **The Commonwealth in 2030 with or without the Resilient Lands Initiative**

It is likely that the changes in climate will continue to accelerate during the 2020s. For example, the 2020s will almost certainly see more extended droughts, heat waves, heavy rainstorms, hurricanes, tornadoes, and coastal flooding than Massachusetts has experienced so far in the 21<sup>st</sup> century. With current levels of preparation for this more extreme climate, land conservation and stewardship efforts will continue, but the Commonwealth will still see more than 30,000 acres of forests and farms utilized for houses, roads, and other impervious surfaces. Given this rate of

development and current levels of conservation, there would be only a small net increase in the resilience of the Commonwealth's cities and towns.

However, with full implementation of the RLI, the Commonwealth could significantly reduce the development of existing forests and farms, provide needed housing, and increase our resilience to climate change. For example, it is estimated that land conversion could be reduced by 15,000 acres over a 10-year period if Natural Resource Protection Zoning (NRPZ), a Housing Choice practice encouraged by Chapter 40A Section 5, were adopted and utilized by 10 additional communities each year.<sup>2</sup>

Broader use of this and related zoning techniques will enable the Commonwealth to continue moving toward critical housing goals, but do so by building in less sensitive places and on smaller lots that are close to new, protected open spaces. This accomplishment will encourage even less acreage loss in the 2030s. In addition, the RLI will bring the following benefits to the residents of the Commonwealth, with most of those benefits concentrated in the 13.6% of the land area of the Commonwealth (694,000 acres) that is considered an Environmental Justice census tract, and where 49.6% of the population lives.<sup>3</sup>

The following estimates serve to illustrate the impacts of RLI implementation. These estimates were produced by state staff and the consulting team that assisted with plan production. They are informed by data from the state land conservation team, MassGIS, published reports, and other sources. If implemented, these initiatives are expected to be executed by EEA, communities, nonprofits, and other stakeholders.

#### **Expected Land Resilience from Continuing Conservation Activities at Current Levels:<sup>4</sup>**

- 100,000 acres of forest and farms permanently conserved and managed to increase resilience
- 200,000 acres of forest have adopted resilient conservation practices (via the Department of Conservation and Recreation's Working Forest Initiative)

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<sup>2</sup> This zoning technique was selected for inclusion in the RLI for the same reason it is a Housing Choice practice: its ability to both produce housing and conserve land. When implemented consistent with Chapter 40A Section 5, NRPZ protects at least half of the associated land area while producing at least the same number of housing units as conventional development. According to Mass Audubon's Losing Ground report, 3,500-4,000 acres per year of non-solar land conversion has been occurring in recent years, or as much as 40,000 acres over a decade. The estimate of 15,000 acres protected by NRPZ is then somewhat less than half the rate of land conversion from development.

<sup>3</sup> Environmental Justice statistics from 2020 US Census data and preliminary EEA EJ layer.

<sup>4</sup> Each of the statistics in this section is simply an extension of the current trend from EEA's ongoing land conservation, forest management, tree planting, and park access work. For example, an average of about 10,000 acres per year has been conserved in recent years, so over the 10-year horizon of the Resilient Lands Initiative Plan we would expect to see 100,000 acres protected.

- 1,600 acres of new urban forest cover planted (80,000 trees planted in EJ census tracts via the Greening the Gateway Cities Program and other programs)
- 300,000 residents of EJ census tracts have safe, shady, and appealing walking routes to local parks and greenspaces (50 miles of restored walking routes)

#### **Additional Land Resilience Anticipated from RLI Implementation:<sup>5</sup>**

- 100,000 acres of forests and farms conserved and managed to increase resilience
- 210,000 acres of forests and farms have adopted resilient conservation practices
- 14,500 acres of new urban, riverfront, and floodplain forest cover
- 6,000 acres of restored “cooling” greenspace and parks in urban areas
- 1,000 acres of new urban farms and community gardens

#### **Total Land Resilience Added from the RLI plus Current Conservation Levels by 2033:<sup>6</sup>**

- 200,000 acres of forest and farms permanently conserved and managed to increase resilience (more than 30% of the Commonwealth will be protected)
- 410,000 acres of forest and farms have adopted resilient conservation practices (nearly 20% of all private forest and farmland)
- 16,100 acres of new urban and riparian forest cover
- 6,000 acres of new greenspace and parks in urban areas
- 1,000 acres of new urban farms and community gardens

#### **Total Resilience Added from the RLI Plus Current Conservation Levels by 2050:<sup>7</sup>**

- 600,000 acres of forest and farms permanently conserved and managed to increase resilience (more than 38% of the Commonwealth will be protected)
- 1,230,000 acres of forest and farms have adopted resilient conservation practices (51% of all private forest and farmland)

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<sup>5</sup> The added resilience numbers in this section are an estimate of the anticipated benefits of RLI implementation. For each of these five bullets, a reasonable calculation was made of potential results from some of the activities called for in the plan. For example, the Commonwealth’s FY23 capital budget includes a new line item to “green” urban areas. The 14,500 acres of new urban forest cover is, then, a projection of what EEA and our agencies can do with this money, along with resources from the federal government, and in combination with additional plantings by our municipal and nonprofit partners.

<sup>6</sup> Combines expected resilience from current activities and new RLI measures over 10 years.

<sup>7</sup> Combines expected resilience from current activities and new RLI measures over 30 years.

- 64,400 acres of new urban, riverfront, and floodplain forest cover (about 15% of all EJ census tracts)
- 18,000 acres of new greenspace and parks in urban areas (5% of all EJ census tracts)
- 3,000 acres of new urban farms and community gardens (to provide for the fresh food needs of 30,000 residents of food deserts)
- 900,000 residents of EJ census tracts have safe, shady, and appealing walking routes to local parks and greenspaces (150 miles of restored walking routes)

The goal of the Clean Energy and Climate Plan for 2025/2030 is to continue to make progress toward the net zero 2050 GHG mandate by selecting and implementing policies and programs that will set us on a path that, over the intervening decades, will enable us to reach that objective. The Resilient Lands Initiative will similarly pilot and then implement measures to enhance the use of *natural land as a climate change mitigation and resilience solution* to sequester carbon and decrease heat island, flooding, and drought impacts to people and ecosystems. That said, it is important to reiterate that RLI goals can be achieved alongside important housing, public health, and transportation goals. By utilizing the smart growth principles adopted by the Commonwealth, prioritizing investment in developed areas such as Gateway Cities, employing green infrastructure and otherwise advancing policies that support both land development and conservation goals, the Commonwealth will realize housing, transportation, public health, and environmental benefits, especially for vulnerable populations.

## **Piloting the Strategies of the Resilient Lands Initiative – 2023 - 2025**

Fully implementing the recommendations of the RLI will significantly reduce climate impacts to residents, increase social equity, and protect the unique ecosystems that make Massachusetts a special place to live. Initially, however, the RLI is set up to be implemented as a strategic set of pilot programs to select the most effective programs for expansion later in the decade. As mentioned previously, the actions below are therefore intended to be a “menu” to choose from to begin efforts to fully use land to reduce climate impacts to people and ecosystems. Ultimately, the seriousness of climate impacts on vulnerable populations will drive action and field-testing a range of land-based strategies will have important value as programs are ramped up in the second half of the decade. Nature-based solutions to climate impacts are effective and efficient because “green infrastructure,” like planted trees, grows and becomes more effective with time. However, trees grow slowly, so it is important to implement nature-based solutions as soon as possible if the Commonwealth intends to count on them to provide climate change benefits in the 2050 timeframe.

## The Resilient Lands Initiative Vision Will Be Implemented through Eight Strategies

The strategies are:

- **No Net Loss of Farms and Forests:** Select and implement land conservation and development policies and programs that seek to meet this goal by minimizing loss of farms and forests through smart growth incentives, making investments in new urban and riverine greenspace, and through strategic housing production. Seek to decrease the amount of land developed annually over the coming decade, working toward the goals of meeting our development needs with as little land as possible.
  - Anticipated costs, feasibility of implementation, and other potential impacts to housing development will be considered as EEA works with Executive Office of Housing and Economic Development (EOHED) and housing and other stakeholders to develop and implement specific policies and programs to work toward no net loss.
  - Progress toward realization of no net loss will be measured by tracking changes in land cover and land use. This is already being done by EEA's Climate Team as part of our required greenhouse gas accounting.
  - Programs to achieve this strategy will focus on efficient land use that supports natural resource-based economic development in rural communities, strong tax bases in all communities, sustainable production of additional housing in Gateway Cities and other suitable locations, vibrant cities and village and town centers, and expanded green spaces so all residents have the benefits of close-by green space and the health, economic, and climate resilience benefits it provides. In addition, policies and programs that enable the mitigation of farm and forest land development will be explored.
  - Seek to expand programs to plant trees in EJ census tracts. Launch pilot programs to 1) plant trees along rivers and in floodplains, 2) analyze thousands of urban vacant lots (for greening and housing) and begin restoring appropriate vacant lots into urban forests, greenspace, and farms, and 3) strategically expand tree cover on the 435,000 acres of lawns in the Commonwealth.
  - Evaluate the expansion of rural water and sewer infrastructure to increase housing and economic development in village centers.
- **Food Systems:** Seek to expand the amount, quality, and accessibility of locally grown food, especially in food deserts, and ready the state's local food production and delivery system (farms, fisheries, and aquaculture) for future stress from droughts, floods, storms, sea level rise, and other climate change impacts.



- Look to expand Massachusetts Department of Agricultural Resources' (MDAR) Urban Farming Program to include:
  - A new “Vacant Lots to Farms” initiative focused on “food deserts” in our cities that turns hundreds of vacant lots into a solution to food insecurity
  - A small new grant program for community farms and gardens
  - A locally led approach (perhaps by existing Community Health Committees<sup>8</sup>), initially as a pilot, to improve food security for the most in-need residents, which would build on EEA's successful Food Security Infrastructure Grant Program
- Evaluate the capacity and funding of the Agricultural Preservation Restriction Program to protect “whole farms” (farm, forest and wetlands, and infrastructure) and make them affordable to nearby recent immigrant farmers
- Seek to expand the successful urban “green team” model across the Commonwealth's cities.
- **Urban Greenspaces and Community Health & Safety:** Improve public health by providing readily accessible close-to-home natural areas for outdoor recreation, exploration, and inspiration and to help protect communities from increasing heat waves, flooding, storms, and other climate change impacts.
  - Evaluate the designation of climate risk zones where land restoration, conservation, and stewardship projects are critical to reduce heat islands and flooding.
  - Pursue the creation of a network of shady green spaces in high-density neighborhoods using vacant lots, tax title parcels, and other areas.
  - Seek to launch a grant program for EJ neighborhood organizations to lead outreach, design, and implementation of initiatives to use restoration, conservation, and stewardship projects to protect and improve community health as climate change impacts worsen.
  - Work with MA Economic Development and Transportation agencies and local communities to evaluate a pilot program, “Equitable Access to Parks,” which would create or improve walking routes to parks in EJ neighborhoods.
- **Water Resources:** Protect and restore the drinking water supplies that are critical for housing and economic development, inland and coastal waters, and habitats from increased threats.

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<sup>8</sup> Community Health Needs Assessment Committees, or CHNA's, are set up under the MA Department of Public Health by a 1992 state law and the Affordable Care Act to improve health through local collaboration in 27 regions, and to assess health needs and target significant health care funding for community benefits provided by law by health care providers. The environment of residents is a significant “determinant of health” considered by CHNA's.

- Seek to expand landscape-scale conservation grant funding, especially in public drinking water supply watersheds, with a focus on premier unfragmented and restorable landscapes and cold-water habitats.
- Conduct a statewide parking lot assessment that looks at recommendations for incentives for reducing pavement and associated stormwater impacts and rates low-use parking lots in priority watersheds for their potential to reduce stormwater and flood risk if improved or converted to greenspace.
- Look to expand the restoration of urban rivers via “daylighting” projects in partnership with the Division of Ecological Restoration and the Municipal Vulnerability Program (MVP).
- Evaluate updates to the Drinking Water Protection Zone regulations to require expanded protection of uplands and natural buffers that help protect drinking water supplies from contamination from stormwater pollution.
- Work with the State Revolving Fund (SRF) programs to support green infrastructure projects (i.e., tree planting, land conservation, rain gardens and cooling parks, restoration of paved areas, etc.).
- **Natural Carbon Storage and Climate Resilience:** Increase the amount of carbon stored on and the climate resilience of natural and working lands – forests, farms, parks and urban greenspaces, wetlands (coastal and inland), and soils. Offsetting greenhouse gas emissions via carbon sequestration helps the Commonwealth implement the Clean Energy and Climate Plans and realize net zero greenhouse gas emissions in 2050 as required by the Global Warming Solutions Act. Retaining and increasing natural land cover also helps implement the State Hazard Mitigation and Climate Adaptation Plan by reducing the risk posed by more frequent and intense storms and extreme heat. To realize these benefits, the RLI proposes that Massachusetts:
  - Seek to modify an existing landowner tax incentive or launch the Forest Resilience Program to pay annual incentives (from state and private investments) to private and municipal landowners to adopt verified forestry practices (thinning, extended rotation, tree retention, etc.) to expand carbon storage and improve forest climate resilience on our 3 million acres of forests.
  - Work to adopt recommendations from the Healthy Soils Action Plan, including incentives for soil best practices and further reduction of wetland conversions.
  - Support realization of the natural and working lands goals of the Clean Energy and Climate Plans, including the protection of at least 30% of the remaining undeveloped land in the Commonwealth and a 5% increase in the use of long-lived durable wood products, preferably

made from locally sourced timber (for the carbon storage benefits and as a substitute for more GHG intensive non-renewable materials).

- Seek to increase the percentage of long-lived forest products from existing harvests.
- **The Green Economy:** Expand the number of jobs in sustainable farming, maintaining healthy soils, managing forests for carbon storage and climate resilience, and expansion and stewardship of forests and urban tree canopy. These activities benefit communities by keeping or returning land to economically beneficial natural resource-based use, enhancing the tax base of communities, and employing more residents.
  - Seek to create more natural resource-based employment in the private sector with a target of 10 new jobs in each of our 170 rural communities and 30 new jobs in each of our 45 cities, with expanded forest and farm resilience and urban forestry projects.
  - Explore the creation of a program to provide refundable state tax credits to private forest and farm landowners with climate farm or forest plans for implementing best practices for carbon storage and climate resilience.
  - Look to provide funding, technical assistance, and incentives for infrastructure, processing, and value-added products from working forests to advance a viable local forest product system and working lands economy modeled after Vermont's Working Landscapes Program.
- **Landscape Conservation and Restoration:** Look to expand the number of landscape and watershed-scale conservation, stewardship, and restoration projects completed by EEA and its agencies in partnership with local, regional, and statewide land trusts, regional conservation partnerships, and watershed organizations. Permanent conservation is critical in our efforts to reduce our vulnerability to climate change.
  - Seek to expand the state conservation land tax credit cap to \$5 million per year and explore adding fee land donations to the federal tax incentives, which currently only conservation restrictions (CRs) qualify for.
  - Collaborate, with MassDOT and a multi-sector working group, to prioritize and evaluate construction of the most critical wildlife road passage projects in the state.
- **Collaboration for Sustainable Solutions:** Engage with residents and communities on a coordinated outreach and education campaign focused on the benefits of land conservation, stewardship, and restoration as climate-change solutions.
  - Ensure communication is clear and in terms that resonate with people not previously involved with land conservation.
  - Create and build relationships with the local Indigenous 1<sup>st</sup> peoples of this land, primarily the Wampanoag Nation, the Nipmuc Tribe, and the Stockbridge-Munsee Band of Mohican

Indians. Develop and establish a working relationship with the 1<sup>st</sup> Indigenous land trust here, the Native Land Conservancy, Inc., to ensure collaboration on cross-cultural shared values in land conservation and preservation. Safeguard future Wampanoag Indigenous lifeways and cultural practices on ancestral homelands.

- Look at creating 24 case studies and stories from across Massachusetts that demonstrate how land conservation, stewardship, and restoration enhance each of the land values.
- Create a website for all recreation and open space opportunities across public and private ownerships by 2024.
- Develop a website focused on “nature-based” climate solutions and how they can be implemented at home and in neighborhoods.
- Look to establish a RLI marketing campaign that is centered around the concept of No Net Loss of Nature’s Services, to complement other initiatives that leverage this concept and to build environmental literacy, including in areas with EJ populations.
- Seek to establish a matching grant fund for municipally sponsored education programs on climate threats, resilience, and nature’s services as part of the MVP or another state program.
- Strive to be inclusive in implementing the RLI especially reaching out to and including EJ communities and the private sector (farmers, foresters, developers, etc.).



# The Resilient Lands Initiative Implementation Guide

## Continued Public Involvement

The Resilient Lands Initiative (RLI) planning phase included 12 Steering Committee meetings of a group of about 40 experts in the land values of the RLI; 14 focus groups that included 270 advocates, volunteers, and field practitioners; two public listening sessions with 60 attendees; and dozens of written comments. Then and now, the Initiative strives to be both more attentive to addressing climate change impacts and more inclusive of residents often not involved in land conservation and restoration plans, especially in Environmental Justice (EJ) neighborhoods. The unique set of recommendations focus on conserving the Commonwealth's most intact natural landscapes and improving the quality of life in cities through a range of strategies. The first in the nation goal of No Net Loss of Farms and Forests seeks to reduce land conversion in rural and suburban areas via smart growth incentives and encourages farm and forest expansion projects in EJ neighborhoods. This Initiative also supports the need to develop and implement policies and programs to expand housing opportunities in a way that uses land more efficiently. In this way, the RLI conserves and makes natural landscapes more accessible, increases the intangible and real value of land conservation to people, and improves public health, especially in urban areas. This is critical as heat waves, air pollution, water quality and quantity challenges, flooding, and impacts from storms all increase due to the impacts of climate change.

## Land Values

The values adopted by the Steering Committee are *urban parks and public health; forests; farms; habitat; water supply and watersheds; reducing climate impacts to people; economic stability; outdoor recreation; and teaching and respecting the cultural values of the land, especially those of Indigenous Peoples*. This last value was proposed by leaders of the Indigenous Peoples of Massachusetts and adopted into the RLI.



Discussion of how to incorporate this value is included in “Strategy #8: Focus on Collaboration.” In addition, the following principles will guide the implementation of teaching and respecting cultural values going forward:

- Create and build relationships with the local Indigenous people of this land, primarily the Tribes of the Wampanoag Nation, the Nipmuc Tribe, and the Stockbridge-Munsee Band of Mohican Indians (homelands: Berkshires of MA).
- Establish a working relationship with the 1<sup>st</sup> Indigenous land trust in Massachusetts, the Native Land Conservancy, Inc., and any other Indigenous conservation groups, to ensure that we work together on cross-cultural shared values in land conservation and preservation; safeguarding a future of Indigenous lifeways and cultural practices on conserved and protected ancestral homelands.
- Recognize, honor, respect, and protect the sacred value of ancient objects of cultural significance and unmarked burial grounds with the understanding and acceptance that nothing should ever be removed, and only protected. Should something be accidentally discovered, it should be returned to the appropriate Tribe.



# Implementing Actions by Key Strategy

Below is a detailed list of actions recommended by the Resilient Lands Initiative Steering Committee, focus group attendees, and those providing oral and written input from the public listening sessions. These actions represent a menu of options to best achieve the eight strategies.

**Expanding the Benefits from Each Strategy:** In each case, program guidance and administration will strive to incorporate pollinators into the planting approach, seek to plant fruit and nut trees wherever appropriate, work to manage invasive species where feasible, and endeavor to implement healthy soils practices to improve soils. For riparian plantings, native shrubs and perennials, including berry thickets, could be added along with trees.

**Working with Partners to Leverage State Funds:** The funding sources and cost estimates provided are for state funding, including federal funding channeled through state agencies, which can serve as a catalyst for project completion. These do not reflect the significant investment of staff and funds raised or appropriated by communities, NGOs, and families that work the land to supplement state funding and make the projects happen.

## 1. No Net Loss of Farms and Forests

This Resilient Lands Initiative strategy addresses many of the land values and overlaps with the other strategies. It will be implemented via a combination of state and local policies, regulations, and incentives focused on significantly reducing the development footprint on farms and forests and the loss of trees during development. To reduce and offset this loss, the strategy will conserve existing farms and forests via smart growth; create new farms and community gardens; and expand forests and tree canopy cover in city and town neighborhoods, along rivers, and in some fields and in lawns. To meet housing and other development needs, it will promote redevelopment, infill on previously developed sites, and strategically sited new growth.

## Models for Implementation

### WITHIN MASSACHUSETTS

Massachusetts has several programs which could be used as models for implementation of this strategy, including:

- EEA's Article 97 and other no net loss of protected open space policies
- The Public Lands Preservation Act of 2022
- Executive Order 193 – No Net Loss of Farmland from State Actions
- Communities that have successfully implemented natural resource protection and related types of zoning
- Cities and towns that have successfully implemented tree retention bylaws
- Municipalities that have reused mills, brownfields, and other previously developed sites

### OUTSIDE MASSACHUSETTS

Maryland is the national leader through implementation of the Maryland Forest Law, and there are other state and local examples of No Net Loss of Farmland policies:

- Maryland's No Net Loss of Forests Law and Policies: This set of laws, programs, and regulations strives to maintain the forest canopy cover in the state at 40%, offsets most forest loss mitigation above 1:1 for high quality forests, and increases the support for private forest stewardship.<sup>9</sup>
- Pennsylvania's River Buffer Program: <https://www.greenbiz.com/article/growing-movement-help-farmers-reduce-pollution-and-make-profit>
- Chesapeake Bay's River Buffer Program: <https://www.chesapeakeprogress.com/abundant-life/forest-buffers>
- Davis, Calif., has a No Net Loss of Farmland Ordinance: <https://farmlandinfo.org/law/davis-ca-agricultural-land-mitigation-ordinance/>
- California Council of Land Trusts has a No Net Loss of Farmland model local ordinance: <https://farmlandinfo.org/publications/conserving-californias-harvest-a-model-mitigation-program-and-ordinance-for-local-governments/>
- Philadelphia Vacant Lot Greening Program: <https://penniur.upenn.edu/uploads/media/vacant-land-full-report.pdf>
- Baltimore Green Network Plan: <https://www.baltimoresustainability.org/projects/green-network/>

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<sup>9</sup> Maryland passed two forest protection laws, one in 1991 and one in 2013. See: <https://dnr.maryland.gov/forests/Pages/programapps/newfca.aspx> and <https://www.tandfonline.com/doi/abs/10.1080/14660466.2019.1650600>

## Case Study: Progress on Smart Growth and Open Space Conservation in the Connecticut River Valley

The City of Northampton has taken a comprehensive approach to increasing housing that is affordable focused on previously developed land while supporting farming and outdoor recreation and conserving open spaces. Over the past few decades, Northampton has worked with MassDevelopment, the Pioneer Valley Planning Commission, and the Valley Community Development Corporation to build 350 new housing units (50% of which are deed-restricted affordable housing) at Village Hill, a former state institution, while protecting 350 acres of farmland, community gardens, and riverine forests along the Mill River. An innovative farming lease with the Smith Vocational School helps train future farmers while producing food for city residents. This helps to support the healthy agricultural sector in the Valley and Northampton's vibrant downtown and job-producing industries, including some housed at Village Hill.



*LEFT: New housing at Village Hill (Photo credit: City of Northampton)*



*RIGHT: Protected farmland (Photo credit: City of Northampton)*

Northampton is one five Valley communities that are using Smart Growth Overlay Districts authorized by MGL Chapter 40R to encourage more dense housing developments. The law requires the state to provide funding to communities based on the number of housing units produced. With some of the best agricultural soils in the world along the Connecticut River, building new housing on existing developed land while conserving farmland and woodlands is an important priority. Since it was launched as the first farmland conservation easement program in the United States, MDAR's Agricultural Preservation Restriction program has conserved over 35,000 acres of farmland in the Valley, supporting several hundred farms in perpetuity. In Northampton, over 6,000 acres of farms and forest are permanently conserved and about 5,000 acres of the remaining land could be developed. Northampton has an active land conservation partnership with Kestrel Land Trust, Mass Audubon, and the Broad Brook Coalition.



*LEFT: Bean-Allard Farm in Northampton, protected by the City, Trust for Public Land, and EEA (Photo credit: City of Northampton)*



*RIGHT: Floodplain forest restoration planting at Mass Audubon's Arcadia Sanctuary (Photo credit: Mass Audubon)*

The City is constantly expanding greenways and landscape conservation areas that connect with other communities. In this and other ways Northampton exemplifies the Resilient Lands Initiative's No Net Loss of Farms and Forest Strategy by combining smart growth, land conservation, and restoration of previously developed or unforested land to reach its goal. In addition to smart growth and land conservation, Northampton is actively restoring land. The recently closed Pine Hill Golf Course is now being re-purposed to bring nature back, restore slow natural drainage, and restore golf fairways to diverse forest. The City received two EEA grants in partnership with Mass Audubon to permanently protect 105 acres (with a small portion left for five new homes clustered along a road) and remove underground drainage to restore Nashawannock Brook, which flows through the parcel. Partners are planting a diverse selection of trees to reforest portions of the course and to remove fill to restore pre-existing wetlands. This property is part of the Rocky River Greenway that connects Mass Audubon's Arcadia Sanctuary along the Connecticut River to upland conservation areas in the City. At the Sanctuary, Mass Audubon recently completed the planting of a floodplain forest on an unused section of old field along the river. One of the priority strategies of Northampton's new Open Space and Recreation Plan (in addition to improving and expanding parks and open spaces for all) is to "convert unloved pavement to beloved parks." With 70,000 acres (109 square miles) of parking lots across the Commonwealth (the area of five average-sized communities), this is a worthy goal as a model for other communities.<sup>10</sup>

<sup>10</sup> Estimate of acres of parking lots is from a GIS analysis conducted by Regenerative Design as part of the Healthy Soils Action Plan process.



## Action Steps and Costs to Pilot or Fully Implement

### ► Action #1: Enhanced adoption of Natural Resources Protection Zoning (NRPZ) and related “cluster development” techniques

NRPZ is a proven tool for cities and towns to direct growth to the most appropriate locations and significantly reduce the footprint of development on important farm and forest land (by up to 80%) while producing housing units and keeping landowner income equivalent to traditional “cookie cutter” subdivisions. Currently, about a dozen communities have adopted NRPZ bylaws, while many more have other forms of cluster zoning. A funding preference incorporated in EEA’s planning grant program to encourage communities to develop NRPZ has had limited success, and a stronger incentive and an ambitious target should be evaluated. Thus, the goal of this Action is to pass NRPZ in 100 communities, focusing on communities with large amounts of farm and forest land and a high rate of anticipated growth, by 2030. Recognizing the need for housing in these high growth communities, the emphasis would be on reducing land consumption while retaining housing production. There is the potential to produce the same number of housing units and protect about 15,000 acres of land – 50% of the projected 2020-2030 land loss – over the coming decade.

Because NRPZ works best when other local zoning, subdivision, and health regulations are updated or enhanced (Board of Health regulations, setbacks, etc.), this Action proposes to fund a two-year commitment to communities that apply. The first year would provide a municipality professional planning assistance to review their zoning and other municipal land use regulations, and the second year would continue the planning assistance to work with the community to draft an NRPZ bylaw and other needed regulatory changes and take them to Town Meeting or City Council. If the NRPZ passes, the municipality would be awarded a \$100,000 grant for two years to implement actions that complement the No Net Loss Strategy, such as land conservation, infrastructure needed to concentrate growth, tree protection bylaws, healthy soils incentives, tree planting, etc.

### ► Action #2: Seek to enhance adoption of tree protection bylaws

This is a proven tool to reduce tree canopy loss during development or redevelopment, and about a dozen communities have tree protection bylaws. The bylaws typically include a protection zone along the perimeter of parcels where trees are protected during development. If trees are removed, offset trees are planted on the parcel or elsewhere, or payment is made to a community tree planting fund. EEA has model zoning and currently offers grants that fund planning consultant costs to draft a customized local zoning bylaw/ordinance, but it has had very few applicants since its inception. This Action would enhance the amount the Commonwealth would pay for the costs of developing the bylaw and reward communities for adopting it with a grant to fund tree planting. The goal is for 100 communities to adopt these bylaws over the decade, including 15 Gateway Cities.

► Action #3: Evaluate legislative priorities to support the implementation of the RLI

Legislative authorization is needed for several potential RLI policies and programs. Legislation would provide incentives and other mechanisms to help reduce climate impacts to vulnerable populations, particularly in Environmental Justice (EJ) communities, enhance the economic stability of urban and rural communities, and reduce carbon emissions associated with land conversion.

Potential RLI tools and incentives likely to need legislation include a reduction in property taxes for provision of public access to privately owned urban greenspace; funding for a new program to build water and sewer systems to support growth in small town and village centers; the establishment of a new state tax credit for tree planting in EJ communities; an assistance program for people of color to acquire farm and forest lands; creation of a new “Parks and Greenspace Enterprise Zone” statute that enables municipal adoption of a revenue capture mechanism that devotes a percentage of increased property tax revenue generated by park improvements to the acquisition, development, stewardship, programming, and improvement of parks and greenspaces; and a new program to provide communities – particularly small, rural, underfunded towns that generally host the most conserved state land – with funding that acknowledges the important benefits protected lands provide the entire Commonwealth.

► Action #4: Assist in the implementation of no net loss of farms and forests and other RLI actions that are included in the Clean Energy and Climate Plans

A number of RLI actions have been incorporated in the Clean Energy and Climate Plan (CECP) for 2025/2030 or 2050. As the CECPs and RLI are implemented, EEA will focus time and attention on these, while continuing to explore other RLI policies that can help the Commonwealth realize the no net loss goal by 2035.

► Action #5: Tree planting in buffers along rivers, streams, lakes, and ponds

Create working groups of the RLI (including farmers, Conservation Districts, and USDA NRCS) to develop a riparian tree planting program to significantly expand tree cover in appropriate riparian areas and create more jobs on farms. The program would focus on unforested riverside land, that when planted with certain tree species, can supplement existing farm use, including hay fields, fallow fields, vacant land, etc., by providing additional income from nuts, fruits, and wood products. The work group should look at the best alternatives for funding these programs, including the USDA Conservation Reserve Enhancement Program, State Revolving Fund (SRF), state capital funds, etc., as has been done in the Chesapeake Bay program, discussed below. The program should also support the retention of edge/transitional habitat along farm fields and the

opportunities for piloting agroforestry crops to increase tree cover and shade for crops and grazing animals, and enhance soil health.

As to potential cost, a \$1 million per year state pilot program would add about \$1,000 per acre to the incentives available from USDA. This state funding estimate is based on work done in the Chesapeake Bay which focuses on planting hundreds of miles of river buffers.<sup>11</sup> A key to this program's success is to work with the USDA. The Conservation Reserve, Environmental Incentives, or another USDA landowner cost-share program needs to be the base of a program, with state funding to enhance incentives to help implementation. Planting crop-producing nut and fruit trees is another way to create and maintain buffers where farmers are interested in keeping cash crops along rivers and streams. Creating 800 miles of river and stream forest buffers, or 10% of our 8,000 miles of rivers and streams, would require planting about 10,400 acres of new forest (for 100-foot buffers). The program would need to work with local land trusts, conservation districts and watershed associations to find appropriate institutional lawn, developed areas and low production farm fields that would have the best water filtration and habitat benefits.

## 2. Focus on Food

Expand the amount of locally grown food, especially in food deserts, and ready the Commonwealth's local food production system for future stress from droughts, floods, storms, sea level rise, and other climate change impacts.

### Models for Implementation

WITHIN MASSACHUSETTS

#### *FOR URBAN FARMS*

- Gardening the Community, Springfield, MA: <http://www.gardeningthecommunity.org/>
- Mill City Grows, Lowell, MA: <https://www.millcitygrows.org/>
- Urban Farming Institute, Boston, MA: <http://urbanfarminginstitute.org/>
- World Farmers, Lancaster, MA: <https://www.worldfarmers.org/>

#### *FOR COMMUNITY FARMS*

- Brookfield Farm, Amherst, MA: <https://www.brookfieldfarm.org/aboutthefarm>
- ReVision Urban Farm, Dorchester, MA: <https://www.vpi.org/revision/>

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<sup>11</sup> See: <https://www.hrpdcva.gov/uploads/docs/Presentation%208%20NRCS.pdf>

### *FOR COMMERCIAL FARMS*

- Davidian Farm, Northborough, MA: <https://www.davidiansfarm.com/>
- Redfire Farm, Granby, MA: <https://www.redfirefarm.com/>
- Verrill Farm, Concord, MA: <https://verrillfarm.com/>
- Farmer Dave's, Dracut, MA: <https://farmerdaves.net/>
- Pie in the Sky Berry Farm, Northampton, MA: <https://www.gazettenet.com/>

### *OUTSIDE MASSACHUSETTS*

#### *FOR URBAN FARMS*

- City Farm, Providence, RI: <https://inhabitat.com/city-farm-south-providences-urban-agriculture-transformation/>

#### *FOR COMMUNITY FARMS*

- Soul Fire Farm, Petersburg, NY: <https://www.soulfirefarm.org/theland/>

## **Case Study: Creating a Model for Food Justice in Lowell**

Grassroots urban agriculture organizations have been formed in many Massachusetts cities in recent years, including Boston, Springfield, Worcester, Leominster, and other cities. Massachusetts was the first state to offer urban agriculture grants to help build capacity for new organizations by investing in infrastructure and creating new urban farms. Mill City Grows in Lowell is one of the oldest urban farming organizations in the state. In 2022, Mill City Grows published the Lowell Community Food Assessment, which investigated food insecurity and resiliency across the city. This assessment identified a serious need for more affordable food access, and specifically for more access to fresh fruits and vegetables that are high-quality, culturally connected to Lowellians, and grown sustainably. Mill City Grows offers a range of programs that foster food justice to increase residents' health and economic independence while improving environmental sustainability. Their strategies include increasing access to farmland, gardens, and locally grown food, as well as education programs about gardening and nutrition. Mill City Grows works with capable partners like Lowell Parks and Conservation Trust, the City of Lowell, Lowell Public Schools, and other local partners and funders along with hundreds of volunteers to ensure fresh, healthy food is accessible to everyone in the community.





*A community gardener at Mill City Grow's West 3<sup>rd</sup> St. Community Garden (Photo credit: Mill City Grows)*

In its 10 years of operation, Mill City Grows has created eight community gardens on restored lots that provide over 200 raised garden plots (4 feet by 10 feet) to residents. Mill City Grows also leases a four-acre farm in the city and a greenhouse which together produce 40,000+ pounds of fresh produce each year that is distributed through their mobile market which makes regular weekly stops in the neighborhoods of Lowell. Mill City Grows offers a 100-household “veggie box” farm share program that operates 10 months per year; gardening and cooking classes; support for 19 school gardens as well as in-school and afterschool programs; and assistance to local immigrant and refugee growers. It also leads local food systems advocacy work.

Mill City Grows, Lowell Parks and Conservation Trust and Mass Audubon have recently worked together with the City and local residents to advance the protection of Rollie's Farm, a 20-acre private Christmas tree and vegetable farm that is a local landmark and the largest unprotected open space and family farm left in Lowell. The land will combine a restored natural habitat of forests, shrubland, and wetlands with sustainably managed farm fields growing crops reflecting the varied tastes of a diverse city. The organizations are working with local residents to finalize the future plans for the farm, which will include urban farming, community gardens, a food forest, a nature play area, and an accessible nature trail for visitors of all abilities.



The partners also hope to build an education center for a variety of farm and nature programming, including summer camp, school field trips, teen programs, adult nature walks, and climate action opportunities. The process has included numerous community listening sessions and focus groups with residents and neighborhood organizations, as well as an agreement with the City of Lowell to hold a permanent Conservation Restriction that protects the land in perpetuity. The Lowell Parks and Conservation Trust (LPCT) has led conservation and stewardship efforts at several other natural areas in Lowell. More recently, LPCT is partnering with the state to launch the “Greening the Gateway City Program” to plant 2,400 trees in neighborhoods lacking shade and greenspace. Mass Audubon has recently launched its “Nature in the City” initiative to build climate resilience and healthy communities. Mass Audubon has urban nature centers in Boston, Cambridge, Worcester, and Attleborough and is looking to significantly expand its presence in cities. All three organizations have regularly worked with Lowell’s schools to involve students in nature and gardening activities.

These efforts to expand fresh local food, collaborate with residents, and conserve and expand urban gardens and farms are a model for the Resilient Lands Initiative to follow.



*Public tour of Rollie’s Farm in Lowell (Photo credit: Mass Audubon)*

## Action Steps and Costs to Pilot or Fully Implement

- Action #1a: MDAR Urban Agriculture Program: Seek to Create a “Vacant Lots to Farms” program in Massachusetts cities

Collaborate with city and regional planners, local NGO’s, and MDAR Urban Farming staff to analyze vacant lots in Gateway Cities, Boston, and other cities. If implemented, offer grants to cities to collaboratively develop urban farm/garden plans. Form a working group with representatives from, but not limited to, EEA, MDAR, DCR, EOHEd, EPA, urban farmers, Urban Farm Institute, Ground Works, municipalities, community groups, the MA Food System Collaborative, neighborhood associations, and religious organizations. This working group’s goal would be to identify locations across the state in urban centers where the state, city, and other organizations can lease land in urban environments to urban farmers and farm organizations. The Dudley Street Neighborhood Initiative can be used as a model for the working group. One possibility is to work with interested communities to move city-held tax title land to conservation or agricultural purposes. Another is to offer grants to municipalities, NGOs, and farmers to purchase or lease land, renovate the land, build infrastructure, and assist in farm startup. One goal of the working group would be to assure that food produced is affordable and marketed to local neighborhood residents. Preference should be given to farms that are operated by residents and which utilize the New American Farmer Project Model. Nuestras Raices in Holyoke can be used as an example.<sup>12</sup>

Regarding cost, there are tens of thousands of vacant lots (both private and public) in the Commonwealth’s 45 cities. Looking exclusively at EJ census tracts, there are over 34,000 acres of private vacant land in 28,000 individual parcels. In Worcester and Springfield alone, there are more than 6,000 private vacant lots. Creating urban farmland or community gardens requires bringing soil and providing irrigation and other infrastructure at a cost of about \$80,000 to \$100,000 per acre. Along with an expansion of the capacity of local urban farming organizations via MDAR’s program, creating and renovating urban farmland is equally important. With 10% of Massachusetts residents food-insecure and 40% of residents with low incomes lacking access to supermarkets,<sup>13</sup> the value of creating farmland in areas where much of the need exists is very high. If urban farms addressed 10% of the food security need, that would require about 35,000 acres of urban farms or farms distributing food to EJ neighborhoods where much of the need is. To make a significant start on this initiative, it is recommended that a “Vacant Lots to Farms” program be started in 10

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<sup>12</sup> See: <https://nuestras-raices.org/>

<sup>13</sup> See Massachusetts Local Food Action Plan: 14 See: <https://ghl292.p3cdn1.secureserver.net/wp-content/uploads/2021/09/MLFSPFull.pdf> and [http://www.mapc.org/wp-content/uploads/2017/11/MFSP\\_3\\_Access.pdf](http://www.mapc.org/wp-content/uploads/2017/11/MFSP_3_Access.pdf) and : [http://www.mapc.org/wp-content/uploads/2017/11/MFSP\\_3\\_Access.pdf](http://www.mapc.org/wp-content/uploads/2017/11/MFSP_3_Access.pdf)



Gateway Cities over the rest of the decade in partnership with local NGOs. The goal of each city would be to create 50 acres of new farms over 10 years for a total of 500 acres of new farms at an annual cost of \$5 million. Federal regional conservation partnership or other recently approved federal funds could potentially be used in the form of grants to local organizations. This funding will also start with grants to all cities to produce urban farm plans, to transfer priority tax title parcels to city control, and to purchase priority private parcels.<sup>14</sup> Toward the end of the 2020s, grants would also be used to support organizations in the 10 selected cities covering their first three years of operation.

► Action #1b: Seek to expand MDAR’s Urban Agriculture Program

To meet the need for more urban farming, expand MDAR’s first-in-the-nation urban farming program to support more successful urban farming programs like Mill City Grows. Action #1a (above) focuses specifically on creating new urban farms on currently vacant land in 10 cities throughout the Commonwealth. This Action, #1b, focuses on building the network of capable urban farming organizations and expanding their production, marketing, infrastructure, and collaboration with nearby neighborhoods, especially in the cities not selected for Action #1a.

The grants and support offered by this program are critical to building the capacity of local farming initiatives. Grants could include funds for beautification of urban farm and garden locations to sustain neighborhood support.

► Action #1c: Look to expand community farms by creating a small grant program to support and enlarge community farms and gardens

As MDAR’s Urban Agriculture Grant Program focuses on commercial farming, a program to expand community farms is recommended as a separate initiative. In the past 10 years, the number of community farms in Massachusetts has grown from just a few to over 20, including farms in Amherst, Canton, Concord, Dartmouth, Everett, Framingham, Greenfield, Harvard, Holliston, Leominster, Lexington, Lincoln, Littleton, Medway, Natick, Needham, Newton, North Grafton, Norwell, Springfield, Waltham, Winchester and more. A small grant program could help solidify and expand this movement, which benefits more than just the growers, since this food is often donated to food banks or sold to families via CSAs, farm stands, or farmers markets. If half of the grants were for new community farms and the other half to expand existing farms and gardens, that would add 100 communities over ten years to the 20 that have community farms now.

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<sup>14</sup> See Brockton’s Urban Farm Plan at: <https://brockton.ma.us/wp-content/uploads/2018/10/brockton-urban-agriculture-plan-2017.pdf>

Community farms also serve to expand the local garden movement and educate the hundreds of residents who volunteer at these farms about healthy soils and gardening practices and about the importance of locally grown food. Community farms are supported by donations and the sale of produce and often employ a farm manager along with dozens of volunteers. Grants should include a plan for organizational viability and connection to local schools and the creation of school gardens. Examples of community farms and gardens include:

- Prospect Hill Farm, Harvard, MA: <https://www.facebook.com/prospecthillfarmCHP/>
- Littleton Community Farm, Littleton, MA: <https://littletoncommunityfarm.org/>
- Codman Community Farm, Lincoln, MA: <https://codmancommunityfarms.org/overview>
- Brookfield Farm, Amherst, MA: <https://www.brookfieldfarm.org/aboutthefarm>
- World Farmers, Lancaster, MA: <https://www.worldfarmers.org>
- Urban Roots Farm, Springfield, MA: <http://urbanrootsfarm.com>
- ReVision Urban Farm, Dorchester, MA: <https://www.vpi.org/revision/>

► Action #2: Evaluate expanding the capacity and funding of the Agricultural Preservation Restriction Program to protect “whole farms”

MDAR’s Agricultural Preservation Restriction (APR) Program, in partnership with USDA NRCS, is a model for the United States as one of the first and most successful farm protection programs. Recently, MDAR conducted several listening sessions, updated policies, and hired several new stewardship staff to improve communication and collaboration with the 900+ APR farm owners. The RLI has identified a need to expand the APR Program beyond its current model to reach farms that currently do not qualify for APR due to soils, acreage, land values, ownership, amount of forest, and other criteria, and to create a model that conserves the affordability of farm infrastructure and housing. This new program under the APR umbrella will be developed by a diverse work group led by MDAR and EEA and will include farmers, farm support and conservation organizations, MA Housing agency staff, and food and health advocates, including the Massachusetts Food Policy Council, the Rural Policy Commission, health insurance interests, and municipalities. The program would not compete with the traditional APR Program, but would fill a niche to conserve land associated with a different segment of the farming community and would include a focus on improving access to food for all residents, especially in food-insecure areas. It is critical to involve commercial farmers in the goal of reducing food insecurity in Massachusetts.<sup>15</sup>

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<sup>15</sup> See these links for mapping of food-insecure areas: [http://www.mapc.org/wp-content/uploads/2017/11/MFSP\\_3\\_Access.pdf](http://www.mapc.org/wp-content/uploads/2017/11/MFSP_3_Access.pdf) and <https://mapublichealth.org/priorities/access-to-healthy-affordable-food/ma-food-trust-program/>

APRs protect and keep affordable about 20% of the 205,000+ acres of cultivated and hay fields in the Commonwealth, which do not include orchards or woodlands on farms. There are APR projects that are ready or nearly ready that could participate in the APR program if there were additional funds, as well as many local projects that could be funded by state funds but that do not qualify for USDA funds due to soils, NGO ownership, and other criteria. Additionally, protecting and keeping affordable farm infrastructure and housing is an increasingly important need.<sup>16</sup>

Over the 10 years of initial RLI implementation, there is the potential for 5,000 acres of farms to be permanently protected and kept affordable for future farmers. This land could meet the fresh food requirements of 50,000 Massachusetts residents permanently.

► Action #3: Expand urban “Green Teams” across our cities

Seek to create a grant program to fund “Green Teams” in EJ neighborhoods across the state. Green Teams is a concept started by a few local organizations such as Groundworks, which operates in some Gateway Cities. Grants would be multi-year and include funds for supervisory staff, student stipends, and materials for creating urban gardens and other projects. Green Teams are also an excellent pathway for high school students to pursue environmental careers and significantly address the social justice, diversity, and inclusion shortcomings of the environmental sector.

► Action #4: Explore the creation of a pilot grant program for local neighborhood organizations in food deserts to help implement EEA’s Food Security Infrastructure Grant Program in an alternative manner

The concept of allowing local groups to plan, design, and implement solutions to food insecurity has been raised several times by grassroots advocates at RLI focus groups across the Commonwealth. Under this action, a grant solicitation would be issued for NGOs in food deserts, which would select an organization to receive one pilot grant to include planning, designing, and implementing actions to significantly reduce food insecurity in one EJ community. The selected party would, over five years, lead outreach, design, and implementation of initiatives to increase food availability in their food desert. Of note, this Action would involve grassroots nonprofits from EJ communities with high food-insecurity. The result of this effort could provide important guidance to EEA and its agencies.

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<sup>16</sup> See: <https://www.farmlandlp.com/2012/01/one-acre-feeds-a-person/#.Xw9DsZnKiu4> and <https://mafoodsystem.org/plan/goal/2/>

### 3. Focus on Urban Greenspaces and Community Health

Improve the health of community residents by providing readily accessible and close-to-home natural areas for outdoor recreation, exploration, and inspiration, and by preparing communities for increasing heat waves, flooding, storms, and other climate change impacts.

#### Models for Implementation

##### WITHIN MASSACHUSETTS

- Greening the Gateway Cities Program (urban tree planting): <https://www.maurbancanopy.org/>
- Municipal Vulnerability Program: <https://www.resilientma.org/>

##### OUTSIDE MASSACHUSETTS

- Conservation Fund's Parks with Purpose, Atlanta, GA: <https://www.conservationfund.org/our-work/cities-program/our-projects/parks-with-purpose>
- Rhode Island Health Equity Zones: [https://health.ri.gov/programs/detail.php?pgm\\_id=1108](https://health.ri.gov/programs/detail.php?pgm_id=1108)
- Philadelphia Horticultural Society's LandCare Program, Philadelphia, PA (vacant lot greening): <https://phsonline.org/programs/transforming-vacant-land/program-model-and-impact>

#### Case Study: Restoring Vacant Lots into Parks in Chelsea

For more than a decade, grassroots groups and the City of Chelsea have worked together to create more new parks than any other city in the Commonwealth by restoring vacant land into beautiful, small, neighborhood parks. The parks offer a cool oasis of trees and grass during hot summer days and a place for younger and older generations to come together and get healthy exercise. For example, Creekside Commons Park, one of six new parks created since 2010 with the help of \$2.4 million in EEA grants, offers bocce courts and horseshoe fields for older residents along with play structures that stimulate and challenge young residents and grass and shade for all residents. EEA, MassDOT, and the City are also building a rail trail and greenway that runs for nearly a mile in the City.

GreenRoots, a nonprofit committed to achieving environmental justice and improved public health, has led efforts to significantly expand greenspace, reduce pollution sources, improve air quality for residents, and produce locally grown, healthy food. Even while supporting community members





*TOP RIGHT AND LEFT: Creekside Commons Park in Chelsea (Photo credit: GreenRoots)*

*MIDDLE RIGHT: Cooling off at Creekside Commons Park (Photo credit: Tracy VanAuken, Robert Wood Johnson Foundation)*

*MIDDLE LEFT: Planning additional greenery (Photo credit: GreenRoots)*

*BOTTOM LEFT: "Creating a "cool block" (Photo credit: GreenRoots)*

*BOTTOM RIGHT: Enjoying the shade (Photo credit: GreenRoots)*

during the pandemic, GreenRoots has gained commitments on new public open space along Chelsea Creek and initiated design of a new park along Mill Creek. The City of Chelsea has taken on maintaining new parks even with budget challenges, by using creative partnerships. The City and GreenRoots have worked together to find locations for new parks and to support DCR crews to plant 2,400 new trees across the City. A collaboration of GreenRoots, Boston University's School of Public Health, the City of Chelsea, and the Boys and Girls Club is creating a "cool block" which will focus a range of cooling tools on one of Chelsea's most intense "heat islands". In working with the City, the partners are greening a vacant lot, planting trees, and installing pavement and roofs with lighter colors that absorb less heat. The results of the "cool block" work will be useful to cities across the region.

The innovative work in Chelsea highlights the need to look at greening in cities to reduce heat island effects and flooding caused by development and paved areas and made worse by climate change. A recent analysis by Regenerative Design as part of the Healthy Soils Action Plan estimated that there are about 110 square miles of parking lots in the Commonwealth – about the size of five entire average-sized communities. EEA's analysis found that there are 34 square miles of vacant lots in EJ census tracts, with about 10% of this land in the 100-year floodplain, where greening would be helpful and where further development unwise. This represents a huge opportunity for greening work.

## Action Steps and Costs to Pilot or Fully Implement

### ► Action #1: Designate climate risk zones

As pointed out by the Massachusetts Climate Assessment, extreme heat and flooding are among the more urgent climate change related concerns the Commonwealth needs to address. While this is an issue in many locations, some neighborhoods are at much greater risk from the threats of heat waves and flooding. Climate models project that the Boston region will experience between 22-58 days over 90 degrees between 2080-2100.<sup>17</sup> Currently, 20% of Massachusetts residents do not have air conditioning and 60% only have window units. It is estimated that without air conditioning, indoor temperatures will exceed 91 degrees – a level dangerous to health – 19% of the time in some future climate scenarios.<sup>18</sup> EJ neighborhoods have a high correlation with urban heat islands

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<sup>17</sup> See: <https://www.umb.edu/gbrag>. The report considers four counties and two climate scenarios (RCP4.5 and RCP8.5).

<sup>18</sup> See: <https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download>

due to the amount of pavement and developed area and the lack of tree canopy and greenspace.<sup>19</sup> Neighborhoods at high risk from flooding where green solutions can be effective should be mapped for future action. Tree planting programs implemented during the next 10 years will reach maximum cooling and flood reduction value around 2050. Nature-based solutions like tree planting and greening of vacant lots are not only cost-effective, but will yield multiple benefits including cleaner air, improved health (especially for respiratory conditions like asthma and COPD), reduced obesity, an improved tax base, and enhanced mental health.<sup>20</sup> Over a decade, consistent funding and a focus on addressing climate risk zones could produce 4,800 acres of new greenspace in 10 cities that would include 1,200 acres of new urban tree canopy.

See these Philadelphia studies of greening vacant lots:

- <https://phsonline.org/programs/transforming-vacant-land/program-model-and-impact>
- <https://www.pennmedicine.org/news/news-releases/2018/july/greening-vacant-lots-reduces-feelings-of-depression-in-city-dwellers-penn-study-finds>

Also see these studies from Louisville, KY; New York; and the UK on the health effects of urban tree planting:

- <https://www.whas11.com/article/tech/science/environment/green-heart-project-looks-to-green-up-louisville-with-tree-plantings/417-2b806a1f-1e92-4c8d-bd82-1596ff917b6e>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3415223/#:~:text=Unadjusted%20estimates%20suggest%20that%20an,RR%2C%200.74%20per%20SD%20of>
- <https://www.sciencedaily.com/releases/2017/11/171117103814.htm>

This Action recommends establishing a planning assistance program to help designated high-risk communities establish climate risk zones using EEA criteria. Communities with climate risk zones could receive technical assistance grants to develop a remediation plan to determine the optimal implementation of greening techniques and locations. Communities with designated zones and plans could then apply for implementation grants.

► Action #2: Seek to launch a Plot Restoration Opportunity Program (PROP)

Assessors' records show that there are 34,000 acres of private vacant lots (28,000 lots) in Gateway Cities and Boston and thousands of additional publicly owned vacant lots. Some of

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<sup>19</sup> See I-CARES model developed by UMass for EEA: <https://ecowaters.com/>

<sup>20</sup> See: <https://ehp.niehs.nih.gov/doi/full/10.1289/ehp.1408216>



these lots are best re-developed for housing. Gateway Cities generally, and these lots specifically, are preferred places for housing development because new units in these locations concentrate growth, are served by existing infrastructure, and do not consume farm or forest land. Other lots not appropriate for development may best serve neighborhoods by being transformed into urban farms, gardens, micro-forests, and parks. Doing so would address urban heat island concerns, help alleviate flooding, and have many other benefits.

This Action could green up to 2,400 acres in Boston and Gateway Cities in partnership with local communities and state housing and economic development agencies, and could include clean-up, new soil, landscaping and planting. Program design could include stipends for neighborhood stewards via grants to local NGOs to continue to care for lots after renovation, as the stewardship of new greenspace is often a concern for city governments.

There are three suggested methods to accomplish this Action: 1) restoration by locally hired crews like the Greening the Gateway City Program, 2) grants to cities and NGOs, and 3) creation of “Green Neighborhood Zones” with required amounts of grass/tree, forest, and farm lots. Urban greening could also be supported by those seeking to mitigate loss elsewhere.

For the state grants, most lots would be renovated to be covered by grass and trees. This program would focus on neighborhoods in need of greening where Green Neighborhood Zones are not located, with half of the 1,200 acres in new forest and half in grass/trees. “Climate Risk/Food Security Zoning Districts” would utilize local land use plans and regulations to establish zones, averaging about 500 acres, that would be targeted for “greening,” for instance by converting vacant lots to community gardens, funded via incentive payments.

Assuming one acre of urban farm can provide the vegetable/fruit needs for 10 people year after year, implementing this zoning would provide the annual fruit/vegetable needs of 4,000 people in “food deserts” into the future in addition to providing significant neighborhood cooling, air filtration, improved exercise and health and reduced flooding.

► **Action #3: Create a network of small, neighborhood shady parks and natural areas in high-density neighborhoods**

EEA has focused its Parkland Acquisitions and Renovations for Communities (PARC) Program on investing in EJ communities for decades, and about 80% of spending from the PARC Program is in EJ communities. However, while this program is essential for communities across the state to improve their park and outdoor recreation facilities, due to program constraints a new targeted program should be considered to encourage applicants to site parks in optimal locations to reduce heat islands, especially near public and senior housing and schools. Parks that meet certain criteria to be effective

cooling parks could be encouraged via carefully drafted program criteria, such as the amount of pavement removed, amount of new tree canopy added, and the size and location of the new park. This Action would be considered both a climate and EJ initiative. Areas qualifying to apply to this new program could be limited to those within specifically mapped urban heat island and EJ areas.

► **Action #4: Seek to launch a locally led nature-based solutions pilot grant program to improve community health and resilience to climate impacts**

EEA should look at creating a grant program for local neighborhood organizations, especially in EJ neighborhoods, to lead outreach, design, and implementation of initiatives to use land restoration and greening projects to improve community health as the impacts of climate change increase. This Action is different from Action #2 because it empowers local neighborhood residents to develop the solution that works best for them. Normally, state government offers grants and city leadership applies for their top-priority projects. This is a unique concept that would be piloted in certain neighborhoods to identify successful strategies developed by and for people who live within urban heat islands with little greenery.

Funding for this multi-year “outreach-to-implementation” pilot grant would likely come from EEA in coordination with other state agencies, cities, private foundations, and health care organizations and would include funding for land stewardship projects employing neighborhood residents.

► **Action #5: Collaborate with the Office of Outdoor Recreation**

Outdoor recreation is offered by multiple entities including state and municipal agencies, NGOs, and private outdoor recreation businesses. There is a need to collaborate via the Office of Outdoor Recreation to connect the dots between all the outdoor recreational offerings and to understand the big picture regarding common challenges and solutions for more efficient provision of outdoor recreational services. As part of the RLI, help the Office to coordinate with all the different outdoor recreation providers and to present all recreational options to the public in one seamless location.

There is a need for a central website of all recreation and open space with a map of all trails and spaces open to the public among all state agencies, municipalities, NGOs, and privately managed spaces. The website and map could be supported by a coalition of organizations and should include links between paths and parks and public transit. The development of this system should include diverse input, especially from EJ communities that the State Comprehensive Outdoor Recreation Plan survey showed are most interested in expanding their outdoor recreation opportunities. The office could also develop one system of trail markers and signs for a statewide trail system and offer annual grants to municipalities and NGOs to implement small projects on the outdoor recreation network.

► Action #6: Improve coastal access, especially for underserved residents

Massachusetts should look to improve access to its coastline, estuaries, and tidal rivers. Mapping of sea-level rise has been completed and can be used to identify public access sites that will see increasing use as the impacts of climate change increase. This Action would recommend investing in acquisition of public access points to and along the coast at locations that are spaced frequently along the shoreline, and that connect with existing or planned public transportation, bike routes, and regional walking paths. This program is best operated by the MA Coastal Zone Management (CZM) office, which could offer grants for small, key coastal access sites to municipalities and NGOs.

In the past, CZM operated a coastal acquisition grant program with federal funding. This grant program would focus on increased coastal access in EJ communities and select projects utilizing sea-level rise mapping along with other priority coastal access criteria.

► Action #7: Implement the Pilot Park Access Plan to provide safe and inviting walking routes to 12 parks in Fitchburg, Worcester, Chelsea, and Lawrence

EEA currently invests \$12-15 million per year to build and renovate parks. This investment is especially important for improving equity in accessing parks in EJ neighborhoods. To assess safe walking routes to parks such as these, EEA recently completed the first analysis of park access equity for these four Gateway Cities. The plan is based on community input on the most popular and feasible walking routes to the 12 most visited parks in these cities. After collecting input, EEA solicited support from a consulting firm to then map the 100 one-half mile routes, developed criteria for safe and inviting walking, and evaluated the cost to improve each route, which includes safe street crossing, improved sidewalks, improved shade, and vacant lot restoration. If implemented, these plans would improve park access for about 300,000 residents of these communities.

## 4. Focus on Water Resources

Protect and restore drinking water supplies, inland and coastal waters, and habitats from increased threats.

### Models for Implementation

WITHIN MASSACHUSETTS

- *DCR's Watershed Protection Plan FY19-FY23*, Quabbin and Wachusett, MA: <https://www.mass.gov/doc/dcr-watershed-protection-plan-fy19-fy23/download>
- *Acushnet Sawmill Restoration*, New Bedford, MA: <https://www.savebuzzardsbay.org/news/the-sawmill-opens-after-multi-year-restoration-on-the-acushnet-river/>

- *A Case Study at Century Bog*, Wareham and Plymouth, MA: <https://www.manomet.org/wp-content/uploads/old-files/Century%20Bog%20Case%20Study%205-13.pdf>

## OUTSIDE MASSACHUSETTS

- Sebago Clean Waters, Sebago, ME: <https://highstead.net/insights/major-grant-will-protect-water-quality-in-maine/> and <https://www.sebagocleanwaters.org/>
- Chesapeake Bay Watershed Initiative (pollution trading program): <https://www.cbf.org/issues/water-quality-trading/>
- “Using State Revolving Funds for Nature-Based Pollution Reduction”: <https://www.conserva-tionfinancenetwork.org/2018/05/21/using-state-revolving-funds-for-land-conservation>
- “Holland City Votes to reduce its impervious surfaces by 10%,” Arnhem, the Netherlands: <https://www.theguardian.com/world/2020/jul/29/dutch-city-arnhem-redraws-layout-prepare-global-heating-effects>
- Healthy Watersheds Consortium Grants: <https://www.epa.gov/hwp/healthy-watersheds-consortium-grants-hwcg>

## Case Study: Protecting Brewster’s Water Supply for the Long Term

Brewster has a reputation of being very proactive in protecting its groundwater through years of open-space investments, dating all the way back to the 1980s when the town acquired approximately 800 acres on the southwest side that became the Punkhorn Parklands, which helps protect the wellfields there. Cape Cod’s water supply depends on their “sole source” aquifers – there are no other options for drinking water if they become contaminated. Due to the permeable, sandy soils, the Cape’s water supply wells are vulnerable to contamination, especially from nitrogen loading from septic systems. In recent years, a partnership of the Brewster Water Department, the Conservation Commission, the Brewster Conservation Trust and the Open Space Committee along with the Town of Dennis has protected 150 additional acres at a cost of about \$10 million in more than a dozen projects in the southwest corner of the town where aquifers and wells for the two towns are located. These projects have received expert technical assistance and project management from the Compact of Cape Cod Conservation Trusts, a nationally recognized conservation organization that serves all the Towns and land trusts for the Cape’s 15 communities.

Brewster has one other drinking water aquifer area in the southeast section of town where the Town has recently completed a 66-acre conservation project along the shores of Long Pond at a cost of \$6 million. Earlier acquisitions have protected more than 100 acres in partnership with Harwich and Orleans which also depend on this aquifer area. Brewster's partnerships and persistence over more than 35 years is a model for other communities across the Commonwealth who are also grappling with protecting land that holds the future of a safe drinking water supply. The funds spent in protecting aquifer lands to keep water quality high are also a cost-effective investment by helping to avoid town-wide sewerage to reduce contamination as has occurred in other towns. Climate change has increased the gravity of the water supply protection challenge as increased droughts and more intense storms and stormwater runoff make protecting the land that drain to aquifers and reservoirs even more critical.



*Over 1,500 Brewster Town Meeting members voting to support the Long Pond water protection acquisition (Photo credit: Mark Robinson)*

### **Action Steps and Costs to Pilot or Fully Implement**

- **Action #1: Conserve the most intact landscapes within the watersheds of the Commonwealth's Gateway Cities' drinking water supplies**

The RLI Steering Committee identified a strong connection between conserving the best remaining examples of intact landscapes and completing the protection of many of the Gateway Cities' water supplies. The RLI committee called water supply protection the "lens for conservation." Many Gateway Cities are likely to see increased populations as climate impacts increase migration, as already occurred in Holyoke after Hurricane Maria devastated Puerto Rico, and because residents are attracted to the vibrant cultures and housing opportunities in these cities. Gateway Cities are



good places to grow, and there is opportunity for EEA and EOHED to work with existing and create new policies and programs to encourage development in them.

One of the great assets of many Gateway Cities is the surface water supplies developed in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries when these cities had significantly larger populations. This Action can meet two valuable goals – protecting the Commonwealth’s best unfragmented landscapes and habitats and assuring clean water in Environmental Justice communities as the impacts of climate change increase. To implement this Action, a new Watershed Habitat Conservation grant program is recommended, which would focus on meeting a landscape conservation and restoration goal of 10,000 acres in important water supply watersheds. Just as the Landscape Partnership grants have created new and dynamic partnerships among communities, land trusts, and state agencies, the new Watershed Habitat Conservation grants would create new partnerships among drinking water supply divisions in municipalities and habitat conservation experts at state agencies, land trusts, and regional planning agencies.

These grants could also be a match for the USDA Regional Conservation Partnership and Forest Legacy grants, both of which have increased funding for the New England area. These grants also represent a key theme of the RLI – connecting rural and urban regions through shared resources. To meet the spirit of that theme, these grants need to reward the rural communities that host the Commonwealth’s last unfragmented landscapes. To address this issue, this new grant program would be unique in that it would include a significant investment in the local communities to employ local residents to restore these landscapes. These efforts include riparian tree planting, invasive removal, or supporting eco-tourism to these new conserved landscapes. The program will also strongly encourage the acquisition of land via conservation restrictions so working farms and forests can continue to contribute to jobs and to the tax base of their local communities.

#### ► Action #2: Expand urban river and stream restoration projects

Urban river and stream restoration projects can add important habitat, provide new walking trails and greenways, cool neighborhoods, and reduce flooding. Just as rural habitat conservation and restoration projects provide multiple watershed benefits, urban habitat restoration provides a range of important benefits in areas with many residents who lack access to nature. These projects would encourage significant removal of pavement, stream daylighting, aquatic passage improvements, and native riparian plantings.

The Urban River Visions program created by the EEA and DFG Riverways Program in the early 2000s is a good model for transformative habitat, watershed, and greenway project proposals. Projects should include restoring wetlands to native cover, returning streams to natural configurations, and taking measures to maximize the benefits of these projects for flood reduction and carbon storage.

This Action would hold up the successes of that program and recommend offering grants for fresh urban river restoration plans. Municipalities with completed plans could qualify to apply for grants from a potential new Urban River Habitat and Greenway Grant Program. These grants could create a partnership involving the Division of Ecological Restoration, EEA, municipal DPWs, nonprofits such as the Nature Conservancy, and regional planning agencies, which would complete plans and designs and implement these projects with the help of additional federal funding, where available. This Action would complement EEA's Municipal Vulnerability Program. The grants would require a significant amount of neighborhood-led collaboration on the restoration plan and design and involvement of local NGOs and neighbors in stewarding the complete restoration sites.

► **Action #3: Evaluate updates to upland drinking water protection zones**

This Action would work on a collaborative plan to expand protection of uplands and natural buffers. Upland areas of surface drinking water watersheds are increasingly important as the impacts of climate change cause more frequent and intense storms. There are 547,000 acres in these zones, or 10% of the state, and about half of this land is permanently protected. Upstream developments are expected to increasingly strain stormwater installations. For example, a 4-inch/24-hour storm event generates 13,600 gallons per acre of runoff from a forest while generating 105,900 gallons per acre from a developed site (Healthy Soils Action Plan). Developments occurring on drinking water watersheds should be the model for allowing no more than the natural forest cover stormwater flow to leave the developed parcel especially in large, intense storms. This Action will require DEP, communities, and stakeholders to convene as a work group to evaluate options and make recommendations for changes to the water supply regulations.

► **Action #4: Parking lot assessment and restoration**

Conduct a statewide parking lot assessment and make recommendations for incentives for reducing pavement and associated stormwater impacts. By restoring little-used parking lots in environmentally sensitive areas for use by the public as parks, gardens, greenways, or alternatively for development to reduce pressure on farm and forest land, cities and towns across the Commonwealth will take an important step in reducing future flooding and heat island impacts.

Implementation of this project could begin with an analysis of the number, size, location, and usage of state-owned parking lots. While existing programs work to reduce stormwater from parking lots, this Action would locate the parking lots where modeling shows the best benefit to stormwater and heat island reduction. The analysis would go beyond satellite image interpretation and include discussions with committees of residents and planners about the feasibility of parking lot removal and nature restoration. Additionally, grants from the existing Land Use Planning Grant Program or



possibly a new focused grant program would be recommended to further plan with local residents and officials and to design and implement 10 pilot restoration projects.

## 5. Focus on Natural Carbon Storage and Climate Resilience

Achieve a significant increase in carbon storage and climate resilience in forests, coastal and inland wetlands, and soils.

### Models for Implementation

#### WITHIN MASSACHUSETTS

- Family Forest Carbon Program (carbon storage): <https://www.forestfoundation.org/family-forest-carbon-program>
- Working Forest Initiative (climate forestry): <https://www.mass.gov/guides/working-forest-initiative>

#### OUTSIDE MASSACHUSETTS

- City Forest Credits: <https://www.cityforestcredits.org/>
- Comet Farm Program, USDA Natural Resource Conservation Service (voluntary carbon reporting tool for farmers): <https://comet-farm.com/>

### Case Study: Supporting Our Most-Forested Region in the Era of Climate Change

The Woodland Partnership of Northwest Massachusetts (formerly the Mohawk Trail Woodland Partnership) was officially created by a 2018 state law after over 100 local meetings to design a regional program to support 21 rural communities by enhancing jobs and businesses related to tourism and sustainable forestry and conserving and stewarding the 300,000 acres of diverse forests. A unique intersection of three forest ecosystems, this northwest corner of Massachusetts is seeing significant impacts from a changing climate. Through a combination of several state, federal, and private grants, the Board of the Partnership (including 17 towns and several regional environmental and economic development organizations), working with forest climate experts from across the region, has developed a “climate forestry” program for towns and private woodland owners to increase the resilience and carbon storage of their forests.

The program is partially based on the successful Foresters for the Birds Program, where Mass Audubon ornithologists have trained dozens of private licensed foresters in assessing and implementing practices over hundreds of acres to enhance the habitat for over a dozen declining bird species.<sup>21</sup> Mass Audubon is now working with the New England Forestry Foundation (NEFF) and the Department of Conservation and Recreation (DCR) to train private foresters in assessing forests for a menu of practices focused on enhancing resilience and/or increasing the storage of carbon. Some practices, like removing invasive species, reducing deer browse impacts, or planting climate-adapted trees can help to enhance both resilience and carbon storage. Other practices, like extending the time between harvests or harvesting to enhance species diversity, focus mostly on carbon storage or enhanced resilience, respectively.

The carbon storage practices were developed by The Nature Conservancy and the American Forest Foundation for its new Family Forest Carbon Program, which is now being launched in Massachusetts, Vermont, and eastern New York. Contributing to these efforts, DCR, working with Mass Audubon and NEFF, has developed a new climate forestry stewardship plan format to encourage towns and private forest owners to develop plans focused on enhancing climate resilience and carbon storage. In partnership with the MA Woodlands Institute, DCR funds private foresters to complete these plans for interested landowners. DCR's Working Forest Initiative has funded more than 2,500 forest stewardship plans on over 250,000 acres of private and town forests across the state in the past 10 years.



*LEFT: Community riverside tree planting in Conway (Photo credit: Lisa Hayden, New England Forestry Foundation)*



*RIGHT: DCR forester leading a landowner workshop on forest climate resilience (Photo credit: Jennifer Fish, DCR)*

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<sup>21</sup> See: <https://www.mass.gov/guides/foresters-for-the-birds-assessing-your-woods-for-bird-habitat>

There are already a number of actions by towns in the Partnership region that others can emulate. The Town of Rowe developed a climate forest plan for its 1,200-acre Pelham Lake Forest and planted dozens of climate-adapted trees; trained elementary school teachers and students to monitor for invasive species; and treated ash trees to help them withstand a new invasive threat. Five other communities have also completed climate forest plans and will implement other practices, and will create two demonstration forests which Mass Audubon will monitor and help run programs to educate forest owners. Conway planted dozens of new trees to enhance the habitat and flood resilience along the South River.

### Action Steps and Costs to Pilot or Fully Implement

#### ► Action #1: Launch the Climate Smart Forestry Program

The development of this program with capable partners including the Northern Institute for Applied Climate Science, The Nature Conservancy (TNC), DCR, Mass Audubon and New England Forestry Foundation has recently been completed. There has been a long-standing desire by small private forest landowners to be able to sell carbon offset credits for managing their forests in ways that will assure increased carbon storage and resilience to climate change. Most carbon offset markets require significant investment on the part of the landowner to inventory and model the growth of their forest. This limits these types of incentives to very large landowners (4000+ acres). This program is modeled on the TNC and American Forest Foundation's Family Forest Carbon Program and is practice-based. Rather than measure and model each parcel, this program will incentivize practices that are proven to increase carbon storage and forest resilience to climate change while maintaining carbon stocks and supporting other ecosystem services such as protecting water quality, cold water habitat, and downstream water supplies and communities. Once developed, this program would pay annual incentives to private and municipal landowners (10+ acres) to adopt verified forestry practices such as thinning, extended rotation, tree retention, setting aside forest reserves, etc., over 20 years or more, in order to expand carbon storage and improve forest climate resilience on our 3 million acres of forests.

The program was developed with funding from the DCR Working Forest Initiative, the U.S. Forest Service, EEA's MVP Program, and private foundations. It is anticipated that the annual payments can come from a combination of USDA payments and private companies purchasing the offsets. Additional funding will be helpful to leverage USDA grants and to pay for some of the initial landowner payments for those committing to the program.<sup>22</sup>

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<sup>22</sup> For example, Amazon recently invested \$10 million in the Family Forest Carbon Program in PA: <https://www.cnn.com/2020/04/21/amazon-invests-10-million-for-forest-conservation-in-climate-change-plan.html>

The DCR Working Forest Initiative has enrolled about 250,000 acres in its Forest Stewardship and Chapter 61 Forest Tax Law Programs over the past decade. With continued investment, EEA could quantify the amount of carbon added to these forests each year towards the statewide goal because they are enrolled in its program. It is expected that this amount might range from 150-200,000 tons of carbon dioxide stored per year.

► **Action #2: Evaluate potential amendments to the MA Forest Tax Law**

Chapter 61, 61A and 61B all offer forest and farm owners significantly reduced property taxes for a commitment to maintain their land in its “current use.” There is some form of farm and forest “current use” law in every state. Chapter 61 improves forestry practices because enrollment requires the development of a forest plan by a licensed professional forester and supervision of any harvesting by a licensed forester. The Working Forest Initiative, which offers cost-share payments for forest landowners to complete forest stewardship plans, which is a more habitat-based version of a forest management plan, has since the early 2000s increased the enrollment in Chapter 61 from 15 to 25% of eligible landowners (owners of more than 10 acres of forest land). In the category of owners with 40+ acres, enrollment is even higher. This program has also resulted in an increase in the percentage of harvests overseen by a professional forester in the 2000s – from 10% to nearly 50% currently.<sup>23</sup> By recommending an enhanced incentive in the form of Chapter 61 for forest stewardship to support carbon storage and forest resilience, it is anticipated that the enrollment in Chapter 61 will increase significantly. The Climate Smart Forestry Program, when it is fully operational, could serve as the entrance requirement for the new Chapter 61 C. Farmlands should also be eligible for entrance to Chapter 61 C if they can incorporate healthy soils practices in a measurable way.

If implemented, this Action would require a thorough, inclusive, and well-planned process like the one that occurred in the early 2000s when Chapter 61 was significantly amended. In addition to state agencies, stakeholders (including forest landowners and farmers, tax assessors and municipal officials, forest and farm advocates, and NGOs) should be involved in planning efforts. The key to future success is to offer the landowners in Chapter 61C and communities an additional incentive from the state level to accompany the longer-term commitment to this program.

► **Action #3: Adopt the recommendations of the Healthy Soils Action Plan**

The Healthy Soils Action Plan (HSAP) was developed based on extensive stakeholder input and scientific analysis, and it contains recommendations for actions to enhance soil health including farming techniques and land management strategies. The RLI was developed on a parallel track

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<sup>23</sup> Chapter 61 and forest harvesting statistics from DCR.

and information was shared among the two efforts. The HSAP showed that significant improvement to soil health and productivity and significant protection of soil carbon could be achieved with best practices for forest and farms.

USDA currently funds some healthy soils practices, but further state incentives could increase enrollment. In the HSAP, the forestry best practices focused on enhanced protection of wet soils. Cost-sharing for forestry operations to install practices like timber mats could help the feasibility of their implementation. To assist forestry practices and harvesters, a new grant program is recommended.

► **Action #4:** Seek to increase the percentage of long-lived forest products from existing harvests

One method of increasing the carbon storage from the Commonwealth's forests is to increase the percentage of the existing harvests that get stored in long-term products. This can be accomplished by increasing the number of harvests that leave the fastest-growing, healthiest trees – the ones likely to be suitable for long-term products – until the next harvest. An alternative way is to help improve the manufacturing and marketing processes so there is less waste and more local markets for long-lived products, including new emerging markets for cross-laminated timber and wood building insulation.<sup>24</sup> Local harvests could also be channeled to help repair and build affordable housing, especially in the rural regions where most harvests occur. To facilitate this utilization of local lumber for local affordable housing, EEA and DCR in partnership with EOHED could pilot a facilitated procurement of lumber utilizing Massachusetts sawmills that matches the needs of rural housing trusts and authorities. Likely this could be done by purchasing certified native lumber and organizing it into standard building kits for the affordable-housing sector.

To implement this Action, a pilot grant program is recommended. This program would focus on the supply chain that processes harvested wood for projects that would measurably and significantly increase the amount of wood harvested that will be used in long-term products where carbon will be stored. This assistance could help forestry operators reduce waste through equipment modernization or through acquisition of new equipment to use existing harvests for new products, like thermal wood, or to form partnerships with local affordable housing NGOs to utilize wood in affordable housing.

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<sup>24</sup> See regional agreement and new technologies at: <https://www.masstimberregionaldialogue.com/> and <https://golab.us/>



- Action #5: Establish a goal and metric for construction of wood buildings using locally sourced timber for carbon storage and substitution of steel, concrete, and plastics as outlined in the Clean Energy and Climate Plans for 2025/2030 and 2050<sup>25</sup>

There was interest among the Steering Committee to incentivize the use of local wood products to build local buildings. In the Boston area, there is also interest among architects and builders to utilize wood for mid-rise housing where mass timber<sup>26</sup> is competitive with traditional steel and concrete construction. The Boston Planning and Development Agency (BPDA) is currently offering incentives, via a grant from the USDA and funding from the ClimateWorks Foundation, to assist developers with mass timber building designs. Another USDA grant is testing and using Eastern hemlock wood for the first time in mass timber to be used in Boston's first mass timber building. If implemented, this Action will require research and analysis to look at whether additional local species could be used in a regional cross-laminated timber (CLT) plant to build housing in the Boston area with a significantly lower carbon footprint. Work will be needed to look at how this effort can be carried out in a way that maintains the increased carbon storage in the Commonwealth's forests with high forestry standards. This Action can be accomplished by convening a broad-based working group with knowledge of the forests and wood buildings and all the ecological and economic aspects that need to be analyzed.<sup>27</sup>

## 6. Focus on the Green Economy

Expand the number of jobs in sustainable farming, maintaining healthy soils, managing forests for carbon storage and climate resilience, and expansion and stewardship of forests and urban tree canopy.

### Models for Implementation

#### WITHIN MASSACHUSETTS

- MDAR Farm Viability and Enhancement Program: <https://www.mass.gov/service-details/farm-viability-enhancement-program-fvep>
- Greening the Gateway Cities Program: <https://www.maurbancanopy.org/>

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<sup>25</sup> See: <https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2025-and-2030>

<sup>26</sup> Mass timber refers to large buildings made with large wood panels for floors, ceilings, and beams. See: <https://www.masstimmerregionaldialogue.com/>

<sup>27</sup> This effort could build on the success of the Mass Timber Dialogue. See: <https://www.masstimmerregionaldialogue.com/>

## OUTSIDE MASSACHUSETTS

- Forest policies to enhance climate benefits: <https://www.forestfoundation.org/what-we-do/increase-carbon-storage/>
- Vermont Working Lands Enterprise Initiative: <https://workinglands.vermont.gov/>
- Vermont Farm and Forest Viability Program: <https://www.vhcb.org/viability>

### Case Study: The Green Economy Supporting Environmental Justice Neighborhoods

The Greening the Gateway Cities Program (GGCP) has planted 35,000 large new trees in underserved neighborhoods in 23 cities across the Commonwealth in the past 10 years, employing 635 seasonal tree-planters mostly from these neighborhoods. Of these workers, 53% have continued for multiple seasons and 17% have gone on to find permanent green jobs with the state or local cities. The GGCP also supports local grassroots organizations' youth "green teams" to provide outreach and education and tree planting in some locations. A USDA study found tree planting has a 2:1 economic multiplier in the region including local tree nurseries where trees are grown, the state's largest agriculture sector.<sup>28</sup> The GGCP has already exceeded its goal of planting 2,400 trees per city in seven cities and is approaching this additional five-trees-per-acre density goal in many areas (below, see map of Chelsea, the most densely populated Gateway City).

Unlike gray infrastructure, trees provide exponentially more community services each year. A study by Stantec found the GGCP recouped its initial investment in 15 years due to reduced energy use by residences. The energy saving value of trees was confirmed when thousands of trees had to be removed due to the Worcester Asian Longhorned Beetle disaster; there was a 1% increase in energy use for each 1% loss of tree cover. This correlation between energy use and tree cover loss has been confirmed by many modeling studies across the country.<sup>29</sup> Tree-planting energy savings are also an important way to reduce "peak load" use during increasing heat waves and help "decarbonize" the electric grid. Expanding tree cover also reduces stormwater by as much as 10% under tree canopies, which helps reduce flooding and stormwater treatment costs.

Beyond the new jobs, job training, and utility savings for underserved residents and cities, the GGCP has demonstrated that widespread tree planting has many other climate resilience, health, and quality

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<sup>28</sup> See: <https://www.sciencedirect.com/science/article/abs/pii/S161886671730523X>

<sup>29</sup> See: <https://scholarworks.umass.edu/theses/1071/> and [https://www.researchgate.net/publication/316419798\\_Effects\\_of\\_urban\\_tree\\_canopy\\_loss\\_on\\_land\\_surface\\_temperature\\_magnitude\\_and\\_timing](https://www.researchgate.net/publication/316419798_Effects_of_urban_tree_canopy_loss_on_land_surface_temperature_magnitude_and_timing)



of life benefits. Increasing heat waves have a disproportionate effect on underserved neighborhoods, where there is lower access to air conditioning and increased heat islands due to extensive pavement. The GGCP program has installed 250 temperature gauges in three cities – one of the first extensive measures of actual summer heat in urban neighborhoods. The results show that areas with trees are significantly cooler and even the recently planted trees in Holyoke already showed a measurable cooling effect on hot summer days. Two studies in Los Angeles and the UK have also shown that asthma impacts are significantly lower in areas with more trees.<sup>30</sup> Trees are also a natural absorber of particulate pollution linked to improved health, as Louisville’s EPA-funded “Green Heart” study is showing.<sup>31</sup>

The “right tree-right place” approach of the GGCP is also greatly expanding biodiversity and resilience of neighborhoods while reducing future costs in each city by planting dozens of species of trees adapted to each site and chosen by residents with guidance from urban foresters. The GGCP is also bringing nature close to residents who have little nearby greenspace; trees planted so far are within 50 feet of at least 35,000 residents. GGCP interns have interviewed over a hundred residents who are caring for new trees, and 97% reported being “very happy” with the program. The diligent watering of trees by residents has resulted in an 85% survival rate several years after planting – much higher than other programs.

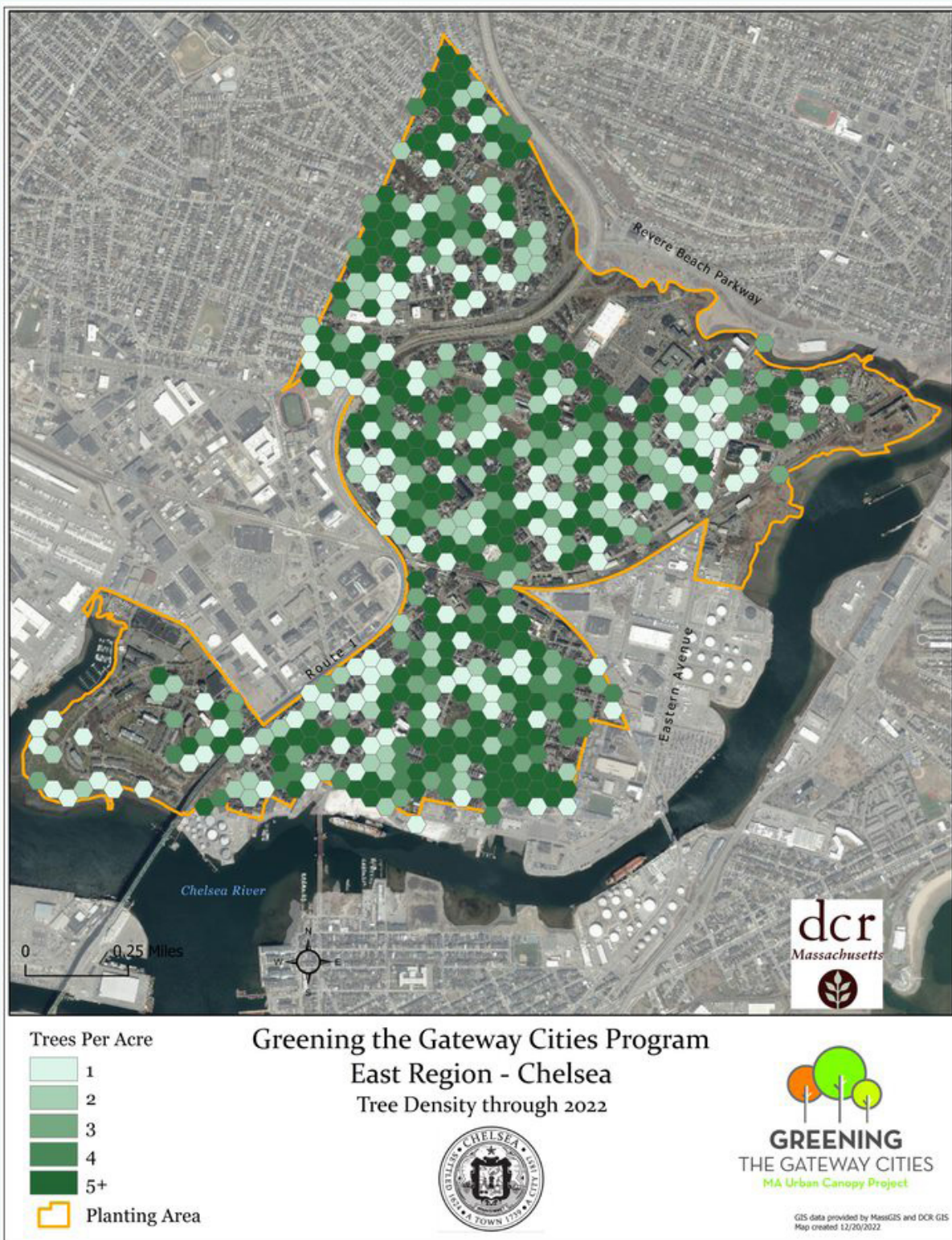


*LEFT PHOTO: Some of the more than 700 trees planted in Quincy’s Snug Harbor public housing neighborhood (Photo credit: Mathew Cahill courtesy of the DCR Urban and Community Forestry Program)*

*RIGHT PHOTO: DCR tree planters in Fitchburg in 2022 (Photo credit: Mathew Cahill courtesy of the DCR Urban and Community Forestry Program)*

<sup>30</sup> See Los Angeles study: <https://www.mdpi.com/1660-4601/18/7/3487> and UK study: <https://www.sciencedirect.com/science/article/pii/S0160412017304026>

<sup>31</sup> See: <https://www.enviromeinstitute.com/green-heart>



ABOVE MAP: Location of the 2,400+ new trees planted in Chelsea (Map created by Gianna Hays courtesy of DCR Urban and Community Forestry Program)



## Action Steps and Costs to Pilot or Fully Implement

- Action #1: Seek to create 3,000 new jobs throughout the Commonwealth employing people to restore the land to reduce climate impacts for people and restore habitat, watershed, and forests.

The first five strategies described in this report will create dozens of new jobs to expand nature in the Commonwealth. The Green Economy strategy highlights and re-focuses the RLI on the economic benefits of having resilient farms, forests, and fisheries. Overall, the RLI will strive to grow private-sector employment by at least 10 new jobs in each of our 170 rural communities; at least 30 new jobs in each of our 45 cities; and dozens of new jobs in suburban communities due to expanded forest and farm carbon storage and resilience activities, as well as urban forestry, greening, and restoration projects. In addition to the jobs created in the No Net Loss, Urban Greenspace, Food, and Carbon Storage strategies, this Action recommends consideration of a state refundable tax credit for farmers and forest landowners to implement restoration, carbon storage, or climate resilience practices as recommended in a climate forest or farm plan.

DCR has developed a new forest plan format with Mass Audubon that will be specifically focused on practices that enhance carbon storage and forest resilience. MDAR, in partnership with NRCS, can update the farm plan to include recommended practices for enhancing soil productivity and carbon storage as soil organic carbon is the best measure of soil productivity and resilience. If a farmer or forest landowner has a recommended practice in their climate plan that is not covered by other existing incentives, landowners would be able to submit the practice for a tax credit, after review by DCR or MDAR.

The Commonwealth's farm and forest landowners make up less than 3% of the population but care for nearly half the land throughout the state. Surveys of forest and farm landowners show that they are highly motivated to manage their land with the most updated, sustainable practices. A survey of 450 forest landowners found that they spent an average of \$2,200 of their own funds to implement the state-funded forest plan. This program would be especially important for landowners with small ownerships that do not qualify for other state programs, but which are nonetheless important and often viewed by many more people, making them ideal demonstration projects. The implementation of the tax credit practices would potentially generate hundreds of forestry and farming jobs.

- Action #2: Seek to create the Forest Viability Program

To implement this Action, funding, technical assistance, and incentives are recommended. These resources would be used for infrastructure, processing, and value-added products from working forests to advance a viable wood products system and working lands economy modeled after Vermont's Working Landscapes Program and MDAR's Farm Viability Program. Any grants

would be competitive for infrastructure for forest businesses to improve their efficiency and market competitiveness based on business plans by subject experts hired by MDAR. Like Farm Viability, participants would need to record a forest viability covenant on their land for 10 years. This program will “keep forests as forests” and make them more valuable as forests. In Vermont, a similar program has funded 250 projects in the past 10 years with \$7 million in state funds. The state funds leveraged \$11 million in private funds to create 500 new jobs, sustain 1,000 jobs, and add \$36 million to the economy while benefiting 16,000 acres of working lands.

## 7. Focus on Landscape Conservation and Restoration

Expand landscape and watershed-scale conservation and restoration projects via EEA agencies and local, regional, and statewide land trusts and watershed organizations. Permanent conservation will mean constantly improving climate resilience values for people and habitat (such as reducing heat islands, flooding, water and air pollution, and risk to water supplies).

### Models for Implementation

#### WITHIN MASSACHUSETTS

- EEA’s Landscape Partnership Program: <https://www.mass.gov/service-details/landscape-partnership-grant-program>

#### OUTSIDE MASSACHUSETTS

- Examples of Iconic Wildlife Passage Structures: <https://www.canadiangeographic.ca/article/banffs-famed-wildlife-overpasses-turn-20-world-looks-canada-conservation-inspiration>
- USDA NRCS Regional Conservation Partnership Program: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/rcpp/>

#### CASE STUDIES

- NRCS’s Landscape Partnership Grant for the Southern New England Heritage Forest and the Sebago Lake Partnership for Portland, ME’s Water Supply: <https://www.mymassconnwoods.org/the-southern-new-england-heritage-forest-rcpp> and <https://wildlandsandwoodlands.org/wp-content/uploads/2022/08/Sebago-Clean-Waters-Case-Aug-2022.pdf>
- Endowment for Forestry and Communities and EPA’s Watershed Innovation Grants: <https://www.usendowment.org/what-we-do/ecosystem-markets/healthy-watersheds-through-healthy-forests/a-success-story-an-old-investment-helps-yield-downstream-results/>

## Case Study: Protecting a 50-Mile Wildlife Corridor across the Middle of the Commonwealth

Landscape conservation is like completing a puzzle with thousands of pieces and years of work with conservation-oriented families to find just the right way to complete the protection of priority ownerships. Several skilled and persistent land trusts working with dozens of communities and four state agencies have made significant progress conserving a corridor from the Connecticut River across the Mt. Holyoke Range around the Quabbin Reservoir and east to Wachusett Reservoir and north to New Hampshire. Protecting this corridor also helps protect the water supply for over 60 communities. Much of the corridor is within the Connecticut River Watershed, which is recognized as nationally important through the designation of the Silvio O. Conte National Fish and Wildlife Refuge.

The Kestrel Land Trust has helped protect over 10,000 acres over the past decade in 55 projects that conserve the ecologically unique Mt. Holyoke Range. These projects also make ecological connections to the 60,000 acres of DCR land surrounding Quabbin Reservoir. Wildlife tracking studies done by trained volunteers show that a range of large mammals like bobcat, otter, moose, and bear travel across this landscape. The Conservation Assessment and Prioritization System – UMass Amherst’s award-winning landscape conservation model – ranks the region west of Quabbin as one of the Commonwealth’s most ecologically significant forested regions. The 55 projects ranged from just a few acres to thousands of acres in size and were supported by Community Preservation Act funds from nine municipalities, and many EEA and USDA grants, private foundation grants, and acquisitions by DCR, MassWildlife, and MDAR.

On the east side of the Quabbin lies the 2,000-acre Dougal Range of hills running north from Ware to Hardwick. The area is unusual because it contains no state conservation lands. The East Quabbin Land Trust has worked with many landowners supported by EEA’s Conservation Partnership grants and protected 600 acres of this unique range so far. The Dougal Range is a good example of the value of landscapes to rural communities and to the biodiversity of the Commonwealth. The range contributes to clean water supplies for the village of Gilbertville and the Town of Ware, and contains five farms that provide fresh food for local markets. The Range has only one paved road bisecting it and its unfragmented landscape connects three ecologically significant watersheds. It is designated as an Important Bird Area by Mass Audubon with a high density of increasingly rare interior forest bird species nesting there.

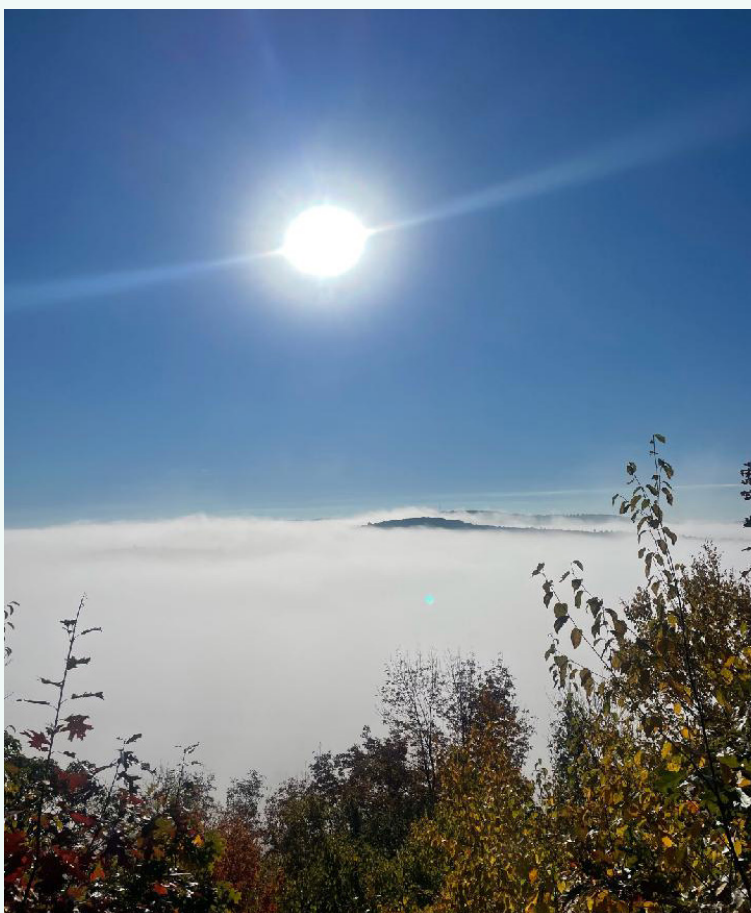
On the north and east side of the Quabbin, the Mount Grace Land Conservation Trust (MGLCT) has been working for more than two decades to protect the landscape that leads from Quabbin





*ABOVE: The sun rising over Mt. Holyoke Range (Photo credit: Jamie Malcolm-Brown Photography)*

up to New Hampshire and east to the Wachusett Reservoir. Beginning in the early 2000s, MGLCT worked with four small communities north of Quabbin and dozens of conservation-minded families to protect 9,000 acres in more than 100 parcels. Key to the success of this two-year project was the connection MGLCT had to the communities and the financial support (about \$9 million) and technical expertise from EEA, MassWildlife, and DCR. MGLCT followed this success with a series of USDA Forest Legacy grants using a new, innovative approach that included dozens of parcels across the landscape in one grant. As a result of this success, EEA launched the Landscape Partnership grant program, which complemented the federal program.



*ABOVE: Sun rising over fog from the Dougal Range overlook in Hardwick  
(Photo credit: Will Hood)*

Since MGLCT received the first Forest Legacy “landscape” grant in the early 2000s, MGLCT and Kestrel Land Trust have received \$23 million in USDA funds from Forest Legacy and the Community Forest Program to protect 14,600 acres across this landscape. EEA and partner projects (including EEA grants and conservation restrictions completed by land trusts and towns) have protected 50,000 acres in 682 projects in this region since 1999 with \$108 million in EEA funding. The Conservation Land Tax Credit, the newest EEA program, has helped protect over 1,300 acres with another 450 acres waiting for funding, utilizing \$1.8 million in state tax credits and \$5.8 million

in land donation value since 2011 in this landscape. Perhaps the most ambitious recent project – the Quabbin to Wachusett Mountain project – protected 3,100 acres in 32 parcels via a collaboration of three land trusts and Mass Division of Water Supply Protection over three years. The latest landscape Conservation Project protected 705 acres along five brooks in three communities with the help of an EEA Landscape Partnership grant.

Conserving this 50-mile-long landscape so it continues to function for a diversity of wildlife and maintains the rural way of life cherished by dozens of small communities requires public-private partnerships like those described here that work closely to meet the goals of local communities and woodland-owning families. An added urgency in doing landscape conservation work across the Commonwealth is climate change. Landscape conservation helps maintain wildlife populations as habitats change and supports communities by providing more stable water supplies through droughts and intense storms and reducing impacts to downstream communities.

## Action Steps and Costs to Pilot or Fully Implement

### ► Action #1: Explore expansion of landscape and watershed-scale conservation, stewardship, and restoration projects

There are appropriate places for both new growth and large-scale land conservation, and EEA and our sister agencies can work together to achieve both. For example, while EEA invests in land conservation, it also encourages sustainable housing production by offering grants to communities to plan and zone for housing development in places and at densities that reduce land consumption. Going forward, EEA will continue to fund projects that are explicitly about sustainable housing production to complement efforts to conserve land and natural resources. In the 2022 grant round alone, EEA provided Land Use Planning grants to five communities to address MBTA Communities compliance; funded four projects to produce or implement a Housing Production Plan (including a regional plan for the Merrimack Valley); and helped five communities draft mixed-use zoning that includes housing. Together the Executive Offices of Housing and Economic Development and Energy and Environmental Affairs and our many partners can enhance our efforts to encourage local zoning and make infrastructure investments that site growth where it is most appropriate, like transit stops, Gateway Cities, and village and town centers, while also working to protect large undeveloped areas.

One tool for doing this is EEA's Landscape Partnership Program, which funds two to three large, complex projects each year. Throughout the 2020s, it is critical to conserve the remaining intact landscapes with these strategies that ensure the conservation of the watersheds and wildlife corridors that make Massachusetts unique. There is also a need to complete landscape projects at a range of scales that fit every region of the state, from Cape Cod to the Berkshires. Watershed-focused conservation projects are especially needed for the conservation of salt marshes, intertidal creeks, interdunal wetlands, and the surrounding upland buffers, which include working lands like farm fields and out-of-production cranberry bogs. Protection of these buffers is critical because as sea level rises, coastal wetlands can migrate up into these areas. CZM and watershed organizations should be conservation partners in this effort.

EEA should consider expanding the current Landscape Partnership grant program to include landscape- and watershed-scale projects of all types so that these unique resources can be enjoyed by future generations in all regions. Already a sliding scale of minimum qualifying acreage has been incorporated, incentivizing conservation stakeholders to pursue the largest conservation outcomes remaining in their service areas. About 30,000 of the Commonwealth's most intact landscapes could be conserved by doing so, protecting people from climate impacts along the coast and rivers and streams. EEA's Local Acquisitions for Natural Diversity (LAND) program is essential for communities to protect individual high priority parcels for a variety of habitat, working lands and recreation purposes and often serves as the first conservation project in a community.



As such, it is an important tool to implement this action and complement the expanded Landscape Partnership grant program.

The expanded Landscape Partnership program would enable multiple partners to complete visionary projects and encourage multi-parcel projects across municipal boundaries that conserve whole habitat or watershed systems. Any expanded program could include a significant stewardship and restoration component by offering funding for these types of projects on a multi-year basis, after the initial acquisition is completed. With recent funding expansions from the USDA's Forest Legacy and Regional Conservation Partnership Program, these funds can be leveraged to protect the Commonwealth's legacy landscapes, watersheds, and wildlife corridors.

- **Action #2:** Evaluate the expansion of the state conservation land tax credit cap to \$5 million per year and explore adding fee land to the federal tax incentives (currently only Conservation Restrictions qualify)

The Conservation Land Tax Credit Program (CLTC) is one of the most successful conservation programs in the Northeast due to the large number of applications, the quality of the land protected, and the amount of leverage the program generates, which is more than \$4 for each state dollar in tax credits. Since 2011 when the program started, \$22,035,289 in tax credits have been issued and 15,416 acres have been protected by these donations. It is also a very secure tax credit program because tax credits are not issued until EEA notifies the Department of Revenue that the land has been permanently protected with the recording of the associated conservation restriction at the Registry of Deeds by a state agency, municipal Conservation Commission, or a land trust. The CLTC is the only refundable tax credit for conservation in the nation and in this way, it can be used by low-income landowners. For many farmers, land has passed to family members over generations and the land is their main asset. Due to its popularity, there is currently over a two-year waiting period for landowners to make a land donation.

Recognizing the amount of donations that have consistently been on the waiting list over the more than 10 years of the program, it is recommended that the current \$2 million annual cap be raised to \$5 million. This has the potential to protect an additional 15,000 acres over the coming decade.

- **Action #3:** Convene a multi-sector work group to prioritize and begin implementing the most critical wildlife passage projects in the state.

The work of the Division of Ecological Restoration (DER), UMass's Critical Linkages Project, TNC's Berkshire Wildlife Linkage, and EEA's MVP Program have laid a foundation to launch a more expansive aquatic and terrestrial wildlife passage and climate resilience program. Implementation of this Action would require convening of a statewide group including DPWs, MassDOT, DPH, and

Health Boards, as well as a range of conservation organizations to compile a list of the top priority projects. The group would examine a range of existing conservation plans with a local, regional, and statewide focus. The group could assemble a “top 10” list of signature wildlife-passage projects for each region of the state.

## 8. Collaboration for Sustainable Solutions

Collaborate with residents and communities in their native language to use land conservation and restoration as climate change solutions important to the health of our human and natural communities.

### Models for Implementation

#### WITHIN MASSACHUSETTS

- Groundwork Lawrence’s Spicket River Greenway Video: <https://www.groundworklawrence.org/spicketrivergreenway>

#### OUTSIDE MASSACHUSETTS

- The Conservation Fund’s Parks with Purpose Program: <https://www.conservationfund.org/our-work/cities-program/our-projects/parks-with-purpose>

### Case Study: A Model for Involving Community Residents

Mill City Grows, the REACH LoWELL Coalition, and the Greater Lowell Health Alliance recently completed the Community Food Assessment in the City of Lowell. The Coalition included five grass-roots community and health organizations that represent the City’s neighborhoods and its wealth of ethnic diversity. The Assessment solicited residents’ views and needs regarding Lowell’s food system, food security challenges, and possible solutions to give residents better access to healthy, fresh food. The Assessment worked with a seven-member steering committee that represented communities that are frequently overlooked or difficult to reach, and collected over 1,000 resident surveys across Lowell. The project also surveyed and interviewed emergency food providers and food producers; conducted seven focus groups; and interviewed 20 people with knowledge of food security issues. All these efforts offered access to people speaking a range of languages other than English. Altogether, the project included over 50 local organizations with a focus on including communities that have been excluded from accessing programs in the past, including immigrants



and refugees, youth, seniors, BIPOC communities, low-income families, people experiencing chronic illnesses, and unhoused people.

The Assessment is an excellent model for the Resilient Lands Initiative programs going forward. It is also a reminder that food is a part of a healthy outcome for residents and should be affordable, fresh, close to home, and culturally connected. The Assessment is also a reminder that the other outcomes hoped for by the Resilient Lands Initiative – like access to nature, parks, trees, clean water and air, recreation opportunities, green jobs, and cool places to walk – are critical to the physical and mental health of residents. One of the main conclusions of the Assessment is that a diversity of fresh fruits and vegetables are the most important food residents would like to have more access to, and that the greatest barrier to food security in Lowell is affordability – both due to high cost of valued foods and the low income of residents. Residents also lack the time for shopping and cooking, and lack transportation to healthy food sources. A key recommendation of the report is to improve the extent and ease of programs that make valued foods accessible to low-income residents. Another key finding is that over half of residents are gardening or would like to garden, and programs that support gardening and urban agriculture should be expanded.



*Mill City Grows and the Lowell Health Center reach out to residents in the neighborhoods of Lowell to support the Community Food Assessment (Photo credit: Mill City Grows)*

## Action Steps and Costs to Pilot or Fully Implement

- Action #1: Make the Resilient Lands Initiative a model program for public involvement and inclusion

This is a watershed moment for the land-conservation community. It is the opportunity to expand the community to help reach environmental and social justice goals and to enlist the future stewards of the land in all communities. A truly inclusive RLI will be much more meaningful and a lot more likely to be implemented. To implement this Action, an inclusive work group to help guide the implementation of the RLI Vision will be needed. The participants from the 14 Focus Groups, the Steering Committee, and the public listening sessions offer a good start. The group should also expand to include residents of EJ communities, including the 6% of residents who primarily speak languages other than English. EJ census tracts in Massachusetts include 49.6% of the population who lives on 13.6% of the land. The local Indigenous 1<sup>st</sup> Peoples of this land, primarily the Wampanoag Nation, the Nipmuc Tribe, and the Stockbridge-Munsee Band of Mohican Indians, need to be fully involved and help write and implement actions pertaining to the cultural land value in the RLI. Additionally, representatives of the private sector, including farmers, foresters, and landowners will be critical to this working group.

As part of this Action, it is important to ensure communication is clear and in terms that resonate with people not involved with land conservation. Agencies beyond EEA including housing and community development, MassDOT, and public health need to be involved in the implementation of the RLI. The proponents of many of the other planning initiatives to which RLI is connected also need to be involved, including regional planning agencies, the MA Food Policy Council, and the Rural Policy Commission. This will require that EEA and its partners dedicate the time and resources needed to accomplish this Action.

- Action #2: Collect and develop 24 brief and engaging case studies and stories that demonstrate how land conservation and stewardship enhance all land values

These case studies will address topics such as urban parks and public health, forests, farms, habitat, watersheds, economic stability, cultural land values, reduction of climate impacts, and outdoor recreation. To be effective, they will address the eight strategies of the RLI and engage all the communities across the state. An outreach effort to share the case studies and perhaps have a speakers' tour with the project leaders is recommended. The case studies should include visionary projects, including nature-based climate solutions and how they can be implemented at home and in neighborhoods.

- ▶ Action #3: Create and build relationships with the local Indigenous 1<sup>st</sup> Peoples of this land, primarily the Wampanoag Nation, the Nipmuc Tribe, and the Stockbridge-Munsee Band of Mohican Indians

Develop and establish a working relationship with the 1<sup>st</sup> Indigenous land trust here, the Native Land Conservancy, Inc., and representatives of all the tribes of the Commonwealth to ensure collaboration on cross-cultural shared values in land conservation and preservation, safeguarding the future of Indigenous lifeways and cultural practices on rescued and protected, ancestral homelands. This Action will require a new dedication of existing staff time and will include working with Native American representatives to write a policy brief describing how the cultural values of the land can be enhanced.

- ▶ Action #4: Build the RLI marketing campaign around the concept of No Net Loss of Nature's Services and a matching grant program for municipally sponsored education on this issue

Net Loss of Farms and Forests is a goal that supports the other seven strategies. However, taken as a whole, the RLI is about increasing the awareness of how all people benefit from having nature near them. This marketing campaign is needed to show how all eight strategies work together and are what is needed for the 2020s. Small matching grants for municipalities and schools to participate would necessitate a program, but would be an important part of this campaign. Finally, the four collaboration Actions would greatly benefit from outside communications help so that RLI-related messaging can be most effective.



# Tracking and Metrics

As elements of the RLI are evaluated for implementation, appropriate performance metrics will be developed. These will be assessed based on the potential benefits listed, and staff assigned to manage their implementation and track and report on their realization.



*Photo Credit: Jennifer Fish, DCR.*



# The Resilient Lands Initiative Strategy

## Reaching People through Maps

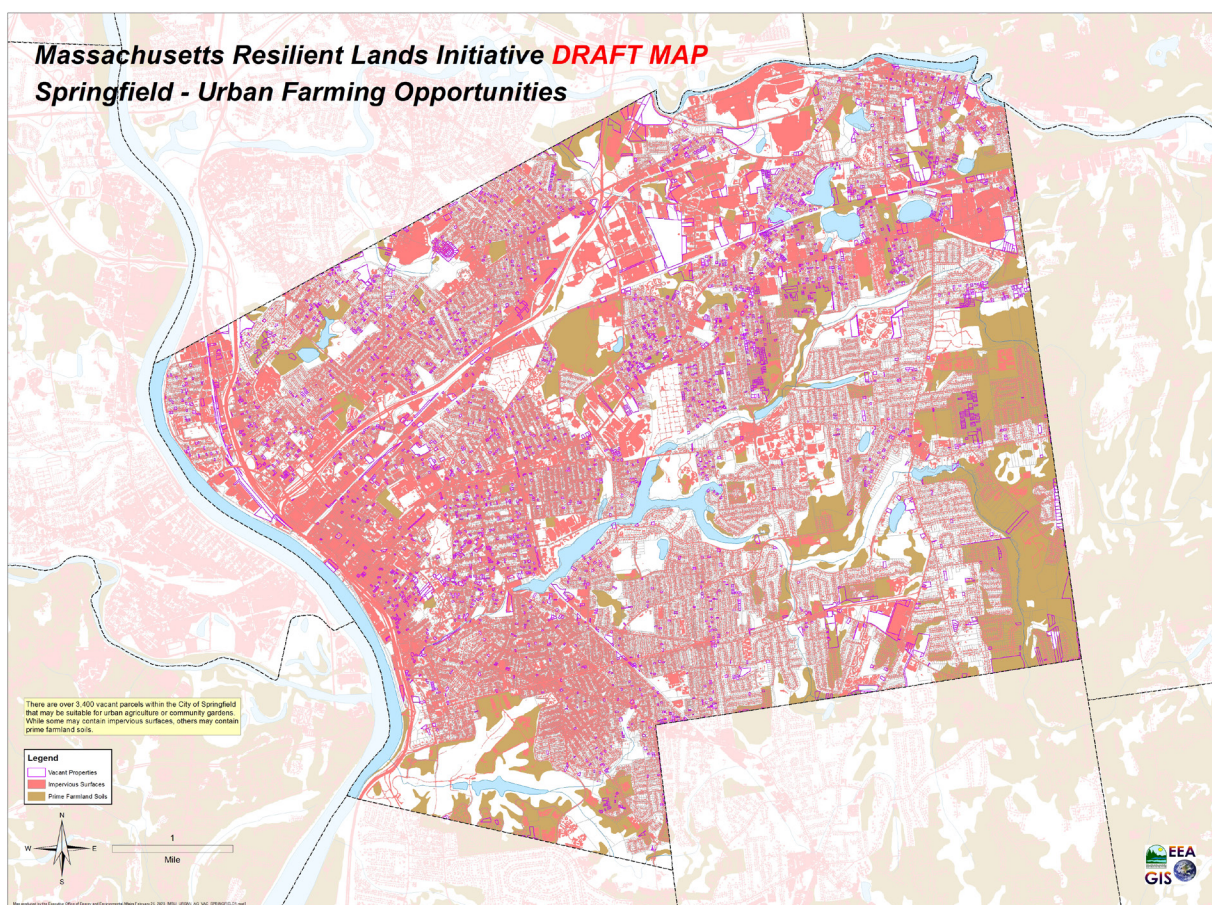
The Resilient Lands Initiative represents a shift in thinking about land conservation, stewardship, and restoration. As a result, many of the ways to measure progress towards goals are also new. While the above sections derived important information from GIS map analysis, it is notable that there is only one map in the above text – a map showing the location of the 2,400 trees planted in Chelsea. This section is meant to envision how mapping and analysis can be used to help the RLI implement and track progress of its eight strategies. This section includes ideas on how mapping can help with the implementation phase of the RLI. Several draft maps developed by EEA GIS during the RLI planning phase are shown as examples of the mapping concepts in this section.

One important advancement would be the creation of a comprehensive Vision Map that would address priority land and types of land needed for climate resilience for people and ecosystems; land conservation and restoration; “resilience zoning”; “resilience bylaws”; enhanced conservation tax credits; and expanded conservation funding focus.

The Vision Map should include:

1. Urban vacant lots appropriate for greening – gardens, farms, micro-forests, urban wilds, pollinator gardens, rain gardens, etc., focusing on food, park, and community garden deserts
2. Safe walking route maps, in collaboration with the Department of Public Health (see dozens of walking route maps in four Gateway Cities in the Municipal Park and Open Space Access Assessment)
3. Maps of food deserts
4. Forests that are most vulnerable to climate impacts that affect people (pine barrens, reservoir watersheds, headwaters of rivers and streams above cities and villages, etc.)





Sample map showing the potential for urban farming and greening in Springfield (Map created by Ben Smith, EEA GIS)

5. Prime farmland or Locally Significant Soil areas and farms with whole-farm protections<sup>32</sup>
6. Wildlife migration corridors, including where farmland adds value and including urban areas<sup>33</sup>
7. The most critical heat island areas and urban flood-prone areas
8. Per capita pavement maps
9. Remaining unprotected surface water supply watershed land
10. 2020 Losing Ground Green Infrastructure Network (GIN) areas<sup>34</sup>
11. An easy-to-use RLI map viewer where users can combine overlays they are interested in, broken out by each of the land values and strategies

<sup>32</sup> See: <https://www.mass.gov/service-details/ma-local-food-action-plan> and the Healthy Soils Action Plan.

<sup>33</sup> See: <https://ag.umass.edu/resources/land-conservation-tools/glossary/connectivity> for a range of mapping tools. MassWildlife's BioMap 3, soon to be released, will also be a new, invaluable tool.

<sup>34</sup> See report and maps at: [https://www.massaudubon.org/content/download/41477/1007612/file/Losing-Ground-VI\\_2020\\_final.pdf](https://www.massaudubon.org/content/download/41477/1007612/file/Losing-Ground-VI_2020_final.pdf)



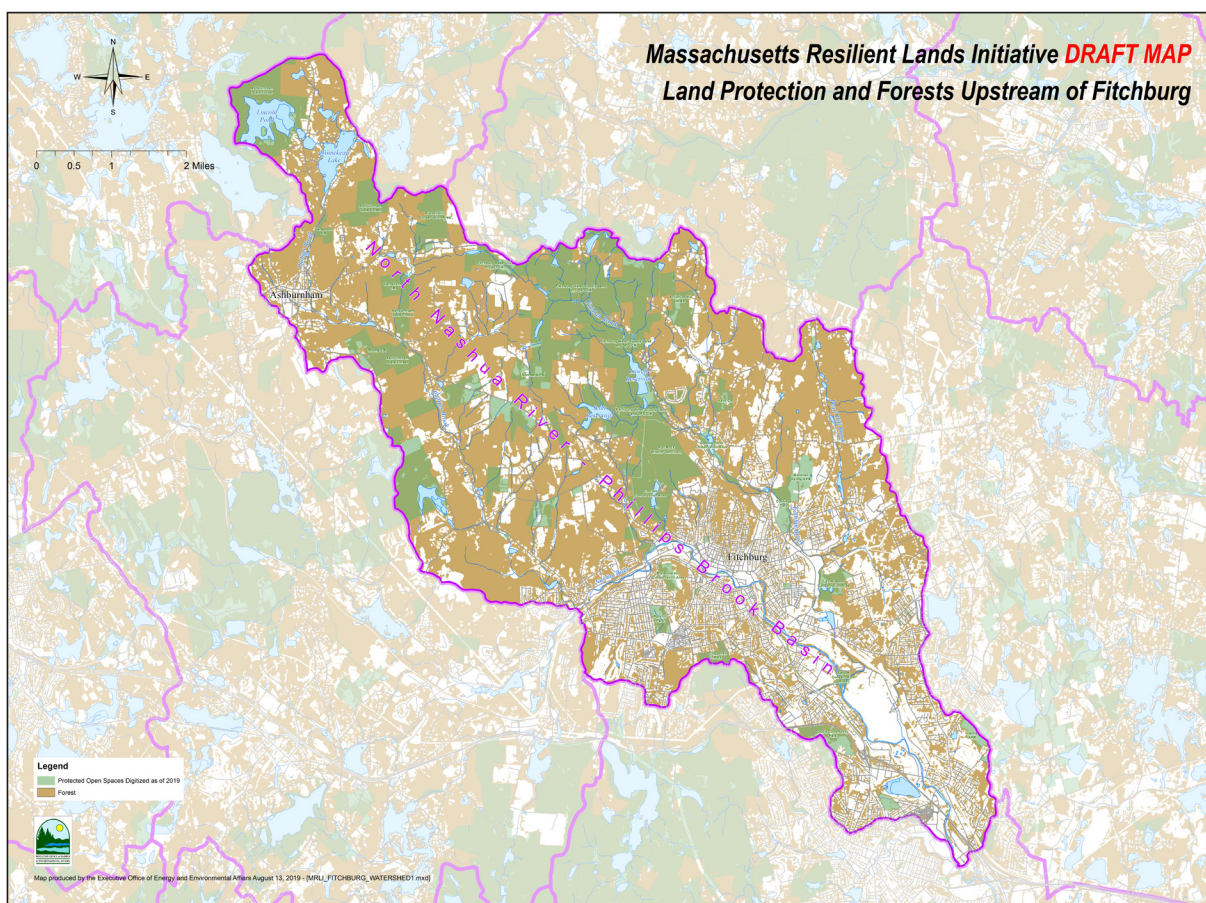


Sample map showing areas in Boston within a half mile of farmers' markets (Map created by Ben Smith, EEA GIS)

12. Maps that expand on the work done by the Metropolitan Area Planning Council (MAPC) and the Boston Climate Smart City project<sup>35</sup>
13. A link to order paper maps for rural areas with poor internet or limited printing capabilities
14. Story Maps on each of the eight Resilient Lands Initiative strategies
15. Other maps that can be used to enhance the eight RLI Strategies

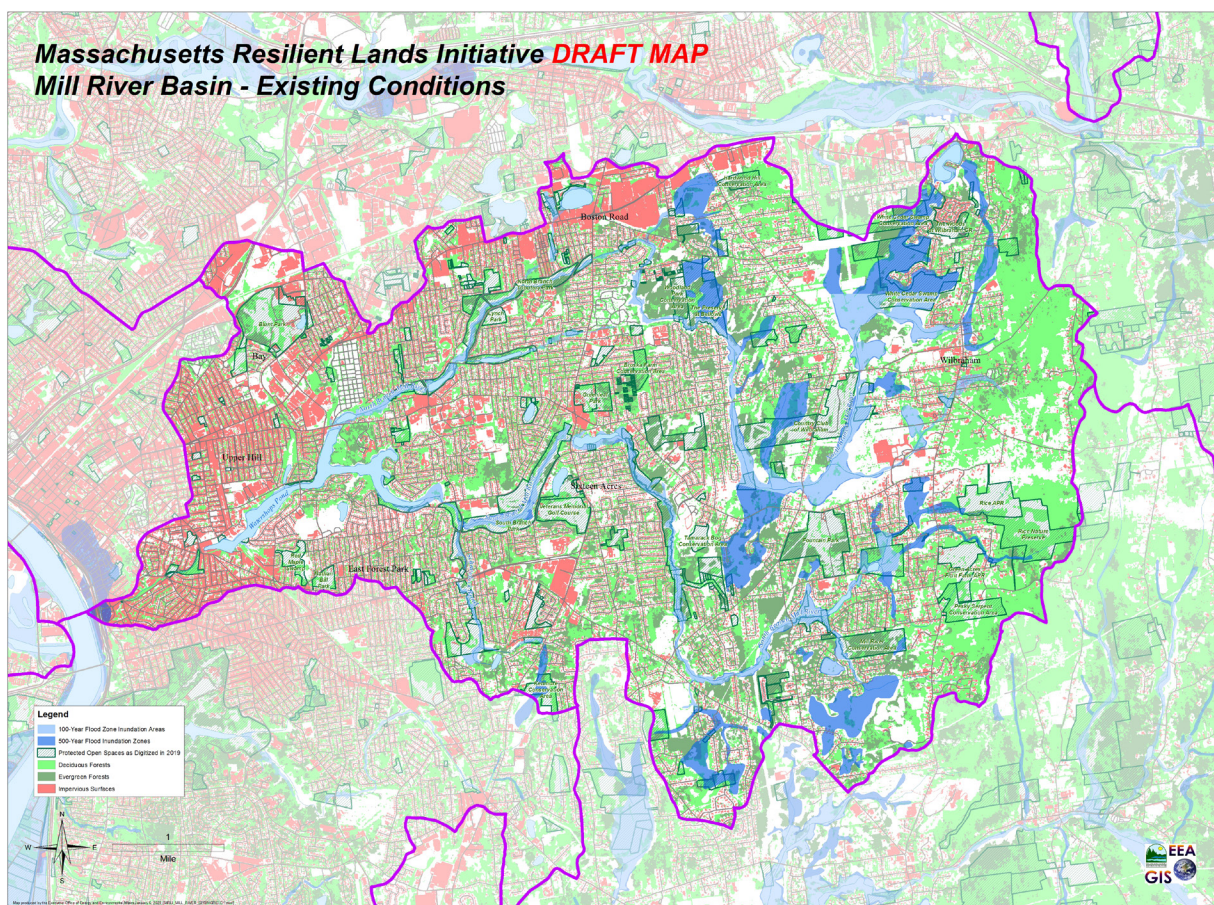
<sup>35</sup> See: <https://www.mapc.org/our-work/expertise/climate/mmc/>





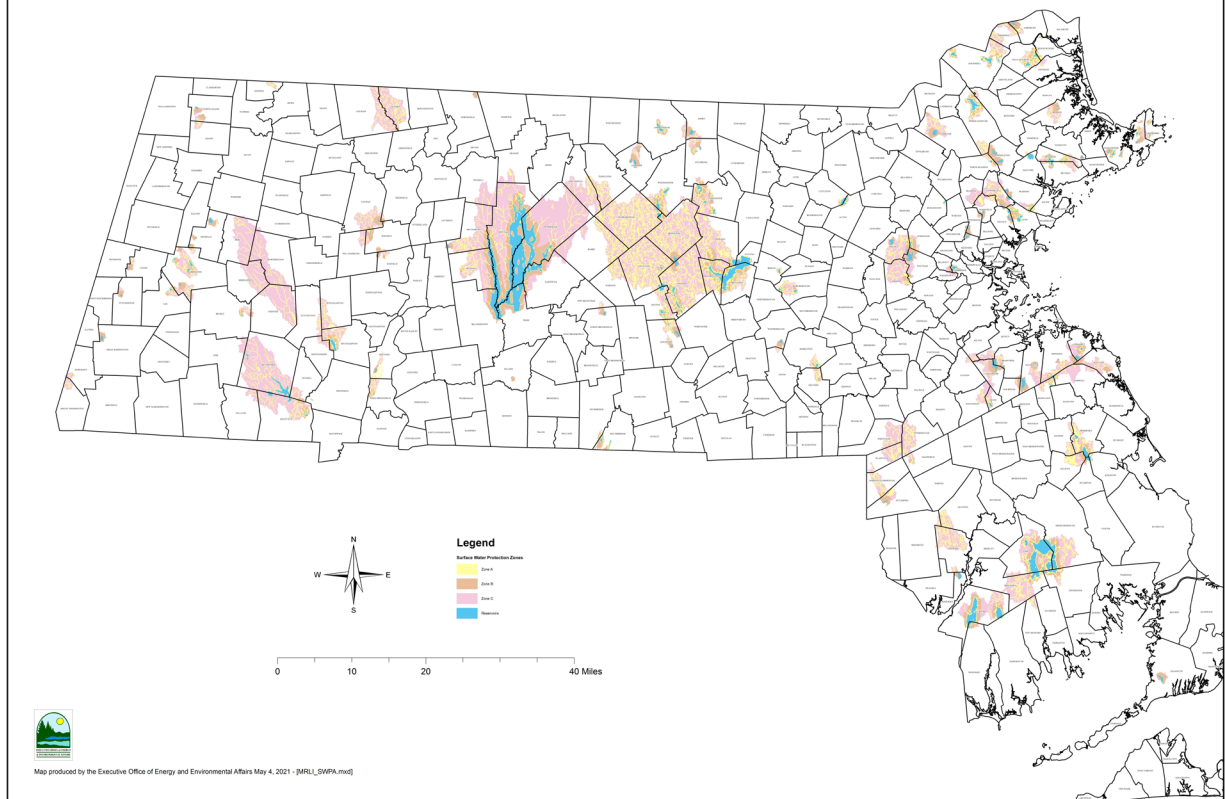
*Sample map showing extensive forests upstream from downtown Fitchburg helping to reduce flooding and protect its water supply (Map created by Ben Smith, EEA GIS)*





*Sample map of Mill River watershed in Springfield showing flood plain in developed areas and the importance of forest upstream of Springfield in reducing flooding (Map created by Ben Smith, EEA GIS)*

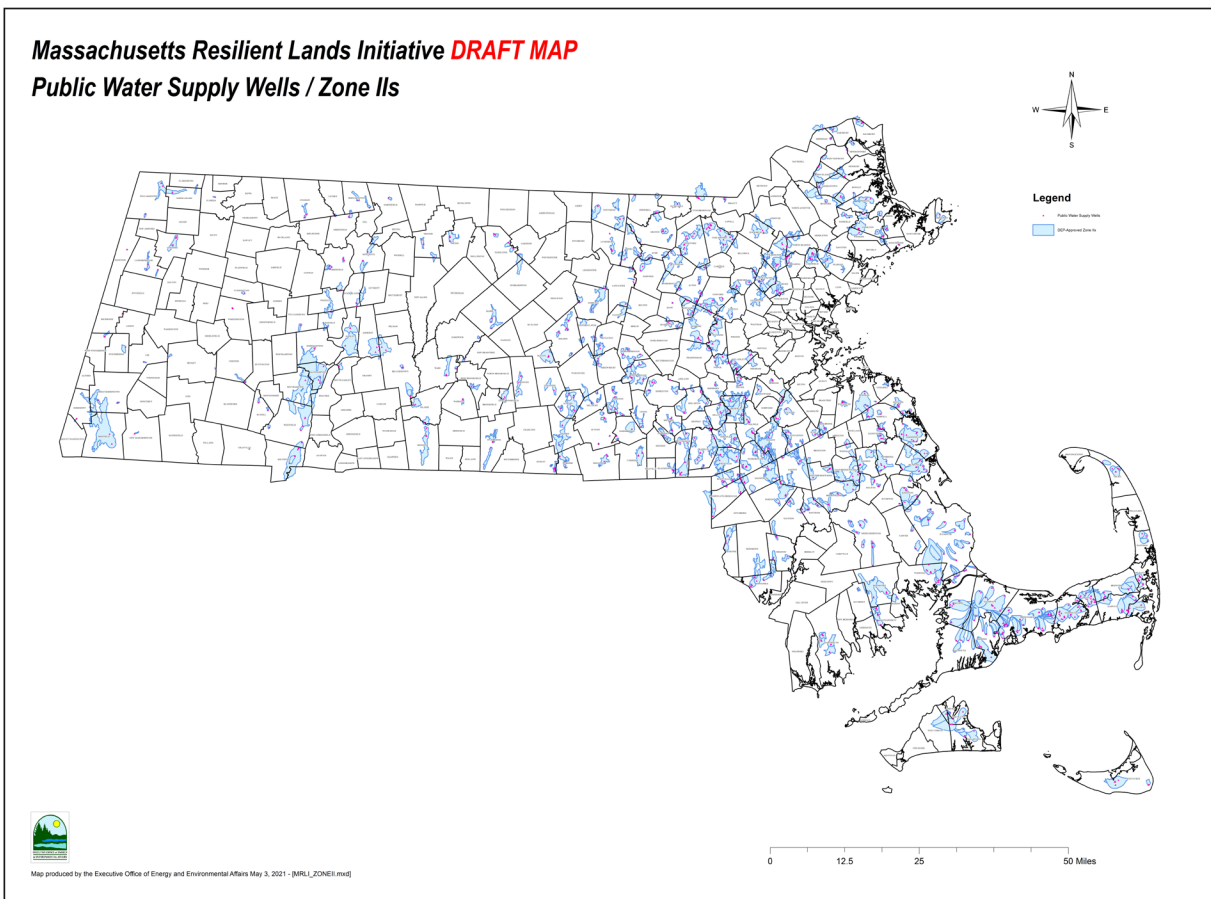
**Massachusetts Resilient Lands Initiative *DRAFT MAP***  
**Reservoirs / SWPAs**



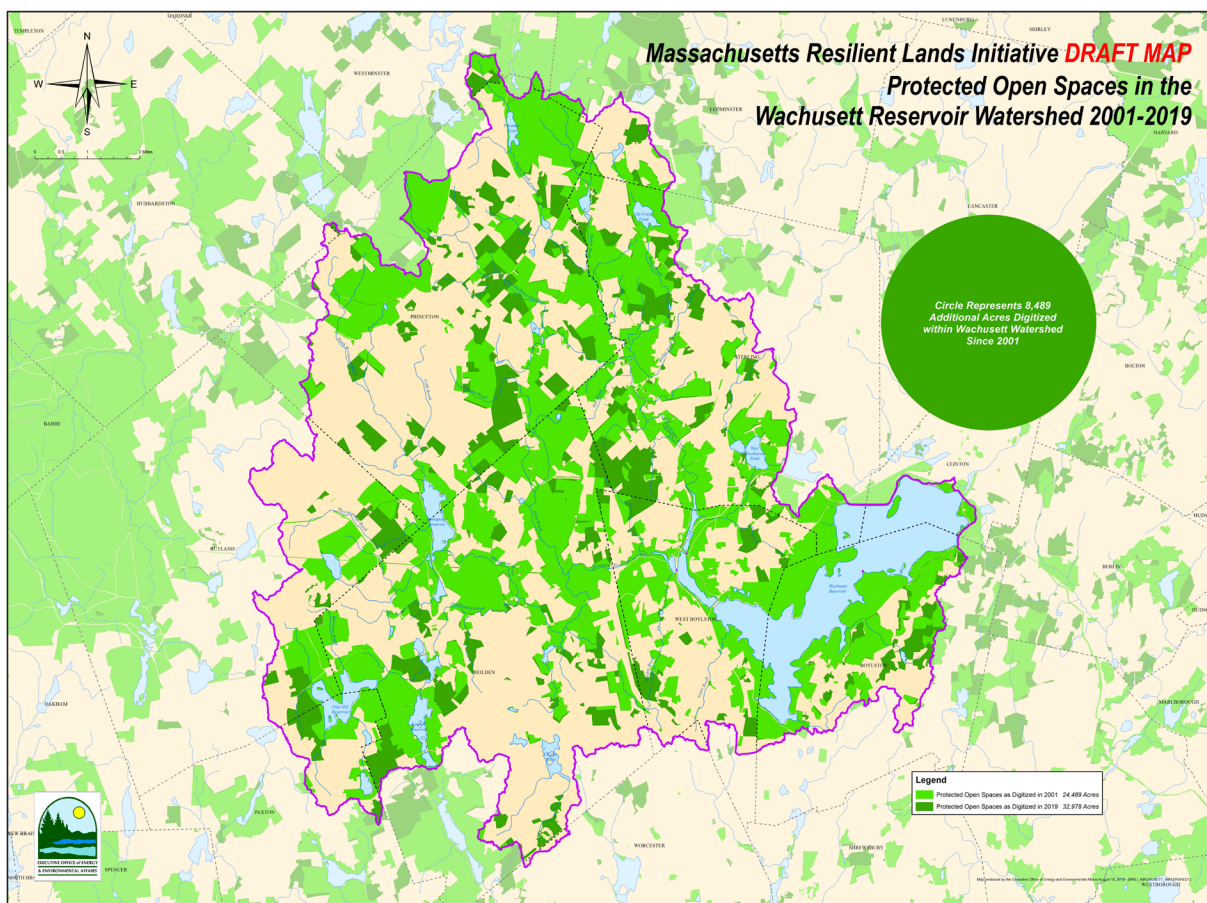
*Sample map of public surface water supply protection areas, which make up 10% of the Commonwealth and are 49% protected land (Map created by Ben Smith, EEA GIS)*



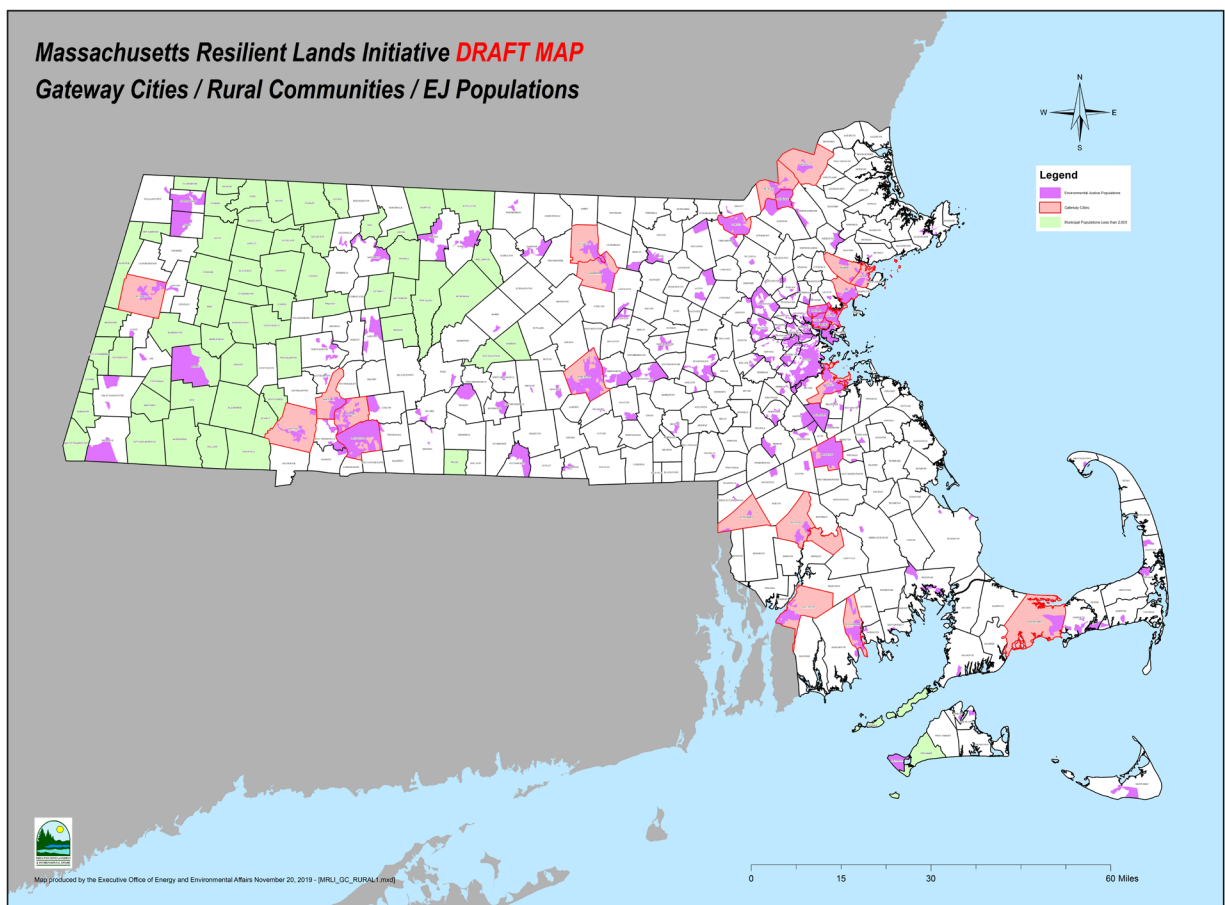
**Massachusetts Resilient Lands Initiative *DRAFT MAP***  
**Public Water Supply Wells / Zone IIs**



*Sample map of public well protection areas that make up 9% of the Commonwealth and are 26% protected land (Map created by Ben Smith, EEA GIS)*



Sample map of Wachusett Reservoir watershed showing recent progress by DCR and its partners in protecting this “natural forest filter” for Metropolitan Boston’s water supply (Map created by Ben Smith, EEA GIS)



*Sample map showing communities with populations less than 2,000 along with Gateway Cities and Environmental Justice census tracts (Map created by Ben Smith, EEA GIS)*

# The Resilient Lands Initiative

## Reaching People through Other Innovative Products

The following products would advance the public’s understanding of, and involvement in, the RLI and the strategies recommended in this report. This is important, as the RLI was produced by a broad steering committee, and it is intended to be implemented collaboratively. Many of the following elements represent potential means of educating the public on the intent of the RLI and the tools that could be used to implement it. Several of these items would also help the Commonwealth and its partners track progress and evaluate the merits of alternative approaches to realizing the objectives of the Resilient Lands Initiative. As with other elements of the Plan, choices will be made going forward as to which of the items is employed.

1. An RLI website grouped by the eight strategies and the land values that includes:
  - a. Additional case studies under each of the eight RLI strategies, with before-and-after photos
  - b. A “dashboard” to track progress on the eight strategies
  - c. Links to the Land Value Policy Briefs
  - d. Links to the 20 inspirational presentations of the RLI Steering Committee
  - e. Links to all the RLI Steering Committee summaries and notes from the 14 focus groups
  - f. High-quality stories showcasing successes
  - g. A link to Mass Audubon’s Shaping the Future fact sheets
  - h. A video highlighting the key recommendations for the eight strategies featuring local, inspirational people
2. An RLI collaboration effort to involve a diversity of Massachusetts residents in the implementation of the RLI
3. An initiative whereby the RLI implementation committee matches partners to work together on grants that support each strategy

# Appendix

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