

**THE MASSACHUSETTS
CLIMATE AND ENVIRONMENTAL POLICY
BRIEFING BOOK**



APRIL 2022

THE MASSACHUSETTS CLIMATE AND ENVIRONMENTAL POLICY BRIEFING BOOK

PARTICIPATING ORGANIZATIONS

ACADIA CENTER

ALTERNATIVES FOR COMMUNITY AND ENVIRONMENT

AMERICAN FARMLAND TRUST

APPALACHIAN MOUNTAIN CLUB

CLEAN WATER ACTION

CLIMATE XCHANGE

COMMUNITY PRESERVATION COALITION

CONSERVATION LAW FOUNDATION

GREEN ENERGY CONSUMERS ALLIANCE

GREENROOTS

HEALTH CARE WITHOUT HARM

HEET

HERO NURTURING CENTER

MASS AUDUBON

MASS LAND TRUST COALITION

MASSACHUSETTS RIVERS ALLIANCE

MASHPEE COALITION FOR INDIGENOUS ACTION

MASSACHUSETTS CONSERVATION VOTERS

MASSACHUSETTS FOOD SYSTEM COLLABORATIVE

MASSBIKE

METROPOLITAN AREA PLANNING COMMISSION

NEW ENGLAND FORESTRY FOUNDATION

NORTH AMERICAN INDIAN CENTER OF BOSTON

NORTHEAST ORGANIC FARMING ASSOCIATION/MASSACHUSETTS CHAPTER

PIONEER VALLEY PLANNING COMMISSION

THE NATURE CONSERVANCY IN MASSACHUSETTS

THE TRUST FOR PUBLIC LAND

THE TRUSTEES

This briefing book is produced by 501(c)(3) charitable organizations, and by law none of these materials can be used for partisan or political purposes. The briefing book is for educational purposes only.

Coordinated and prepared by Jennifer Ryan, JLR Consulting. April 2022.

TABLE OF CONTENTS

INTRODUCTION	3
SECTION 1. FUNDING	
GENERAL OPERATING, CAPITAL, AND AMERICAN RESCUE PLAN ACT.....	5
COMMUNITY PRESERVATION ACT.....	8
SECTION 2. CLEAN ENVIRONMENT	
ENVIRONMENTAL JUSTICE	10
AIR QUALITY.....	12
WATER QUALITY.....	14
SOLID WASTE.....	17
TOXIC CHEMICALS.....	20
SECTION 3. CONSERVATION AND COMMUNITIES	
LAND PROTECTION.....	24
BIODIVERSITY.....	27
RIVERS AND STREAMS.....	30
TRIBAL ISSUES.....	35
PARKS AND PUBLIC ACCESS.....	37
WORKING LANDS: FARMS AND FORESTS.....	39
AGRICULTURE AND FOOD SYSTEMS.....	42
URBAN AGRICULTURE.....	46
MASSACHUSETTS OCEAN AND COASTAL MANAGEMENT.....	49
SECTION 4. CLIMATE CHANGE	
CLEAN ENERGY.....	52
BUILDINGS.....	55
TRANSPORTATION.....	58
ADAPTATION.....	60
NATURAL CLIMATE SOLUTIONS.....	63

INTRODUCTION

The next governor of Massachusetts will have no choice but to address the recent, sobering assessment¹ from the United Nations Intergovernmental Panel on Climate Change (IPCC). The world must rapidly shift away from fossil fuels and deploy renewable energy, increase energy efficiency, and protect nature now in order to stabilize the climate and avoid devastating climate change impacts to communities, especially those disproportionately impacted by environmental degradation. The IPCC report speaks to the imperative for Massachusetts to continue to push to reduce greenhouse gas emissions and to invest in climate change preparedness statewide.

The new governor, at the same time, will lead the Commonwealth through the third year of the COVID-19 pandemic, which has impacted every sector of state government. This is a time of greatly increased societal awareness of environmental and racial injustices, and a tremendous opportunity to engage state agencies and the public in meeting the diverse needs of the Commonwealth - from parks to local food to clean transportation. The global pandemic continues to impact every community, bringing a significant increase in local outdoor recreation, including state park and trail use. Broken supply chains and limited mobility have steered many more people to local food options, including farmers markets, community supported agriculture, and home delivery services. This presents an opportunity to step up and support local agriculture, increase food security, and stimulate the economy by investing in farmland protection and viability.

This policy briefing book was prepared by 28 conservation and environmental nonprofit organizations, Indigenous organizations and individuals, and planning agencies. Participants range from local, regional, state, and national/international organizations and together represent over 300,000 Massachusetts residents and an additional 120 member organizations. The term “environment” is a big tent with interconnected issues, going well beyond topline themes of climate change and conservation. In this book are ambitious goals to protect nature, clean air, restore wetlands and critical fish and wildlife habitat, and meet the state’s lofty Net Zero climate change challenges mandated in the Next Generation Climate law; ideas to meaningfully address economic, racial, and environmental justice issues that include Environmental Justice populations in decision making; ways to address growing concerns over drinking water; Tribal perspectives on environmental issues; strategies to grow the Massachusetts agriculture and forestry sectors and the outdoor recreation economy; next steps in ocean management and right whale protection; and more. Throughout, we have elevated Environmental Justice calling for specific actions as they pertain to the issue at hand.

The new governor must recognize the connection between where we live, the environment, and the resource and knowledge-based economies in Massachusetts. The Commonwealth is a global clean energy hub, employing more than 110,000 people and is a \$14 billion dollar industry that comprises 3 percent of the Massachusetts economy.² Beaches, fishing opportunities, and natural landscapes support a tourism industry that brings \$20 billion a year, and state investments in land conservation return 4:1 on natural goods and services. Massachusetts’ 7,241 local farms have an economic impact of \$10 billion annually, with tremendous room for growth.³

¹ [AR6 Climate Change 2022: Mitigation of Climate Change — IPCC](#)

² [About MassCEC | MassCEC](#)

³ [MDAR 2018-2019 Annual Report](#)

Thank you for learning more about climate and environmental policy priorities. We look forward to working with the next administration to make Massachusetts cleaner, greener, and equitable.

GENERAL OPERATING BUDGET, CAPITAL SPENDING, AND AMERICAN RESCUE PLAN ACT FUNDS

Key takeaways: Environmental agency funding and capital investments have been deprioritized to the detriment of natural resources, public health, agricultural sector, water systems, tourism economy, COVID-19 recovery, and climate progress. Without passage of the federal “Build Back Better” spending package and its attendant promise of financing climate mitigation, resilience, and adaptation solutions in Massachusetts, the next governor needs to re-examine the commitment to address environmental and climate crises and redouble efforts through the clearest statement of commitment we have: the annual state operating budget and annual capital spending plan.⁴

Summary: In 2001, funding for environmental agencies comprised approximately 1% of the state operating budget. Today, they are funded at slightly more than half that level (0.62), detrimentally impacting the thin budgets of the Executive Office of Energy and Environmental Affairs (EEA), Department of Agricultural Resources (DAR), Department of Conservation and Recreation (DCR), Department of Environmental Protection (DEP), Department of Energy Resources (DOER), and the Department of Fish and Game (DFG).

With expanding responsibilities under new climate laws, and increasing impacts of climate change to communities, agencies are being asked to do more without adequate funding. The 2021 Next Generation Roadmap law alone created new requirements for planning exercises and goal setting, transferred responsibility for designing complex building codes to DOER, and called for an overhaul of Massachusetts Environmental Policy Act (MEPA) regulations to ensure inclusion of important Environmental Justice provisions; however, the law did not contain any funds for implementation. Subsequent state budgets have included increases for a few new staff, but this level of increased responsibility requires more substantial annual investments.

In addition to major gaps in climate and Environmental Justice funding, long-standing underinvestment has created widening backlogs of need. For example:

- the 2014 Water Infrastructure Commission estimated the gap between current funding for the state’s water infrastructure and the amount of funding actually needed to be \$10 billion for drinking water and \$18 billion for wastewater;⁵
- the 2022 DCR Special Commission report found that: “Massachusetts state and local governments spent \$32.65 per 1,000 people on parks⁶ and recreation. [t]hat is the lowest in the country and only 58% of the national average of \$56.56 per 1,000 people”;
- EEA’s MVP program has been incredibly popular among municipalities - 93% are enrolled. In the last funding round, \$20.6 million was distributed through planning and action grants, though the requests for funding were more than double that amount;⁷

⁴ The annual capital spending plan is funded through five-year environment and climate bond bills. The next bond bill is due to be enacted into law in 2023.

⁵ <https://www.mass.gov/doc/water-infrastructure-finance-commission-final-report/download>

⁶ <https://www.mass.gov/doc/umdi-dcr-special-commission-report/download>

⁷ <https://www.mass.gov/news/baker-polito-administration-awards-21-million-in-climate-change-funding-to-cities-and-towns>

SECTION 1. FUNDING

- over the last decade, DEP has experienced a greater than 50% decrease in watershed data collection. The agency cannot issue water permits in a timely manner because of the multi-year backlogs in water quality monitoring, assessment, and reporting;
- and, during last spring's Culvert Replacement Municipal Assistance Grant Program RFR, the DER received applications from 70 municipalities requesting a total of \$6.8 million with only \$2.75 million available to award.

Recommendations:

General operating

- Increase funding across environmental agencies so that crucial initiatives can be properly implemented. (See annual [Green Budget Coalition priorities](#))
- Minimize reliance on retained revenue within agency budgets.
- Separate DEP's water quality monitoring program from the operating line item so the agency and grantees can better plan for the opportunities.

Bond funding

- Increase EEA's share of the annual capital budget to address backlogs and make new investments in land conservation, climate mitigation and adaptation, water quality, and outdoor recreation.
- Use capital funds to carry out the natural and working lands carbon recommendations in EEA's 2030 Clean Energy and Climate Plan (expected to be released summer 2022) and the Resilient Lands Initiative (RLI).
- Increase capital funding for land conservation and public access to address increased demand and maintenance needs.
- Increase capital plan funding to DER's programs and grant programs, which support municipalities as they protect their communities from increased flooding from increased precipitation and sea level rise, and to restore rivers, streams, water supplies and natural systems.
- When possible and relevant, ensure that nonprofit partners can be recipients of funds, as they serve as key partners to municipalities and the state in advancing on-the-ground projects.

American Rescue Plan Act and federal infrastructure funds

- Prioritize investments that will provide years of multi-sector co-benefits, such as MVP action grants, open space acquisition and protection, and ecological restoration. Ensure that nonprofit partners can be the recipients of these funds, as they serve as key partners to municipalities in implementation, especially in communities that lack capacity to apply for grants and implement projects.
- Ensure that these investments are made equitably, by prioritizing investments in Environmental Justice communities and the communities hit hardest by COVID-19 pandemic.
- DEP administers the State Revolving Fund (SRF), which was recently capitalized with \$1 billion from the 2021 federal infrastructure law over the next five years and \$100 million through the American Rescue Plan Act (ARPA).⁸ That money would be most effectively deployed with an increased proportion of grants (rather than loans) to municipalities. This is an important equity component, as lower-resource cities and towns may not be able to repay loans, thus leaving infrastructure such as sewer and stormwater collection systems to continue to degrade. ARPA funds are meant to be in addition to state capital funds, not to replace these investments.

With the Environmental Justice provisions included in the Next Generation Roadmap law, it is critical to provide adequate funding for staff to carry out the responsibilities detailed in the law, including carrying

⁸<https://www.mass.gov/doc/state-revolving-fund-update-on-american-rescue-plan-and-bipartisan-infrastructure-law-382022/download>

SECTION 1. FUNDING

out cumulative impact analyses, making information accessible to all, and coordinating across the secretariats going forward.

Specifically, the next governor must support:

- translation services during public comment periods. EEA is facing a civil rights complaint as a result of inadequate language services. EEA and its agencies need more funding to address this;
- additional mapping technology to overlay environmental and public health data to fully implement the cumulative impacts component of the Next Generation Roadmap law;
- and, additional staff positions in EEA's Office of Environmental Justice and the MEPA Office.

Resources/Contact Information:

- Katharine Lange, Massachusetts Rivers Alliance, katharinelange@massriversalliance.org
- Emily Myron, The Nature Conservancy in Massachusetts, emily.myron@tnc.org
- Linda Orel, The Trustees, lorel@thetrustees.org

COMMUNITY PRESERVATION ACT

Key takeaways:

- The Community Preservation Act (CPA) has been adopted by over half of the state's municipalities: 34 cities and 154 towns, comprising 65% of the state population. The CPA has raised more than \$2.65 billion for local community preservation initiatives, allowing municipalities to preserve open space, build new parks and playgrounds, restore and rehabilitate historic assets, and create and support affordable housing.
- Since it was signed into law in 2000, CPA has developed into a robust smart growth tool that provides municipalities with the means to invest in local quality-of-life assets. **Continued investment and support at the state level are required to maintain the health, longevity, and effectiveness of the program.**

Summary: Signed into law in 2000, the Community Preservation Act (CPA) allows municipalities to create a local Community Preservation Fund for (1) open space protection and outdoor recreation, (2) historic preservation, and (3) affordable housing. Community preservation monies are raised locally through the imposition of a surcharge of up to 3% of the tax levy against real property, and municipalities must adopt CPA by ballot referendum. To date, 188 municipalities in the state have adopted CPA—this means that residents in well over half the state have voluntarily voted to enact this CPA surcharge in order to create local community preservation funds.

Property taxes traditionally fund the day-to-day operating needs of safety, health, schools, roads, maintenance, and more. But until CPA was enacted, the Commonwealth's cities and towns had no secure funding source to create and support affordable housing options, or the recreational and historical spaces that improve residents' quality of life. Over the lifetime of the program, municipalities have been able to fund over 14,000 projects statewide through local CPA programs—many of which would not have been possible without CPA funding being available.

As of Fiscal Year 2021, the CPA program has accomplished the following statewide:

- 32,566 acres of open space have been preserved and protected;
- over 3,000 outdoor recreation projects (parks, playgrounds, athletic fields, etc.) have been funded;
- over 6,300 appropriations have been made for historic preservation projects;
- and more than 8,700 affordable housing units have been created with an additional 14,700 units supported.

The CPA statute also created a statewide Community Preservation Trust Fund, administered by the Massachusetts Department of Revenue, which provides distributions each year to communities that have adopted CPA - funded through instrument recording fees at all registries of deeds statewide. These annual disbursements serve as an incentive for communities to pass CPA, and this supplemental state funding is an integral piece of the program; it allows communities to make substantial investments across the three categories of the program.

However, by 2018, with more communities adopting CPA each year, this revenue source was in danger of dwindling to the point of futility. As a result, legislation was passed in 2019 to increase the fees at the

SECTION 1. FUNDING

state's Registries of Deeds, which resulted in over \$82 million in collections for the CPA Trust Fund in 2021, nearly tripling the revenue collected prior to this legislation passing.

Additionally, since 2013, the state legislature has included provisions in the annual state budget that allocates available budget surplus funding to the CPA Trust Fund—these supplemental funds have been allocated to the CPA program six times since 2013 and have significantly boosted the distributions for communities in each of those years in which the funding was available.

Support at the state level has been vital for the stabilization and ongoing health of the statewide CPA Trust Fund. These investments have made the Community Preservation Act an irreplaceable tool for dozens of small towns, as well as Gateway Cities like Fall River, Holyoke, and Lowell, as well as the City of Boston, which adopted CPA in 2016.

With over a dozen more communities across the state considering CPA adoption in 2022, continued investments and support at the state level is imperative to maintain the vast benefits that the CPA program provides to municipalities.

Recommendations:

- **Maintain support and annual investments for CPA on the state level.** The Commonwealth's continuing investment in the CPA Trust Fund is critical to ensuring a healthy distribution to municipalities from the CPA Trust Fund.
- **Update the Department of Revenue's CPA reporting software.** DOR is charged with oversight on required annual reports from CPA communities on their expenditures and project details. However, the reporting software has not been updated since 2014, and updates are required so that communities can accurately catalog their CPA initiatives each year.

Resources/Contact Information:

[Community Preservation Coalition](#)

- Stuart Saginor, Stuart.Saginor@communitypreservation.org
- Chase Mack, Chase.Mack@communitypreservation.org

Organizational Partners on the Community Preservation Coalition Steering Committee:

- [Trust for Public Land](#)
- [Mass Audubon](#)
- [Massachusetts Affordable Housing Alliance](#)
- [Citizens' Planning and Housing Association](#)
- [Preservation Massachusetts](#)
- [The Trustees](#)

ENVIRONMENTAL JUSTICE

Key takeaways: In Massachusetts, People of Color, low-income people, and people with limited English proficiency are more likely to be exposed to worse indoor and outdoor air quality, are more at risk to the harmful impacts of climate change and are more likely to have polluting and dangerous energy infrastructure built in their neighborhoods. The next governor must:

- implement and enforce existing Environmental Justice (EJ) and non-discrimination laws and policies. (For example, in the Next Generation Roadmap Law, Massachusetts Constitution Article 97, Executive Orders 552, 559, 592);
- support amendments to laws that currently do not serve EJ populations and other communities on the frontlines of pollution relating to energy siting reform, air quality improvement, and improving access to courts to remedy discriminatory actions;
- and, take a holistic approach to climate, environmental, transportation, and energy policy that moves us away from fossil fuels and puts us on a path to a just and equitable Commonwealth where all people can thrive by targeting a minimum amount of investments to EJ Populations and other frontline communities overburdened by pollution and underserved by environmental benefits.

Summary: Environmental Justice laws and policies give EJ Populations and other communities on the frontlines of pollution not only the opportunity to be heard by decision makers but ensure that their input is incorporated into decisions that impact them.

The Massachusetts Constitution, executive orders, statutes, and policies direct executive agencies to implement EJ principles, which include the meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies, including climate change policies, and the equitable distribution of energy and environmental benefits and burdens. The [2021 Next Generation Roadmap Law](#) requires the integration of cumulative impact analyses into environmental permitting. Finalizing the method for cumulative impact analysis and operationalizing it must be a priority for 2023. Further, state agencies must implement multilingual communication, community engagement, and consultation with the Environmental Justice Advisory Council.

Massachusetts residents and workers have worked for decades to ensure equal access to environmental justice for all. Our laws, programs, and policies have not yet achieved that reality.

We recommend that the next governor enact energy siting reform that expands membership of decision-making boards that reflect Indigenous and Environmental Justice population members, requires a cumulative impact assessment, the results of which should prohibit the siting of new or expanded energy infrastructure that burdens EJ populations, and requires early consideration of how to promote environmental justice, renewable energy, and high quality safe jobs concurrently. We further recommend legislative and executive action that would require the installation of high quality air filters in buildings located near congested roadways, establish a stronger air monitoring network that captures data on ultrafine particulate matter, set air pollution reduction targets, establish clear enforcement for local boards of health to direct mold remediation, and prohibit the installation of gas stoves in new construction. Finally, the next governor needs to restore at the state level critical civil rights protections

SECTION 2. CLEAN ENVIRONMENT

previously available under federal law to prohibit government programs, policies, and practices that discriminate or have a discriminatory effect based on protected characteristics and guarantee a remedy for people who have experienced discrimination. The Commonwealth should eradicate discrimination and secure access to the judicial process for people to enforce our rights and protect health and the health of the environment.

Opportunities for economic growth and investments in workforce development are a primary focus of both the post-COVID-19 recovery and the clean energy transition throughout the Commonwealth. For Massachusetts to fully realize its commitment to a just transition that fosters pathways out of poverty and entry into the green economy for historically marginalized residents, state agencies must be deliberate in their coordination around workforce development and effort must be made to meaningfully prioritize job training, state contracting policies, and hiring practices that will enable greater diversity and representation across all sectors.

Recommendations:

- Implement and enforce existing Environmental Justice and non-discrimination laws and policies.
- Amend laws that do not serve EJ populations and other communities on the frontlines of pollution relating to energy siting reform, air quality improvement, and improving access to courts to remedy discriminatory actions.
- Take a holistic approach to climate, environmental, transportation, and energy policy that moves us away from extractive systems (fossil fuels and economically) and puts us on a path to a just and equitable Commonwealth where all people can thrive by targeting a minimum amount of investments to Environmental Justice populations and other frontline communities overburdened by pollution and underserved by environmental benefits.
- Target a minimum percentage of investments and spending in EJ populations. There should be at least a proportional amount of the overall state benefits from investments, including but not limited to state grants, targeted environmental compliance, enforcement and assistance, supplemental environmental projects, compliance assistance, economic partnerships, and workforce development programs, to the percent of the population that is designated as an EJ Population or other communities as necessary to ensure meaningful participation and the equitable distribution of environmental burdens and environmental benefits in accordance with guidance provided by the Environmental Justice Advisory Council.

The outcome of the above activities should result in community engagement that influences state decision-making, diverse hiring and workforce development practices across all sectors to achieve quality jobs, and redress the harm of long-standing environmental, energy and development policies that have burdened Environmental Justice populations and other historically marginalized residents.

Resources/Contact Information:

- Sofia Owen, Alternatives for Community and Environment, sofia@ace-ej.org
- Staci Rubin, Conservation Law Foundation, srubin@clf.org

AIR QUALITY

Key takeaways:

- Air quality problems disproportionately impact Environmental Justice populations in Massachusetts.
- The next governor needs to greatly increase outdoor air quality monitoring in air pollution hotspots, and use that data to set enforceable targets for air quality improvements.
- Indoor air quality is an under-developed policy area with major impacts on public health, and burning gas for cooking is a primary culprit.

Summary: Outdoor air quality has significant impacts on public health, and the risks are borne disproportionately by Black and Brown people in Massachusetts. On average, residents of color in Massachusetts are exposed to pollution from vehicle emissions that are [26 to 36 percent higher than the rate of exposure to White residents](#). A study by Harvard University found that an increase in long-term air pollution exposure ($1 \mu\text{g}/\text{m}^3$) leads to a [COVID-19 death rate that is eight percent above](#) the risk for residents of communities without such exposure.

Indoor air quality also poses health risks, with emerging science showing risks coming from gas stoves. Cooking with gas releases toxic chemicals into the air from both unburned gas and burned (combusted) gas. These chemicals include lead, chromium, benzene, hexane, formaldehyde, and nitrogen dioxide. All of these are harmful to human health.

Expanded air monitoring for fine particulate matter ($\text{PM}_{2.5}$) and ultrafine PM is necessary for the state to determine baseline conditions and track improved air quality trends. Robust air quality data should be a significant factor in cumulative impacts analysis under the Massachusetts Environmental Policy Act (MEPA.) Studies have shown that even if we implement policies designed to lower emissions from transportation, like the now-paused Transportation and Climate Initiative and other emissions reductions programs, disparities in air quality in pollution hotspots will continue to persist in 2032. This finding should be a clarion call to decision-makers: Massachusetts must take proactive steps now to mitigate disparities and improve air quality for EJ populations and communities on the frontlines of pollution. However, the Commonwealth currently lacks sufficient baseline data to even begin to address this inequity and prevent further harm.

The Commonwealth must identify pollution hotspots and monitor air quality, and set ambitious targets for improved air quality by 2030 and 2035. Data collected from the expanded [air monitoring network](#) throughout the Commonwealth to measure ultrafine particulate matter and black carbon in locations near roadways will allow us to set enforceable targets for emissions reductions, ensuring that pollution is diminished in hotspots and air quality improves. Wintertime woodsmoke can also cause local hot spots in rural areas and should also be considered in developing an expanding PM monitoring network. With regard to indoor air quality threats from gas stoves, public health education and equipment changeout program deployment currently lags behind the risks. Induction cooktops are more expensive on average than gas stoves, but also are about 30% more efficient than standard non-induction electric ranges, and provide the precise temperature control that people have become accustomed to with gas. Electricity is also more expensive than natural gas currently, which impacts utility costs for households. There are only rebates on commercial cooking appliances through Mass Save. Municipalities, utilities, and the public health community can work together to raise awareness of the

SECTION 2. CLEAN ENVIRONMENT

benefits of induction cooking and create programs to make it more accessible for households. More research can be done into the correlation between gas cooking and health to support the transition to induction.

Recommendations:

- Use funds from the Regional Greenhouse Gas Initiative (RGGI), already allocated for clean transportation purposes through the MOR-EV program, to expand the Commonwealth's air quality monitoring network before other funding sources, such as federal funding, become available.
- Use ramped-up data collection of localized outdoor air pollution as well as a broad stakeholder group (with representatives from local Environmental Justice organizations, academic institutions, and labor) to identify pollution hotspots and establish a 2022 baseline and use that data to set ambitious targets for improved air quality by 2030 and 2035.
- Use state procurement power and other policy levers to mandate installation of air filters in existing eligible buildings (including but not limited to schools, residential buildings with more than two tenant occupied units, certain commercial buildings, and correctional facilities within 200 meters of congested roadways).
- Require MERV-16 HVAC filtration systems in newly constructed eligible buildings (including but not limited to daycare facilities, residential developments, hospitals, schools, long-term care facilities, school aged daycare programs, temporary shelters and nursing homes).
- Update the state's sanitary code to ensure the enforcement of public health regulations regarding mold.
- Update the state building code to prevent the installation of new gas stoves.
- Scale up programs to replace gas stoves with induction.

Resources/Contact Information:

- Staci Rubin, Conservation Law Foundation, srubin@clf.org
- Sofia Owen, Alternatives for Community and Environment, sofia@ace-ej.org
- Kai Palmer-Dunning, HEET, kai.palmer-dunning@heet.org

WATER QUALITY

Key takeaways: Climate change is exacerbating long standing challenges to water quality in Massachusetts, like stormwater and sewage pollution. These challenges are often worse for urban communities with more impervious surfaces. The antiquated water infrastructure causes serious harm to the quality of drinking water and surface waters. It is imperative that the state rapidly invest in upgrades like sewer separation, lead service line replacement, and per- and poly-fluoroalkyl substances (PFAS) treatment facilities.

As a solution to stormwater pollution, natural and human made green infrastructure soaks up and filters water where it lands, preventing it from picking up contaminants on pavement. Green infrastructure offers social, environmental and economic co-benefits like reducing urban heat, increasing green space in communities, and providing wildlife habitat. The MVP program and the DER already support green infrastructure projects, but the state must accelerate the pace of their work through increased funding and staff.

Summary: Stormwater pollution is the top threat to Massachusetts waterways. As we develop more impervious (paved) surfaces, precipitation is forced to run across parking lots and streets before entering nearby waterways, carrying with it pollutants such as heavy metals, salt, bacteria, oil, gas, animal waste, fertilizer, and debris. As the climate warms, Massachusetts is experiencing more precipitation, and in turn, more stormwater pollution. To protect and restore waterways, it is essential that we better manage this widespread problem, especially in cities.

This is not only an environmental issue - water quality also has serious justice and public health impacts. The most urbanized neighborhoods often have the most impervious cover, contributing disproportionately to stormwater pollution in local rivers. All that pavement also creates heat islands for residents. Installing green infrastructure in these areas accomplish the dual goals of soaking up precipitation where it falls and cooling down the air.

Drinking water infrastructure is also aging and outdated. In Massachusetts it is estimated that 220,000 water service lines are made out of lead. As these lead pipes age and corrode, lead contaminates drinking water and threatens the health of residents. With recent changes to the federal Lead and Copper Rule and an influx of federal funding, Massachusetts must ensure an equitable and streamlined process to access those funds so that the communities who are most in need are prioritized for expedited lead service line replacement.

PFAS chemicals are in Massachusetts drinking water and surface waters. Since a Maximum Contaminant Level (MCL) was created by DEP in 2020, over one hundred drinking water suppliers have found that the amount of PFAS in their drinking water exceeds the legal limit. Some wells have been temporarily shut off, water suppliers being directed to provide bottled water to residents in the interim (creating plastic pollution and associated greenhouse gas emissions), and the need to plan for costly water treatment techniques that can cost millions of dollars. The Commonwealth must act to hold chemical companies responsible for the cost of cleanup, rather than letting residents bear the financial responsibility for this widespread threat to their drinking water.

SECTION 2. CLEAN ENVIRONMENT

The next governor has an important role to play in improving stormwater management, including setting water quality standards, testing water quality throughout the state, enforcing water quality laws and regulations, implementing programs to help tackle this challenging problem, and providing funding for critical needs, such as water infrastructure improvement. Much of this work is done by the Department of Environmental Protection, including expansive PFAS testing and municipal grants. However, DEP has historically lacked the staff and funding to do this important work.

Human-induced global climate change is causing sea levels to rise at an alarming rate. Along with these rising tides, saltwater intrudes into coastal aquifers and up into freshwater systems. Neither humans nor freshwater wildlife can tolerate salt water. If contaminated, groundwater supplies become unusable without costly desalination treatment. Negative impacts to both plant and animal species across the food web reverberate, often devastating local fisheries. The only way to minimize saltwater intrusion, and the great economic loss to communities reliant on the fishing industry for their livelihood, is to slow sea level rise through drastic reductions in greenhouse gas emissions.

Did you know?

- Three billion gallons of sewage enter Massachusetts waterways every year from sanitary and combined sewer overflows across 19 communities, like Chicopee, Fall River, and Lawrence. Sewage pollution contaminates waters and poses serious health risks to residents. It will cost billions of dollars to upgrade these systems statewide. For the Massachusetts Water Resources Authority (MWRA) alone, it will cost over \$15 billion to get rid of combined sewer overflows.
- Often, the best available data for a water body is outdated and doesn't reflect changes in the climate. DEP and partners need a more robust water quality monitoring program that yields updated, accurate data to accomplish this critical work.
- Industrial dumping still happens. A 2018 study found that nearly 54 percent of major industrial facilities exceeded pollution limits at least once during an 18-month period. These chemicals damage water quality and aquatic habitat in places like the Housatonic River.
- As Pilgrim Nuclear Power Station closes down on the South Shore, the company is considering dumping its radioactive waste into Cape Cod Bay. This would be disastrous for marine and freshwater wildlife, as well as for the robust tourism industry the region supports.
- Over 100 public water systems have found PFAS in their water supplies that exceed the new state limit, representing a potential multi-million-dollar cost to the Commonwealth if polluters are not held responsible for the cost of remediation.
- Current approaches to lead service line replacement leave the option of partial replacements, which temporarily increase, and ultimately do not significantly decrease, levels of lead. Partial replacements are likely to occur when properties are rented, or homeowners are low income.
 - Approximately 220,000 lead service lines are still in use, many in EJ communities.

Recommendations:

Programs

- Increase funding to EEA's MVP Program and expand eligibility to nonprofit organizations, who already often serve as partners in implementation, so more communities can benefit from green and climate-friendly infrastructure.
- Encourage municipalities to comply with their MS4 permits through funding and technical assistance from DEP.⁹

⁹[Massachusetts Small MS4 General Permit | US EPA](#)

SECTION 2. CLEAN ENVIRONMENT

- Expand programs like the Greening the Gateway Cities program that help buffer streams and mitigate stormwater impacts.
- Incorporate forward-looking precipitation into DEP's own planning, and when approving external plans in order to appropriately plan for climate impacts.

Funding

- Increase the proportion of grants (rather than loans) distributed through the State Revolving Fund (SRF) to municipalities. Grants should be prioritized for green infrastructure projects and low-income communities.
- Direct significant funding through SRF or other vehicles to water infrastructure improvements to separate sewage and stormwater collection systems, like in the MWRA's system, for example.
 - EJ: Municipalities with fewer resources may have trouble paying back SRF loans, and thus not apply, leaving aging water infrastructure to decay further.
 - Separate out DEP's Water Quality Monitoring grant program from their operating budget so the agency and grantees can better plan for the opportunities and increase overall funding.
 - Take advantage of the funding in the environmental bond to accelerate the pace of water infrastructure upgrades.
 - Increase funding and staffing so DEP can more thoroughly monitor water quality, identify water quality impairments, develop TMDLs, and work with communities and partners to restore water quality across the state.
 - Increase technical assistance to make the SRF loan process more accessible to EJ, low income, rural, and other understaffed communities

Policy

- Support EPA in its efforts to implement Residual Designation Authority, which would require private landowners to contribute to cleaning up local stormwater impacts.
- Work with EPA to develop the next MS4; the new statewide permit should require that municipalities make substantial, measurable progress in decreasing stormwater pollution.
- Support efforts to decrease use of road salt in the next MS4 and on state roadways, including by considering salt applicator training and certification programs similar to New Hampshire's Green SnoPro program.

Resources/Contact Information:

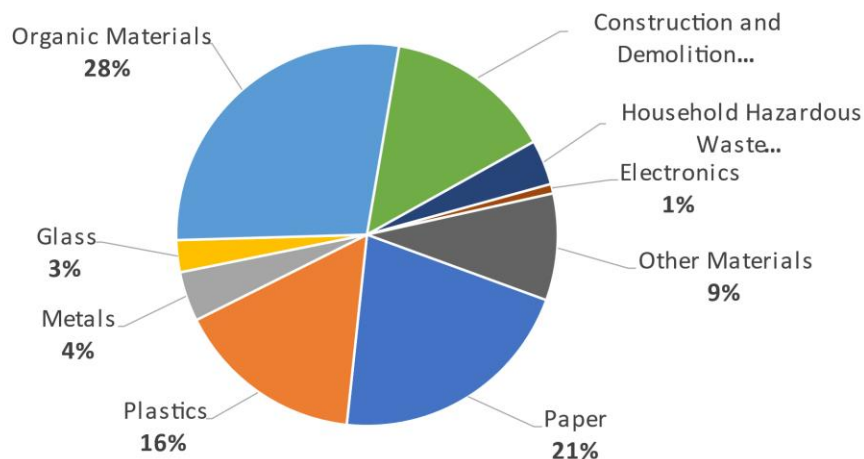
- Julia Blatt, Massachusetts Rivers Alliance, juliablatt@massriversalliance.org
- Emma Gildesgame, The Nature Conservancy in Massachusetts, emma.gildesgame@tnc.org
- Maureo Fernandez y Mora, Clean Water Action, mfernandezymora@cleanwater.org

SOLID WASTE

Summary: The Commonwealth of Massachusetts' five and a half ton per year solid waste problem – is no better now than it was at the time of the last three gubernatorial elections. The incinerators and landfills that burn and bury this waste are still polluting air and water, contributing to climate change and blighting predominantly Environmental Justice populations that host facilities within Massachusetts and as far away as Ohio and the Carolinas. Meanwhile, despite recent enormous increases in cost, predominantly single-stream curbside recycling program does not work. Curbside materials are largely downcycled, burned or buried. We have solutions to these problems, but need strong leadership from Beacon Hill to realize them.

The pie chart below is a breakdown of what Massachusetts is sending to be burned and buried. Most of the materials, including paper and cardboard, plastic, metal, glass, organics, textiles, and construction and demolition materials can be recycled or composted.

Overall Waste Composition in Massachusetts by Primary Material Category (Spring/Summer 2019)



Source: MassDEP – Waste Characterization Study 2019

Reducing Disposal:

Composting – Given that 28% (over 1.5 million tons per year), of disposal is organic materials or food and yard waste, the first step should be banning all food scraps from disposal, as the State of Vermont has done. The next administration could also be crucial in supporting policies and regulations that lead to real composting. This would not only save cities and towns tens of millions of dollars, but would also have significant climate impacts both up and down stream.

DEP already banned Commercial Food Waste from disposal in 2014 (any food scraps from producers who generate more than a ton a week for material) and in the fall of 2022 will expand that ban to generators who produce a half ton or more a week. While this has resulted in some investment in composting infrastructure, cities and towns need food scraps out of the trash to realize significant

SECTION 2. CLEAN ENVIRONMENT

savings. It is also imperative that the Commonwealth stop allowing toxic composting solutions – i.e., the processing of food scraps with sewer sludge thereby contaminating it with PFAS and other dangerous toxics always present in the sludge.

Paper and Cardboard – 21%, or over a million tons a year, of Massachusetts’ disposal is paper and cardboard, both materials that DEP has banned from disposal since the 1990s. One of the easiest ways to reduce disposal would be to enforce this Waste Ban. Over the last two administrations, DEP has been woefully understaffed and unable or unwilling to ensure that millions of tons of commercial cardboard in particular end up burned or buried. A new governor could change that and make this a priority.

Fix Recycling:

Since the China Sword policy banned importation of contaminated plastic and paper from the United States, waste companies have imposed many cities and towns with increased fees for curbside recycling. For instance, the City of Boston went from paying just \$89,000 per year in 2017 to more than \$5,000,000 a year in recycling costs in 2020. The City of Springfield’s recycling costs jumped from roughly \$550,000 in 2017 to \$669,800 a year in 2021.

While there are some deeper solutions needed (reverting back to dual stream recycling would help, for instance) there are two changes that would save cities and towns tens of millions of dollars, create jobs across the Commonwealth, benefit the climate, and not cost taxpayers a cent: modernizing the Bottle Bill and implementing an Extended Producer Responsibility system for packaging and paper.

Bottle Bill – According to DEP, curbside glass is not recycled into bottles in Massachusetts, but used as landfill cover or roadbeds. Plastic bottles collected in curbside bins cannot be used to make new, food grade plastic because it is likely to be contaminated by toxics, for example, a bottle of bleach or weed killer. Expanding all glass, plastic, and aluminum beverage containers in Massachusetts’ Bottle Bill (in addition to beer and soda bottles, as it is now) would solve some of these problems. Including more beverage containers, especially nips, would also significantly reduce roadside litter. If the types of containers were coupled with increasing the deposit from five cents to ten the redemption rate would skyrocket to about 90%, meaning over three billion more containers would be recycled each year, as compared to the current deposit return system. Finally, modernizing the Bottle Bill would lead to an additional 3.2 million MBtu in energy saved a year, or power for over 41,100 households. In climate terms, GHGs would be reduced by an additional 187 thousand metric tons, equivalent to the removal of 40,600 cars off the road for an entire year – at no cost to the taxpayers.

Extended Producer Responsibility for Packaging and Paper – EPR systems have been around for decades, and if done right can result in significant reimbursements to cities and towns and agencies, while improving data. Like modernizing the Bottle Bill, a strong EPR bill is before the Legislature. If it is passed, DEP will be crucial to making it work. Getting these bills across the finish line would be much more likely with the support of the governor.

Need for Better Data:

Due to historic cuts at DEP, there exists no reliable data for how much the state is actually recycling. Each year, about one third of municipalities fail to report the tonnages that their programs handle. And business and multi-family waste and recycling is unreported for almost all of the state. This lack of data makes it impossible to plan, implement or evaluate waste reduction, reuse, recycling or composting programs. We need additional staff at DEP to collect and analyze data that can lead to better policies, programs and results. With more resources and data, DEP would be able to conduct a robust and

SECTION 2. CLEAN ENVIRONMENT

meaningful planning process, accurately evaluate the existing waste system and for DEP to build and implement strong, enforceable goals.

Shut Down Massachusetts' Incinerators:

Six of the seven incinerators in Massachusetts are in neighborhoods designated as Environmental Justice populations. Burning over three million tons of waste a year, they spew dioxin, PFAS, and other toxics into the airshed and make it impossible for the Commonwealth to eventually meet its climate goals in the long run. They include the oldest incinerators in the country, and are breaking down, and more polluting every year. Yet, the Commonwealth subsidizes and incentivizes the energy produced by these inefficient dinosaurs at the expense of health. The first step is to recognize that burning trash is not sustainable and should be stricken from the Renewable Portfolio Standard. The next would be for the next governor to make a plan for shutting all seven incinerators down and making a just transition for the communities they burden.

Recommendations:

- Ban all food scraps from disposal.
- Enforce Waste Bans, especially Paper and Cardboard: Make Waste Ban enforcement a priority and fund DEP to hire qualified, waste ban inspectors whose time is dedicated to carrying out this work.
- Support modernizing the Bottle Bill and passing Extended Producer Responsibility for packaging and paper.
- Better Data and Metrics: Increase funding for DEP's Bureau of Waste Management to collect and analyze solid waste data so we can determine best ways to meet solid waste reduction goals.
- Shut down all seven Massachusetts' incinerators.

Resources/Contact Information:

- Kirstie Pecci, Conservation Law Foundation, kpecci@clf.org

TOXIC CHEMICALS

Key takeaways:

1. **Enforce and implement existing laws.** Toxic chemicals should be treated as serious hazards. The first line of defense against toxic chemicals is banning them from products before they impact the environment, economy, and public health. Robust implementation of existing laws, including the Toxics Use Reduction Act (TURA), Mercury Management Act, and Children and Firefighters Protection Act is needed to make sure that companies that sell products and operate in Massachusetts are doing all that they can to protect our residents and workers from toxic chemical exposures.
2. **Toxic Free Kids.** Every child in society is born with a “[chemical body burden](#)” passed from parent to child during pregnancy. This burden grows with the child as they encounter an ever-increasing range of synthetic chemicals present in food, air, water and everyday consumer products. In 2012, the [American Academy of Pediatrics](#) noted, “associations between early life exposure to pesticides and pediatric cancers, decreased cognitive function, and behavioral problems,” and called on governments to reduce children's exposure to pesticides. Massachusetts schools, childcare centers, and public parks departments still use toxic pesticides on outdoor grounds, including glyphosate and 2,4-D, potentially endangering children's health.
3. **PFAS.** Polyfluoroalkyl substances (PFAS) are the most concerning chemical of this generation. Lack of transparency around PFAS as a class, paired with its extremely dangerous health effects and persistence in the human body and environment, represent a threat to water, agriculture, food systems, and human health. The best thing we can do to prevent further damage from PFAS is to ban these chemicals and force the market to come up with affordable, well-researched, safer alternatives. Remediation of PFAS will be costly, and polluters should pay the bill.

Summary: Scientific research each year uncovers more links between toxic chemical exposures and cancer, learning disabilities, asthma, infertility, Parkinson's disease, and many other conditions. The burdens these chemicals cause society include lost productivity, missed school days, health care costs, special education, and decreased happiness and well-being. The health care costs and lost earnings alone, just from repeated low-level toxic chemical exposures from everyday sources, is over \$340 billion.¹⁰

Toxics Use Reduction Act: TURA saves companies money and reduces the use and release of toxic chemicals. As of 2010, “chemical use has been reduced by 40%, byproducts by 71%, and releases on site by 91%.”¹¹ In 2017 the program reported “Many businesses are saving on their annual operating costs as a direct result of toxics use reduction or resource conservation efforts.”¹² Despite this success, TURA has potential for far greater impact. Fees paid by large users of toxic chemicals, supposed to be adjusted for inflation annually, have never been increased (since 1990). Lower financial incentive hampers TURA

¹⁰ Science News, Exposure to chemicals dangerous to hormone function burdens Americans with hundreds of billions in disease costs, October 2016. <https://www.sciencedaily.com/releases/2016/10/161018103657.htm>

¹¹ TURA 20th Anniversary Leaders Reduce Toxic Chemical Use by 3 Million Pounds https://www.turi.org/TURI_Publications/Publications_about_TURA_and_TURI/TURA_20th_Anniversary_Leaders_Tour

¹² Toxics Use Reduction and Resource Conservation: Competitiveness Impacts for Massachusetts Businesses, September 2017 [TURI Report 2017-002 . September 2017.pdf](https://www.turi.org/TURI_Report_2017-002_September_2017.pdf)

SECTION 2. CLEAN ENVIRONMENT

partner agencies' ability to maximize the positive impact of the law. TURA also spotlights particularly hazardous chemicals to bring more companies into the program, but this provision has been under-utilized. As a result, workers, residents, and businesses are denied public health, environmental and economic benefits.

Toxic chemicals in consumer products: Most chemical exposure occurs from consumer products on a gradual, day to day basis from a multitude of toxic chemicals present in everyday life. Furniture, children's toys, cleaning products, personal care products, electronics, building materials and food packaging all contribute to a daily toxic chemical soup, and are not regulated under TURA. Manufacturers are not required to disclose which chemicals are in the consumer products they produce. Disclosure empowers prevention: knowing what toxic chemicals are present in products enables the state to prioritize uses of concern for further research and evaluation for safer alternatives. Legislation such as *An Act for Massachusetts toxic free kids* [H.939/S.2676](#) would require manufacturers of children's products, personal care products, cleaning products and others to disclose the presence of some of the most hazardous chemicals in them.

Nanotechnology: Tiny molecules designed at a size of 1 to 100 nanometers (nm) are emerging as a new "constituent of concern." Nanomaterials are technologically compelling for their extremely small size and high reactivity, among other properties, but these same properties pose a serious hazard to public health and the environment. Massachusetts has one of the highest concentrations of nanotechnology industry in the nation, but government regulations have not caught up with the associated risks. The next governor must identify where nanomaterials are being used, and what harms may result from that use, in order to ensure public health and safety as the industry grows. As a first step, multi-walled carbon nanotubes should be added to the TURA list and the threshold for reporting should be reduced in accordance with their miniscule size.

Flame retardants: Legislation was signed into law in January 2021 that bans 11 toxic flame retardants in children's products, household furniture, and more. Yet thousands of toxic flame retardants are excluded, leaving Massachusetts residents still vulnerable. The law empowers the DEP to add additional chemicals to the banned list and the next administration must do so in order to protect the health of the children and firefighters.

Toxic Free Kids: In 2012 the [American Academy of Pediatrics](#) called on governments to reduce children's exposure to pesticides, because of the "associations between early life exposure to pesticides and pediatric cancers, decreased cognitive function, and behavioral problems." *An Act relative to improving pesticide protections for Massachusetts schoolchildren* [H.926](#) would prohibit all but EPA "minimum risk" pesticides and those permitted for organic agriculture to be used near schools and child care centers, except in the case of a public health emergency (in which schools could apply for a waiver). In 2010, New York passed a similar law as did Connecticut in 2015.

Reducing pesticides use and modernizing pesticide reporting: The Department of Agricultural Resources (MDAR) is required by law to report on "efforts taken and the progress made toward reducing pesticide use, furthering the use of integrated pest management and other alternate pest control methods in the Commonwealth" ([MGL c. 132B § 5A](#)). Yet MDAR never developed or submitted this report. [Recent high profile bald eagle deaths](#) from rat poison provide a tragic call to action. Legislation, such as [H.4600](#), *An Act relative to pesticides*, can address this shortfall by requiring integrated pest management (IPM) plans and modernizing the state's pesticide use reporting system (currently relying on analog paperwork). An online MDAR reporting database will enable the public to

SECTION 2. CLEAN ENVIRONMENT

determine exposures and advocates to understand overall toxic use in the Commonwealth.

PFAS: Polyfluoroalkyl substances as a chemical class contain thousands of widely used industrial chemicals for stain proofing, water resistance and non-sticking properties. PFAS accumulate in the food chain and persist in the environment indefinitely, threatening the safety of fisheries and other natural food products, and disrupting the entire food web of natural ecosystems. Research links PFAS exposure in humans to cancer, immune system deficiencies, low fertility, and developmental issues in children and infants.

- The chemical industry phased out some PFAS, but thousands remain in countless consumer products (including food packaging) and firefighting equipment. These products end up in landfills, incinerators, compost, and agriculture sludge, none of which break down PFAS, thus leaching them into drinking water supplies, food systems, and agricultural products. The Commonwealth must take immediate action to keep PFAS and other persistent chemicals out of waterways, wastewater, and food supply chains. The [interagency task force on PFAS chemicals](#) formed in 2021 can act as a springboard to strengthen regulations and prevent further PFAS contamination by phasing it out of products. Important steps include turning to safer alternatives, identifying existing contamination, and holding polluters accountable for cleanup.
- Many industries are allowed to flush PFAS-containing waste into wastewater drains that, once treated, are discharged into waterways. But PFAS are not removed during the treatment process and end up in waterways just the same. In the 19 Massachusetts communities that still have combined storm-sewer systems, high rain events overflow storm sewer systems with PFAS-containing sewage, flushing it un- or under-treated into rivers and streams, thus harming natural ecosystems, recreation opportunities, and drinking water sources.
- PFAS in drinking water exceeds the legal limit (set by DEP in 2020) in over 100 Massachusetts drinking water systems. Water suppliers have responded by shutting off wells and providing bottled water. While necessary in the short run, these temporary solutions create more plastic pollution and associated greenhouse gas emissions. Protecting public health and providing safe drinking water are not optional. But treatment techniques to remove PFAS will cost suppliers millions of dollars. There is an urgent need to eliminate PFAS from products and hold polluters accountable for remediation.
- PFAS in Anvil 10+10, the pesticide commonly used for mosquito control¹³, enters forests, neighborhoods, and wetlands during aerial and truck spraying. These chemicals are then flushed into waterways during rain events, contaminating ecosystems and drinking water sources.
- Agricultural soils [in Maine](#) have already revealed PFAS contamination; from decades of PFAS-tainted sewage sludge, or “biosolids,” being applied as fertilizer. Compost from feedstocks with “biodegradable” service wares and foods stored in PFAS-treated packaging are also exceeding legal limits ([report](#)). Farms across New England have already been shut down for PFAS contamination; Massachusetts is next.
- Firefighters suffer from disproportionately higher cancer rates, especially from those linked to PFAS exposure. The gear designed to protect firefighters while they’re saving lives is actually risking theirs: firefighting Personal Protective Equipment (PPE) contains significantly high PFAS, even though safer alternatives are available. The next governor should support the International Association of Firefighters, Professional Firefighters of MA, and PFAS Action Groups in calling for

¹³<https://www.bostonglobe.com/2020/12/01/metro/toxic-forever-chemicals-found-pesticide-used-millions-mass-acres-when-spraying-mosquitos/>

SECTION 2. CLEAN ENVIRONMENT

a ban of PFAS in firefighting gear.

Recommendations:

PFAS

- Regulate PFAS as a class.
- Immediately halt the use of PFAS-containing sewage sludge as agricultural fertilizer.
- Separate the 19 remaining combined storm sewer systems in Massachusetts to prevent PFAS-contaminated combined sewer overflows into waterways.
- Prepare relief programs for farmers with PFAS-contaminated soils.
- Provide lifelong health monitoring for exposed farmworkers and their families.
- Investigate PFAS-contaminated compost and prevent further impacts to food supply.
- Ban manufacture, distribution, and sale of PFAS-containing firefighter PPE.
- Ban PFAS in firefighting foam and continue state buyback programs.
- Ban PFAS in all products for which safe alternatives exist.
- Investigate and mitigate PFAS contamination of groundwater, drinking water and agricultural soils, per the recommendations of the [PFAS Task Force](#)

Pesticides

- Implement recommendations from the statewide [Mosquito Control for the 21st Century Task Force](#). Invest in natural green infrastructure and low impact development to treat toxics-containing stormwater runoff before it reaches waterways.
- Modernize pesticide reporting and call for reduction in the use of pesticides in all forms of land and pest management, especially where vulnerable populations such as children or the elderly may be exposed, and in close proximity to rivers and streams.

Enforce and strengthen laws

- Fully implement the Toxics Use Reduction Act, Children and Firefighters Protection Act, and Mercury Management Act.
- Enforce the regulation requiring MDAS to report on progress to reduce pesticides.
- Pass new laws to replace known toxic chemicals with safer alternatives and require product disclosure to identify unknown hazards.
- Develop regulations to protect public and environmental health from nanomaterials.
- Ban organohalogen and organophosphate flame retardants.

Environmental Justice populations

- Transition to safe, healthy parks and fields management that reduces exposure to toxic chemicals.
- Migrant farm workers, and their families are disproportionately exposed to toxic pesticides. Reduce pesticide use and provide health monitoring, treatment for farmworkers.
- Toxics pose serious reproductive health threats, which disproportionately impact Black women. Many toxic products, such as skin lightening creams and hair relaxation products, are marketed specifically to Black women and other People of Color. Leaving toxic chemical phase-out to the market results in less-toxic products being more expensive, pricing out low-income families from safe options.

Resources/Contact Information:

- Martin Dagoberto L. Driggs, NOFA/Mass, marty@nofamass.org
- Maureo Fernandez y Mora, Clean Water Action, mfernandezymora@cleanwater.org

LAND PROTECTION

Key takeaways: Massachusetts has more land trusts per capita than any other state in the U.S., and a legacy of conserving critical lands for the benefit of future generations. Yet we continue to permanently develop land at an average 13.5 acres per day, losing opportunities to protect natural resources and the multitude of benefits they provide, including the protection of drinking water supplies, wildlife habitat, quality of life in communities, and the critical agriculture, forestry, fisheries, and outdoor recreation industries.¹⁴

We are calling on the next governor to set an ambitious goal of protecting 50% of lands by 2050, doubling the pace of land conservation from ~55 acres per day to 100 acres per day.¹⁵ Right now, just over 25% are protected. This will require significant commitment and investments in land conservation via developed partnerships that leverage public, nonprofit and private resources and innovative funding models, while maintaining public support, and mapping Environmental Justice communities to create equity in land conservation planning.

Summary: Between 2012 and 2017, nearly 30,000 acres of forest were lost, some developed, and some cleared.¹⁶ The state needs to invest in smart land use planning and land conservation - and set aside critical natural resources before it is too late. This work is increasingly important, as land-based nature-based solutions are a sustainable and affordable way to protect communities from climate change impacts and provide numerous co-benefits.

Public funding for land protection unlocks a variety of climate, health, ecosystem, and economic benefits, and Massachusetts is host to several innovative models, such as the Massachusetts Community Preservation Act, which leverages local and matching state funds for land conservation, recreation, affordable housing and historic preservation, and the Conservation Land Tax Credit, which incentivizes private donations of land for the purposes of conservation. Access to parks, trails and nature is crucial to mental and physical health, and to a comprehensive COVID-19 recovery. Visits to parks more than doubled during the pandemic, and that trend has not let up (see "[Parks and Public Access](#)" section, page 37).

Massachusetts' climate law mandates binding emissions goals for Natural and Working Lands (NWL), making carbon storage and sequestration an element of the Net Zero 2050 emission limit and the Next Generation Climate Roadmap to achieve that limit. Investing in protecting, restoring, and managing NWL now will pay dividends in the future. Natural climate solutions are the only tools we have to remove carbon pollution from the atmosphere at scale, and at cost. Massachusetts' NWL currently sequester carbon equal to about 7% (4.6 million metric tons CO₂e) of the state's gross greenhouse gas emissions each year,¹⁷ with the potential to remove and reduce an additional 1-2 million metric tons CO₂e per

¹⁴ Massachusetts' legacy of conservation is faced with the new challenge of contributing to President Biden's nationwide goal of protecting 30% of U.S. lands by 2030. See also, <https://www.massaudubon.org/our-conservation-work/policy-advocacy/shaping-climate-resilient-communities/publications-community-resources/losing-ground/key-findings>

¹⁵ *ibid*

¹⁶ *ibid*

¹⁷ Annual carbon sequestration, 2010: Methods taken from Gu et al. 2019 and applied to Massachusetts. Gu H, Williams CA, Hasler N, Zhou Y (2019) "The Carbon Balance of the Southeastern Forest Sector as Driven by Recent Disturbance Trends", *Journal of Geophysical Research – Biogeosciences*, 124, doi:10.1029/2018jg004841 MA annual emissions, 2017: Appendix C:

SECTION 3. CONSERVATION AND COMMUNITIES

year by 2030.¹⁸ For more, see the “[Working Lands](#)” (page 39), and “[Natural Climate Solutions](#)” (page 63) sections.

The Departments of Conservation and Recreation (DCR), Fish and Game (DFG), and Agricultural Resources (DAR) are critical public partners with land conservation organizations, land trusts, cities and towns, water suppliers, farmers, and foresters, as well as the outdoor recreation and tourism industries, which all depend on a steady source of state funding to leverage private, federal, local, and nonprofit investments in land conservation. Unfortunately, the state reduced capital investments in land conservation over the past six years (to a low of \$8 million for state agencies in FY19 from earlier highs of \$50 million a year). Additionally, ***Massachusetts continues to spend less on parks and recreation per capita than any other state in the nation*** – only \$32.65 per 1,000 people.¹⁹

There are significant opportunities to increase the pace of land conservation across the state:

- Increase investment in the [Local Acquisitions for Natural Diversity \(LAND\) grant program](#) to be commensurate with the [Parkland Acquisitions and Renovations for Communities \(PARC\) grant program](#), which has seen increases in recent years. LAND is important for rural communities to leverage state investments in forests, wetlands, and soils that protect drinking water supplies and wildlife habitat.
- Better leverage nonprofit organizations by increasing the cap for grants available to them. For example, [Conservation Partnership Grants](#) for land trusts and conservation nonprofits are currently capped at \$85,000 per project, which is a relatively modest amount when compared to other land acquisition grants (\$400,000 for PARC and LAND). Most state grants are designed to support state agencies, cities, and towns; yet, the state’s 130 land trusts are often responsible for leveraging significant private investments, helping cities and towns with planning, funding, and completing complex land and water conservation and restoration projects, while welcoming millions of people to preserves, beaches, parks, and trails each year. Nonprofits accomplish this work rapidly via teams of specialists with decades of experience, supporting communities and state agencies to get deals done.
- Increase the annual cap on the [Conservation Land Tax Credit](#) incentive program, which has a multi-year wait list of landowners willing to donate conservation land, causing a backlog and deterring landowners from participating.

EEA, as of spring 2022, continues to delay finalization and implementation of the Resilient Lands Initiative (RLI), a legacy-making set of strategies to improve the quality of life for all residents of Massachusetts through land conservation and protection initiatives. The RLI highlights the many reasons for investing in existing and new programs to protect, restore, and manage natural resources, including reduction of urban heat island effect, climate resilient neighborhoods, clean drinking water, working farms and forests, outdoor recreational opportunities, habitat conservation, and more. Myriad benefits make these investments among the most cost-effective strategies on behalf of the public. The benefits of access to nature for mental and physical public health alone justify new NWL investments in the state, which has some of the highest health care expenditures in the nation while spending the least on public lands.

Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017 (<https://www.mass.gov/lists/massdep-emissions-inventories>).

¹⁸ Nature4Climate. 2020. See MA state profile at: <https://nature4climate.org/u-s-carbon-mapper>

¹⁹ Department of Conservation and Recreation Special Commission. 2021. Prepared by UMass Donahue Institute. <https://www.mass.gov/doc/umdi-dcr-special-commission-report/download> page 51

SECTION 3. CONSERVATION AND COMMUNITIES

As included in the “[Funding](#)” (page 5) section, federal COVID-19 relief funds present a tremendous opportunity to make up ground in conserving and protecting lands in Massachusetts.

Recommendations:

- Set a bold and critical goal to protect at least 50% of Massachusetts lands by 2050.
- Increase capital investments for community investment grant programs, with the ultimate goal of funding the LAND program commensurate with PARC spending, increase capital funding for agency land programs, and increasing grants under the Conservation Partnership grant program.
- Operationalize and fund the core strategies of the Resilient Lands Initiative, including a shift in focus to landscape and watershed-scale conservation stewardship and restoration projects, fund conservation and restoration of natural system connections across municipal boundaries.
- Increase the annual cap on the Conservation Land Tax Credit from \$2 million to \$7.5 million.

Consistent capital investments in land acquisition are critical to meet the new requirements under the Next Generation Climate law and to ensure that all residents have access to nearby parks and open space. State investments leverage significant local, federal, and private matching funds and are the cornerstone of complex land protection projects.

Resources/Contact Information:

- Linda Orel, The Trustees, lorel@thetrustees.org
- Emily Myron, The Nature Conservancy in Massachusetts, emily.myron@tnc.org
- Sam Anderson, Mass Audubon, sanderson@massaudubon.org

BIODIVERSITY

Key takeaways:

- We rely on plants and wildlife to support agriculture, fisheries, human health, and the outdoor recreation economy, as well as natural ecosystems for their own intrinsic value and the complex, interconnected benefits they provide to society.
- Preserving and restoring native plant and animal biodiversity is critical for ensuring the integrity and functionality of natural ecosystems and the numerous services they provide, including clean air, water and soil, carbon sequestration and storage, and pollinator services.
- Massachusetts loses nearly 5,000 acres of land each year to development (13.5 acres per day.) Numerous other threats to biodiversity include habitat loss and degradation, invasive species, pollutants and pesticides, and climate change.
- It is critical to ensure adequate personnel and funds to conserve, restore and manage natural habitat on both public and private lands, and to prioritize underserved communities that are at greatest risk of suffering the impacts of climate change (such as, creating urban habitat to mitigate ground-level pollution and heat stress), and to generally improve quality of life.

Summary: The planet is facing both a climate crisis and a biodiversity crisis. One-third of the species in the U.S. are vulnerable, and one-fifth are at high risk of extinction.²⁰ The abundance of wildlife has also been greatly reduced and the problem is getting worse. A 2019 landmark study showed a loss of three billion birds - 30% - over the past 50 years in North America²¹ and other data points to alarming declines in insect biodiversity and biomass globally.

Massachusetts has a rich natural heritage with tremendous biodiversity of plants and animals because of its diverse geography, ranging from sandy beaches and coastal habitats to extensive forests, wetlands, and rivers. However, threats to global biodiversity are also urgent here, where 432 species are listed under the Massachusetts Endangered Species Act (MESA).

The Natural Heritage and Endangered Species Program (NHESP) helps to conserve and protect native animals and plants and their sensitive communities and habitats as required under MESA. NHESP staff collects, manages, and analyzes biological data on rare species and vulnerable natural communities that inform conservation efforts statewide. Staff recover rare species populations through restoration efforts and active management of habitat and provide partners with data and mapping. NHESP also provides educational programming, publications, and conservation tools to connect residents with nature and help guide conservation. Yet NHESP is chronically underfunded. Agency experts are under constant pressure to allow for widespread development of designated Priority Habitat, despite the impact on imperiled species. Increased capacity and funding will enable these experts to implement key planning and mapping tools to leverage partnerships with private landowners, nonprofit land trusts, and cities and towns, and need the support of government leaders to carry out their important mandate.

BioMap: In June 2022, BioMap3 will be released. Created by NHESP, The Nature Conservancy and other partners, BioMap3 is a cutting-edge vision and conservation plan for conserving biodiversity for a healthy and resilient Massachusetts. The plan intends to help plants and animals thrive within their

²⁰ https://www.nwf.org/-/media/Documents/PDFs/NWF-Reports/2018/Reversing-Americas-Wildlife-Crisis_2018.ash

²¹ Rosenberg et al. 2019. Decline of the North American avifauna. Science.

SECTION 3. CONSERVATION AND COMMUNITIES

diverse communities. It identifies strategies that ensure a climate-resilient landscape that protects rich natural heritage, including access to nature and outdoor recreation, clean air, clean water, and health and well-being for citizens. BioMap3 informs land acquisition, land and water restoration and management, and open space planning by the state, municipalities, and nonprofit organizations. This planning work is particularly important as Massachusetts loses nearly 5,000 acres of land each year to development²² – an average of 13.5 acres per day. The next administration should fully employ the BioMap 3 strategies to protect and strengthen wildlife habitat. (See BioMap2 [here](#))

Pollinators: Insect biodiversity and biomass are declining across the globe with an estimated 40% of species threatened with extinction.²³ Pollinators, including bees and butterflies, are an especially vulnerable group. Globally, 88% of all plants are animal pollinated.²⁴ In the Commonwealth, 45% of agricultural commodities rely on pollinators, especially wild and managed bees. Pollinator declines threaten not only food supply, but also the integrity of natural ecosystems and the many ecosystem services they provide. Evidence indicates that bee communities right here in Massachusetts are becoming less diverse: a recent UMass study, for example, shows that one species of bumble bee is becoming increasingly common while other once-common species are now extirpated or rare. If we improve habitat and reduce pesticide exposure, we can increase the resilience of pollinator communities in the face of other stressors, such as disease and climate change.

Massachusetts stands to lose both the diversity of species and overall abundance of wildlife if we do not address the threats to biodiversity, including climate change, habitat loss, poorly planned development, toxic contaminants (such as pesticides and herbicides) and invasive species. The loss of pollination services due to insect population decline will have a detrimental impact on the state’s agriculture. A decline of insect biodiversity threatens the ability of ecosystems to support human life, including soil and freshwater functions (nutrient cycling, soil formation, decomposition, and water purification), biological pest control, pollination services and food web support, all critical to ecosystem functioning, human health and human survival.²⁵

Massachusetts has been a leader in land and water conservation over several decades. We have protected over 1.3 million acres of parks, forests, farms, water supply lands, and wildlife management areas. We have cleaned rivers, lakes, and shorelines, and removed dams that block their flow and stop fish from swimming freely. We have precedence and systems in place to improve the conservation, management and restoration of fish, wildlife and pollinator habitat. But much more needs to be done. A diversity of species and structures across a landscape may help to reduce the susceptibility of its individual components to climate change, as well as other changing environmental conditions and stressors. At a landscape level, natural ecosystems and naturalized settings can increase environmental services such as water quality, wildlife abundance, pollinator habitat, and carbon sequestration.²⁶

Recommendations:

- Apply BioMap3 as a widespread and foundational tool to guide proactive conservation, restoration, and development initiatives, including industrial scale renewable energy facility siting.

²² Ricci et al. 2020. Losing Ground: Nature’s Value in a Changing Climate. Massachusetts Audubon Society, Lincoln, MA, 33pp

²³ IPBES (2019): Global assessment report on biodiversity and ecosystem services <https://ipbes.net/global-assessment>

²⁴ <https://www.mass.gov/doc/massachusetts-pollinator-protection-plan/download>

²⁵ van der Sluijs, JP, 2020 <https://www.sciencedirect.com/science/article/pii/S1877343520300671>

²⁶ From “[USDA Climate Adaptation Resources for Agriculture, October 2016](#),” p.27

SECTION 3. CONSERVATION AND COMMUNITIES

- Codify the reimbursement of MassWildlife Inland Fish and Game Fund for both free and discounted licenses and adequately fund the Natural Heritage and Endangered Species Program through the state operating budget.
- Increase capital funding for land protection and aquatic connectivity, as well as habitat restoration and management, by both state agencies and partner organizations.
- Establish high-quality pollinator habitat on state land and along MassDOT roadways and create corridors across the Commonwealth so plants and wildlife species can move and adapt to a changing climate.
- Further restrict neonicotinoid use and offer holistic solutions to overreliance on pesticides, including support for soil remediation and resources to incentivize and help conventional farmers transition to organic practices; they've been banned in the E.U. since 2013.²⁷
- Remove more dams and replace more culverts to improve freshwater flow and river access for fish populations through increased funding for the DER.
- Enact policy to control mosquito-borne diseases through ecologically based and targeted programs that limit the use of pesticides and avoid aerial spraying.

Resources/Contact Information:

- Linda Orel, The Trustees, lorel@thetrustees.org
- Emily Myron, The Nature Conservancy in Massachusetts, emilymyron@tnc.org
- Rosemary Malfi, NOFA/Mass, rosemary@nofamass.org
- Sam Anderson, Mass Audubon, sanderson@massaudubon.org

²⁷ <https://www.science.org/content/article/european-union-expands-ban-three-neonicotinoid-pesticides>

RIVERS AND STREAMS

Key takeaways: With an estimated 8,229 river miles,²⁸ 1,200 named rivers,²⁹ 588,486 acres of wetlands³⁰ and 1,519 miles of coastline,³¹ water touches every resident of the Commonwealth and draws millions of visitors each year. The recent pandemic highlighted the importance of these resources for safe and enjoyable recreation, in addition to water supply and ecosystems. Climate change is increasing the frequency and severity of both floods and drought, threatening natural ecosystems, infrastructure, and water supplies. In response, the next administration must carefully manage water resources for both climate change impacts and public use and enjoyment.

Summary: Issues related to protecting rivers and streams, as well as the human and natural benefits we derive from them, are inextricably linked to the impacts of climate change and efforts to increase resilience. Climate change is causing shifts in precipitation and temperature, bringing significant challenges for how we live with water. Flash floods and flash droughts are both becoming more frequent and intense. Rainfall is coming in fewer, larger storms, and winter precipitation falls as rain on frozen ground rather than snow, rapidly flowing to rivers and streams rather than trickling down to recharge groundwater. At the opposite extreme, climate change is causing more frequent, intense, and prolonged droughts. Drought reduces flows in rivers and streams, concentrating pollutants that harm ecosystems and threaten public health. Excessive groundwater pumping when surface water supplies are low further depletes flows, and cuts into the future water supply “savings account”.

Natural systems are already under tremendous pressure to adapt and survive. Healthy ecosystems are necessary for mitigating floods, maintaining water quality and quantity, recycling nutrients, and providing habitat for plants and animals. We too must adapt by protecting and restoring floodplains, wetlands, and streams. Only then can we ensure enough water for both humans and nature.

Water quantity: The state’s Water Management Act, passed in 1986 and updated in 2014, is failing. Enacted to “...ensure prudent and sustainable use of water, maintain healthy watersheds and gradually improve degraded ones,”³² this important law governs water allocations for all water withdrawals over 100,000 gallons per day. As currently implemented, the regulations are far too weak and do not protect the sustainability of rivers, groundwater, and water supplies. The next governor must work with state agencies to balance the needs of humans and nature by carefully managing water resources.

Residents, businesses, and industry get their water from two interconnected sources: surface rivers, streams, and lakes, and underground aquifers. All of these are replenished naturally by rain and snow (and sometimes wastewater discharge). Taking out more water than nature puts back causes environmental harm and threatens water supply for the Commonwealth’s nearly 7 million residents and

²⁸ <https://www.google.com/url?q=https://www.rivers.gov/massachusetts.php&sa=D&source=docs&ust=1648565931487159&usg=AOvVaw1GlrRsWI-u9lBZom3a83bV>

²⁹ <https://www.mass.gov/doc/final-massachusetts-integrated-list-of-waters-for-the-clean-water-act-20182020-reporting-cycle/download>

³⁰ https://www.google.com/url?q=https://www.nawm.org/pdf_lib/state_summaries/massachusetts_state_wetland_program_summary_083115.pdf&sa=D&source=docs&ust=1648565931486911&usg=AOvVaw1NXCHsODZ2YACViciPbQH3

³¹ <https://www.google.com/url?q=https://coast.noaa.gov/data/docs/states/shorelines.pdf&sa=D&source=docs&ust=1648565931487432&usg=AOvVaw37RCWlcwNWkpuhBLDUhORZ>

³² <https://www.mass.gov/service-details/sustainable-water-management-initiative>

SECTION 3. CONSERVATION AND COMMUNITIES

over 180,000 businesses.³³ Drought further risks the future of rivers, streams, and water supply. Massachusetts updated its Drought Management Plan in 2019, but the drought conservation actions are merely recommendations. They need to be enforceable.

Flooding and drought are not mutually exclusive. An extreme rain event can cause flood damage amidst drought conditions - prolonged periods of overall reduced rainfall that lead to less water in streams, rivers, lakes and ponds and reduced groundwater levels. Times of low-flow impact Massachusetts residents and tourists' ability to swim, boat, and fish in rivers, and native fish and other wildlife's ability to survive. When less surface water is available, over-pumping groundwater further exacerbates these challenges. Fortunately, the green infrastructure and nature-based solutions that help build resilience to extreme storm events can also help replenish groundwater supplies, building Massachusetts' long-term drought resilience.

The best way to safeguard against the cumulative impacts of drought is to reduce human water use and water waste, leaving more water in streams. Over 50% of residential water use in the U.S. is watering lawns and gardens. Using drinking water for this purpose, and other unnecessary uses like flushing toilets and washing laundry, is unsustainable. Cities and towns across the nation are investing in "purple pipe" for greywater outdoor landscape watering, and the most forward-looking are pursuing recycled drinking water. In 2009, DEP established a permitting program for using reclaimed water, but only about a dozen projects have been completed to date. Massachusetts should step up as a leader in water reuse.

Recommendations:

- **Support passage of *An Act relative to maintaining adequate water supplies through effective drought management* (H.898/S.530)**, which would give the Secretary of Energy and Environmental Affairs the authority to require water conservation (cessation of outdoor lawn watering) during declared droughts.
- **Update and improve the Water Management Act regulations**, which are seriously flawed and, in some cases, actually take the state backwards.
- **Require "registered water" users to follow the same rules as "permitted" water users**, by requiring them to conserve water during droughts. A long-overdue step toward water sustainability in the Commonwealth, the Baker administration started but has thus far failed to follow through.
- **Champion water recycling** by allocating environmental bond funding to grants, loans, and technical assistance for reclaimed water projects.

Water Quality: Actually, we don't "love that dirty water..." Fifty years after passage of the Clean Water Act, waterways are still not clean. Discharges containing raw sewage, leaking septic systems, and road runoff loaded with fertilizer, oil, gas, sand, and road salt all contribute to failing water quality in Massachusetts.

Three billion gallons of sewage enter Massachusetts waterways every year from sanitary and combined sewer overflows across 19 communities, like Chicopee, Fall River, and Lawrence. Sewage pollution contaminates waters and poses serious health risks to residents. For the Massachusetts Water Resources Authority (MWRA) alone, it will cost over \$15 billion to get rid of combined sewer overflows; and billions more to upgrade these systems statewide.

³³ <https://www.census.gov/quickfacts/MA>

SECTION 3. CONSERVATION AND COMMUNITIES

The top source of pollution to waterways is stormwater, see “[Water Quality](#)” section (page 14). Nutrient overload from excess fertilizer and wastewater discharge is a close second. Excess nutrients cause outbreaks of cyanobacteria - or blue green algae - which is toxic to people and animals.³⁴ Not only habitat and recreation are at risk: many of these waterways serve as public drinking water supplies. And all that pollution is very difficult, and costly, to remove.

According to the clean water act, all waterways in the U.S. should be at the very least, “fishable” and “swimmable.” Yet 468 rivers and streams in Massachusetts still do not meet this minimum safety requirement and another 642 have not been evaluated.³⁵ Ensuring the safety of the Commonwealth’s residents and visitors to fish and swim in plentiful waterways is an important responsibility that can no longer be overlooked.

Saltwater intrusion into freshwater systems, caused by climate-induced sea level rise, is a significant threat to water quality and ecosystem health. Reducing greenhouse gas emissions and minimizing rising tides are critical to protecting freshwater habitat and the natural resources we depend on.

The state's most urbanized and polluted waterways, often encased in concrete, flow through Environmental Justice communities, limiting their access to rivers and streams for healthy outdoor recreation and poisoning those who rely in part on subsistence fishing. Rivers and streams flowing through lower-income, predominantly-BIPOC communities, and Environmental Justice populations should be just as clean and healthy as those flowing through all other communities. Healthy rivers in densely populated, urbanized areas can provide critical access to greenspace for those who have been historically and systemically cut off from healthy ecosystems. Healthy rivers also provide community cooling benefits during heat waves.

Recommendations:

- **Strengthen and support DEP’s Divisions of Watershed Management and DER.** Recent legislative and administrative leaders have recognized DER’s critical role in helping the state achieve climate resilience, increasing their funding to do so. Similar investment is needed in DEP’s Watershed Management. The next governor has the opportunity to greatly expand the scope of this important work.
- **Prioritize restoration projects in state-identified Environmental Justice communities.** Those communities bearing the brunt of the legacy of environmental mismanagement should be the first to receive investment to right past wrongs.
- **Continue investing in DEP’s MVP program** to assist local governments in protecting waterways from combined sewer overflows.

Habitat: Rivers and streams provide important natural functions that both humans and wildlife depend on, while also contributing to the recreation economy. See the “[Parks and Public Access](#)” section (page 37) for more on the benefits of natural spaces. Heavier rainstorms cause increased flooding around rivers and streams, especially in densely populated areas. Pavement, rooftops, and other impervious surfaces amplify these impacts by short-circuiting the natural water cycle - flushing water too quickly to rivers and streams and reducing the amount of rainfall that filters down to recharge aquifers. These once extreme but now normal precipitation events erode stream channels, damage habitat, and flush

³⁴ <https://www.epa.gov/nutrientpollution/issue>

³⁵ <https://www.mass.gov/doc/final-massachusetts-integrated-list-of-waters-for-the-clean-water-act-20182020-reporting-cycle/download>

SECTION 3. CONSERVATION AND COMMUNITIES

pollution and trash into waterways.

Massachusetts is home to 432 endangered, threatened, or special concern species,³⁶ many of which depend on rivers and streams. Restoring waterways is one of the most cost-effective ways to give endangered species the best chance of survival in a changing climate.

Undersized and/or improperly sized culverts interrupt stream connectivity, which is harmful for wildlife. There are approximately 25,000 culverts and small bridges in Massachusetts, the majority of which need to be replaced. These culverts fail in large storms, damaging roads and creating public safety hazards.

From water chestnut to hydrilla, knotweed to gypsy moths, invasive species are choking Massachusetts ecosystems. Invasive infestations impair water quality, degrade wildlife habitat, reduce recreational opportunities, and burden municipalities with unsustainable costs.

Often overlooked is the role of rivers and streams in maintaining cultural heritage and expression, especially for Native American communities. These values must be protected for all residents and visitors. Federal and State law provides Native American residents of Massachusetts access to every water body in the state, untaxed and unimpeded. Barriers to this access - due to private property, development, and lack of understanding among the general public and public agency staff - often impinge on their protected hunting and fishing rights.³⁷

Recommendations:

- **Support *An act responding to the threat of invasive species* (H.999/S.563)**, which will centralize state resources under one office, guide municipalities and nonprofit organizations with best practices, and establish a grant program to help fund eradication, prevention, and public outreach activities.
- **Invest in culvert upgrades** through the Municipality Vulnerability Planning program or other funding means; installing appropriately sized culverts is a high priority for many municipalities.
- **Remove unnecessary dams and replace culverts to restore rivers and streams** by supporting the DER's dam removal efforts through significant bond allocation.

Water Infrastructure: Impervious Cover - The vast majority of rivers and streams have been altered by human infrastructure — floodplains paved over, streams channelized and encased in concrete. These changes disrupt natural stream flow, destroy habitat, and cause erosion. Heavier rainstorms cause increased flooding around rivers and streams, especially in densely populated areas, creating public safety hazards, damaging infrastructure, homes and businesses, and disrupting transit. We can mitigate these negative impacts, which are nearly twice as likely to occur in lower income and BIPOC neighborhoods,³⁸ by investing in multi-benefit stormwater green infrastructure and low impact development “best management practices.” The constructed wetland at Alewife in Cambridge, for example, filters stormwater, provides wildlife habitat, and serves as an oasis in an urban neighborhood. These investments should be made in the most impacted areas first: Environmental Justice communities.

³⁶ <https://www.mass.gov/info-details/list-of-endangered-threatened-and-special-concern-species>

³⁷ <https://www.capecodtimes.com/story/news/2021/05/15/mashpee-wampanoag-tribe-member-confronted-access-herring-run-buzzards-bay-cape-cod-aboriginal-rights/5018710001/>

³⁸ <https://www.wickedlocal.com/story/regional/massachusetts/2021/06/17/redlining-flood-risk-affordable-housing-neighborhoods-massachusetts-low-income-areas/7324821002/>

SECTION 3. CONSERVATION AND COMMUNITIES

Dams - Massachusetts waterways are interrupted and degraded by 3,000 dams,³⁹ which disrupt natural streamflow and block fish passage in addition to impacting water quality (see “Water Quality” section, page 14). Relicensing throughout the Commonwealth provides a crucial opportunity to protect natural and cultural resources and develop recreational amenities, adding to economic development opportunities in Environmental Justice communities. Federal dam licenses span 40-50 years; natural, cultural and recreational commitments in these licenses could have a long and sustaining impact on ecosystems and communities. Yet key conservation and social provisions are often excluded because power companies fail to negotiate with conservation organizations, the communities they impact, and tribal representatives.

Recommendations:

- **Support stormwater “best management practices,” relying on nature to recharge water** into the ground and decrease impervious surfaces. Stormwater BMPs slow down stormwater, recharge groundwater, beautify neighborhoods and decrease pollution loading to streams.
- **Encourage creation of stormwater utilities** to implement and finance green infrastructure and low impact development investments.
- **Prioritize** water infrastructure improvement in Environmental Justice communities.
- **Direct EEA to play a strong role in dam relicensing** to ensure that power companies:
 - Protect wildlife habitat and key species;
 - Conduct traditional cultural property inventories and work with tribes to ensure that cultural resources are protected; and
 - Work with communities and nonprofit organizations to develop recreational amenities that increase access to rivers, especially in underserved communities.

Resources/Contact Information:

- Danielle Dolan, Massachusetts Rivers Alliance, DanielleDolan@massriversalliance.org
- Emma Gildesgame, The Nature Conservancy in Massachusetts, emma.gildesgame@tnc.org
- Kristen Sykes, Appalachian Mountain Club, ksykes@outdoors.org
- [Impervious Cover in NH and MA](#)
- [Stormwater Utilities](#)
- [Hydropower and Dam Removal](#)
- [MA Drought Management Plan](#)
- [MA DEP Water Management Act Program](#)
- [MA Reclaimed Water Program](#)
- [Nutrient Pollution](#)
- [Pesticides and Contaminated Water](#)
- [Overview of the Clean Water Act](#)
- [Reconnecting Rivers to Floodplains](#)
- [Native American Harvesting Rights](#)
- [Endangered Species Coalition](#)
- [Municipality Vulnerability Planning \(MVP\) Program](#)

³⁹[River Restoration: Dam Removal | Mass.gov](#)

TRIBAL ISSUES

Key takeaways and Summary:

Indigenous Peoples hold less than five percent of the world's total land holdings and yet have preserved almost eighty percent of the world's biodiversity. This accomplishment shows the impact of traditional Indigenous values on land management and can serve as an example to the world on how to maintain and even renew the vibrancy of life on the planet.⁴⁰

- Tribal sovereignty and self-determination should always be respected, in the form of nation-to-nation negotiations. As original title holders of the land, Tribal governments also hold the original jurisdictional authority; any rights not expressly ceded are thus retained by Tribal governments.⁴¹
- For any and all projects that impact Tribal land holdings, natural resources, historic or cultural sites, a process that involves free prior and informed consent must be applied, as is pursuant to the United Nation Declaration of Human Rights and the United Nation Declaration on the Rights of Indigenous Peoples. Mere notice or consultation are not the equivalent of consent.⁴²
- Reparations for illegal land dispossession will be necessary for the continued existence of Native people as culturally distinct communities in their own homelands. Return and repatriation of land should be pursued whenever possible. Otherwise, land swaps or compensation should be negotiated.
- The Commonwealth should support the rights of Tribal governments to proceed in state and federal court *pro se* (on one's own behalf). Tribal governments and their agencies are distinct from corporations, partnerships, or unincorporated associations. Government representatives or agencies act with political authority to represent the interests of the Tribal membership and these representatives or agencies often challenge fundamental doctrines of federal Indian law. Attorneys, as people invested in the United States legal system, can be inherently biased against authentic representation of Tribal interests.⁴³
- Treaty law is the supreme law of the land superseding state law, including but not limited to the right to hunt, fish, and gather in the usual places, and the right to water access untaxed and unimpeded. It is incumbent on the state to uphold these treaty rights across its internal policies.⁴⁴

These concerns of Tribal rights being upheld by state policy, if unmet, could potentially bring about costly legal challenges directly to the state of Massachusetts. Continued violations of treaty rights constitute violations of human rights, federal, and international law. While the state of Massachusetts is bound by federal law, the United States has yet to ratify the United Nation Declaration on Human Rights, making these rights non-binding in the U.S. However, in an increasingly interconnected world of lending and finance of global capital, such violations could potentially be cause for enacting sanctions from lending institutions in nations that do abide by international law (such as Germany, Switzerland, France for example). Continued violations at a federal level could call to question jurisdictional authority

⁴⁰ <https://www.nationalgeographic.com/environment/article/can-indigenous-land-stewardship-protect-biodiversity>

⁴¹ <https://www.justice.gov/enrd/timeline-event/congress-passes-first-indian-trade-and-intercourse-act>

⁴² https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf

⁴³ <https://people.umass.edu/derrico/shoshone/index.html>

⁴⁴ <https://memory.loc.gov/cgi-bin/ampage?collid=llsl&fileName=008/llsl008.db&recNum=129>

SECTION 3. CONSERVATION AND COMMUNITIES

of the state (*see, for example, McGirt vs Oklahoma*⁴⁵).

The opportunity for the state to move forward in true collaboration with Tribal governments could potentially create bold new approaches for stewardship and management of land and resources that could benefit all people of the state. Tribal people want a quality of life that that people of any race, creed or color would enjoy and benefit from.

Recommendations:

There are several areas of concern for Tribal rights being consistently ignored in connection to the environment and our ability to act as environmental stewards. Many occur from local and town authorities enacting local ordinances, such as:

- Limiting or taxing access to water by means of resident only access, tolls or paid parking permits;
- Lack of acceptance of tribal ID as valid proof of the right to hunt, fish, and gather; and
- The adverse impacts of deforestation, habitat loss, and water pollution on the ability to exercise Tribal rights to hunt, fish, and gather, often as a result of over development.
- Rivers and streams running dry due to excessive water withdrawals for residential and industrial development, especially during drought conditions, also impinges on protected Tribal rights of access to cultural resources such as fish and shellfish harvesting.

The state of Massachusetts should take proactive measures to ensure that it is meeting the obligations to Tribal people and Tribal governments, both as an independent actor and ensuring that there is continuity in regard to local governments under its jurisdiction.

Resources/Contact Information:

- Hartman Deetz, Mashpee Coalition for Indigenous Action, hartman.deetz429@gmail.com
- Jean-Luc Pierite, North American Indian Center of Boston, jeanlucpierite@gmail.com

⁴⁵ <https://www.pbs.org/newshour/nation/supreme-court-could-limit-a-2020-oklahoma-indian-land-decision>

PARKS AND PUBLIC ACCESS

Key takeaways: Public open space and access to natural areas are critical for public health and the \$16 billion annual outdoor economy.⁴⁶ Massachusetts has fallen inexplicably behind in meeting this demand, amplified exponentially by the pandemic. As Massachusetts continues to recover, expanding access to and improving the quality of public parks and waterways, pedestrian and bike trails, and other opportunities for people to experience nature and waterways as part of their daily lives must be a priority along with improvements in transportation, climate readiness, and economic development actions.

Summary: Access to parks, natural areas, and water features is an important factor for healthy living in urban, suburban, and rural communities alike. New residents and businesses are attracted to places with high quality outdoor recreation opportunities. Time spent outdoors improves mental and physical health in increasingly quantified ways. Outdoor exercise and simply time spent in nature and around greenery and water reduces anxiety, stress, and aggression. It is associated with greater happiness and well-being, reduces mortality, and improves cognitive and motor development in children, immune function, and even eyesight. Parks and natural areas can also serve important co-benefits like increasing the state’s resilience to extreme heat and flooding and improving air quality for residents. Outdoor recreation is also a significant driver of the Massachusetts economy, with \$10.5 billion annually in added value to the state’s GDP, directly supporting 114,000 jobs, and \$5.5 billion in wages and salaries.⁴⁷

Across the state, Massachusetts has a wealth of outdoor recreational opportunities in all seasons that go hand-in-hand with the Commonwealth’s commitment to protecting natural resources and preserving special places. Yet many residents and visitors do not know about the opportunities available to them nor the beautiful places they have yet to discover throughout the state. And not enough residents are able to access parks and nature to reap the benefits of time spent outside. In Massachusetts, 94% of People of Color live in areas that are nature-deprived, compared to 14% of White people.⁴⁸ Parks serving majority non-White neighborhoods are disproportionately smaller and more crowded. Access to natural spaces and clean waterways, even when they are nearby, is often impeded by physical barriers and safety issues.

Parks, trails, waterways, and open spaces saw unprecedented use during the pandemic (see [Covid Silver Lining](#)). State parks alone saw a doubling of traffic according to EEA’s COVID-19 Community Mobility Report. The Department of Conservation and Recreation provides the largest base for parks and access but has been sorely underfunded for more than a decade. The recent [Department of Conservation and Recreation Special Commission Report](#) found that “relative to its population, income, and total government spending, Massachusetts’ local and state investments in parks and recreation are at or near the bottom of all states.”⁴⁹

⁴⁶ U.S. Department of Commerce Bureau of Economic Analysis Outdoor Recreation Satellite Account 2019 report. See <https://www.bea.gov/sites/default/files/2020-11/orsa1120-State.xlsx>, Combined value added and wages.

⁴⁷ U.S. Department of Commerce Bureau of Economic Analysis Outdoor Recreation Satellite Account 2019 report. See <https://www.bea.gov/sites/default/files/2020-11/orsa1120-State.xlsx>.

⁴⁸ Center for American Progress. The Nature Gap. July 2021. See <https://www.americanprogress.org/article/the-nature-gap/>

⁴⁹ DCR Special Commission Report. See <https://www.mass.gov/doc/umdi-dcr-special-commission-report/download>

SECTION 3. CONSERVATION AND COMMUNITIES

People enjoy going outside. It is good for health and the economy. Now is the time to seize the opportunity of tremendous public health benefits that can be ingrained in the regular habits of more residents than ever, be it walking, biking, camping, or hunting in forests and parks, and fishing, swimming, kayaking, and canoeing in the state's waters.

Recommendations:

- Invest in connectivity and access for all residents to quality parks, waterways, and natural areas, including trails and pathways. For example, make sure every Massachusetts resident can access a high-quality open space within a 10-minute walk. Continue the MasTrails program, including the successful collaboration between the Department of Conservation and Recreation and the Massachusetts Department of Transportation for both planning and construction grants to municipalities and NGOs.
- Establish an Office of Outdoor Recreation (OREC). A new OREC, as proposed in *An Act establishing the Office of Outdoor Recreation (S.560)*, would be housed in EEA and several agencies would be tasked with coordinating with each other as well as municipalities, recreation businesses, sportsmen and women, land trusts, and watershed groups to support, promote and market outdoor recreational activities available throughout the state. The office would stimulate economic development, travel and tourism, and improve the quality of life, health, and well-being of residents and visitors to the Commonwealth, especially Environmental Justice populations. So far, 17 states have allocated staff and resources to create an office of outdoor recreation, including Maine, Maryland, New Hampshire, and Vermont.
- Fund parks and trails with a \$10 million increase each year to the Department of Conservation and Recreation and implement an environmental bond that provides \$50 million for Land Protection Grant Programs, \$40 million for MasTrails grants to municipalities, and \$100 million for urban parks and trails. Eliminate Retained Revenue as a mechanism to fund day-to-day DCR operations to keep the agency focused on service instead of being driven by ways to increase revenue. Decrease DCR's reliance on long-term seasonal employees by converting some seasonals to full-time employees to retain continuity and growth in skills and knowledge.
- Focus investments and interagency activities on projects and programs that will improve access to high quality open space and clean waterways for BIPOC communities, including improving safety through enforcement and by removing dangerous or physical barriers. Implement a "prescription for nature" program through interagency and community health center collaborations.
- Use American Rescue Plan Act (ARPA) and federal infrastructure bill funds to begin eliminating DCR's \$1.0 billion deferred maintenance backlog, putting people to work for parks that continue to be a critical asset for health as we recover from the pandemic. Between these two federal programs, Massachusetts will have more than \$10 billion in federal money coming in for use across a broad spectrum of needs.

Resources/Contact Information:

- Heather Clish, Appalachian Mountain Club, hclish@outdoors.org
- Linda Orel, The Trustees, lorel@thetrustees.org
- Doug Pizzi, Mass Conservation Voters, doug@massconservationvoters.com
- Deanna Moran, Conservation Law Foundation, dmoran@clf.org

WORKING LANDS: FARMS AND FORESTS

Key takeaways:

- Working lands (farms and forests) are an integral part of the state’s comprehensive climate strategy. We cannot meet the states’ climate goals unless we protect existing natural and working lands from conversion to developed land and sustainably manage them.
- Farms and forests cover millions of acres of land in Massachusetts (490,000 and 3.24 million acres, respectively), playing essential roles in communities. Opportunities abound for the state to increase investment in conservation and to support management practices that protect and restore natural resources for both urban and rural communities.

Summary: Massachusetts’ working farms and forests support local economies, provide local food, wood, and other products, sequester and store carbon, provide habitat, and support ecosystem services like clean air and water.⁵⁰ These lands are predominantly owned and operated by small family landowners.

Farms and forests across the state are increasingly stewarded with practices that protect and enhance natural resources, contribute to climate change mitigation, and support a secure food system. For example:

- Farms are adopting practices that build organic matter (soil carbon) and soil health, such as using cover crops, applying compost and reducing tillage. Such measures improve resistance to erosion, water infiltration and water holding capacity, in addition to pulling carbon out of the atmosphere.
- Programs like the [Forest Stewardship Program](#) help private landowners work with professional foresters to create long term management plans and carry out planned activities. A number of “climate-smart” forest management practices have been identified that can make forests more resilient to climate change and safeguard the carbon they store.⁵¹

Thousands of acres of permanent forest loss each year in Massachusetts emits 1.3 million metric tons of CO₂ equivalent to the atmosphere as carbon emissions and foregone sequestration over the subsequent 40 years⁵² – we cannot afford to keep losing the best tool for removing carbon pollution from the air. Please see the “[Natural Climate Solutions](#)” (page 63) section and the “[Agriculture and Food Systems](#)” (page 42) section for more on this issue.

Despite the importance of working lands, they are rapidly being lost to development.

- Between 2001-2016, 14,300 acres of Massachusetts’ farmland was converted to urban and highly developed use, while 12,800 acres were considered threatened by low-density residential development,⁵³ and from 2012-2017, 30,000 acres of forest were lost.⁵⁴

⁵⁰ See key statistics from the state re [farms](#) and [forests](#)

⁵¹ For examples, see [Healthy Forests for Our Future](#) or this [Combined List of Carbon and Adaptation Practices](#)

⁵² <https://www.nature.org/content/dam/tnc/nature/en/photos/Avoided-Deforestation-Report-NE-NY.pdf>

⁵³ <https://farmlandinfo.org/statistics/massachusetts-statistics/>

⁵⁴ https://www.massaudubon.org/content/download/41477/1007612/file/Losing-Ground-VI_2020_final.pdf

SECTION 3. CONSERVATION AND COMMUNITIES

- Recently, industrial-scale solar development has put increased pressure on forest and agricultural lands. A [3-year study](#) is underway at UMass Amherst to determine the potential impact of co-location of solar arrays atop active agricultural lands.
- Farmland prices in Massachusetts are the third highest in the nation (at \$13,700),⁵⁵ causing inequitable access, with state programs exacerbating this by favoring large landowners. According to a [2018 report](#) by the National Young Farmers Coalition, the biggest issue facing young, beginning, Black, Indigenous, and Other Farmers of Color in the U.S. is access to land tenure.
- One in three forest landowners in Massachusetts is 65 or older.⁵⁶ Landowners need assistance with succession planning to ensure their land is properly stewarded in the future, and not converted to other uses against their wishes.
- Climate change is amplifying threats to forests and farms, including more frequent extreme weather events (droughts and floods), pest and disease outbreaks, and invasive species. Left unchecked, these threats will diminish forest and farms capacity to mitigate climate change, bounce back from disturbances, support biodiversity, and provide the services and goods on which society depends.

The state has developed or is in the process of developing a number of plans and programs that should guide future work:

- [MA Local Food Action Plan](#) (2015) - working lands protection and management, farming, processing, and distribution recommendations and goals, including the Farmland Action Plan mentioned below;
- [Farmland Action Plan](#) (expected 2022) - goals and recommendations to increase the pace of farmland protection and improve equitable access to those who wish to farm;
- [2025 and 2030 Clean Energy and Climate Plans](#) (expected summer 2022) - recommendations for natural and working lands, including conservation, management, and development of locally produced, long-lived wood products, such as cross-laminated timber;
- Healthy Soils Action Plan (in approval phase) - roadmap for building economic and ecological resilience through exceptional soil stewardship on all land types, working in tandem with the state's climate resilience goals;
- MA Healthy Soils Program (established by the legislature in 2021) - will be informed by the Healthy Soils Action Plan and will require funding;
- Forest Climate Resilience Program pilot (in development in Western MA since 2019) - would provide additional payments to landowners who choose climate-smart forestry practices and implement them over a 20-year time frame; opportunity to formally launch this program within the Chapter 61 current use program.

Recommendations:

Support funding and program development for recommendations in the plans mentioned above.

Increase resources to protect and manage farm and forest land to be more resilient:

- Develop and implement policies to ensure equitable distribution of resources, including access to land, especially for Black, Indigenous, and People of Color and systematically disadvantaged farmers and aspiring farmers.
- Increase funding for DCR and DFW to protect forest land and for DAR's Agricultural Preservation Restrictions; support more staff at these agencies to provide stewardship support.

⁵⁵ https://www.nass.usda.gov/Publications/Todays_Reports/reports/land0821.pdf

⁵⁶ <https://masswoods.org/legacy>

SECTION 3. CONSERVATION AND COMMUNITIES

- Increase the annual cap on the [Conservation Land Tax Credit](#) Incentive program, which protects forest land and farmland at a fraction of its actual cost.
- Support an amendment to Article 99 of the Massachusetts Constitution to protect smaller farms.
- Increase and adapt active forest management practices to bolster resistance to degradation from and resilience to climate change.
- Allow for more flexible agricultural preservation restrictions to promote farm sustainability activities.
- Maximize deployment of solar power within the more than 1 million acres of land that are already developed or degraded, including rooftops, parking lots, and other low-impact areas with minimal ecosystem service values.

Provide incentives to landowners to improve management of farms and forests for a range of benefits:

- Both forest reserves (areas left to natural processes, without timber harvest) and sustainably managed forests (areas managed by people for a range of values, including timber) are important and appropriate on both private and public forest lands in Massachusetts.
- Incentivize carbon-beneficial forestry practices through existing programs and create new forest programs that pay landowners for the value of carbon in working lands. For example, launch and adequately fund the state's Forest Climate Resilience Program to incentivize landowners to manage their forests using climate-smart practices that help the forest and the planet.
- Incentivize farmers to employ climate smart practices, such as organic farming, no-till practices, and cover crops, in order to maintain healthy soils, increase carbon storage, and maintain clean water.

Support local production of new, long-lived wood products, such as cross-laminated timber (CLT) and wood fiber insulation.

- CLT can support increased affordable housing production, due to its applicability in modular and prefabricated construction systems and advantages in speed of construction compared to steel and concrete. While there is not currently a CLT manufacturer in Massachusetts or New England, developing a local supply chain for the material depends on well-managed working forests.⁵⁷

Resources/Contact Information:

- Winton Pitcoff, MA Food System Collaborative, winton@mafoodsystem.org
- Martin Dagoberto L. Driggs, NOFA/Mass, marty@nofamass.org
- Connor Rockett, New England Forestry Foundation, crockett@newenglandforestry.org
- Linda Orel, The Trustees, lorel@thetrustees.org
- Chelsea Gazillo, American Farmland Trust, cgazillo@farmland.org
- Sam Anderson, Mass Audubon, sanderson@massaudubon.org
- Michelle Manion, Mass Audubon, mmanion@massaudubon.org
- [MA Forest Action Plan](#)
- [MA Local Food Action Plan](#)
- [MA agricultural facts and statistics](#)
- [Avoided Deforestation Report NE and NY](#)
- [Healthy Forests for our Future](#)
- [Farms Under Threat, A New England Perspective](#)

⁵⁷ <https://static1.squarespace.com/static/6077630439e6a51a220d79a0/t/61561a49e63c332ce0f44e42/1633032781507/Mass+Timber+Final+Report+Compressed.pdf>

AGRICULTURE AND FOOD SYSTEMS

Key takeaways: The future of the agricultural economy and the well-being of the population depends upon ensuring that no one goes hungry, food systems are resilient and socially just, food production is environmentally sustainable, and access to healthy, local, and nutrient-dense food is improved and equitable for all groups who have been, and still are, marginalized.

Food supply chain disruptions and skyrocketing food prices make it essential that Massachusetts invest in local agriculture and food distribution systems to offer more consistent prices, affordable local food, and to help reduce Greenhouse Gas Emissions.

Farmers need state investment in agricultural infrastructure, including funds for equipment and land, processing facilities, training, and education. Farmers also need the state to help centralize the recruitment of labor and strategies to encourage worker retention.

Through the implementation of healthy soils practices, agriculture can result in a net improvement in environmental quality. Farmers can play an essential role in climate change mitigation and remediation through soil carbon capture, water filtration and retention, and other natural resource enhancements. Farmers who provide such ecosystem services should be compensated beyond the price of their crop sales.

Summary: *Addressing Food Insecurity Across the Commonwealth* - In 2019, 8.2% of Massachusetts households were food insecure, meaning they did not have dependable access to enough food for active and healthy living, and had difficulty at some time during the year providing enough food for all members of their household. This number surged as a result of the COVID-19 pandemic. As of December 2021, 15.9% of Massachusetts households were food insecure.⁵⁸ Food insecurity disproportionately impacts Black, Indigenous, and People of Color (BIPOC) led households. In 2019, 19.1% of BIPOC households in the state faced food insecurity. This number increased to 21.7% in 2020.⁵⁹

The U.S. Department of Agriculture (USDA) cited that the rate of food insecurity is highest among households with incomes near or below the poverty line. “All households with children and particularly households with children headed by single women or single men; women and men living alone; Black- and Hispanic-headed households; and households in principal cities and nonmetropolitan areas.”⁶⁰ At the same time, many farmers experience a drastic supply chain shift resulting in the loss of markets and income, and waste of fresh surplus foods. The success of Massachusetts farms and effective hunger relief strategies are linked. Massachusetts farms have an important role to play in ensuring food security and access. Fresh, local food reaches cities and rural communities in many ways.

Agriculture in the Commonwealth - The vital role of Massachusetts farms in feeding communities is linked to their important place in the state’s economy.

⁵⁸ <https://www.projectbread.org/hunger-by-the-numbers>

⁵⁹ <https://www.projectbread.org/blog/why-do-recent-headlines-say-no-increase-in-food-insecurity-in-2020>

⁶⁰ <https://www.ers.usda.gov/webdocs/publications/99282/err-275.pdf?v=9606.7>

SECTION 3. CONSERVATION AND COMMUNITIES

- Massachusetts has over 7,200 farms on more than 490,000 acres, occupying just under 10% of all land in the state.⁶¹
- Small farms (agricultural sales below \$250,000, per the USDA) account for 94% of farms in Massachusetts while family or individually owned farms account for nearly 80% of Massachusetts farms.⁶²
- According to the 2017 National Agricultural Statistic Service Census, 413 farms in Massachusetts are owned by BIPOC producers compared to 7,018 farms owned by White producers.⁶⁴
- The agricultural industry in Massachusetts provides over \$7 billion in economic impact, and approximately 36,000 jobs.⁶²

According to a study by the Massachusetts Food Trust, 40% of Massachusetts residents (2.8 million people) live in food insecure areas without access to grocery stores, also known as food deserts, according to USDA.⁶³ These “food deserts” are concentrated in rural areas and low-income urban communities. Food security in Massachusetts is threatened by over-reliance on imported foods, particularly from regions of the world and the nation challenged by climate destabilization and geopolitical disruption.

Producers and workers in agriculture also face financial difficulty in their industry. Farmers in Massachusetts earn just 96 cents for every dollar they spend on production, according to the 2017 USDA Census of Agriculture. The average price of an acre of farmland in Massachusetts is \$13,700 according to the 2021 National Agricultural Statistic Service Land Values Survey. This is a 21.2% increase from the 2020 price. Massachusetts has the third most expensive farmland in the country after Rhode Island and New Jersey.

Conventional agricultural methods rely on inputs of synthetic fertilizers and pesticides, which often results in undeniable negative environmental impacts, including biodiversity loss, decreased soil health and water pollution. Fortunately, healthy soils practices and agroecological methods offer opportunities for agriculture to become a net positive for environmental quality while increasing climate resiliency and profitability.

Massachusetts has a forward thinking [MA Local Food Action Plan](#) to guide policy and investment decisions, and a variety of programs that strengthen food systems and address food insecurity in the Commonwealth. The Healthy Incentives Program has helped 113,000 households access \$32 million of fresh produce from local vendors (as of February 2022).⁶⁴ The Food Security Infrastructure Grant has invested over \$51 million in enabling healthy eating and strong local food systems.⁶⁵ Addressing food insecurity provides substantial economic benefits for the Commonwealth. Hunger and food insecurity in the state increased health-related expenditures by a minimum of \$2.4 billion in 2016 alone.⁶⁶ Nationally, nonprofit groups estimate that hunger costs the United States over \$160 billion each year in poor health outcomes, chronic disease, and lost productivity.⁶⁷

⁶¹ <https://www.mass.gov/info-details/agricultural-resources-facts-and-statistics>

⁶² <https://www.farmcrediteast.com/knowledge-exchange/Reports/2020%20Northeast%20Economic%20Engine>

⁶³ <https://mapublichealth.org/priorities/access-to-healthy-affordable-food/ma-food-trust-program/>

⁶⁴ <https://www.mass.gov/doc/healthy-incentives-program-fact-sheet-august-2020-pdf/download>

⁶⁵ <https://www.mass.gov/news/baker-polito-administration-awards-over-132-million-to-support-food-security-in-massachusetts>

⁶⁶ <https://www.macostofhunger.org/>

⁶⁷ <https://mcgovern.house.gov/news/documentsingle.aspx?DocumentID=398766>

SECTION 3. CONSERVATION AND COMMUNITIES

Numerous programs have been implemented to help farmers produce more food in Massachusetts. The Agricultural Preservation Restriction (APR) program, one of the first in the nation, offers to pay farmers meeting certain criteria the difference between fair market value of their land and the agricultural value of the farms in exchange for a deed restriction which ensures that the land remains in farming. Since its inception 40 years ago, APR has protected more than 73,000 acres on over 930 farms.⁶⁸ Full funding and support will allow this program to continue expanding on its aim of protecting vital agricultural land the Commonwealth needs to supply local, fresh products.

The pending [2022 Farmland Action Plan](#) will develop state-level goals and recommendations for increasing farmland protection, farmland access, food security, and the long-term economic and environmental viability of farms across all regions of the state. Future investments and policies should be shaped by this Plan, as well as recommendations in the [MA Local Food Action Plan](#).

Healthy Soils Practices and agroecological methods of food production offer ways for farmers to improve soil health and water quality, sequester atmospheric carbon in the soil, increase profits, and improve food security and climate resilience. The forthcoming Healthy Soils Action Plan (EEA) will provide a roadmap for policy makers in scaling out such practices, and the recently established Massachusetts Healthy Soils Program (under the Commission for Conservation of Soil, Water and Related Resources) provides a vehicle for a coordinated statewide effort.

Recommendations:

The [MA Local Food Action Plan](#) details many of the recommendations below.

- Add a cabinet-level position to coordinate food system planning and development, connect the work of multiple agencies, ensure that interventions are effective and efficient, and support agencies in taking a systemic approach to food by considering the economic, environmental, and cultural impacts of their decisions related to food system programs, regulations, and funding.
- Support enhanced funding and flexibility for nutrition and food assistance programs, especially those connecting recipients with locally grown food, including the Healthy Incentive Program.
- Support partnerships that link farm markets, farms, hunger relief programs, and consumers, and strengthen direct access to regional food distribution centers for producers and consumers.
- Increase support provided to local food system businesses and residents through UMass Extension programs by significantly increasing its budget, re-instituting producer training programming, expanding producer and consumer education, and elevating Cooperative Extension's importance in the University's mandate.
- Bolster the Agricultural Preservation Restriction program, allocating funding to enable program expansion and act on recommendations from the Farmland Action Plan.
- Support food and nutrition education in public school curriculums.
- Continue funding the Food Security Infrastructure Grant program, which provides essential capital support for all food system sectors.
- Invest in Local Food System Hubs, especially in rural food deserts, where co-ops, food system business incubators, local farms CSAs, and food system education and training programs can work together to educate and train farm and food system workers, while also selling farm products and CSA memberships, as well as value-added farm-to-table products produced by incubator local businesses.

⁶⁸ <https://www.mass.gov/doc/apr-program-guide-0/download>

SECTION 3. CONSERVATION AND COMMUNITIES

- Help farmers implement climate-smart, ecological agriculture by providing incentives and technical assistance for soil and water conservation, climate resilient healthy soils practices and the reduction of fossil fuel-based inputs, including pesticides and synthetic fertilizers.
- Agriculture and food production considerations should be a factor in all transportation, housing, environmental, and other planning efforts.
- Prioritize investments which support direct marketing, where the food chain is shorter, and farmers can command a fair price for their products.
- Explore compensating farmers for the ecosystem services they provide, such as carbon sequestration, water filtration and retention, and wildlife habitat creation and protection.⁶⁹
- Support regular updates to the 2015 MA Local Food Action Plan, to allow goals and recommendations to better reflect the changing landscape and better inform policy.

Resources/Contact Information:

- Martin Dagoberto L. Driggs, NOFA/Mass, marty@nofamass.org
- Linda Orel, The Trustees, lorel@thetrustees.org
- Winton Pitcoff, MA Food System Collaborative, winton@mafoodsystem.org
- Chelsea Gazillo, American Farmland Trust, cgazillo@farmland.org

⁶⁹Note: The Vermont legislature has assembled a "Soil Conservation Practice and Payment for Ecosystem Services Working Group" to explore such incentives, with [preliminary reports available](#).

URBAN AGRICULTURE

Key takeaways:

- Urban agriculture provides a wide range of economic, environmental, and community health benefits by revitalizing spaces and creating sustainable, local food systems.
- The needs of urban farmers overlap with larger scale farms in some respects, but differ in other key areas, including average parcel size, remediation needs, infrastructure challenges, ownership, and variety of crops raised.
- Increased educational opportunities and technical assistance for urban growers through the MA Department of Agricultural Resources and UMass Extension are critical to the success of urban agriculture programs.

Summary: Urban agriculture refers to a range of activities including growing, cultivating, processing, marketing, and distributing food that is produced sustainably in urban areas for commercial purposes. Urban agriculture offers exceptional opportunities for creating jobs, improving neighborhoods, building community, providing healthy, culturally appropriate food to local markets, and absorbing stormwater and heat. Entrepreneurs and community organizers are transforming empty or blighted properties into profitable farms, addressing social and environmental challenges in the process. The Massachusetts Department of Agricultural Resources (MDAR) needs to improve policies and increase state investments in urban farms - needed to leverage additional investments, facilitate local efforts, and ensure success of this growing movement. Massachusetts should be a national leader in urban agriculture to strengthen communities, combat food insecurity, revitalize urban neighborhoods and create climate resilient landscapes. Urban farms provide the following benefits:

Economic Opportunities

- Create new jobs, training, and business opportunities.
- Market goods directly to nearby consumers, markets, and restaurants, enabling viable farm businesses with potentially higher profits.
- Produce a higher quality product delivered fresher and faster, with shorter distribution links and smaller inventories, while creating high quality market goods for local consumers and businesses.
- Keep consumers' money within their communities, stimulating local economic growth and fostering increased food security. Revitalize neighborhoods and improve quality of life.

Health and Wellbeing

- Generate hands-on experiences for school children, families and local groups, building self-esteem and leadership skills.
- Produce nutritious food to combat hunger, diabetes, heart disease, and obesity while creating avenues for community involvement.
- Foster outdoor exercise, improving physical, mental, and emotional wellbeing.
- Provide education in nutrition, wellness, and sustainable food production.
- Contribute healthy foods to schools, hospitals, shelters, and food pantries.

Environmental

- Transform and revitalize abandoned and blighted properties.
- Build green infrastructure that filters and absorbs stormwater, improves surface water quality, and reduces heat island effects, which are expected to get worse with climate change.
- Create wildlife, bird, and invertebrate habitat, including for pollinators.

SECTION 3. CONSERVATION AND COMMUNITIES

- Decrease carbon emissions by reducing food transport over long distances.
- Increased vegetative and soil carbon sequestration from urban gardens can support the Natural and Working Lands mandate by helping the state meet its emissions reduction targets under the Next Generation Climate Roadmap.

Unemployment and poverty levels remain high in the Commonwealth's 55 cities. For example, in Boston, 1 out of 5 families live below the poverty line. Experience in Boston has shown that three acres in production could support a dozen new green jobs. In late 2021, nearly 16 percent of Massachusetts households were food insecure, a rate that has doubled because of the pandemic.

Massachusetts is poised to be a national leader in urban agriculture. Mayors, entrepreneurs, and nonprofit groups focused on city farming, community revitalization, children's health, and urban parks stand ready to leverage state investments in urban farming projects to the benefit of both public and private stakeholders. Several Massachusetts cities and towns have recently passed ordinances that provide a framework for urban farm operations. State leadership will be needed to help in:

- Identifying municipal and state-owned public lands and making appropriate lands available through long-term leases.
- Providing farmers with the capacity to deal with absentee owners and gain clear title or legal rights to acquire derelict parcels and helping with environmental testing and soil remediation.
- Helping farmers bring urban agriculture to scale by providing low interest loans, grants, and incentives for infrastructure including irrigation and rainwater management systems, greenhouses, and composting.
- Marketing produce locally to consumers and helping farmers connect to local markets, grocery stores, and restaurants.
- Provide educational opportunities and technical assistance for urban farmers.
- Create state incentives for municipalities to increase their capacity to support urban agriculture and enact local ordinances to encourage urban farming.

Recommendations: Implement recommendations in the [MA Local Food Action Plan](#) and pending [2022 Farmland Action Plan](#), many of which are detailed below.

- Increase visibility of urban farming and help cities develop local distribution networks, while offering tax incentives to privately owned institutions that make land available for urban farming.
- Invest in MDAR's Urban Agriculture Program by increasing incentives, loans, and grants in urban agriculture, along with technical support to help with business management, marketing and farming skills. Cities would benefit from resources to help make local policy and permitting more friendly to urban agriculture projects.
- Reduce the state requirement that agricultural land must be more than 5 acres to benefit from state farmland programs, as many urban parcels are under 5 acres.
- Take steps to ensure the long-term sustainability of the Healthy Incentives Program (HIP). HIP doubles SNAP recipients' purchases at farm stands, farmers markets, mobile markets, and CSAs, improving health outcomes for some of the Commonwealth's most vulnerable residents and increasing sales for local farms.
- Provide special focus to Environmental Justice communities, where food insecurity is often high, as urban farming can simultaneously address health and environmental disparities.
- Incentivize municipalities to make publicly owned vacant land available for agriculture.

SECTION 3. CONSERVATION AND COMMUNITIES

- Streamline DEP's assessment and remediation of contaminated soil on land used for urban farming.
- Support funding for Urban Ag staff at MA Department of Agricultural Resources and UMass Extension.

Resources/Contact Information:

- Linda Orel, The Trustees, lorel@thetrustees.org
- Winton Pitcoff, MA Food System Collaborative, winton@mafoodsystem.org
- Chelsea Gazillo, American Farmland Trust, cgazillo@farmland.org

MASSACHUSETTS OCEAN AND COASTAL MANAGEMENT

Key takeaways:

- All major projects in and transiting through state ocean waters must be consistent with the Massachusetts Ocean Management Plan. Major projects anticipated include transmission cables from offshore wind energy development.
- Coasts are under threat from development and climate change impacts including accelerated sea level rise, frequent tidal flooding, and increased storm surge. Efforts to build resiliency for coastal communities should rely on nature-based solutions.
- The North Atlantic right whale, one of Massachusetts' most iconic species, is critically endangered with less than 340 animals left on the planet. The main threats to right whales are ship strikes and entanglement in fishing gear. Mandatory vessel speed restrictions can reduce the incidence and severity of vessels strikes while "on-demand" fishing systems used by the lobster fishery can minimize the risk of right whale entanglement and protect the livelihood of U.S. lobstermen.

Summary: Massachusetts' 1,500-mile coastline and its coastal and ocean waters are a vital part of the Bay State's history, character, economy, and ecosystems. State ocean waters and indeed ocean waters around the world are at unprecedented risk due to climate change and biodiversity loss. The Massachusetts Ocean Management Plan (Plan) protects critical marine habitat and species and important water-dependent uses and provides a management framework for ocean-based projects in Massachusetts ocean waters. Updated every five years, the 3rd edition of the Plan, issued in January 2022, contains maps of special, sensitive, or unique resources and water-dependent uses, siting and management standards, an assessment of the status and trends in ocean conditions, and a science framework to ensure progress on key ocean management priorities over the next five years. With a gubernatorial-appointed Ocean Advisory Commission and EEA-appointed Scientific Advisory Council, recent work to update the plan focused on ocean habitat, fisheries, transportation and navigation, sediment and geology, cultural heritage and recreational uses, and energy and infrastructure.

As climate change impacts worsen, coasts around the state are losing ground, fenced in by development with no other lands to accommodate retreat. Ecologically critical habitats are increasingly at risk including salt marshes, which provide food and habitat for more than 75 percent of fish species, supporting a critical economic sector for Massachusetts. Protection and restoration efforts are needed to ensure that the state can continue to reap the many benefits of healthy coasts and to enhance fisheries and aquaculture.

The endangered North Atlantic right whale, one of Massachusetts' most iconic species and a critical part of the ocean ecosystem, is in peril. U.S. and Canadian ship strikes and entanglement in fishing gear are the main causes of right whale deaths. Vessel speed restrictions and new ropeless or "on-demand" fishing gear technology, currently being piloted by some Massachusetts and other fishermen, offers solutions to save the right whale and maintain lobster fishing as a way of life.

Coasts face a variety of threats. In addition to poorly planned development and climate change impacts, pollution from runoff and effluents is also a threat, degrading near shore water quality and exacerbating problems like ocean acidification. Massachusetts needs to improve permitting for nature-based coastal restoration projects by developing consistent thresholds, improving interagency coordination, and better supporting pilot projects with grants for technical assistance and monitoring. Investing in coastal wetland conservation and restoration has important climate adaptation, resilience, and mitigation

SECTION 3. CONSERVATION AND COMMUNITIES

benefits. In Hingham and Quincy, for example, salt marsh restoration projects have increased carbon storage at a rate equivalent to avoiding the combustion of over 22,000 gallons of gasoline per year⁷⁰. Coastal natural lands can play a critical part in meeting the goals of the Next Generation Climate Roadmap law.

A large majority of the North Atlantic right whale population spends several months of the year in Massachusetts waters, and some part of the population remains in waters to our south year-round. With fewer than 340 individuals left on the planet, and the species' status recently downgraded from endangered to critically endangered, they are one step away from extinction. Mandatory vessel speed restrictions in areas frequented by right whales can reduce the incidence and severity of vessels strikes, while "on-demand" fishing systems used by the lobster fishery can minimize the risk of right whale entanglement and protect the livelihood of U.S. lobstermen. These systems release a buoy and a line, or a lift bag and trap, to the water's surface when its owner sends a signal from a nearby fishing vessel, eliminating the need for static vertical lines in the water column.

Recommendations:

- Support passage of legislation to create a statewide program to buy property and then demolish homes and other buildings at risk of flooding; and to permanently conserve and restore the land to create publicly accessible open space and a natural buffer against future storms and floods.
- Streamline permitting of projects designed to protect and restore coastal wetlands, especially salt marsh remediation. To tackle climate resiliency, stakeholders need predictable permitting pathways and permitting pathways that are applied consistently throughout the state.
- Pursue coastal resilience through nature-based solutions, including the conservation and restoration of wetlands, as opposed to expensive, harmful coastal hardening strategies. Green infrastructure, including waterfront parks, mitigates storm surge and flooding, protects coastal property, and creates outdoor recreation opportunities—sustainable and affordable benefits not brought by 'gray' concrete infrastructure.
- Ensure equity in building coastal resilience, prioritizing vulnerable communities like the Environmental Justice communities in East Boston, Fall River, New Bedford, and elsewhere.
- Implement the recommendations of the MA Shellfish Initiative Strategic Plan.⁷¹
- To reduce the risk of entanglements in fishing gear, support and advance the transition to on-demand fishing systems. This would increase fishing opportunities for Massachusetts fishermen during several months of the year when lobster and gillnet fishing with vertical buoy lines is prohibited. In addition, because the leading manufacturer of this new technology is a Massachusetts-based company, it would create additional manufacturing jobs in the region.
- To reduce the risk of vessel strikes, expand the current vessel speed restrictions, implemented by Massachusetts Department of Marine Fisheries under 322 Mass. Reg. 12.05, that currently require vessels to go 10 knots or less in the Cape Cod Bay between March 1 and April 30, to all state waters between Jan 1 and June 1.
- Support the national and global commitment to protecting at least 30% of U.S. lands and waters by 2030 to build the ocean's resilience to climate change and protect biodiversity.

⁷⁰ <https://www.mass.gov/files/documents/2016/08/ob/eco-services-full-ma-der.pdf>

⁷¹ www.massshellfishinitiative.org/uploads/1/0/4/9/104987295/report_on_msi_strategic_plan_4.23.21_.pdf

SECTION 3. CONSERVATION AND COMMUNITIES

Resources/Contact Information:

- Jack Clarke, representing the Metropolitan Area Planning Council, jclarkegoodharbor@gmail.com
- Linda Orel, The Trustees, lorel@thetrustees.org
- Priscilla Brooks, Conservation Law Foundation, pbrooks@clf.org

CLEAN ENERGY

Summary: Clean energy is a vital piece of the Commonwealth’s economy, future, and energy independence. Massachusetts has led the way in the push for renewable generation and will soon be home to the first major offshore wind farm in the country. The clean energy industry has produced incredible results for the Commonwealth, with over 105,000 clean energy workers at the end of 2021, a small dip from historic numbers because of the COVID-19 pandemic. Clean energy is helping to power the economy more with each passing year. However, Massachusetts has only scratched the surface of what is possible. Our energy future will involve the rapid electrification of the transportation, building, and industrial sectors. We must continue to embrace renewables and unlock the barriers that hold the Commonwealth back from a carbon-free energy system.

The Global Warming Solutions Act (GWSA) required reductions in greenhouse gas emissions of 25% by 2020 and 80% by 2050 below 1990 levels. The Climate Act passed in 2021 made a number of critical updates to the Global Warming Solutions Act, updating the 2050 limit to net zero, implementing interim benchmarks for 2030 and 2040, requiring emission reduction targets for six specific sectors of the economy, and codifying Environmental Justice language into law. While a momentous achievement, the Commonwealth must not rest on its laurels if it is to achieve these ambitious milestones. This section briefly outlines key clean energy issues and provides recommendations for future action.

Strengthen Massachusetts National Leadership on Energy Efficiency: Investments in energy efficiency (EE) are beneficial for the ratepayers and the Commonwealth. EE has been one of the largest contributors to achieving the 2020 GHG reduction target, by cutting energy use and the pollution emitted by traditional power generators. But the programs have not provided access to all ratepayers equally. With the approval of the recent Three-Year Energy Efficiency Plan, Massachusetts will be investing almost \$4 billion in energy efficiency to achieve \$9 billion in benefits to ratepayers and a reduction of 845,000 tons of greenhouse gas emissions. The incoming administration must provide full support for expanding the Commonwealth’s energy efficiency programs to ensure that everyone has access to measures to save energy and make buildings healthier and more comfortable.

Increase Clean and Renewable Energy in Massachusetts and New England: The cost of renewable energy is dropping quickly. However, we still need to promote state policies to accelerate development of more renewable energy sources, such as solar, offshore wind, and geothermal, in order to meet the Global Warming Solutions Act net zero requirements and have a chance at mitigating the worst effects of climate change. Any incoming administration needs to make the rapid, sustainable, and responsible development of new renewables a top priority. Increasing the Renewable Portfolio Standard (RPS) and Clean Energy Standard (CES), significantly increasing offshore wind procurements, setting higher solar and storage targets, and providing better support to municipal aggregation must be top priorities for any incoming administration.

Additionally, the Commonwealth’s “renewable” energy definitions are in some places over a decade old, and need to be re-calibrated to ensure that renewable incentive money funds only resources with a climate benefit. Woody biomass and municipal solid waste combustion (i.e., burning trees and garbage) must be removed from the definition of renewables.

SECTION 4. CLIMATE CHANGE

Overhaul the Electric Grid and Utility Regulation: The way we get electricity is outdated and is increasingly a roadblock to achieving clean energy goals. The system is structured to reward utilities richly for building new infrastructure projects, which makes it harder to implement cheaper and cleaner local solutions, integrate customer-owned solar, develop smart charging strategies for electric vehicles, and take energy efficiency programs to the next level. Massachusetts desperately needs leadership from the governor's office to help change both how utility planning is done and how utilities are compensated. Leadership is needed to improve the process on these issues, with clear deadlines and improved stakeholder input, and to facilitate the transformation that the energy system needs. An independent DPU should also work to align utility compensation and financial incentives with delivery of the services that we demand of a modern utility, such as reliability, energy efficiency, minimizing the cost of the grid, integrating distributed renewables, and providing choices, opportunities, and control to consumers.

No New Fossil Fuel Transmission Infrastructure: Energy efficiency and renewable resources are significantly lowering future peak demand and annual electric energy needs. Continuing to push for the development of these clean sources of energy needs to be a priority over the construction of major new infrastructure to deliver fossil fuels to Massachusetts. The natural gas industry is looking for ways to have electric ratepayers fund new gas transmission pipelines. The courts have said that this is unlawful. Massachusetts needs its governor committed to upholding the law and forging a path forward with new clean power rather than new pipelines. Massachusetts also needs a strong administration to stand up for its climate goals at ISO-NE, and demand that the reforms the states suggested in the Governors' Energy Vision process get implemented. Consumer voices should be heard at ISO-NE, and fossil fuels should no longer receive special treatment and financial support that disadvantage renewables.

Recommendations:

- Support and expand access to energy efficiency delivery programs.
- Increase the amount of renewable energy available to customers by strengthening the RPS/CES.
- Provide greater state support for municipal aggregations that include more Class I renewable energy than required by the RPS/CES.
- Expand offshore wind procurements and address regional transmission.
- Set higher solar and storage targets.
- Remove biomass and municipal solid waste from the RPS.
- Reform utility planning and financial incentives.
- Prevent the construction of new fossil fuel transmission infrastructure in Massachusetts.
- Reform programs that incentivize and procure renewable energy to optimize the rapid deployment of energy sources and avoid, minimize or, as a last resort, mitigate the negative impacts of the lifecycle of renewable energy and its transmission on ecosystems, biodiversity, and people.
- Insist that ISO-NE reform its markets, transmission development, and governance structure to account for state climate priorities and accountability to consumers.
- Explore using existing and possibly new transmission resources in a bi-directional method to employ existing Canadian hydropower as a form of pumped storage and exclude additional buildout of hydroelectric impoundment dams in Canada, and elsewhere, from eligibility in procurements and other clean energy policies.

SECTION 4. CLIMATE CHANGE

Resources/Contact Information:

- Kyle Murray, Acadia Center, kmurray@acadiacenter.org
- Caitlin Peale Sloan, Conservation Law Foundation, cpeale@clf.org
- Steve Long, The Nature Conservancy in Massachusetts, slong@tnc.org
- Heather Clish, Appalachian Mountain Club, hclish@outdoors.org
- Larry Chretien, Green Energy Consumers Alliance, larry@greenenergyconsumers.org
- Heidi Ricci, Mass Audubon, hricci@massaudubon.org

BUILDINGS

Summary: Buildings account for approximately 44% of total statewide greenhouse gas emissions when we factor in electricity and on-site combustion of fossil fuels. Approximately 77% of the emissions from buildings are the direct result of on-site combustion of fossil fuels, primarily for space heating, water heating, and cooking. To achieve the Commonwealth’s ambitious goal of net zero emissions, we must rapidly shift to constructing only all-electric new buildings, as designing new buildings to be hyper efficient and electrified is both more cost effective and less technically challenging than retrofitting existing buildings. These new buildings should also utilize techniques to reduce embodied carbon emissions. However, given that about 81% of the buildings that will be standing in 2050 have already been built, the incoming administration must also make large-scale investments in programs to retrofit, weatherize, and replace fossil fuel end use equipment in existing buildings. This includes implementing a statewide building performance standard (such as in [Washington State](#) and [Colorado](#)). Electrification and weatherization of buildings will substantially reduce emissions now and set these buildings on a course to achieving carbon neutrality as the grid transitions to 100% carbon-free sources of electricity generation over the coming years, delivering healthy homes and job creation to the Commonwealth as we recover from impacts of COVID-19.

High performance buildings free from fossil fuels can generate myriad public health, safety, wellness, and resilience benefits and result in operational cost savings. Without strong protections, however, there are risks of unintended consequences from displacement of Environmental Justice populations and overburdening of residences with fees. Old buildings and homes have a number of unique challenges that make them difficult to weatherize with existing funding, especially for low-moderate income residents.

Rapidly Expand Weatherization and Whole-Home Electrification: The interim Clean Energy and Climate Plan (CECP) set an ambitious goal of installing residential 1,000,000 heat pumps in Massachusetts by 2030, and MAPC estimates that two million buildings statewide will need to undertake deep energy retrofits and electrification to meet the Commonwealth’s net zero climate goals. That pace is more than eight times faster than what energy efficiency programs have previously installed. Unfortunately, the Commonwealth is currently lagging far behind on this goal. The incoming governor must prioritize ramping up these programs and the jobs that this level of transition will create. These heat pumps must be accompanied by pre-weatherization and weatherization, as preventing air leaks can unlock the true potential of heat pumps. Acadia Center analysis has shown that whole-home electrification paired with weatherization can cut energy bills in half while reducing emissions by 78%. But, given the upfront costs of pre-weatherization, weatherization, and whole-home electrification, Massachusetts must develop a dedicated funding source to enable the transition and ensure that ratepayers are not on the hook for these costs. Additionally, these services need to be delivered in a plug-and-play package from a scaled up and well-trained workforce. A portfolio of funding and financing mechanisms is needed, ranging from loan and green leasing programs to statewide programs to fund a systematic overhaul of existing buildings. Sources of funding that could be explored include the deeds excise tax, a delivered fuels efficiency fee, or dedicated funding through general tax dollars. These recommendations must also occur simultaneously with protections and support for low- and moderate-income customers, multifamily housing, homes located within Environmental Justice block groups, and affordable housing. The Commonwealth should also explore possible opportunities to align deep energy retrofits with other efforts that maximize public health benefits, including resources to de-lead homes.

SECTION 4. CLIMATE CHANGE

Embrace and Promote GeoGrid: Networked geothermal heat pumps, also known as the GeoGrid, is an innovative solution to heat and cool homes in a safe, non-emitting, and affordable way. GeoGrids use networked ground source heat pumps, meaning pipes running from under the street to buildings and homes are filled only with water, delivering thermal energy with no gas. The system connects buildings with different heating needs, so energy is never wasted but is exchanged or stored in the ground until it is needed. Tapping into stable temperatures underground through GeoGrids, heating and cooling needs can be met in a clean, non-emitting way that doesn't overburden the electric grid if heating and cooling were otherwise fully electrified. An incoming administration must apply best practices from Eversource and National Grid GeoGrid demonstration pilot projects to remove barriers to GeoGrids and scale up adoption to whole communities and municipalities.

No new fossil fuel hookups: It is not enough for the Commonwealth to promote weatherization, electrification, the GeoGrid, and other affirmative possibilities. Massachusetts must stop expanding the use of gas, end incentives for fossil fuel equipment and infrastructure, and take other steps to ensure that no new fossil fuel hookups occur. The Merrimack Valley gas explosion in 2018 reminded the Commonwealth of the dangers of fossil fuel combustion and the old infrastructure that delivers fuel to residents' homes. Unfortunately, plans released from the utilities in the Future of Gas docket (DPU 20-80) show a desire to not just maintain, but expand, the state's natural gas infrastructure. As the Commonwealth continues to electrify, these shortsighted investments will be placed upon the backs of an ever-declining ratepayer base, particularly those in Environmental Justice communities, locking them into bad investments for decades. Massachusetts must take a strong stance on this issue and eliminate the option for new fossil fuel hookups.

No Use of RNG/Hydrogen for Residential/Business Heating: Utilities and the fossil fuel industry have touted renewable natural gas (RNG) and hydrogen as low-emission or emission-free alternatives to natural gas that could help the Commonwealth achieve its ambitious climate goals. However, these claims are misleading, as the development of these fuels can have wildly different greenhouse gas footprints depending on how they are produced and other negative public health impacts regardless of their production if they are combusted. Unfortunately, the ones that truly have lower emissions are in short supply.

Bio-methane that would otherwise have gone straight into the atmosphere can play a targeted role in achieving net zero emissions. However, relying on the nation's **limited supply** of sustainable biomass feedstocks to produce RNG for the gas system does not come without a *massive* opportunity cost. Biomass resources should only be used to decarbonize the sectors that are hardest-to-electrify like industry, chemical production, aviation, and shipping – and not used to heat buildings.

Similar concerns apply to green hydrogen. It is 4-6 times more efficient to directly electrify a building with a heat pump than produce green hydrogen to burn in the building. There are also significant technical, health, and safety concerns with blending highly explosive green hydrogen into the gas system and, again, such limited resources should be saved to decarbonize the hardest-to-electrify sectors of the economy.

Recommendations:

- Rapidly expand pre-weatherization, weatherization, and whole-home electrification programs.
- Develop a sustainable funding source that doesn't rely primarily upon ratepayers to address building decarbonization.
- Support a building performance standard and public disclosure requirement for buildings based

SECTION 4. CLIMATE CHANGE

on carbon, that is in alignment with 2050 and interim targets, financial tools, and includes protections for vulnerable residents.

- Electrify and weatherize EJ communities first to lower bills and get them off gas.
- Embrace and promote GeoGrid.
- Ban new fossil fuel hookups.
- Bar use of RNG/hydrogen for home heating.
- Develop and support rate classes that are more favorable to electrification.
- Encourage use of cross-laminated timber (CLT) and other types of mass timber to reduce embodied carbon emissions of new construction.
- Integrate a robust net zero building energy code into the statewide stretch code by 2025 and the base building energy code by 2028.
- Align Mass Save programs, C-PACE and other financial tools with the Next Generation Roadmap Law of 2021 and the urgency of climate change.

Resources/Contact Information:

- Kyle Murray, Acadia Center, kmurray@acadiacenter.org
- Caitlin Peale Sloan, Conservation Law Foundation, cpeale@clf.org
- Larry Chretien, Green Energy Consumers Alliance, larry@greenenergyconsumers.org
- Tim Cronin, Health Care Without Harm, tcronin@hcwh.org
- Connor Rockett, New England Forestry Foundation, crockett@newenglandforestry.org
- Leah Robins, Metropolitan Area Planning Council, lrobins@mapc.org
- Zeyneb Magavi, HEET, zeyneb.magavi@heet.org

TRANSPORTATION

Key takeaways: The transportation sector is the largest source of greenhouse gas emissions in the Commonwealth and historically one of the most challenging to decarbonize. Meeting climate goals will require rapid vehicle electrification across all segments of transportation, including light-, medium-, and heavy-duty vehicles, municipal fleets, school buses, rideshare vehicles, and public transit buses and trains.

- Electrifying current modes of transportation goes a long way, but meeting climate goals will also require reduced reliance on personal vehicles through investment in public transit and walking and biking infrastructure, and encouragement and incentivization of these alternatives.
- Expanded public transit service and electrification of public transit are both Environmental Justice priorities. Transit is essential, connecting people to jobs, education, healthcare, and social and cultural opportunities. Ensuring the transportation system provides these benefits to everyone, including people who depend on public transit, while not bringing diesel exhaust to neighborhoods already suffering from air pollution, should be a central goal of the Commonwealth's transportation plan.

Summary: The transportation system of the near future in Massachusetts must drastically reduce greenhouse gas emissions, while also getting people where they need to go, protecting public health, and doing so equitably. The transportation sector is the largest source of carbon emissions in the Commonwealth, which means it is both a climate liability and an opportunity for significant reductions. In meeting the climate change goals for the transportation system, there are opportunities to simultaneously advance equity and public health.

The two primary tools to achieve transportation system emissions reductions are vehicle electrification and shifting trips from personal vehicles to public transit, walking, and biking. Vehicle electrification is driven by both incentives and mandates and should employ these strategies in stages: mandating electrification of public fleets in stages over the next several years, incentivizing private electric vehicle purchases now, and mandating new private vehicles be electric in several years.

Personal vehicles represent an outsized share of Massachusetts transportation emissions. Reducing personal vehicle trips supplements transportation electrification for near-term emissions reductions and eases the long-term burden of increased electrification on the electric utility sector. Mode shift away from personal vehicles requires investment in alternatives, from funding public transit agencies to running more routes more frequently and reliably, to creating more infrastructure for walking and biking. Personal vehicle trips can also be discouraged through congestion pricing, tolls, and gas taxes.

The Interim Clean Energy and Climate Plan was correct in stating that Massachusetts needs more than 750,000 electric light-duty vehicles by 2030, but it failed to include necessary policies to improve public transit ridership, walking, and biking. In addition to electrification, there is significant opportunity to enable improved access to public transit and build out a more connected walking and bicycling network. To achieve this, the Commonwealth must address the chronic transportation funding crisis, and invest recurring, progressive revenue sources into public transit systems. Even with the influx of federal funding, new state revenues generated by the Fair Share Amendment (on the November 2022 ballot), regional ballot initiatives, increased fees for Transportation Network Companies, and congestion pricing paired with expanded transit access and reliability are critical.

SECTION 4. CLIMATE CHANGE

Recommendations:

- Electrify the Commonwealth’s public transportation buses and commuter rail.
- Improve access, reliability, affordability, and resilience of public transit infrastructure.
- Implement a low-income fare on the MBTA and support fare-free buses on the RTAs.
- Identify a permanent funding source capable of providing MOR-EV rebates or the equivalent to middle-class consumers purchasing EVs costing less than \$50,000, with rebates greater than \$1,500 and available for new, leased, and used electric vehicles available at the point of purchase.
- Expand zero-emission vehicle incentives (ZEVs) for high-mileage, low- and moderate- income drivers to ensure that incentives actually meet their needs. Adjust programs to find other ways to make ZEVs accessible to these populations, such as by requiring the electrification of fleets.
- EV ownership should be made accessible to low- and moderate-income drivers—who are more likely to buy pre-owned and older-model vehicles compared to new vehicles—via sliding-scale income-adjusted rebate programs.
- Require utilities to offer ZEV drivers off-peak charging rebates to reflect lower costs of service.
- Increase opportunities for employers to reduce the vehicle miles traveled of their employees, through modifications to DEP’s Rideshare regulations or other programs.
- Continue investment in programs that expand safe walking and biking infrastructure, such as Complete Streets and MassTrails.
- Raise broad-based transportation revenue to put the MBTA on sound financial footing and increase operating assistance to RTAs that does not depend on fare increases or disproportionately burden Environmental Justice populations, low-income riders, and transit-dependent riders.
- Remove barriers to e-bikes.
- Rapidly expand EV charging infrastructure, especially by increasing access to fast charging stations, expanding public charging stations near multi-unit dwellings, and areas where residents do not have access to off-street charging.
- Implement a Low Carbon Fuel Standard.
- Set vehicle miles traveled reduction targets for Massachusetts.
- Implement the advanced clean truck rule.
- Ensure that expanded and improved transit is paired with housing policies that prevent displacement and gentrification.

Environmental Justice and Transportation: It is critical that transportation investments, incentive programs, and other strategies for reducing transportation emissions center the needs of communities that have faced and continue to face disproportionate exposure to transportation pollution. Service on the MBTA and the RTAs needs to be expanded, both in terms of geographic scope as well as frequency and ridership.

Resources/Contact Information:

- Kyle Murray, Acadia Center, kmurray@acadiacenter.org
- Staci Rubin, Conservation Law Foundation, SRubin@clf.org
- Larry Chretien, Green Energy Consumers, larry@greenenergyconsumers.org
- Kasia Hart, Metropolitan Area Planning Commission, khart@mapc.org
- Sofia Owen, Alternatives for Community and Environment, sofia@ace-ej.org
- Jonah Kurman-Faber, Climate XChange, jonah@climate-xchange.org

ADAPTATION

Key takeaways:

We must take a multi-pronged approach to climate change:

- **Mitigation** – *avoiding the unmanageable* – is climate action to reduce greenhouse gas emissions that cause climate change.
- **Adaptation** – *managing the unavoidable* – is a specific action, project, activity, or process taken to reduce or eliminate long-term risk to people, property, and natural systems from climate change and/or natural hazards and their impacts.
- **Resilience** is the ability of a system and its parts to anticipate, absorb, or recover from a hazardous event in a timely and efficient manner.
- **Nature-Based Solutions (NBS)**: the protection/conservation, management, and restoration of an existing ecological system or replication of natural processes to address natural hazards like flooding, erosion, drought, and heat islands by fostering adaptation, enhancing resilience and safety, avoiding costs, providing benefits such as sequestering carbon pollution, reducing emissions, and providing clean air and water.
- **Environmental Justice**: prioritize equity and Environmental Justice by ensuring those most impacted by climate change lead policymaking with representation, metrics, and accountability.

Summary: MA leads the nation in state policy approaches to adaptation and resilience. The state provides the most up-to-date data and information on climate through the [Resilient MA Clearinghouse](#); integrates climate change impacts and adaptation strategies with hazard mitigation planning through the [State Hazard and Climate Change Management Plan](#); provides support for cities and towns to identify climate hazards, assess vulnerabilities and strengths, and develop and implement action plans to improve climate resilience through the [Municipal Vulnerability Preparedness \(MVP\) Program](#); and has dedicated [funding](#) for adaptation and resilience spanning many programs and agencies.

About 75% of the Commonwealth’s population lives on or near the coast⁷². In recent decades, the northeast has seen a rapid increase in extreme precipitation events—55% since 1958⁷³—and accelerated sea-level rise and storm surges that are eroding shorelines and washing away communities and natural resources. We have also seen, and will continue to see, an increase of 90-degree days. Increases in temperature and more frequent and severe extreme heat exacerbate health problems and poor air quality. In 2016, 2018, and 2020 droughts impacted drinking water supplies, agricultural production, wildlife habitat, and recreation/tourism. Climate change is amplifying threats to forests through more frequent extreme weather events, more frequent pest and disease outbreaks, and the spread of invasive species. Left unchecked, these threats will diminish forests’ capacity to mitigate climate change, bounce back from disturbances, and provide the services and goods on which society depends.

Challenges:

- Lack of sustainable and equitable funding - bond funding alone is not enough to support ongoing

⁷² National Oceanic and Atmospheric Administration, Office for Coastal Zone Management

⁷³ K. Hayhoe, D.J. Wuebbles, D.R. Easterling, D.W. Fahey, S. Doherty, J. Kossin, W. Sweet, R. Vose, M. Wehner. Our changing climate. In impacts, risks, and adaptation in the United States: fourth national climate assessment, volume II Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, volume II (2018), 10.7930/NCA4.2018.CH2

SECTION 4. CLIMATE CHANGE

and needed climate change adaptation and resilience efforts.

- Lack of consistency in policy and regulation - there is currently a patchwork of approaches and continued barriers to using best science and practices. This reinforces systemic institutional racism and favors traditional gray infrastructure over NBS.
- Lack of support and training for municipal public works staff - there is little to no training on stewardship of green infrastructure or about the benefits of using NBS over traditional approaches to gray infrastructure.
- Lack of state leadership on public engagement, governance, monitoring, and accountability - while we have a robust stakeholder process in the Implementation Advisory Committee for climate mitigation, Massachusetts abandoned its parallel adaptation advisory board in 2014 and has never reinvigorated it.
- Lack of public acceptance - Adapting to climate change is still seen by some as “admitting defeat,” despite the fact that we know there are unavoidable impacts we will face regardless of success on emissions reduction. For instance, managed retreat is a highly controversial resilience strategy.

Opportunities:

- Enhance existing sources of funding and create new sources of revenue for sustainable and equitable climate change adaptation and resilience.
- Enact policies and regulations for consistency and predictability that integrate climate mitigation and adaptation approaches.
- Center Environmental Justice by ensuring policy and implementation decisions include representation of those most impacted by climate change and whose lived experiences need to inform solutions.
- Foster and prioritize Nature-Based Solutions (NBS) throughout adaptation and resilience policies, funding, and programs.
- Leverage the work that needs to be done to make communities more resilient by investing in a green workforce.

Recommendations:

- Enhance existing sources of funding and create new sources of revenue for sustainable and equitable climate change adaptation and resilience. The next governor must support sustainable and equitable funding from a variety of revenue sources that provide benefits and do not increase harm to Environmental Justice communities and frontline communities.
- Undertake statutory and regulatory reforms that incorporate climate science into codes and standards, including state building codes, environmental review, utility, and critical infrastructure management, and more. The state must also clarify and streamline permitting for nature-based solutions, which build resilience to climate hazards and provide additional co-benefits to communities and the environment.
- Ensure that the business community has skin in the game with responsibility for infrastructure and community resilience, incentivizing public-private partnerships, serving on advisory boards and meeting goals and metrics.
- Prioritize Nature-Based Solutions, which enable communities to enhance safety and avoid costs by protecting, restoring, and managing natural systems to reduce risks from climate hazards, such as flooding, heat, and drought. Investing in NBS now saves communities billions later in cost avoidance for disaster recovery and repairs by providing sustainable flood protection services and helping municipalities meet mandatory water quality standards. Ecological restoration projects also create new opportunities for boating, fishing, hiking, birdwatching, and swimming,

SECTION 4. CLIMATE CHANGE

which support Massachusetts' outdoor recreation industries.

- Green workforce development represents new opportunities to create jobs for under-resourced and marginalized communities and should be an essential part of the Commonwealth's economic response to COVID-19. The tragedy of closing businesses and laying off workers provides an opportunity for the state to tap this important source of labor by providing them with training and education needed to launch new careers. At the same time, we face urgent environmental and climate challenges that depend on constantly evolving technologies that require trained and certified workers.
- Implement the recommendations of the MA Healthy Soils Action Plan, including increased funding for state Healthy Soils programs and practices as a means of climate adaptation such as: increased drought tolerance and water infiltration/stormwater management, managing changes in crop pests due to changes in climate, and improving the resilience of the pollinator community.
- Create a statewide voluntary property buyout program for owners and tenants who are facing substantial flood risk and have no other viable options, including low-income homeowners and Environmental Justice populations who may be facing skyrocketing flood insurance premiums in the face of increasing flood risk or who cannot afford to rehab or rebuild when extreme weather hits.
- Develop a state-wide strategy for retrofitting existing building stock, including state and municipal-owned buildings, for changing climate conditions.
- Frontline communities are most impacted by pollution from emissions and climate change impacts—heat, flooding, and drought. Policy and funding must provide benefits and not increase harm. We must ensure policy and implementation decisions include representation of those most impacted by climate change and whose lived experiences need to inform solutions. We must include measurements, metrics, and accountability to secure adaptation and resilience benefits for frontline communities.

Resources/Contact Information:

- Emma Gildesgame, The Nature Conservancy in Massachusetts, emma.gildesgame@tnc.org
- Steve Long, The Nature Conservancy in Massachusetts, slong@tnc.org
- Deanna Moran, Conservation Law Foundation, dmoran@clf.org
- Linda Orel, The Trustees, lorel@trustees.org
- Marty Dagoberto L. Driggs, NOFA/Mass, marty@nofamass.org
- Katharine Lange, Massachusetts Rivers Alliance, katharinelange@massriversalliance.org
- [Resilient MA Clearinghouse](#)
- [Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan](#)
- [Municipal Vulnerability Preparedness \(MVP\) Program](#)

NATURAL CLIMATE SOLUTIONS

Key takeaways: Aggressively reducing fossil fuel use is the most important thing we can do to fight climate change. However, reducing fossil fuel use alone is not enough to reach the Commonwealth’s statutory goal of “net-zero” emissions by 2050 —which means the amount of greenhouse gasses emitted each year is equal to the amount of greenhouse gasses removed each year. Only by harnessing the power of natural climate solutions to remove and store carbon **can** Massachusetts reach Net Zero greenhouse gas emissions goals.

“Natural climate solutions” (NCS) are actions to **protect, manage, and restore natural and working lands**, such as forests, farms, and wetlands, to both reduce emissions from lands and to remove and store carbon that has already been emitted. When land is developed or poorly managed it is a source of carbon emissions. When land is protected and well-managed, it removes carbon from the air while also providing many co-benefits, such as climate adaptation/resilience to address natural hazards like flooding, erosion, drought, and heat islands by fostering adaptation, enhancing resilience and safety, and avoiding costs. Nature also provides clean air and water, wildlife habitat, recreation, open space, and many other societal benefits. However, any reduction in existing atmospheric carbon through NCS must accompany (and not allow for any delay in) the aggressive decarbonization of energy production.

Summary: Massachusetts has some of New England’s richest natural carbon resources – storing and sequestering carbon – in forests, wetlands, and soils.

Forests – Massachusetts is fortunate that 60% of its land is still forested, despite it being one of the most urbanized states in the country.

- **Storage:** Forests store 365 million metric tons of natural carbon, which is 67% of total terrestrial carbon storage among all ecosystems.
- **Sequestration:** Massachusetts’ forests currently sequester carbon equal to more than 7% (~5 million metric tons CO₂e) of the state’s gross greenhouse gas emissions each year, with the potential to do much more⁷⁴.

As trees grow, they take in carbon dioxide from the atmosphere, converting the carbon into wood, leaves, and roots; in fact, one half of a tree’s weight consists of stored carbon. In addition, when wood from sustainably managed forests is used in buildings to substitute for more carbon-intensive steel and concrete, it can lower the carbon footprints of buildings. Finally, urban trees provide a win-win-win, reducing energy usage (and, thereby, emissions) in nearby buildings, sequestering carbon in growing trees, and improving community resilience by providing shade, reducing air pollution, and other benefits.

Wetlands (Blue Carbon) – Blue carbon refers to the long-term storage of carbon within plant habitats growing in coastal lands and near-shore marine environments, like Massachusetts’ salt marshes and eelgrass beds. As these plants draw in carbon as they grow, they transfer much of this carbon into the

⁷⁴ Annual carbon sequestration, 2010: Methods taken from Gu et al. 2019 and applied to Massachusetts. Gu H, Williams CA, Hasler N, Zhou Y (2019) “The Carbon Balance of the Southeastern Forest Sector as Driven by Recent Disturbance Trends”, *Journal of Geophysical Research – Biogeosciences*, 124, doi:10.1029/2018jg004841 MA annual emissions, 2017: Appendix C: Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017

SECTION 4. CLIMATE CHANGE

rich organic soils formed by their roots. In these anaerobic soils, carbon can be stored for decades to hundreds of years. Degrading or destroying these systems releases many years' worth of carbon, as well as reduces their ability to store more carbon in the future. Although the acreage of blue carbon systems in Massachusetts is small, their role in fighting climate change is not. Inland wetlands also store significant amounts of carbon and can act as carbon sinks when healthy and protected, or carbon sources when degraded and converted.

Soils - Both above and below-ground uses of land can aid in the sequestration of carbon; soil carbon and appropriate soil management techniques can significantly increase the carbon capture of land. Massachusetts is currently working on a Healthy Soils Action Plan, which will outline key strategies to achieve healthy, carbon-capturing soils. Farms employing healthy soils practices, such as cover crops, no or reduced till, or integrated crop-livestock systems, may see soil carbon increases from 1-2% up to 5-8% in as little as ten years, which add up to 25 to 60 tons of carbon per acre⁷⁵.

Massachusetts' current policy approach to natural climate solutions lacks the urgency and call to action of the other sectors. This is problematic, because one of the reasons that nature is a powerful tool in addressing climate change is that its benefits compound over many years. Trees planted or wetlands restored now will yield increasing benefits each year through 2030, 2040, and beyond. Conversely, natural and working lands that are lost or degraded now have compounding impacts, with lost carbon sequestration now and each year through 2030, 2040, and beyond.

- **Forests:** Climate change is amplifying threats to forests, through more frequent extreme weather events, more frequent pest and disease outbreaks, and the spread of invasive species. Left unchecked, these threats will diminish forests' capacity to mitigate climate change, bounce back from disturbances, and provide the services and goods on which society depends. We have seen a sustained decline of forests over 30 years due to Forest Conversion and Harvard Forest predicts a ~ 20% loss of carbon storage over the next 50 years if we continue current trends of forest land conversion and management⁷⁶.
- **Coastal and Inland Wetlands:** Fortunately, very few acres of wetland are completely converted to development in Massachusetts each year. The biggest current threats to wetlands are from degradation, including through nutrient pollution, improperly sized or sited road-stream crossings that alter hydrology, and climate adaptation actions that build up and harden coastlines and do not allow coastal wetlands to move with sea level rise.
- **Of the 5.18 million acres of soil in MA, 475,033 acres (9.2%) have already been converted to buildings and pavement in which case almost all of their vital function has been lost. Some of this acreage includes sites with active hazardous material contamination in their soils. An additional 371,898 acres (7%) are vulnerable to degradation through development by 2060 (NELF). According to a recent study on land consumption from Harvard Forest, the majority of future development is likely to occur on forested lands (Thompson, 2020). The conversion of forests to developed lands like houses, pavement, and turf has a long-term negative impact on soil functions like stormwater infiltration, soil biodiversity, and soil organic carbon (SOC) storage. For instance, soils lose 54% of the average forest SOC stock when converted to turf and**

⁷⁵ 3., 4. Hawken, Paul (ed.). *Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*. New York: Penguin Books (2017)

⁷⁶ **Thompson, J. R.,** K. Fallon-Lambert, D. R. Foster, M. Blumstein, E. N. Broadbent, and A. M. Almeyda Zambrano. 2014. *Changes to the Land: Four Scenarios for the Future of the Massachusetts Landscape*. Harvard Forest, Harvard University. ISBN:978-0615-9852-68.

SECTION 4. CLIMATE CHANGE

74% when converted to impervious land covers (HSAP SOC Study).

Recommendations: The next governor must ensure that the role NCS plays in reducing greenhouse gas emissions is part of a comprehensive strategy to tackle climate change and achieve Net Zero. In addition to deep and immediate cuts in fossil fuel use, removing carbon pollution already in the atmosphere is needed – NCS are currently the only technology that can do so at scale and at cost.

The Next Generation Roadmap law codifies natural and working lands as a separate sector and requires the Commonwealth to set numeric goals for reducing greenhouse gas emissions and for increasing carbon sequestration, develop a plan, and implement policies to achieve these goals.

As the Commonwealth develops its goals, the most important actions the Commonwealth can take now regarding natural and working lands are “no-regrets actions,” such as permanently protecting forest land and avoiding the degradation of coastal wetlands. As we get closer to 2050, the more challenging and expensive the remaining emissions reductions will be, and we cannot afford to wait.

To meet emissions reduction and carbon drawdown goals while making the best use of limited funding and resources, we recommend that this hierarchy should be followed:

- Protect forests (especially highly resilient and connected interior forests), wetlands, and farm soils. Much of the carbon in these lands is irrecoverable carbon—meaning that once it is emitted into the air as land is developed, it is not possible to regain that carbon through management or restoration over 30 years (the net-zero timeframe).
- Manage forests and farms in ways that grow carbon in soil and plants over time. This includes paying attention to forest carbon stocks and agricultural soil health and carbon stocks, while also ensuring that there is a steady supply of wood and food coming from working lands. In the case of wood, sustainably and locally harvested wood can replace more carbon intensive building materials, like concrete and steel, thereby reducing carbon emissions from the building sector.
- Restore lands when they have been degraded and it has not been possible to protect or sustainably manage lands. Restoration actions include tree planting (both reforestation and afforestation), restoration of coastal wetlands, and actions to repair soil health.

The protect, manage, and restore hierarchy is embedded in the policy recommendations of the EEA stakeholder group (the Global Warming Solutions Act Implementation Advisory Committee – GWSA IAC), which recommended the following NCS opportunities that are currently being evaluated by EEA for inclusion in the 2030 Clean Energy and Climate Plan:

- Conserve and Protect Forests – especially resilient, interior forests.
- Improve Forest Management.
- Continue, and greatly expand, urban tree planting and stewardship programs.
- Invest in the protection, restoration, and migration of salt marshes, eelgrass beds and inland wetlands.
- Make the value of forest carbon visible and quantifiable in state policies.
- Reward municipalities that use Smart Growth and other climate-friendly actions.
- Implement the Forest Resilience Program within Ch61.

For Environmental Justice populations, implement the recommendations of the Climate Justice Working Group of the GWSA IAC. The natural solutions we propose are implemented within a social setting with specific concerns and considerations that should be kept in mind. The solutions we propose and

SECTION 4. CLIMATE CHANGE

implement should be sited within a context of the changes needed to ensure a just transition to a more sustainable and equitable economy. Simply preserving forested land as carbon sinks without addressing the extractive economic practices ravaging the environment elsewhere will not achieve goals. In particular, the use of forested lands and other nature-based climate solutions can also help us to achieve equity goals. As an example, forested lands can be used to help re-establish Indigenous land use practices.

Resources/Contact Information:

- Emily Myron, The Nature Conservancy in Massachusetts, emilymyron@tnc.org
- Steve Long, The Nature Conservancy in Massachusetts, slong@tnc.org
- Linda Orel, The Trustees, lorel@thetrustees.org
- Marty Dagoberto L. Driggs, NOFA/MA, marty@nofamass.org
- Michelle Manion, Mass Audubon, mmanion@massaudubon.org
- Nature4Climate. 2020. See MA state profile at: <https://nature4climate.org/u-s-carbon-mapper/>
- [Global Warming Solutions Act Implementation Advisory Committee: Guiding Principles, Cross-Cutting Policy Priorities, and Sector-Specific Policy Priorities for the Clean Energy and Climate Plan for 2030](#)

This briefing book is produced by 501(c)(3) charitable organizations, and by law none of these materials can be used for partisan or political purposes. The briefing book is for educational purposes only.

Coordinated and prepared by Jennifer Ryan, JLR Consulting. April 2022.