

The Commonwealth of Massachusetts

Biodiversity Conservation Goals



MAURA HEALEY
GOVERNOR

KIM DRISCOLL
LIEUTENANT GOVERNOR

REBECCA TEPPER
SECRETARY

TOM O'SHEA
COMMISSIONER

October 7, 2024

Public Input Summary

The Department of Fish & Game is actively reviewing all feedback and incorporating input into the Biodiversity Conservation Goals for the Commonwealth that will be reported to Governor Healey. Thank you to all who contributed! If you'd like to receive updates and learn about additional opportunities to engage [sign up here](#) for the latest news, events, and ways to take action.

In September 2023, Governor Maura Healey signed [Executive Order No. 618](#), directing the Department of Fish and Game (DFG) to develop nation-leading biodiversity conservation goals for 2030, 2040, and 2050. To do this, the agency is assessing existing biodiversity efforts and recommending transformative actions to ensure biodiversity flourishes for generations to come. Throughout the development of Biodiversity Conservation Goals for the Commonwealth, the Department of Fish & Game is embracing diverse public input to shape this initiative.

To kick off the public input process, the Department of Fish & Game hosted two virtual public listening sessions on July 17, 2024 from 12-2 PM and July 23, 2024 from 6-8 PM. The format of the listening sessions included a brief presentation on the initiative by DFG Commissioner Tom O'Shea and Assistant Commissioner Jennifer Ryan followed by a facilitated listening session where members of the public were invited to share their thoughts and priorities. The two listening sessions were promoted widely and attracted interest from over **550 individuals who registered for both sessions, with 193 and 125 attendees respectively**. To increase the accessibility of these sessions to all, live interpretation was provided in the five most common languages – Spanish, Portuguese, Chinese, Haitian Creole, and Vietnamese – with interpretation provided upon request for any additional languages. Additionally, live ASL interpretation and CART captioning was provided for both sessions. Both sessions were recorded. The presentation and recordings are posted online at mass.gov/biodiversity.

During the sessions, over **60 individuals from community groups, conservation organizations, businesses, municipalities, and educators** shared three-minute testimony of their priorities, concerns, and ideas for biodiversity conservation goals. Individuals who gave testimony were affiliated with a diverse range of organizations including, but not limited to:

- Acton Select Board
- Appreciate Biodiversity
- Berkshire Environmental Action Team (BEAT)
- Beyond Pesticides
- Botanical Society of New England
- Cape Cod Museum of Natural History
- Climate Action Now Western MA
- Community Land and Water Coalition
- Town of Easton
- Elders Climate Action
- Mass Pollinator Network
- Jones River Watershed Association
- Lake Nippenikut Association

- Massachusetts Lobstermen's Association
- Massachusetts Oyster Project
- Massachusetts Sierra Club
- MassBays Estuary Partnership
- Middlesex Conservation District
- NEC Solar
- Northeast Wilderness Trust
- Sea Ahead Inc.
- Save Lexington Wildlife
- Southeastern Massachusetts Pine Barrens Alliance/Massachusetts Horseshoe Crab Collective
- Town of Arlington
- Town of Ashland
- Trustees of Reservations

Additionally, these sessions kicked off a written comment period from July 17, 2024 – August 30, 2024 where the public was invited to submit more detailed recommendations by form or email. Collectively, over 200 individuals and organizations submitted written comments – including **89 individuals, 79 conservation, climate, and community organizations, over 20 municipalities or committee/commission members, 9 faith-based or public health organizations, 7 educators or academics, and 8 business owners.**

Members of the following conservation, climate, or community organizations submitted comments or signed on to joint letters:

- Andover Pollinator Pathway
- Appalachian Mountain Club
- Appreciate Biodiversity
- Association to Preserve Cape Cod
- Beyond Pesticides
- Biodiversity for a Livable Climate
- Cape Cod Museum of Natural History
- Charles River Conservancy
- Citizens Climate Lobby
- Climate Action Now Western MA
- Climate Reality Massachusetts Southcoast
- Common Ground Land Trust
- Community Land and Water Coalition
- Compact of Cape Cod Conservation Trusts
- Earthwise Aware
- Elders Climate Action
- Environment League Massachusetts
- Environment Watch Southeastern Mass
- Extinction Rebellion Western Massachusetts
- Forest Allies for Responsible Solar
- Friends of Myles Standish State Forest
- Friends of the Middlesex Fells Reservation
- Green Arlington
- Greening Greenfield
- Grow Native Massachusetts
- Hilltown Vision
- Ipswich River Watershed Association

- Jones River Watershed Association
- Kestrel Land Trust
- Last Tree Laws
- Lead for Pollinators
- Learning Lab for Resiliency
- Lexington Climate Action Network
- Lexington Living Landscapes
- Low Impact Hydropower Institute
- MA Pollinator Network
- Manchester Essex Conservation Trust
- Mass Audubon
- Massachusetts Association of Conservation Commissions
- Massachusetts Envirothon Steering Committee
- Massachusetts Forest Alliance
- Massachusetts Lobstermen's Association
- Massachusetts Oyster Project
- Massachusetts Pollinator Network
- Massachusetts Rivers Alliance
- Massachusetts Sierra Club
- Massachusetts Sierra Club Executive Committee
- Massachusetts Society of Municipal Conservation Professionals
- Nashua River Watershed Association
- National Wild Turkey Federation
- New England Aquarium
- North American Climate, Conservation, and Environment (NACCE)
- North County Land Trust
- Northeast Organic Farming Association
- OARS
- Opacum Land Trust
- Partnership for Policy Integrity
- RESTORE: The North Woods
- River Valley Democratic Socialists of America
- Ruffed Grouse Society & American Woodcock Society
- Save Arlington Wildlife
- Save Greater Dowses Beach
- Save Lexington Wildlife
- Save Massachusetts Forests
- Save Massachusetts Wildlife Education Fund
- Smart Solar Shutesbury
- Standing Trees
- Summer Village Conservation
- Swansea Harbor Advisory Committee
- The Enviro Show
- The Food Project
- The Nature Conservancy
- The Rewilding Institute
- The Trustees of Reservations
- Trees As a Public Good Network
- The Trust for Public Land

- Upper Housatonic Valley National Heritage Area
- Wendell State Forest Alliance
- Westfield Concerned Citizens
- Wildlands, Woodlands, Farms, & Communities

The following government, municipal officials, and committee/commissions submitted comments:

- Arlington Open Space Committee
- Barnstable County Assembly of Delegates
- Berkshire County Conservation District
- Brewster Open Space Committee, Planning Board
- Community Preservation Committee
- City of Boston
- DCR Stewardship Council
- DCR Service Forestry
- Easton Conservation Commission, Vernal Pool Association
- Hudson Conservation Commission
- Massachusetts Army National Guard (MAARNG)
- MWRA Water Supply Citizens Advisory Committee
- Northfield Planning Board & Historical Commission
- Pioneer Valley Planning Commission
- Sherborn Open Space Committee
- Town of Acton Select Board
- Town of Arlington
- Town of Harvard, Bare Hill Pond Watershed Management Committee
- Town of Stow
- Town of Sturbridge
- Town of Uxbridge Board of Health
- U.S. Forest Service
- Wellesley Natural Resources Commission

The following faith-based or public health community organizations submitted comments or signed on to joint letters:

- 2 Degrees Northampton
- Boston Catholic Climate Movement
- Climate Action Group of Unitarian Society of Northampton and Florence
- First Church Amherst
- Greater Boston Physicians for Social Responsibility
- Massachusetts Interfaith Power & Light
- Massachusetts Nurses Association
- Melrose Unitarian Universalist Church Climate Action Team
- Worcester Congregations for Climate & Environmental Justice

The following academics or educators shared written comments:

- Bridgewater State University, Visiting Professor
- City of Medford Public Schools, Special Education Instructor
- Middlebury College, Emeritus Professor of Biology and Environmental Studies
- Springfield Public Schools, Science & School Garden Program
- UMass Amherst, Arts Extension Service

- UMass Dartmouth, Biology Professor
- Westfield State University, Environmental Science Professor

The following commenters shared affiliation with businesses including:

- Ocean Solutions Inc.
- Edge of the Wild Ecological Landscaping
- Lighthall Company
- NEC Solar
- Organic Farmer (2)
- Sanofi
- Wilderscaping

Appalachian Mountain Club, VP, Conservation and Recreation Advocacy

Name: Heather Clish

Affiliation: NGO/Community Group/Non-profit

On behalf of the Appalachian Mountain Club, thank you for seeking input for the Commonwealth's biodiversity conservation goals. AMC is the nation's oldest conservation and recreation organization. We connect people to the outdoors from Maine to Virginia, including our 30,000 members here in Massachusetts, and seek to protect critical landscapes across our region. AMC strongly supports the nation's 30x30 goals and the Commonwealth's Executive Order No. 618 to develop biodiversity conservation goals and we appreciate the opportunity to comment on the goals as they develop.

AMC is involved with several regional stewardship and protection efforts that complement the Commonwealth's biodiversity initiative. AMC maintains the Appalachian National Scenic Trail in Massachusetts and coordinates plant phenology monitoring along the full length of the Appalachian Trail. AMC manages the New England National Scenic Trail in partnership with the National Park Service as well as the Department of Conservation and Recreation (DCR), the Department of Fish and Game (DFG), and several municipalities, land trusts, and private landowners. AMC also manages the long-distance Midstate Trail and Bay Circuit Trail in partnership with DCR, DFG, partner NGOs, municipalities, and private landowners. AMC is a founding partner in the Connecticut River Watershed Partnership, which works collectively to benefit wildlife and people in the 4-state watershed that includes Massachusetts.

AMC offers some brief comments for the development of biodiversity goals for Massachusetts:

Trail corridors and their surrounding landscapes provide a tremendous opportunity to provide connectivity for biodiversity and to connect people with nature as climate corridors. Where trails travel directly through densely populated communities, they serve as opportunities to experience nature and advance biodiversity goals associated with the theme of "Nature in Neighborhoods" described in the July 2024 presentation.

To advance biodiversity goals in Massachusetts, AMC encourages DFG to collaborate with trail managers and stewards to identify and advance opportunities to conserve biodiversity and facilitate opportunities for people to experience a sense of belonging in a rich natural world. AMC recommends goals that invest in trail access, parks, and trail planning and construction methods to both serve people and conserve biodiversity. The Commonwealth may look to entities like the US Fish and Wildlife Service as models.

To advance the Commonwealth's biodiversity goals, AMC also recommends collaborating with parties that seek to conserve critical regional landscapes, such as the Appalachian landscape and the Connecticut River Watershed, to identify and accelerate commonly held goals.

Finally, while many actions associated with protecting or improving biodiversity are focused on land and water protection, the impacts of light pollution on wildlife is being increasingly understood. As part of its strategy, the Commonwealth may wish to explore "dark skies" principles, guidance, or actions.

Thank you again for the opportunity to weigh in as the Commonwealth develops its biodiversity goals. AMC welcomes and encourages and encourages additional opportunities for comment as the goals and strategies are fleshed out further and there is more to consider and respond to.

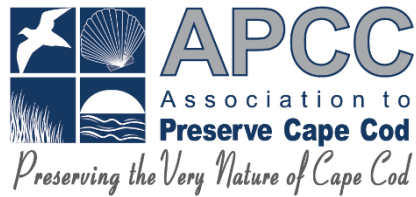
Sincerely,

Heather Clish

VP, Conservation and Recreation Advocacy

Appalachian Mountain Club

hclish@outdoors.org



Andrew Gottlieb
Executive Director

August 26, 2024

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Tom O'Shea, Commissioner
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RE: Biodiversity Goals for the Commonwealth

Dear Commissioner O'Shea:

The Association to Preserve Cape Cod (APCC) submits the following comments in strong support of the Department of Fish and Game's (DFG) initiative to develop biodiversity conservation goals for 2030, 2040, and 2050 that will enhance biodiversity in Massachusetts and serve as a model for the rest of the nation. APCC congratulates Governor Maura Healey and DFG for undertaking this important project.

Founded in 1968, APCC is the Cape Cod region's leading nonprofit environmental advocacy and education organization, working for the adoption of laws, policies and programs that protect, preserve and restore Cape Cod's natural resources. APCC focuses our efforts on the protection of groundwater, surface water, and wetland resources, preservation of open space, the promotion of responsible, planned growth and the achievement of an environmental ethic.

The comments that follow focus on the unique natural environment found on Cape Cod, and on the profound challenges the Cape Cod region faces in protecting and restoring the great spectrum of biodiversity found here. APCC hopes that any program DFG develops from its biodiversity initiative includes the adoption of policies that recognize and actively strive to protect Cape Cod's fragile natural resources while there is still time to do so. APCC encourages DFG to review "Hanging in the Balance: An Urgent Call for Protecting Cape Cod's Natural Resources," a 2023 report by APCC that comprehensively

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analyzes the state of Cape Cod's natural resources, threats to those resources, and recommendations for their protection (apcc.org/hanging-in-the-balance/).

Cape Cod is blessed with an iconic landscape that includes globally significant coastal plain ponds, nearly 600 miles of ocean beaches, coastal embayments, extensive salt marshes, a variety of forest communities, and numerous freshwater wetlands. These resources are some of the primary drivers that attract people to live and vacation on the Cape. They also provide critical habitats for the numerous rare plants and animals found on the Cape.

However, historic development patterns on Cape Cod have fragmented critical habitats, eliminated key resource types and adversely impacted the region's biodiversity. There is limited undeveloped land left on the Cape. If the Cape continues to grow and develop in the pattern it has done in the past several decades, the environmental problems confronting the Cape now will only get worse. We must make better growth and conservation policy decisions on the state, regional, and local levels. How Cape communities choose to develop and to conserve going forward will define the future for our region. Permanently preserving the Cape's remaining critical natural resource areas is one necessary component, along with programs to restore the land and water resources that make Cape Cod so special.

According to the Cape Cod Commission's 2018 Regional Policy Plan, approximately 40 percent of the Cape is protected open space, approximately 46 percent is developed, and only about 14 percent remains undeveloped and unprotected. There are nearly 50,000 acres of undeveloped land on the Cape that are not permanently protected. Of this undeveloped land, roughly 40,000 acres overlap what have regionally been identified as priority natural resource areas. What we do with these remaining acres will define our region and its future.

For purposes of APCC's discussion in this comment letter, priority natural resource areas on Cape Cod are defined as:

- Priority and Estimated Habitat
- BioMap Core Habitat and Critical Natural Landscape
- Zone II Wellhead Protection Areas
- Wetlands and wetland buffers
- Vernal pools and vernal pool buffers

The Cape's priority natural resource areas consist of unique ecosystems that support a diversity of plant and wildlife species. Some of the more noteworthy Cape Cod ecosystems include the

following:

Coastal plain ponds: Due to periodic flooding and changes in water levels, coastal plain pondshores maintain a diverse—and often rare—community of shoreline vegetation as well as habitat for wildlife. The fragile habitat provided by coastal plain ponds on the Cape is particularly vulnerable to development and other human activity.

Kettle ponds: Cape Cod also supports hundreds of kettle ponds, formed from depressions in glacial outwash plains thousands of years ago. Kettle ponds are at risk from surrounding development, agricultural activities, invasive species, and climate change that is gradually warming waters and, combined with nutrient pollution from septic systems and stormwater runoff, is leading to toxic algal blooms.

Pine barren forest: The Cape’s pine barren forests support a variety of wildlife, many of which are rare and specifically adapted to this habitat. Continued development has fragmented pine barren forests and caused them to decline dramatically throughout the region. Fire suppression measures have also contributed to their decline.

Salt marshes: Salt marshes are an iconic feature of Cape Cod’s landscape. Many bird species forage in salt marshes and salt marshes provide essential habitat for juvenile marine life, including important commercial and recreational fish species. Salt marsh habitat on the Cape has been significantly impacted by human activity, including berms, dikes, culverts, mosquito control ditches and filling in of wetlands. Other ongoing threats include coastal development, sea level rise, coastal erosion and invasive species.

Coastal estuaries and embayments: Much of the Cape’s coastal area is made up of estuaries and embayments. Most of the Cape’s estuaries and embayments have been significantly harmed by excess nitrogen pollution, mostly from wastewater, but also from fertilizer and other sources of nutrient runoff.

The unique combination of coastal, upland and freshwater habitats that the above examples and other Cape Cod ecosystems provide have enabled the region to support a diverse population of plant and animal species that distinguish the Cape from other regions of the Commonwealth. The Cape has the highest number and highest density of state-listed rare plant and animal species of any region in Massachusetts with a total of 132 state-listed species, including 75 threatened and endangered species (Cape Cod Commission, 2019).

And yet, current land use practices and regulatory standards continue to promote development

patterns and practices that jeopardize the very resources that draw people to the Cape, sustain a regional quality of life, and fuel the local economy.

For example, in comparing Natural Heritage and Endangered Species Program (NHESP) delineated priority and estimated habitats in 2008 and 2021, a spatial analysis conducted by APCC revealed that there was a considerable loss in acres of these state rare species classifications between those two time periods. Estimated habitat from 2008 to 2021 was reduced by 33 percent, or over 38,000 acres, and priority habitat was reduced by 29 percent from 2008 to 2021, or approximately 37,000 acres on the Cape. These reductions suggest that important habitat has been lost to development, but the numbers also represent changes in public policy decisions regarding what areas are under NHESP jurisdiction. Because of this, more undeveloped areas are now at greater risk than they were a decade ago.

In competing with a history of sprawl and unsustainable development, our natural resources on the Cape have suffered some considerable losses. For example:

- Forest cover loss amounts to approximately 4,500 acres between 2001 and 2019, with much land now converted to single family housing, multi-family housing, commercial, and industrial development (National Land Cover Database).
- Wetlands comprise approximately 30 percent of the land area of the Cape, or approximately 70,000 acres. The Massachusetts Wetlands Protection Act and local wetlands protection bylaws have helped slow, but not stop, the rate of wetland loss on the Cape. The result, particularly in wetland buffer areas where incursions have been allowed to occur, has been death by a thousand incremental cuts from loss of habitat, loss of flood storage capability, and less resilience to the impacts of climate change. Since European settlement, the Cape has lost an estimated 36 percent of its salt marshes.

Today, lands identified as priority natural resource area on the Cape comprise a total of approximately 190,000 acres. However, development has occurred in, and consequently impacted, approximately 27 percent, or over 50,000 acres, of these priority natural resource areas.

The almost total reliance on single family detached housing production has devastated the Cape's environment, needlessly consuming land and leading to habitat fragmentation, poor water quality, and traffic that has been exacerbated by sprawl. Based on an analysis by APCC of land cover data from 2001 to 2019, an estimated 2,399 acres of medium density development

occurred on the Cape during this time period, mostly from single family housing development. Many of the “easiest” places to develop have been developed, and future decisions regarding land use are likely to become more and more difficult. Communities across the Cape, more than ever, must carefully balance the needs of residents for housing, jobs, and services with the need to maintain a strong, healthy and biodiverse environment.

Part of this balance involves building smarter and more sustainably, directing new development to established community activity centers that have centralized wastewater infrastructure and other services. But, another equally vital ingredient for environmental sustainability involves continued conservation of sensitive lands and water resources. As one example, preserving contiguous landscapes is critical to ensuring that wildlife corridors are maintained to the greatest extent possible. Any plans for future growth must also include continued natural resource protection.

The Cape’s traditional sprawling development patterns have been particularly harmful to the environment through the conversion and fragmentation of previously undisturbed landscapes. This ongoing trend highlights the importance of strengthening zoning measures that encourage development and redevelopment in already developed areas such as town centers with access to wastewater infrastructure. At the same time, it is equally important to adopt effective, protective zoning and other actions in undeveloped areas that have significant natural resource value.

In addition to development pressures, Cape Cod’s natural resources are challenged by the global impacts of climate change reshaping coastlines, inundating salt marshes, and altering native plant and animal habitats both along the coast and in inland locations. To prepare as a region for these challenges, conservation and management of our natural resources is essential.

Maintaining vigilance against threats that would diminish the ecological value of *protected* open space is another critical imperative to safeguard Cape Cod’s natural resources and biodiversity. One prime example is the northern 15,000 acres of the 22,000-acre Joint Base Cape Cod. These 15,000 acres were designated by Massachusetts Governor Paul Cellucci in 1999 as the Upper Cape Water Supply Reserve, and legislation officially establishing it as such was signed into law by Acting Governor Jane Swift in 2002. The Reserve is recognized by the Commonwealth as the largest contiguous undeveloped area on Cape Cod, providing a large expanse of pine barren forest habitat that supports multiple state and federally listed rare species. Considered by the Commonwealth to be “permanently protected,” the legislation establishing the Upper Cape Water Supply Reserve states that the area is dedicated to “(a) the

natural resource purposes of water supply and wildlife habitat protection and the development and construction of public water supply systems, and (b) the use and training of the military forces of the commonwealth; provided that, such military use and training is compatible with the natural resource purposes of water supply and wildlife habitat protection.” However, some planned activities on the northern 15,000 acres, such as a proposed multipurpose machine gun range, amount to a significant expansion of existing military use on the Reserve that challenge the concept of “permanently protected” and create new threats to the unique and diverse natural resources found there.

APCC provides the following recommendations for DFG’s consideration regarding actions for state, regional and local policy makers to help protect Cape Cod’s natural resources and to preserve and enhance the region’s biodiversity:

- Continue to acquire open space parcels in all 15 Cape Cod towns, with strong focus on priority natural resource areas, and to provide additional funding sources for open space acquisition.
- In addition to purchasing open space, expand the use of innovative planning strategies and regulatory tools to protect natural resources and biodiversity. Adopt zoning changes that direct growth to locations with redevelopment opportunities and that have appropriate infrastructure, thereby limiting sprawl and minimizing impacts to natural resources.
- Increase restoration of natural resource areas, including:
 - Cranberry bogs: Support the restoration of cranberry bogs to wetlands to enhance carbon sequestration and flood storage, improve water quality, and improve habitat restoration.
 - Salt marshes and freshwater wetlands: Support the restoration of wetlands through the removal of dams and undersized culverts to restore flows, installing stormwater treatment practices, and utilizing other water quality improvement strategies. Facilitate restoration efforts by streamlining the regulatory process. Provide opportunities for salt marshes to migrate inland in response to sea level rise.
 - Rivers: Support the restoration of rivers through the removal of undersized culverts, installing stormwater treatment practices, restoring migratory fish passages, and utilizing other water quality improvement strategies.
 - Freshwater ponds: Reduce future development potential around pondshores, maintain vegetated buffers around ponds, eliminate fertilizer and pesticide use near ponds, and ramp up programs to eliminate aquatic invasive species.
 - Water quality management: Promote water quality improvement initiatives and

the development of wastewater infrastructure, which will help restore impaired water bodies and thereby protect and restore habitat for native flora and fauna.

- Promote the use of native landscaping, which will enhance biodiversity, help restore fragmented habitats, and support pollinator species.
- Increase the protective buffer around vernal pools to 350 feet to allow more upland habitat for vernal pool obligate species.
- Increase NHESP documentation for priority and estimated habitats. To assist in this effort, NHESP should work with conservation groups to develop robust programs to document and map state-listed species.
- Increase educational programs and other outreach initiatives to remove and control invasive aquatic and terrestrial plant species. The state should work with conservation groups to develop local programs to identify and map the locations of invasive species in order to improve state data sets for tracking and eradication.
- To increase protections of native pollinators and other species, promote the reduction of pesticide use through educational programs directed at municipalities, homeowners and businesses. The state should provide municipalities with greater local control in regulating pesticide use.

APCC greatly appreciates the opportunity to provide comments on this important initiative aimed at enhancing biodiversity. We stand ready to assist DFG and the Commonwealth in the effort to promote policies and programs that will advance this initiative in the Cape Cod region.

Sincerely,



Andrew Gottlieb
Executive Director

Acton Select Board Member

Name: Alissa Nicol

Affiliation: Government

I participated in the public listening session on July 17, but ran out of time to mention the following:

Better protection of open meadows, critical habitat to support biodiversity, and not as plentiful as forests and wetlands

Improve awareness and enforcement of the state's nutrient management regulation, i.e. phosphate fertilizer restriction for turf, no phosphate unless soil has been tested and found to be deficient; vendors are required to post flyer featuring this law, but most don't; this is possibly the least known, most poorly enforced environmental regulation in Commonwealth

More financial and technical support is needed for municipalities to remove dams and restore riverine habitat, as well as culvert upsizing

Andover Pollinator Pathway, Member

Name: Maria Bartlett

Affiliation: NGO/Community Group/Non-profit

It is important to address the wide use of pesticides in MA, especially the mosquito/tick spraying services that are hired by home owners. These services are everywhere, are costly, effective with only about 10% of adult biting mosquitos, kill ALL insects including beneficial ones and drift into neighboring properties. The retail sale of neonicotinoids in MA is a great step forward, but these services use pyrethroid compounds that are not banned. This is a big problem!

Arlington Open Space Committee, Co-Chair

Name: Elisabeth Carr-Jones

Affiliation: Government

Thank you for this presentation and listening session. Governor Healey's Executive Order No. 618 is an inspiring effort to support biodiversity conservation. I hope that Massachusetts will follow through with its implementation and I look forward to continued participation in the process.

I would like to reiterate the comments of David Morgan, Arlington's Environmental Planner, about the need for the Department to provide technical assistance to cities and towns. We will need support to set local priorities and implement these sustainability initiatives.

Finally, I suggest that the Fish & Game Department's name be changed. Fish & Game Departments have traditionally been focused on manipulating natural environments to the benefit of hunting and fishing species, often to the detriment of others. The name is therefore counterproductive to the goals of promoting climate resilience and preserving natural biodiverse ecosystems.

Barnstable County Assembly of Delegates, Assembly Delegate

Name: Lilli-Ann Green

Affiliation: Government

Biodiversity and offshore wind are not compatible concepts. If MA truly cares about the environment and biodiversity then you must stand up and do the right thing. Stop offshore wind. If it is not stopped, and truly responsible solutions implemented, our oceans are threatened. Even the air we breathe may be diminished because the natural movement of diatoms will be adversely impacted. Critically endangered species such as piping plovers and North Atlantic Right Whales will be adversely impacted. Rare, threatened and endangered birds will be killed.

10 GW of wind energy off of our iconic Cape Cod National Seashore (CCNS) is not only wrong, it violates the Foundation Document of the National Park Service and also the Foundation Document of CCNS. Furthermore the Bureau of Ocean Energy Management (BOEM) violated its mission statement and did not engage the elected officials and the public in Barnstable County and other MA coastal communities during the planning phases of wind development in the Gulf of Maine. I'm quite certain if BOEM had done the right thing and followed its mission statement, biodiversity would have been discussed and explored as it should be prior to any major development.

Biodiversity is the cornerstone of ecology 101. If our Commonwealth policies diminish biodiversity, climate change could very well become a minor concern next to the destruction of our oceans near Cape Cod, Nantucket, Martha's Vineyard and Southeastern MA and that implication. Furthermore, according to BOEM statements about current approved wind developments, wind turbines will only make marginal and insignificant reductions to climate change. In fact wind turbines may add more destructive elements to the equation, especially if they diminish biodiversity.

Of course the implications of an approximate 60 ton and over 350 foot long wind turbine blade plunging into the ocean is still being determined in the Vineyard Wind disaster that took place this summer season. Significant debris has washed up onto areas where the critically endangered piping plover is nesting. There is indeed toxic material in that blade. Popcorn sized pieces of debris has been washing up on beaches and huge chunks of debris as far as RI as well.

BOEM plans to conduct lease sales in October for 1,000 wind turbines 300 feet higher than the Vineyard Wind 900' wind turbines with one blade failure so far. There have been two blade failures in the only other wind development using the same wind turbines. The Dogger Bank turbines just started operating recently.

According to land based wind data, at least 15 wind turbine blades will fail per year for the 1,000 wind turbines. That number doesn't take into account the weather patterns in the Atlantic Ocean. What is the tipping point for MA to wake up and realize that biodiversity will be severely and adversely impacted if we follow the course of action to site 10 GW of wind energy off of our iconic national seashore? Just because climate change is an existential crisis doesn't mean we should sanction irresponsible and environmentally destructive industry driven options. We must clearly analyze the situation. We must

stand firmly on the knowledge that adversely impacting biodiversity is a loose/loose proposition. I hope the people in this department will use good common sense, oppose offshore wind and fight to preserve and protect biodiversity.



BEYOND PESTICIDES

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Statement of Beyond Pesticides, LEAD for Pollinators, and Northeast Organic Farming Association (NOFA) Massachusetts

Massachusetts Department of Fish and Game

August 30, 2024

Representatives of the Massachusetts Department of Fish and Game, we appreciate the opportunity to comment on the proposed *Biodiversity Conservation Goals* and stress the importance of adopting regulations that protect and enhance biodiversity, public health, and climate resilience. Beyond Pesticides and co-signers are in support of Governor Healey's leadership at the intersection of these monumental issue areas with a forward-thinking vision to integrate holistic policy solutions across the Commonwealth of Massachusetts.

This document is being submitted by Beyond Pesticides and co-signer organizations listed below. Beyond Pesticides is a national, grassroots, membership organization that represents community-based organizations and a range of people seeking to improve protections from pesticides and promote alternative pest management strategies that reduce or eliminate a reliance on toxic pesticides. Our membership spans the 50 states, the District of Columbia, and groups around the world. We are providing this testimony on behalf of our members and supporters in Massachusetts.

We urge the Commonwealth of Massachusetts, in developing the *Biodiversity Conservation Goals*, to adopt a broad government-wide strategy that establishes biodiversity protection and enhancement as a basic tenet for all programmatic decisions going forward. In this context, the following issues, among others, stand out as emblematic of issues that require attention under the Commonwealth's *Biodiversity Conservation Goals*: (i) Ecologically-based mosquito management requirements, (ii) aggressive efforts and chemical restrictions to protect pollinators and stave off the "insect apocalypse" and wildlife decline, and (iii) organic land management practices for all Commonwealth lands in accordance with defined practices and allowed substances in conformance with the federal National Organic Program's National List of Allowed and Prohibited Substances.

In the face of federal stagnation on biodiversity protections, the leadership of state and local governments are critical to the ongoing disregard of escalating ecosystem deterioration. The United States has yet to sign or ratify the United Nations *Convention on Biological Diversity* as of the last Convention of Parties in 2022, despite ratification by 196 nations worldwide.¹ The health of soil and microbial life, air, waterways and coastlines, pollinators and insect populations, ecosystems and farmland, is at stake. In a 2024 opinion piece published in *The Lancet*, one of the oldest running and internationally respected public health journals,

researchers declare “the imperative role of comprehensive research and conservation strategies has never been as pressing.”²

It is critical that the Commonwealth take a broader approach, in response to the cascading impacts of biodiversity collapse, the climate crisis, and public health threats, that defines the current ecological crisis with consideration of the large body of peer-reviewed scientific findings and the following goals:

1. Mosquito management must adopt measures that recognize the benefit of preventive strategies, which establish source reduction programs that manage breeding sites on public lands and educate on the management of private lands, employ programs for larval management with biological controls, and eliminate the use of toxic pesticides.
2. The prohibition of systemic insecticides and treated seeds, including neonicotinoids, must include programs that disclose information on the use of all pesticides in the Commonwealth through a virtual database, educational opportunities to instruct the public on accessing this information, and coordinate with universities and experts to provide readily available information and scientific literature on the adverse effects of toxic pesticides.
3. Land management on public lands must adopt regenerative organic principles and organic certified practices and products, including hospitals, higher education institutions, schools, and parks, among other areas to transition to an alternative, viable system that prioritizes long-term health of the public, ecology, and economy.

Main Recommendations

In alignment with the values and input of frontline communities, scientists, farmers, farmworkers, and advocates across the Commonwealth, we recommend that the following be incorporated into the *Biodiversity Conservation Goals*:

Task the Executive Office of Energy and Environmental Affairs, in consultation with relevant offices, to:

1. Adopt an ecologically based mosquito management plan that emphasizes aerial and ground spraying prohibitions by 2030;
2. Prohibit the use of toxic petrochemical fertilizers, pesticides and pesticide treated seeds, including neonicotinoid insecticides, on public lands by 2030;
3. Adopt the National List of Allowed and Prohibited Substances, in alignment with National Organic Standards (CFR 7 U.S.C. 6517)³, as the official allowed and prohibited inputs for public lands by 2030; and
4. Emphasize and identify interagency coordination to ensure Commonwealth programs are coordinating under the goals, correcting for past problems with interagency communication and contradictory programming.

These goals are not the ceiling for policy actions needed to meet the challenges but demonstrate a starting point to address the mounting crises on our doorstep.

Ecologically Based Mosquito Management Plans

Many of our degraded wetland systems contribute to the spread of mosquitoes. Instead, a shift to more public education and more proactive wetland education would preserve these habitats, including mosquito predators. Pyrethroid insecticides are the chemicals of choice for pest management strategies, particularly for transmission of mosquito-borne dengue fever, arbovirus, Zika, malaria, among other diseases. Unfortunately, studies show that reliance on pyrethroids jeopardize agencies' ability to protect the public against these diseases in common mosquito species (*Aedes aegypti* and *Culex quinquefasciatus*), leading not only to genetic mutations that cause rapid resistance, but also female mosquitoes learning how to evade spraying through smell.⁴ There are decades of expert research, model policies, and information around mosquito control and mosquito-borne diseases to draw upon.⁵

Legislators are considering the policy on this matter. An existing bill, S.445/H.845, incorporates the second goal (mentioned above) that we support in concept. Advocates in our network were disappointed that agency participants in the Mosquito Control for the 21st Century Task Force⁶ did not support the recommendations banning aerial spraying and allowing municipalities to opt out of ground spraying,⁷ decisions that—if approved—ignore documented evidence of adverse impacts of the movement of pesticides through the air, streams, and soil.

Researchers have found viable alternatives⁸ to pesticide use for pest management, such as utilizing beneficial insects that prey on pest insects. Creating habitat for these insects includes planting different flowers that attract syrphid flies—which are known to consume various garden and on-farm insect pests—in Massachusetts and the surrounding New England area.

Neonicotinoid and Systemic Insecticides

There is a need to adopt an integrated pest management approach, with the criteria that the permissible pesticide use is consistent with systemic insecticide prohibitions and the *National List of Allowable and Prohibited Substances*.

Insects, particularly pollinators, are under existential threat from neonicotinoid (neonic) insecticides and neonic-treated seeds. A study published earlier this year in *PLOS One* found that globally, populations rates are projected to decline by as much as 30 to 50 percent within the next two decades.⁹ In Midwestern states, the coveted monarch butterfly (*Danaus plexippus*) saw precipitous declines in abundance beginning in 2003—coinciding with increases in neonicotinoid use on commodity crops.¹⁰ A meta-analysis of the last three decades of studies indicates impacts on pollinator anatomy leading to colony collapse and developmental issues that undermine the reproduction of bees.¹¹

As of 2024, there are five states—Maine, New Jersey, Nevada, New York, and Vermont—that have passed legislation to eliminate, with some exceptions, the use of neonicotinoid pesticides for outdoor nonagricultural purposes.¹² Seven additional states—California, Colorado, Massachusetts, Maryland, Minnesota, Rhode Island, and Washington—have prohibited the homeowner use of neonicotinoids and only permit licensed operators to spray.¹³

The casual use of toxic chemicals has led to unintended consequences, including pesticide resistance in mosquitoes¹⁴ and antibiotic resistance in humans.¹⁵ Meanwhile, research shows that organically managed systems sequester more carbon dioxide per acre than chemical intensive operations, as well as reducing acidification of the environment, net greenhouse gas emissions, energy use, and biodiversity loss.^{16 17}

Advocates implore the Commonwealth to go further than this “whack-a-mole” approach of individual and class-wide bans of pesticides and subsequent use of replacement toxic pesticides. The solution? Adopt a holistic transition in alignment with organic land management practices and restrict allowed materials to the National Organic Program’s *National List of Allowed and Prohibited Substances*.

National List of Allowed and Prohibited Substances

With the passage of the *Organic Foods Production Act* in 1990, the National Organics Standards Board (NOSB), a statutorily mandated independent advisory board to the U.S. Department of Agriculture (USDA), is tasked an oversight function and the determination of acceptable inputs—including pesticides—that do not jeopardize biological health in water, soil, and living beings. The *National List of Allowed and Prohibited Substances*, if adopted as the only acceptable list of substances, inputs, nonsynthetic fertilizers, and pesticides on public lands, would instantaneously prohibit the use of most toxic pesticides with documented adverse health effects currently on the market. The List is subject to an NOSB public hearing and comment and the federal rulemaking process.

Pesticide mixtures, including insecticides, are proven to have existential impacts on ecosystem integrity. Even at individually low levels found in aquatic ecosystems, researchers build on existing literature that demonstrates how groups of pesticides cumulatively amplify as they move up through the food chain. This exposure adversely affects fish,¹⁸ microorganisms,¹⁹ amphibians,²⁰ mammals,²¹ and sensitive ecosystems like coral reefs.²²

USDA identifies 4.89 million acres of organic-certified land in the United States as of 2021²³—with potentially millions of additional acres that adopt practices consistent with organic land management practices and principles. Communities and institutions across the nation are determined to move beyond the rampant use of toxic materials as chronic illness soars and ecosystems are left in a troubling state.

As you consider the development of these Goals, supported by the scientific findings and citations in this statement, we urge that recognition be given to the dire need to improve

safeguards concerning not just neonicotinoids—hazardous insecticides that harm pollinators, birds, wildlife, soil and aquatic organisms, and human health, as well as contaminate surface and drinking water—but also set forward-thinking policies and regulations that replace all toxic pesticides with organic land management principles and approved inputs.

Interagency Coordination

There are currently examples in which various programs within a department are not consistent with the stated objectives of the *Biodiversity Conservation Goals*. For example, various departments within the Executive Office of Energy and Environmental Affairs—including Department of Agricultural Resources—lead the Growing Wild program, which is designed to “reverse the loss of biological diversity, foster and protect endangered species,”²⁴ but at the same time support widespread routine use of pyrethroid pesticides, for example, that are extremely toxic to those species and ecosystems.

A robust *Biodiversity Conservation Goals* framework will address gaps in the U.S. Environmental Protection Agency (EPA) regulations that threaten the safety of residents and ecological stability of the Commonwealth of Massachusetts. These gaps include critical shortcomings in EPA ecological risk assessment that include, but are not limited to, underestimating risks of pesticides on pollinators,²⁵ failure to quantify the alleged economic benefits of pesticide use,²⁶ noncompliance with the *Endangered Species Act*,²⁷ and cumulative exposure to numerous pesticides.²⁸

Conclusion

We appreciate that the Commonwealth of Massachusetts is considering biodiversity conservation in a multifaceted framework. Executive Order 618 charges the Commissioner of the Department of Fish and Game to “recommend biodiversity conservation goals for 2030, 2040, and 2050 and strategies to meet those goals, including coastal and marine biodiversity conservation, to halt and reverse the loss of the variety of species and habitats of Massachusetts” and “conduct a comprehensive review of the existing efforts of all executive department offices and agencies to support biodiversity conservation in Massachusetts.”²⁹

Massachusetts has often played a leadership role in protecting public health in the context of pesticide use. We applaud Governor Healey’s proclamation to establish May 12-18 as Multiple Chemical Sensitivity (MCS) Week,³⁰ joining with other states that recognize public health threat that pesticide pose.

At a time of cascading and intersecting public health, biodiversity, and climate crises, we must stop the use of toxic petrochemical-based pesticides that are found to cause harm. At the same time, we must also move toward an approach that incentivizes sustainable practices that do not necessitate these chemicals to meet pest management goals. Our recommendations above serve as a baseline of policy priorities that the Commonwealth must adopt to advance a holistic vision for preserving and enhancing biological diversity, health, and climate resilience.

We would be happy to work with the Department of Fish and Game to achieve these broader health and sustainability goals going forward. With the adoption of these proposed goals, we urge the Commonwealth to act in the context of eliminating damaging pesticides that can be replaced by practices and materials compatible with the environment and public safety.

Thank you for the opportunity to comment.

Jay Feldman, Executive Director—Beyond Pesticides
Max Sano, Organic Program Associate—Beyond Pesticides
Renée Scott, Pollinator Network Coordinator—NOFA-Massachusetts
Michele Colopy, Executive Director—LEAD for Pollinators, Inc.

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Biodiversity for a Livable Climate, Executive Director

Name: Beck Mordini

Affiliation: NGO/Community Group/Non-profit

Biodiversity for a Livable Climate applauds the state's leadership in protecting biodiversity and the importance of this Executive Order to coordinate those efforts and create statewide goals. We were happy to play a role in initiatives such as the Healthy Soils Action Plan. We continue to support eco-restoration efforts to address climate change through education, outreach and direct restoration activities such as the planting of mini-forests in urban areas.

We would like to emphasize the importance of intact, mature ecosystems as irreplaceable jewels standing in for the nearly non-existent virgin forests. These ecosystems do so much more than sequester carbon, playing essential roles in regulating drought, rain, flooding, heat and fires.

While trusting your expertise: we offer a few guidelines we hope to see incorporated:

- 1) Attention to language. Choose the terms that carry the most protection, with "old-growth" forests being more easily manipulated than "mature" forests. "Conservation" leaves open future uses, while "preservation" implies permanent protection.
- 2) Strict standards of protection. Define according to the USGS Protected Areas Database as GAP 1 and GAP 2 levels of protection and not pretend that GAP 3 (farms and parks) provide the same ecosystem services as wildlands.
- 3) Accept no loopholes. Conflicting studies have created misconceptions that pit ecological goals against the preservation of the few remaining mature forests we have. Massachusetts' biodiversity goals must guard against seemingly innocent or well intentioned loopholes in forest protection.

For example, arguments for logging in support of solar farms, bird habitat or even fire suppression (see bio4climate.org/fire) are misguided and scientific evidence exists to support what common sense tells us- logging is not good for the forest ecosystem. Placement of solar farms in biodiversity hotspots and protected areas has been shown in research by Mass Audubon to be unnecessary to meet MA's clean energy goals and not cost effective when carbon costs are factored in (as discussed with the Director of Bio4Climate in our GBH series)

Thank you for making it clear that biodiversity is not just about feeling good about protecting specific species- it is critically important to the ecosystems that support the human species as well.

Brewster, MA, Chair, Open Space Committee, Planning Board and Community Preservation Committee Member

Name: elizabeth taylor

Affiliation: Government

This was an excellent presentation and the comments were equally on point. It would greatly help if the State aligned with towns to provide funding as well as leadership to better preserve habitats and rare and endangered species, while encouraging biodiversity. I see many invasive plants for sale in local stores and wish there was some way to curtail this. A major issue is the prevalence of pesticides/herbicides in our environment. We are trying to encourage/protect biodiversity, yet the state allows so many pesticides which runs counter to protecting our environment. Our drinking water is in danger from so many of these hazards. Brewster has excellent water, yet all it takes is one spill and we can lose this. The best way to help biodiversity is education. People need understand what is at stake and take responsibility for preservation and bettering our environment. Thank you

Cape Cod Museum of Natural History, President, Brewster & Green Briar Nature Center, Sandwich

Name: Robert F. Dwyer

Affiliation: NGO/Community Group/Non-profit

Cape Cod Museum of Natural History/Brewster

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Harnessing Biodiversity for Biomimicry Innovation on Cape Cod

Biodiversity, with its vast array of species, genetic variations, and ecosystems, is the foundational resource for the field of biomimicry.

“Biomimicry is about valuing nature for what we can learn, not what we can extract, harvest, or domesticate. In the process, we learn about ourselves, our purpose, and our connection to each other and our home on earth.” The Biomimicry Institute

The Cape Cod Museum of Natural History in Brewster, MA, has been exploring the essential relationship between biodiversity and the field of biomimicry and illustrating how the rich diversity of life forms and ecosystems can serve as a cornerstone for innovative and sustainable human solutions. Biomimicry opens a world of possibilities for creating 21st Century solutions inspired by the resilience and efficiency of the natural world

In studying and emulating nature's time-tested strategies, we can explain how technologies and practices address and solve human challenges in ways that are both effective and sustainable. This intersection of natural diversity and human ingenuity prompted us to trademark two phrases, “nature is the pathway to science and innovation™” and “nature is the pathway to science and invention™”.

By leveraging Cape Cod's biodiversity, biomimicry can foster technological, environmental, and social innovations that are both effective and sustainable. The Cape Cod Museum of Natural History (CCMNH) plays a vital role in promoting biomimicry through its diverse exhibits and educational programs, including its Coastal Explorer Science Van, classroom visits, and the KidSummer Nature Program.

Cape Cod's unique environment offers a rich tapestry of biodiversity. This biodiversity includes species diversity (e.g., piping plovers and ospreys), genetic diversity (e.g., the varied genetic makeup of the Eastern box turtle), and ecosystem diversity (e.g., ocean, salt marshes, estuaries, coastal dunes, forests, freshwater ponds and heathlands). The CCMNH fosters an understanding and appreciation of this biodiversity, paving the way for innovative applications through biomimicry.

Biodiversity is crucial for the health and functionality of Cape Cod's ecosystems, ensuring resilience to environmental changes, supporting ecosystem services, and contributing to the region's overall stability

and productivity. CCMNH plays a key role in educating the public about the richness of biodiversity on Cape Cod, and the challenges faced in supporting the fragile environment of the peninsula. Learning from nature, not simply about nature, is crucial. By embracing principles of biomimicry, the biodiversity of Cape Cod can be celebrated and supported.

The Museum's outreach includes our

-Coastal Explorer Science RV Van; mobile nature education programs;

-Exhibits and Classroom Visits: CCMNH's in-house exhibits and educational out-reach visits highlight local ecosystems and species;

-KidSummer Nature Program: This immersive program about local species' adaptations, and challenges students to think about future innovations helpful to solving local, regional or global problems.

Conclusion

Biodiversity is a cornerstone of biomimicry, offering a rich source of inspiration and practical solutions for human challenges. By studying and emulating nature's strategies and systems, we can develop technologies and practices that are sustainable, efficient, and resilient. Conservation of biodiversity is crucial not only for maintaining ecosystem health but also for fostering innovation through biomimicry.

Bare Hill Pond Watershed Management Committee, Town of Harvard, Chair

Name: Bruce A Leicher

Affiliation: Government

Our major comment is to express our concerns with the Department of Fish and Games current policy regarding ecological restoration of lakes and ponds. Rather than taking a carefully, case by case approach, based on data collected by a community, during the past year, the Department of Fish and Game did not respond to a request for consultation, and without carefully reviewing over 20 years of habitat monitoring data, and a carefully designed program to restore the habitat of Bare Hill Pond in Harvard, sent a form letter to DEP in connection with the filing of a Notice of Intent to continue a highly successful program to reduce phosphorous and invasive species in Bare Hill Pond. Ultimately, after DEP realized that the Department of Fish and Game would not respond to a request for a meeting, the DEP approved an Order of Conditions, but the delay interfered with the conduct of the ecological restoration project during the last year.

Bare Hill Pond has a carefully designed program to conduct winter draw downs of the Pond. Over the past 20 years, the level of phosphorous and the extent of invasive milfoil and fanwort have been significantly reduced. The phosphorous is removed from the Pond and absorbed using a nature based solution, multiple miles of vegetated wetlands down stream of the Pond. The outflow is carefully controlled to ensure that the volumes of water do not disturb downstream habitat. This is also facilitated by the significant wetlands created by multiple road crossings between the dam and where the flow becomes a stream. The phosphorous has been reduced below the targeted TDML. This project was constructed and funded under the 319 program.

The comments submitted by the Department of Fish and Game appeared to be a general policy against winter draw downs regardless of the local data supporting its use. This years data show the substantial reversal of the progress made over 20 years by missing the opportunity to conduct a draw down last winter. The evidence cited in the letter was a doctoral thesis, which was useful, but not relevant. The thesis stated that in the absence of 10 or more years of monitoring data showing no harm, that draw downs should not be conducted. It ignored the facts at Bare Hill Pond where there are over 20 and nearly 25 years of monitoring data demonstrating that amphibian, reptile and fish populations have not been impacted and that fish populations without stocking are thriving. In addition, there has been a significant restoration of native plant species and the milfoil and fanwort were previously controlled.

We also note that winter draw downs are not a single activity on which protection of the habitat relies. Multiple rain gardens have been installed at all the major sources of non-point source pollution into Bare Hill Pond. In addition, Diver Assisted Suction Harvesting is being used to control spot areas of invasive growth that remain wet in the winter and are not subject to winter draw down control. All of this is documented in a Watershed Management Plan that is evidenced based and relies on multiple activities to protect and preserve the habitat. See <https://acrobat.adobe.com/id/urn:aaid:sc:US:8ac1cac7-cec2-4c7f-b9bf-2bc6f7ddf13c>

We respectfully request that the Department of Fish and Game alter its one size fits all policy pertaining to the winter draw down of lakes and ponds so that the biodiversity and habitat of Bare Hill Pond can continue to be protected and not lost to eutrophication and invasive species overgrowth. While it may be the case that many winter draw downs are not appropriate planned, timed and monitored to assure that habitat and biodiversity are enhanced, the over 20 years of data on Bare Hill Pond demonstrate that the winter draw downs in fact are enhancing biodiversity.

The objections taken by the Department of Fish and Wildlife, while perhaps well intentioned, are contrary to the goals of the Executive Order.

Berkshire County Conservation District

Name: Ambrose C.

Affiliation: Government

We have a strong coalition of non-profit and state groups that support some efforts, but we cannot compete with the huge bankrolls of money putting up fossil fuel extraction pipelines and low-income housing on untouched forests. While low-income housing is essential to keeping our community together, empty houses are one third to one half of each neighborhood. Short-term rentals are a small portion of what causes our residents to relocate. We have enough housing here that is not used to its capacity. Luxury housing is a dangerous cancer in our area and we need help in the MA legislature to protect our land from extraction and hoarding.

We work with farmers on soil health practices, but are limited by our funding.

Some project ideas are: reimburse farmers for all applied cover crop seeds, Coordinate efforts to use municipal and invasive cuttings to produce biochar which can be applied to soil, fine suppliers who bring plants from out of eco-region or out of country and use fees collected to support native ecotype cultivation, train all state and town road and landscape crews on ecosystem functions.

Thank you.

Cape Cod Museum of Natural History, Vice Chairman

Name: Raymond L. Hebert

Affiliation: NGO/Community Group/Non-profit

We hope encourage the Division to reach out to non-profit educational organizations (Scouting, Campfire, Ymca) with a list of speakers for merit badges counselor education or speaker series, to spread the awareness of the mission.



August 30, 2024

Commissioner O'Shea
Massachusetts Department of Fish and Game
100 Cambridge Street, Floor 6
Boston, MA 02114

By Electronic Submission to DFG.info@mass.gov

RE: Biodiversity Goals for the Commonwealth

Dear Commissioner O'Shea,

We applaud Governor Healey's leadership in signing Executive Order No. 618, directing the Department of Fish and Game (DFW or the Department) to develop nation-leading biodiversity conservation goals. Thank you for the opportunity to provide feedback on the DFW's development of draft biodiversity goals ("Draft Goals") for the Commonwealth. Recognizing the urgent and continuing threats to biodiversity, only heightened by climate change, the City of Boston is committed to playing a proactive role in conservation efforts and expanding access to nature for all community members.

We look forward to leveraging the strategies developed by the Department, as biodiversity is integral to building sustainable and resilient cities. Highly developed urban areas like the City of Boston face distinct challenges in addressing these issues as much of the land has been impacted by human development from dense commercial and residential sections to transportation infrastructure. In this letter, we offer recommendations that acknowledge the different needs across the Commonwealth and propose adaptable strategies that municipalities can tailor to reach our shared goals. At a high level, our comments focus on three principles that the Draft Goals should advance:

1. **Consistency across agencies and flexibility in implementation of biodiversity policies**, including the establishment of a baseline biodiversity index that can be used to implement, monitor, and update policies. Goals should also build on and complement existing State and local efforts, including by developing guidance and incorporating biodiversity policies into existing regulations.
2. **Integrating biodiversity with urban planning and climate change preparedness efforts**, including balancing biodiversity conservation goals and strategies with long-term

sustainability and resilience projects. To meet established goals, the Department needs to ensure access to the necessary resources for municipalities to incorporate policies, including addressing native species supply issues, funding and guidance for invasive species management, reducing hurdles to urban agriculture and permaculture, and tools to support and encourage green infrastructure.

3. **Enhancing community education and engagement**, by supporting place-based learning and access to green infrastructure in classrooms, providing learning opportunities beyond the classroom, and increasing accessibility to green spaces for all.

I. Consistency Across Agencies and Flexibility In Implementation of Biodiversity Policies

Given how difficult it is to create an effective “one size fits all” approach for the diverse array of habitats and communities in the Commonwealth, we encourage the Department to develop biodiversity policies that are both adaptable and additive to existing efforts and regulations. This approach would allow municipalities to tailor biodiversity conservation strategies to address their specific ecological and community needs. To successfully implement key strategies, the Department should equip municipalities and other State agencies with the necessary guidance and funding to make informed decisions and actively contribute to achieving the Commonwealth’s biodiversity goals.

A. Establish a Baseline Biodiversity Index That Can Be Used to Implement, Monitor, and Update Policies

To effectively track and monitor the Commonwealth’s progress in achieving specific biodiversity conservation goals, a comprehensive baseline should be established that incorporates and builds on previous findings, *e.g.*, the State Wildlife Action Plan. The City Biodiversity Index, also known as the Singapore Index, is a model of an existing self-assessment tool that allows cities to evaluate their biodiversity baseline and monitor their progress.¹ The Department should lead a similar state-level initiative or provide municipalities with the necessary funding, staff, and additional needed resources to conduct these assessments. Distinct urban, suburban, and rural indices are likely to capture different species and distribution, and these may be informed by existing citizen-science data initiatives like iNaturalist or eBird. We recommend that the Department establish clear guidance to ensure the baseline index is periodically updated, monitored, and assessed at an appropriate frequency— frequent enough to support informed decisions, yet not so often that it imposes a financial burden.

More targeted research and data collection to (i) analyze current climate stressors on biodiversity and (ii) project the future impact of climate change on the Commonwealth’s biodiversity is

¹ <https://citieswithnature.org/cbi-introduction/>

needed to develop successful conservation strategies. The City supports the Department’s consideration of “room to move” by planning for climate migration with climate change management plans for marine fish and invertebrates. However, there needs to be a broader assessment of short-term and long-term climate impacts on biodiversity, with projections used to inform the development of biodiversity targets and guidance, *e.g.*, identifying the best “native” species to plant while considering shifting planting zones as a result of rising average temperatures alongside the protection and propagation of endemic species.

B. Develop Guidance and Incorporate Biodiversity Policies Into Existing Regulations

In addition to continuing to provide clear guidance on (i) defining biodiversity, (ii) how to design with biodiversity in mind, and (iii) how to achieve biodiversity goals and targets set for the Commonwealth, the Department should collaborate with other agencies to incorporate biodiversity principles into existing regulations. By working across agencies, the Department can ensure that guidance provided to stakeholders is consistent, streamlined, and mitigates any conflicting policies.

The Department’s comprehensive review of existing efforts during Phase 1 of the biodiversity goals development process provides a strong starting point to identify key agencies with which to collaborate. The Wetlands Protection Act presents one such opportunity to embed biodiversity principles into a current regulatory decision-making process²; while not an exhaustive list of examples, we recommend that (i) biodiversity considerations are integrated into performance standards and (ii) biodiversity threshold evaluation indicators be developed for resource areas (or protected natural areas).

Performance standards are designed to ensure that a project’s activities do not negatively impact a protected area. Therefore, they should point to best practices for enhancing natural processes and supporting plants and animals that can thrive in various resource areas. The integration of biodiversity considerations should be supported by providing guidance and training to Conservation Commissioners on how to consider biodiversity when reviewing a project.

Biodiversity threshold evaluation indicators can assist in identifying and distinguishing areas rich with biodiversity from areas with lower biodiversity value. This differentiation can help inform decisions on where to prioritize investment in conservation efforts and streamline the permitting process for resilience projects in areas with lower biodiversity and at risk from climate impacts,

² Massachusetts Department of Environmental Protection promulgates the 310 CMR 10.00 Wetlands Protection Act Regulations. The regulations set forth a public review and decision making process for activities affecting protected areas in order to contribute to interests including flood control, storm damage prevention, prevention of pollution, protection of land containing shellfish, protection of fisheries and protection of wildlife habitat.

e.g., altering coastal wetlands drowning from sea level rise, despite the project having potential impacts on the resource area.

For example, the City of Boston's and City of Revere's joint Resilient Bennington Street and Fredericks Park Project aims to use nature-based and hybrid solutions to (i) reduce near- and long-term flood risk to surrounding residences and the MBTA Blue Line, (ii) improve public safety, multi-modal transportation, and recreational open space and (iii) enhance the habitat value of Belle Isle Marsh. Adding a vegetative berm is the preferred solution as it would protect important community assets from flooding; however, a small section of the vegetative berm would go through a salt marsh that is currently filled with phragmites in a degraded condition. A biodiversity threshold evaluation indicator may streamline the process of determining whether the existing condition or the proposed solution better supports biodiversity.

C. Build On and Complement Existing State *and* Local Efforts

As part of Executive Order No. 618, the Department has comprehensively reviewed existing State agency efforts. Strategies to achieve our biodiversity goals should support, complement, and enhance the work of agencies like the Department of Conservation and Recreation, which is already engaged in efforts to maintain more complex natural landscapes, *e.g.*, alternatives to mowed grass areas, traditional paving, and hardened or artificial shorelines, all of which typically require more resources. Developing and implementing the Commonwealth's biodiversity goals should also build upon and respect existing local initiatives and policies. Many municipalities across the Commonwealth already engage in initiatives that support biodiversity conservation. For example, the City is constructing green infrastructure projects, is managing the care of 29 urban wilds, and has a Supporting Indigenous Communities Program Manager who connects municipal work with the knowledge of local tribal groups. The Department should defer to successful programs rather than requiring municipalities to change them. The Department can help further local biodiversity efforts and encourage other municipalities to contribute to reaching set goals by providing any necessary resources, *e.g.*, toolkits, funding, and guidance (discussed further below in Section II). Municipalities can also assess their internal policies with appropriate funding and ensure alignment with state objectives.

II. Integrating Biodiversity with Urban Planning and Climate Change Preparedness Efforts

Biodiversity should not be viewed as a competing interest but as vital to ensuring sustainable, resilient communities. As the Department considers green planning and design strategies, we recommend a balanced approach that aligns immediate needs, *e.g.*, energy infrastructure, climate resilience projects, and affordable housing, with long-term ecological health. Integrating biodiversity conservation with urban planning and resilience efforts is essential to create a sustainable future for the Commonwealth.

A. Balancing Conservation Efforts With Sustainability and Resilience Projects

Biodiversity goals and strategies should be informed by a long-term view of impacts, recognizing that short-term impacts on ecosystems may be necessary to achieve long-term sustainability. Whether developing new energy infrastructure to reduce fossil fuel consumption to constructing new or adapted wetlands to absorb coastal and stormwater flooding, biodiversity considerations should take the long view.

Achieving our shared climate goals, including electrifying the building and transportation system, will result in an unprecedented increase in electric demand, particularly in the Boston metro area. As demonstrated by the Electric Sector Modernization Plans submitted to the Department of Public Utilities, meeting this demand while ensuring a reliable and resilient grid will require a significant investment in new infrastructure. We support the Draft Goals incorporating biodiversity through green planning and design, *e.g.*, creating a suitability siting tool for new energy infrastructure and informing housing and transportation goals and projects.

Additionally, the need to increase resilience to current and future flooding due to tidal and high-frequency storm events is underscored in multiple reports from the Commonwealth and the City. We need to protect what has been developed over the last several hundred years, including housing, jobs, and infrastructure. For example, the planned adaptation of salt marshes by adding a thin layer deposition to a site may be treated as filling an ecosystem but will provide long-term sustainability in the face of future climate impacts.³ Much of the City's coastline consists of filled land just above historic high tides, leaving coastal areas at risk from flooding and sea level rise. If adaptation intervention does not happen, ecosystems, housing, jobs, and infrastructure will be lost. The Department should refrain from developing policies that increase regulatory burden and limit or reduce resilience projects' flexibility in achieving their goals.

B. Ensure Access to the Necessary Resources to Incorporate Biodiversity Policies

Effectively integrating biodiversity strategies into urban planning and realizing goals requires access to the necessary resources. The Draft Goals present strategies to achieve objectives but must fully identify the resources required, *e.g.*, technical guidance, tools, and funding. Throughout the development process the Department should (i) identify the required resources to meet the strategies developed, (ii) consider the capacity of municipalities to implement the strategies, and (iii) support access to required resources. Examples of areas where the

³ Raposa, K., K. Wasson, J. Nelson, M. Fountain, J. West, C. Endris, and A. Woolfolk. 2020. "Guidance for Thin-Layer Sediment Placement as a Strategy to Enhance Tidal Marsh Resilience to Sea-Level Rise." Published in collaboration with the National Estuarine Research Reserve System Science Collaborative. (finding "there may be a trade-off between optimizing long-term sustainability of a marsh and decreasing vegetative cover in the short term.")

Department, in collaboration with other agencies, can support municipalities and communities with resources include the following:

- **Address Native Species Supply Issues.** The City supports the Department's proposal to develop a Biodiversity Toolkit that promotes native planting. However, to fully realize this goal, the State must address significant supply challenges, including the availability and affordability of native species to meet an already increasing demand.⁴ Ongoing projects have highlighted the necessity to support the native plants industry, as the City often had to make compromises on native plant selections based on limited availability. To increase accessibility and meet the growing demand, the State should incentivize nurseries, landscapers, and other suppliers to add or expand their inventory of native plants, foster partnerships with other States and federal agencies working to address supply issues, and assess the extent of availability issues within the Commonwealth through an inventory of current supplies and availability of native plants compared to invasive plants within the State's industry.
- **Funding and Guidance for Invasive Species Management.** To support invasive species management, the Department should target investments in extensive, long-term invasive species removal in existing green spaces as well as developing illustrated tools that instruct individuals how to identify invasive species and guidance on proper management, prevention, and removal.⁵ Additionally, the Department can incentivize creative methods of disposal that engage and raise awareness for the community to play their part in invasive species removal, *e.g.*, cookbooks of edible invasives like garlic mustard or finding ways to use Japanese Knotweed as animal fodder.
- **Reducing Hurdles to Urban Agriculture and Permaculture.** The City supports the Draft Goals' consideration of bolstering food security and municipal and community-led initiatives like Backyard Growers. This aligns with the City's focus on food justice and increasing food production in neighborhoods, including in public spaces like parks, schools, and community centers. Additionally, the Department can develop policies that incentivize the planting of edible plants, foraging guidelines and groups, and other initiatives that help address food insecurity.

⁴ National Academies of Sciences, Engineering, and Medicine. 2023. "An Assessment of Native Seed Needs and the Capacity for Their Supply: Final Report." Washington, DC: The National Academies Press. (finding "seed suppliers [...] reported the greatest challenges they face in supplying native seed are unpredictable demand, "difficult to grow" species, and lack of stock (starter) seed from appropriate seed transfer zones.")

⁵ Currently, the Department provides a link to the list of invasive plants identified by the Massachusetts Invasive Plant Advisory Group that includes a description of where the plant is found and other general information including how it spreads but does not include photos or methods of removal.
<https://massnrc.org/mipag/invasive.htm>

- **Tools and Information to Support and Encourage Green Infrastructure.** Green infrastructure can increase access to vegetative green spaces in densely developed urban areas, and also presents numerous co-benefits. Green infrastructure can reduce flooding and pollutant loading from stormwater runoff, reduce urban heat islands, add habitat value, improve air quality, and provide mental health benefits. The Department should provide guidance on opportunities to incorporate green infrastructure, as well as information about different types, and explanations of their benefits. Encouraging municipalities to prioritize green infrastructure for stormwater management can also lead to regional connectivity between green spaces, especially in largely developed areas. In addition to guidance, the Department should incentivize green infrastructure by providing municipalities with access to funds to increase capacity to plan and develop green infrastructure projects.

III. Enhancing Community Education and Engagement

The City supports the Department’s goal of instilling an inherent appreciation of nature at a young age, providing opportunities throughout people’s lives, and ensuring access to nature in neighborhoods. Examples in the Department’s proposal include launching the Nature in Our Schools initiative, support for Backyard Growers, and native planting initiatives. The Department should continue to look for and integrate strategies that empower communities through education and engagement, such as the following:

- **Support place-based learning and access to green infrastructure in classrooms:** Strategies to achieve the Commonwealth’s biodiversity goals should include education for all students, but any initiative should be additive, rather than mandatory, to current efforts. For example, Boston Public Schools has 83 school gardens, 38 outdoor classrooms, six green infrastructure sites (five pilot sites and one new rain garden), and five hydroponics programs. As discussed earlier, green infrastructure provides many co-benefit opportunities and should be encouraged in schools and other public spaces, including libraries and community centers.
- **Provide learning opportunities beyond the classroom:** We appreciate that the Department intends to create workforce pathways to climate and biodiversity jobs. In addition to creating pathways, the Department should support initiatives currently focused on workforce development. For example, the City currently has a green industry workforce development program called PowerCorpsBOS that provides young adults with the training, support, and connections to prepare them for employment in the green industry.⁶ The inaugural cohort of PowerCorpsBOS assisted with the management of 87 acres of public land, removed 284 bags of invasive material, and planted 61 trees.

⁶ <https://www.boston.gov/departments/workforce-development/powercorpsbos#team>

PowerCorpsBOS has also supported site restoration of Mattahunt Woods, removing invasive species, and increasing public access through trail enhancements.

- **Increase accessibility in green spaces for all:** The Department must ensure everyone not only has access to walkable green spaces but also the opportunity to interact with nature in a meaningful way. The first step toward achieving this goal is increasing accessibility to communities or groups that lack opportunities to engage and connect with nature. Strategies can include developing user-friendly, navigable maps that help the public easily learn and discover nearby green spaces and protected lands as well as culturally-relevant environmental education for diverse learners.

* * *

We appreciate the Governor's leadership on biodiversity and the Department's ongoing attention to and work on advancing biodiversity conservation in the Commonwealth. Thank you for your consideration of these comments. We look forward to future opportunities to engage in discussions around biodiversity goals, particularly in the City of Boston and other urban environments. Should you have any questions, please contact Alice Brown, Director of Environmental Quality (alice.brown@boston.gov; 617-635-4452).

Sincerely,

A handwritten signature in blue ink, appearing to read "Brian Swett".

Brian Swett
Chief Climate Officer, City of Boston



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Commissioner Tom O'Shea
Massachusetts Department of Fish and Game
100 Cambridge Street, Floor 6
Boston, MA 02114

August 29, 2024

Commissioner O'Shea,

The Charles River Conservancy (CRC) is thrilled to see Governor Healey issue Executive Order 618 and strongly supports the outline shared by the Department of Fish and Game (DFG). Thank you for the opportunity to provide input on the development of biodiversity conservation goals for the Commonwealth.

The CRC's mission is to ensure that the Charles River and its parks remain a well-maintained network of natural urban places that invite and engage all in their use and stewardship. Founded in 2000, we have worked diligently in partnership with the Massachusetts Department of Conservation and Recreation (DCR) and other stakeholders to promote the active use and vitality of the Charles River parks, increase recreational and educational opportunities, and implement interventions that support ecological health, biodiversity, and resiliency.

The CRC wholeheartedly supports the biodiversity conservation goals, particularly those focused on climate resilience and the integration of nature-based solutions. We are especially encouraged by the emphasis on landscape-scale and watershed-scale restoration to connect habitats, restore fish passage, support species migration, and facilitate ecosystem adaptation to climate change. We strongly support the development of tools to avoid impacts on important habitats, inform development projects, and guide clean energy initiatives. Crucially, we recognize the importance of connecting all these efforts with robust educational and programming initiatives in schools and lifelong learning opportunities to create a more informed and engaged community that actively supports conservation efforts.

The CRC's initiatives directly support and complement these biodiversity goals, including:

Floating Wetlands: Our floating wetlands project in the Charles River demonstrates innovative approaches to increase urban biodiversity and water quality improvement. These constructed ecosystems provide valuable habitat for aquatic species while engaging the public on the river's health and demonstrating concrete benefits of nature-based solutions.

Parklands Stewardship: Fueled by thousands of volunteers, our ongoing parkland maintenance and cleanup efforts contribute to improving the health, safety, and beauty of the Charles River parks. Within our Charles River Environmental Watch (CREW) program, a committed team of volunteers monitor assigned sections of the parks, report on local conditions, remove litter and invasive plants, and collect data on native and invasive plant growth in designated test plots to measure the success of our restoration efforts. By involving the community in these stewardship activities, we foster environmental awareness on the urban riparian ecosystem.

Vision for a Swimmable Charles: City Splash, our annual Charles River public swim event, highlights our vision of swimming as an integral goal in restoring the river's health. Our efforts demonstrate how urban river systems can be restored and managed to support both biodiversity and community access to clean, safe, swimmable waterways.

Thank you for your consideration of these comments. We look forward to working with DFG in making the biodiversity goals a reality for the Commonwealth. The Charles River Conservancy stands ready to contribute our expertise and resources to this vital initiative.

Sincerely,

A handwritten signature in black ink, appearing to read "Laura Jasinski". The signature is fluid and cursive, with the first name "Laura" being more prominent than the last name "Jasinski".

Laura Jasinski
Executive Director, Charles River Conservancy
ljaskinski@thecharles.org

The Compact of Cape Cod Conservation Trusts, Land Protection Specialist

Name: Kelly Grant

Affiliation: NGO/Community Group/Non-profit

1. The tools we have to implement these goals are very important. The Conservation Land Tax Credit has at least a 2 year waitlist and needs increased funding to make it an effective incentive for protection of habitat. Conservation Restrictions are another important tool but again have a lengthy timeline that makes it much less effective as a tool. This process needs to be fine-tuned and streamlined to significantly reduce wait times. 2. We are losing significant habitat through clear cutting for housing development and solar development. Housing development can be done smarter to reduce vegetation loss, and solar development should never clear vegetation especially until every paved surface and building has solar panels. 3. Towns need clear concise guidelines they can implement at the local level. Staff resources are limited, they need very practical assistance to tackle these issues.



Stewardship Council

September 19, 2024

Secretary Rebecca Tepper
Executive Office of Energy and Environmental Affairs
100 Cambridge St., 10th Floor
Boston, MA 02114

Dear Secretary Tepper,

We respectfully submit these comments regarding the drafting of Biodiversity Goals for the Commonwealth. We applaud Governor Healey for signing Executive Order No. 618 directing the Department of Fish & Game to develop biodiversity conservation goals for 2030, 2040, and 2050. We agree with the general approach of protecting, restoring, and sustaining species, habitats, and ecosystems and connecting all people to nature. As the Department of Conservation and Recreation owns and manages more acres than any other state agency and connects people to nature all across the Commonwealth, we expect DCR to be a central player in advancing these goals.

As an overarching statement, we strongly agree that **preserving biodiversity is a climate solution**. Loss of biodiversity and climate change are interrelated crises that must be solved together. Land conservation, restoration and stewardship strategies must seek to optimize our abilities to mitigate and adapt to climate change as well as maintain and increase biodiversity.

Protect

- We applaud the goals of protecting 30% of Massachusetts land and waters by 2030 and 40% by 2050. The 2050 goal must be seen as a minimum.
- DCR must be adequately funded and staffed to accelerate its pace of land conservation for biodiversity and for recreation.
- DCR's land conservation strategy should prioritize biodiversity conservation, focusing particularly on unprotected BioMap Core and Critical Natural Landscape areas adjacent to existing state-owned land.
- DCR should continue to work with NGO partners to identify, fund and complete high impact land conservation projects.
- EEA should develop mechanisms to measure progress against each of the biodiversity goals. Specifically, EEA should upgrade the process for updating and maintaining GIS data on currently protected open space to ensure accurate metrics for this goal and to assist with land conservation planning.

Restore

- DCR and MassDOT should work closely together to become leaders in wildlife-friendly transportation planning. DCR parkways should be managed with wildlife in mind, particularly sensitive species directly affected by vehicle traffic. Parkway should be used to demonstrate effective wildlife passages including underpasses and overpasses.

- EEA should continue to direct DEP to update regulations to enable wetlands restoration at the pace and scale necessary to respond to the threats of climate change, particularly in salt marshes and other coastal habitats.
- DCR's Office of Dam Safety and the Division of Ecological Restoration must enhance partnership to accelerate the pace of dam removal. State agencies should develop a coherent community outreach and support service to answer the common set of questions that arise when a community is considering dam removal.

Sustain

- We continue to believe that carefully planned forest management can enhance biodiversity, support local communities, and help our forests adapt to future climate conditions. We agree with EEA's *Response to the Report of the Climate Forestry Committee* that "[r]ecognizing the carbon sequestration and storage implications, when necessary to meet habitat goals the Commonwealth will manage land to sustain biodiversity for at-risk species and Species of Greatest Conservation Need in selectively sited ecological landscapes."
- MassWildlife must develop and apply adequate methods to actively monitor and maintain white-tailed deer density at appropriate levels for forest health. The Hunters Share the Harvest program is admirable and should be expanded and supplemented with additional methods to reduce WTD density to current Wildlife Management Zone goals.

Connect

- DCR should be funded to increase nature-based education and outreach programs for all ages. All programs should have some biodiversity component, leveraging local stories to emphasize the importance of biodiversity.
- Recreation facilities must be sited and activities managed to avoid areas most valuable for biodiversity.
- DCR should partner with communities to create one or more Dark Sky Preserves centered on state parks characterized by low light pollution. Dark sky efforts are critical to biodiversity, stargazing programs are a great way to connect people to nature, and designated preserves can generate tourism activity in rural areas.

The entire Stewardship Council looks forward to working with Commissioner Arrigo and the talented DCR staff to advance their biodiversity goals.

Sincerely,

The DCR Stewardship Council

Jack Buckley, Chair
 Jeffrey Collins
 Ted Dooley
 Kevin O'Shea
 Jennifer N.S. Wilson

Melissa Harper, Vice Chair
 Dicken J. Crane
 Laura Jasinski
 Susan Smiley

Ann Canedy, Esq., Secretary
 Phil Doherty
 Vivian Ortiz
 Dennis Smith

Common Ground Land Trust, President

Name: Jan Parke

Affiliation: NGO/Community Group/Non-profit

Grants are needed for removing plant invasive species from ponds!

Viable fisheries for family recreation are sometimes beyond a municipality or vol organization to finance. Family fishing recreation is very often listed as lacking when towns do surveys for Open Space or Master Plans. Please address this lack of funding.

Common Ground Land Trust, President

Name: Jan Parke

Affiliation: NGO/Community Group/Non-profit

Our land trust owns land abutting Greenville Pond in Rochdale (Leicester)

We own the land that is the public input to this pond. the town owns the dam and pond. This is part of the headwaters of the French River which ultimately drains to Long Island sound. The pond is choked with water chestnut. We have been searching for grants to help with the eradication of this invasive plant. Twice the town has applied for MVP grants for this project but have not been awarded. Please address the lack of funding and grants for water invasive plant species.

Choking rivers also inhibit the viability of flood control dams. Municipalities and vol organizations need help that does not seem available.

DCR Service Forestry, Program Analyst

Name: Sara Wisner

Affiliation: Government

Hi everyone, I was wondering if the administration was going to address the growing number of coyote wolf hybrids in the Northeast. Eastern wolves from Canada have been coming down and reaching Massachusetts, trying to reestablish its past historical range and trying to taking up that missing ecological niche. They are mating and creating viable offspring with coyotes, genetic testing has revealed that many coyotes have 30% wolf in them. Obviously, wolves have/had been federally protected but coyotes are not and many times these animals are killed. How do you stop the killing of wolves and coyote/wolf hybrids? Wolves are a keystone species and are vital in creating balance within the ecosystem, i.e help control an overpopulation of deer, which has been missing from the Northeast landscape for so long. They are also considered culturally important species for the indigenous people of the Northeast. Will you be trying to promote and allow the wolves (and coyote/wolf hybrids) to reestablish its historic range?

I know certain organizations such as Project Coyote and The Northeast Wolf Recovery Alliance are trying to advocate more to be done to protect these species. Also educate the public on coyotes to reduce the fear associated with them.

Thank you



ELM

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August 30, 2024

Commissioner Tom O'Shea
Massachusetts Department of Fish and Game
100 Cambridge Street, Floor 6
Boston, MA 02114

Environmental League of Massachusetts Comments on Biodiversity Conservation Goals for Massachusetts

Dear Commissioner O'Shea,

The Environmental League of Massachusetts commends you and your team in the Healey-Driscoll Administration for your nation-leading work to integrate biodiversity goals into the Commonwealth's ongoing conservation and environmental protection work. ELM was proud to support the signing of Executive Order 618 to begin this process and is looking forward to continuing to partner with DFG, the Executive Office of Energy and Environmental Affairs, and your partner agencies as you begin the critical work of integrating biodiversity goals in both policy and practice.

Broadly, ELM is strongly supportive of the Department's efforts to establish ambitious, science-based biodiversity goals for the Commonwealth and to begin the process of operationalizing those goals in new and ongoing agency work. We wish to provide the following comments focused on successful integration of these goals throughout the Commonwealth to ensure that our 2030 targets and beyond receive the necessary support across the Administration to be achieved.

Ensure adequate resourcing of conservation work. Meeting our statewide biodiversity goals provides multi-pronged benefits and is a worthy investment of significant public resources. The Healey-Driscoll Administration must remain ambitious and committed to pursuing both operational and capital funding specifically for biodiversity efforts through the state operating budget, capital plan, and upcoming environmental bond legislation, as well as increasing spending on complementary programs that support this work, including the Division of Ecological Restoration, the Municipal Vulnerability Preparedness Program, and DCR's Watershed Management program. Without sustained multiyear funding for adequate agency staff, technical assistance, and direct support for landowners, municipalities, and other stakeholders, the Commonwealth cannot reasonably expect to meet the goals it establishes for itself.

Ensuring adequate financial resources are available for biodiversity will require partnership with and leadership from the Legislature to shepherd new spending priorities through their respective legislative processes. ELM remains enthusiastic in our efforts to partner with the Administration to educate the Legislature and the public on the importance of adequately resourcing this work, and we encourage the Department to engage early and often with state elected officials to build greater enduring support for this effort.

Prioritize projects with cross-cutting goals. As the Department rightfully notes in its materials, meeting our biodiversity and conservation goals provides many multi-pronged benefits, including emissions reduction through carbon sequestration, resilience to climate



ELM

ENVIRONMENTAL LEAGUE OF MASSACHUSETTS

change-related impacts, increased equity in which communities and populations have access to nature, and sustaining agricultural resources and the blue economy. In order to maximize the near-term impacts of this work, DFG should develop a system of prioritization that gives additional support and/or accelerated timelines to proposed project with demonstrable co-benefits in environmental justice, emissions reduction, drought and/or flood risk reduction, and increased food security.

At the same time, DFG should work with partner agencies, including the Department of Environmental Protection, the Executive Office of Energy and Environmental Affairs, the Executive Office of Administration and Finance, and the Office of Climate Innovation and Resilience to develop a method of prioritizing capital projects and relevant grant programs that provide biodiversity benefits in addition to their primary goals.

Integrate biodiversity and conservation into broader land use decision-making.

Sustainable development practices are central to meeting the Commonwealth's climate and clean energy goals as well as the state's biodiversity and conservation goals. The Department should work with the Massachusetts Environmental Policy Act (MEPA) Office to develop an assessment tool that can examine the impact, positive or negative, of proposed development projects under the jurisdiction of MEPA review to ensure that state regulators, stakeholders, and the public have adequate data to make informed decisions about project approvals and to facilitate beneficial modifications or mitigation plans when appropriate. Additionally, DFG should work with EEA and municipal partners to explore additional methods to proactively identify small but high-impact projects that do not rise to the threshold of MEPA review but may have significant impacts on biodiversity. Additional support may also be needed to ensure that local planning boards and conservation commissions are provided with the guidance and data needed to integrate biodiversity considerations into their reviews.

Together, integration of these recommendations will accomplish three key goals: 1. Ensuring that the goals required by E.O. 618 receive the necessary financial support; 2. Working to get the most "bang for our buck" out of public spending on conservation; and 3. Aligning planning work across agencies to prevent progress toward these goals from being inadvertently undermined. ELM encourages the Healey-Driscoll Administration to implement a committed "whole-of-government" approach to maximize the efficacy of the Department's dedicated work in this issue area.

Thank you for your consideration of these comments and for your ongoing work to spearhead this critical conservation initiative.

Sincerely,

David Melly

Legislative Director

Environmental League of Massachusetts

CC:

Rebecca Tepper, Secretary, Energy and Environmental Affairs

Melissa Hoffer, Climate Chief

Stephanie Cooper, Undersecretary for the Environment

Jennifer Ryan, Assistant Commissioner for Strategic Initiatives and Climate Policy

Earthwise Aware, Biodiversity & Climate Program Director

Name: Claire O'Neill

Affiliation: NGO/Community Group/Non-profit

Mitigating habitat loss in urban green spaces is crucial for maintaining and enhancing biodiversity. Urban green spaces, such as parks and community gardens, often face challenges like overuse, trampling, and the creation of user trails, which degrade habitats and reduce their ability to support diverse species. By implementing measures to protect these areas, such as designated pathways and educational programs about responsible use, cities can help preserve the ecological integrity of these spaces.

Creating invasive species management plans at the city level is another essential step for urban biodiversity. Invasive species outcompete native plants, disrupt local ecosystems, and reduce biodiversity. Strategic planning and active management of invasive species can help restore native habitats and support the growth of native plants, which are vital for the survival of beneficial insects like pollinators and natural predators. Native plants provide essential resources such as nectar, pollen, and habitat, contributing to the overall health of urban ecosystems.

Reducing noise and light pollution is also critical for biodiversity conservation. Excessive noise interferes with animal communication, breeding, and feeding behaviors, while light pollution can disrupt nocturnal wildlife and plant cycles. Addressing these issues through thoughtful urban planning and the implementation of noise and light reduction strategies can create a more hospitable environment for a wide range of species.

Educating the public and communities about the causes of biodiversity loss and the solutions is equally important. Awareness and understanding can drive community support and participation in conservation efforts. Public education initiatives can highlight the importance of preserving urban green spaces, managing invasive species, and reducing pollution, fostering a culture of stewardship and responsibility.

It's also essential to recognize that tackling climate change without addressing biodiversity loss is doomed to fail, as stated by the United Nations. Biodiversity and climate change are deeply interconnected; healthy ecosystems play a critical role in regulating the climate, and climate change can exacerbate biodiversity loss. Therefore, integrated approaches that address both issues simultaneously are necessary for sustainable solutions.

Supporting and working with local initiatives like Earthwise Aware and similar organizations is also crucial. These groups play a vital role in raising awareness, educating the public, and implementing on-the-ground conservation efforts. By supporting these initiatives, communities can contribute to broader biodiversity conservation goals and create a more sustainable future.

In Massachusetts, incorporating these strategies into biodiversity conservation goals is vital. The state has recognized the importance of preserving its rich biodiversity and has set ambitious goals to protect and restore habitats, manage invasive species, and reduce pollution. By prioritizing these actions, Massachusetts can ensure a healthier, more resilient environment for both wildlife and people.

Thanks for your time.

Claire O'Neill, Earthwise Aware President

Friends of the Middlesex Fells Reservation, Board of Directors

Name: Kyle McGrath

Affiliation: NGO/Community Group/Non-profit

The biggest threats to biodiversity in our state parks and reservations are illegal trails and invasive plants. Birds, mammals, and insects need undisturbed space to reproduce, and with illegal (user-created) trails covering nearly every section of every park, such space simply does not exist, and populations continue to plummet. In the Middlesex Fells alone our survey data shows that there are at least twice as many miles of illegal trail as there are of official ones. Invasive plants like Japanese Knotweed are heavily damaging our ecosystems, particularly our rivers and wetlands, and require both public education to reduce spread and government funding for professional remediation. We CAN balance the need for public outdoor recreation and enjoyment of our parks with the need to conserve and build climate resiliency in these spaces, but we need funding and concerted effort from the Commonwealth, and DCR needs to hire rangers (not just administrative staff). We also need to break down barriers to nonprofits doing ecological restoration work in our parks - too much ambiguity and too hard to get answers from an understaffed and overworked DCR.

Hello, my name is Patty O'Neill, and I live in Greenfield, MA and work as a self-employed Ecological Landscaper and Designer through my company, Edge of the Wild.

I have studied Ecological Design at the Conway School and worked in different kinds of landscaping outfits--commercial, boutique, and now my own, cultivating existing native plant communities and blending ecological function with aesthetic and functional client goals, related to larger conservation goals--after working as a land surveyor with LA's and civil engineers, and worked in the native plant volunteer arena and horticultural/retail side of plants as well. I have so much to say, and I just found out about this yesterday, and informed my networks today. Please extend the public comment period, and in fact keep it open to allow for continuous feedback and readjustment of goals and guidelines as we collectively navigate the uncharted territory of ecological design and transition to a culture of ecological reciprocity while contending with a drastically changing new climate.

As a previous commenter stated, there is a conflict happening between climate advocacy and biodiversity advocacy, as the leading renewable energy projects--commercially-owned, for-profit, centralized energy utilities--site their projects in ecologically intact landscapes because it is cheaper to build there. The same is happening with housing development. The small-scale, decentralized energy construction in already developed spaces--what renewable energy industry workers advocate for themselves--is more costly and has complicated regulations to navigate. The communities and towns who organize to pass ordinances to protect their ecosystems are under threat for daring to do so--Shutesbury is being sued by the solar company and large landowner for limiting their ability to profit off their land, and the Dover Amendment takes away home rule to control that development. Amendments to protect home rule and empower small scale energy in our dysfunctional MA legislature failed to go anywhere after the Climate Bill was dropped this summer.

As we switch our energy away from abundant and cheap fossil fuels, and contend with the need for new energy sources, address housing needs, and protecting and restoring our regional and planetary biodiversity, we must come to terms with the fact that we cannot continue to grow our energy use and expand our footprint as our economic system demands. The two major scientific bodies, IPCC and IPBES, have said as much, and have bleak predictions for our fate as we become locked into rising temperatures as a result of passing our tipping points and ecological destruction: 2 degrees Celsius by 2040, 2.5 by 2050.

The way we mine and site renewable energy comes at the cost of communities and ecosystem degradation elsewhere in the world and at home, and these cannot be separated from our consideration as we make policies--we must ensure responsible and least destructive practices for mining and siting, and decide democratically if choosing these energy sources truly serves our collective well being at all: Our current societies are built around the presumption of endless cheap and abundant fossil fuels, and before that was the norm, people lived much more within the limits of their local and regional ecosystems in the ways that they traveled, ran industries, and lived together. We must seriously consider, with mapping and state resources and coordination, and input from the communities of all sorts that live here, what are the capacities of our lands in MA to live and thrive under a changing climate, and the shifts of populations that are likely to occur because of it and the larger ecological breakdown.

We have 27.4 empty homes for every houseless person in the US right now. We have climate and resource war refugees flocking here en masse, and can expect millions more as time goes on. We have people with more houses than they need wasting energy unused, and farmers and workers being priced out of their hometowns because of this mismanagement and injustice.

Rare habitats are being destroyed for profit-centered sand mining in South East MA with no end in sight, and no accountability for extractors to follow existing laws.

I want the capacity of our landscapes and the biodiversity that shapes and is shaped by it to guide our determination of what kinds of energy sources are suitable for any location--have it be an overlay--and then plan for what kind of development can arise out of those limits. I want to see housing that is clustered away from the most crucially ecologically important landscapes and corridors life needs to sustain themselves long term, and where we do intersect with wildlife amidst our developments to co-habitat harmoniously with them by redesigning our buildings, travel, industries, and land tending practices to continuously better suit everyone. It can be done--look to the indigenous communities for guidance in earnest, as real partners. Our economic system is what limits us and our priorities are misdirected. Allow for constant and regular feedback from everyone to inform the path forward. Empower communities to re- envision how they can sustain themselves together, using watersheds and core ecosystem players as their boundaries and limits. Conserve valuable resources and materials by encouraging and empowering communities to fix, reuse, and redistribute goods. An undemocratic economy based on profit, growth, and exploitation will not allow us to achieve our biodiversity conservation, energy retrofitting, and housing needs. Use your standing as an agency to advocate for an adaptable and directly democratic economy that can reshape our land use to intensities that ensure balanced life for all, as the climate scientists are doing now.

I want to amplify what other commenters have said, and have added some thoughts of my own. Thank you so much for your work.

Sand Mining in SouthEast Mass

Massive environmental justice and biodiversity problem not being addressed, needs serious help. Please protect the land and groundwater of southeastern mass.

Large landowners are selling huge swaths of Southeast mass because sand is worth big bucks. Plymouth in Southeast Mass has angular sand, valuable for mining. Under the guise of cranberry farming, millions of cubic yards are being taken by hundreds of truckloads a day from coastal Pine Barrens. Endangered habitat being hauled, biomap 3 disappearing, and no biological studies are being conducted. Environmental Justice neighborhoods who want to learn about biodiversity cannot--it is being taken from them. Carver, MA. The mining is changing the hydrology, reducing aquifer and leaving it vulnerable to pollution as a result of deforestation and habitat loss.

Agencies not enforcing the law. Mass DEP doesn't have a problem with it. Governor Healy not helpful. No one is listening or doing anything to stop it.

Conservation and Housing Development Conflicts

Housing construction and developments are plowing through forests. MA is losing wetlands and corresponding uplands to development, despite laws and Biomap areas of importance. **Dover Amendment that makes it easier to cut down trees and remove home rule, the ability for towns to impose ordinances to protect their ecosystems from state level development.**

Make it harder to cut trees down—**Unless there is a huge benefit to cut it down, don't**—from a solar professional on planning board of Needham, Artie Crocker.

Empower builders, developers, architects, and the public to conserve trees when they build, cultivate and plant native plants, and tend land according to local and regional conservation goals. Support sustainable building practices as the norm to build using methods, materials, and appropriate siting to preserve trees and ecosystems, allowing crucial ecosystems and wildlife corridors to stay intact. Limit sprawl, focus on non-speculative infill development on already developed cores.

Ambrose Clausen. WMass. Land Conversion. Most of the houses in my neighborhood tanned in my communities **sit empty, heated and cooled year round with fossil fuels**. Without any occupants, except for two or three weeks out of the year. **Meanwhile, farmers and low-income workers leave the area because they cannot find housing**. This is a crisis of our farming community and our conservation efforts. Those most affected by the climate crisis are our farmers and working people. Community members who live here full-time are the ones who have the most interactions and enjoyment of our environment. And their buy-in is essential. Luxury housing sprawl endangers our environment and food production. Gentrification and artificial land value increases have put in farmers and families out of business and out of options. Fighting against corporate greed and private money is an impossible task unless we are helped by our local and State Government bodies. We need your guidance and help to state living in our communities and continue to build strong movements to protect our environment.

There are 27.4 empty homes for each homeless person in the US.

Siting Renewable Energy

Don't take away home rule. Dover Amendment taking away home rule, conflict between town and state, conflicts between business.

Support the development of local industries and supply chains toward self-sufficiency now and in a climatically challenging future. Eliminate wasteful and harmful industries that do not support human or ecological well being, and support retraining workers in fields that do. Plan for an economy that does not rely on endless growth, expansion, exploitation of human and environmental inputs and externalities, so that we can live within the limits of our regional ecosystems and planetary boundaries, now and in the estimatable future. Biodiversity not just conservation but regeneration—soil. Agroforestry! Focus on bio abundance, not bare minimum. Shrinking number of keystone species affecting species that rely on them that are uncommon.

Ecosystem services cannot be duplicated by technology, MA should take a clear stance on this. Hearing about the climate bill trying to put forth tech, as if they can replace natural systems. Lenore Brick, Amherst, founder Regenerative Farming Forest Food of CAN. **Climate advocacy (renewable energy projects, unions) and biodiversity advocacy (preserve ecologically important lands) are sometimes at odds with each other.** Look at these conflicts head on, coordinate across state agencies, regions, and govt branches.

Large utilities like solar should be publicly owned, not commercial for-profit enterprises which need to develop at scale to keep costs down. Encourage and pass laws and regulations that make Decentralized small-scale renewable and passive energy development and conservation affordable and easier obtain and to install.

Work with DOER to site renewable energy on developed land, not forests, crucially ecologically important corridors and wildlife refuges, or valuable farm land. Decentralize renewable energy, make it affordable and ease regulations that make it easier for small scale renewable energy projects. People working in the solar industry are against clear cutting forests for solar. Ban clearcutting forests for renewable energy and use developed areas. Battery plants can catch on fire and burn for weeks. Industrial battery plant sited in the middle of Wendell forest (PROJECT HAS ABANDONED!), on top of aquifer, where there is no municipal water to put out fires. Industrial battery plant contains lithium ion phosphate and PFAS, not connected to any solar energy even.

Funding for Ecological Land Care

Support and empower indigenous communities to lead land care initiatives. They have had the right idea all along, living in reciprocity and limits of their ecosystems. Change the way we relate to the land and life—not resources to extract, but part of us, and we must be allowed to develop stable relationships with land and the communities that live there among us. Empower the public to give feedback on their ecological land management successes and failures, and support their efforts. Reflect this in policy.

Support agroforestry, silvopasture and commons land available to the public. Support native plant cultivation/nurseries/farms—cultivate locally native plants by town to distribute.

Create and fund a **Master Naturalist Program** to educate and coordinate conservation volunteering efforts, like many other states have. This could help unify and amplify our conservation organizing, volunteer impact, and educational outreach efforts.

More funding for **Conservation Districts** for education and outreach for participation, currently only have one pt staff person and volunteers, reduce pesticides around people's homes. Provide funds and guidance to help people shift their gardens/yards/properties to ecologically sound practices.

Funding for managing **invasive species**. There should be a comprehensive and coordinated approach to managing invasive species that includes govt, community, individuals. Establish and enforce requirements and guidelines for the safe removal and disposal of invasive plants to prevent their spread. Create monitoring programs, regulation and enforcement for public and private lands. Plant native species after, remediate soil health, monitor.

Support the **education of landscape professionals and public in ecological landscaping.**

Ecological land management – show landscaping professionals how conservation land is managed. Share conservation management plans to landscape industry and property owners– how can they plug in and work alongside regional conservation goals?

Expand assisted migration corridors and cultivation.

Limit Chemical Use in Landscapes

Hand-in-hand with gentrification and corporate extraction is the excessive use of synthetic fertilizers, pesticides, herbicides, and other poisons like the rodenticides that have been mentioned.

Make the responsible use of pesticides accessible for small scale companies/individuals, require and enforce licensure.

State Owned Lands, State Funding, and Policy Transparency

Create a resource and informational web page. Don't just include policies–**include the scientific peer research that informs the policies. Demonstrate how public input is utilized in policy, strategic, and programmatic decision-making.** Lynn Mann, Mass Sierra club forest protection team. Lunenburg Mass.

Climate Forestry Commission Report. Pine Barrens Restoration–what is happening there, no scientific basis? Going on in Reserve. Independent scientists not being listened to. 30by30 Goals: 30% of land and water undisturbed by people, not just undeveloped by buildings. Road crews having a terrible impact on wetlands. Janet Sinclair, Shelburne Falls.

Include the public comments received along with successive presentations for the public so we can see what others are saying and amplify and organize around issues we agree on. Change the way we relate to the land and life–not resources to extract, but part of us, and we must be allowed to develop stable relationships with land and the communities that live there among us. Empower the public to give feedback on their ecological land management successes and failures, and support their efforts. Reflect this in policy.

Increase state-owned lands for commons, agroforestry, silvopasture, and the preservation of old growth forests. Powerlines - don't use herbicides, how about grazing? Don't jump solely to planting generalized native plants–allow nearby/adjacent/existing seedbank of locally native plants to repopulate barren areas.

Share land management protocols and records with the public. Conduct inventory on state lands, note the defining characteristics and last date of mgmt.

End the practice of allowing state agencies sponsoring commercial logging to compare various mgmt practices using non managed areas as controls. There are no solid controls currently.

All info should be made readily available.

Allow for at least another round of public comment before finalizing these biodiversity goals, and allow input and revision based on feedback to be ongoing.

Corporate Responsibility & Recycling

The companies that profit from degrading our environment need to be held accountable. If a product cannot be bio degraded it should not be sold in 2024. Or beyond. It should be the responsibility of the manufacturer, not the municipality or individual to recycle or find a way of disposing of the product.

Pass laws that empower the public to fix and reuse products and redistribute or share them in their communities. Bring back the boneyards for people to reuse materials. Stop wasting materials.

Dark Sky Conservation

Christina White. Noho passed a lighting ordinance related to Dark Skies to combat light pollution and its negative effect on ecosystems and human well being. <https://darksky.org/>

Non-Native Fish Stocking

Non-native fish stocking creates nutrient overloading when they die, or if they don't die, they outcompete non-native fish. Taxpayers pay for the fish stocking and nutrient cleanup.

Lobster Industry and Conservation

Beth Cassoni and I'm the executive director for the Massachusetts lobsterman's association that I'll call MLA. Currently, the Massachusetts commercial lobstermen are behold to the most restrictive regulations to protect the right whales anywhere in the United States. With a 3-month closure to over 12,000 square miles, the Massachusetts commercial lobstermen have adjusted their businesses to absorb this 5-month economic loss as it takes one month on either end of the closure to set and remove their gear. With every conservation regulation change, the commercial lobstermen continue to comply at their own expense. We would ask that the Commonwealth have direct and in person meetings with the commercial fishing industry as their livelihoods depend on the smart, conscientious, and well laid out planning when talking about biodiversity.

Ecologically Supportive Enterprise

Luke Sawicksky, principal at SeaHead, we are based in Kendall Square in Massachusetts. We are focusing on early stage start-ups that operate in the blue economy. So, everything from fisheries, cultural resilience, off shoring renewable energy, early stage start-up and you have to do with the ocean and focused on a positive sustainable outcome as part of your business

outcome, please reach out to us. How MA can encourage...nature positive solutions through tax structure and regulatory environment changes, take interventions to let innovators go to market at Commonwealth first, leverage students, universities, and scientific research.

--

Patty O'Neill

Owner/Ecological Landscaper & Designer

Edge of the Wild LLC

Ecological Land Care & Design

www.edgeofthewildma.com

(703) 577-6781 cell

Ecological design and land care services for clients in the Connecticut River Valley of Western Massachusetts

Easton Conservation Commission, Land Use and Environmental Planner, Vernal Pool Association, Massachusetts Society of Municipal Conservation Professionals

Name: Jennifer Carlino

Affiliation: Government

Coordinate with grant authorities for additional funding and more user friendly applications, particularly in simplifying the requirements for Open Space and Recreation Plans

Coordinate with permitting agencies like DEP for expedited processes for invasive species control and dam removal

Coordinate with permitting agencies to better protect vernal pools and surrounding habitat

Create a public information or marketing campaign to raise public awareness

Partner with other conservation groups for shared messaging

Environment Watch Southeastern Mass, Coordinator

Name: Meg Sheehan

Affiliation: NGO/Community Group/Non-profit

Why is the Governor allowing destruction of the pine barrens?

www.sandwars.org

<https://www.youtube.com/channel/UCYkyqww6Lv9DhuEwZDMEA>

EWA

Name: Kaylin Roth

Affiliation: NGO/Community Group/Non-profit

I support the EWA's stance:

- Mitigating habitat loss in urban green spaces by addressing user trails and park overuse.
- Creating invasive species management plans at the city level.
- Implementing native planting plans at the city level to support beneficial insects, in collaboration with city invasive management plans.
- Phase-out pesticide use throughout cities, following the example set by other countries.
- Reducing noise and light pollution.
- Educating the public and communities in depth about the need to tackle climate change and biodiversity loss jointly.
- Supporting and working with local environmental initiatives.

Forest Service, Research Wildlife Biologist

Name: David King

Affiliation: Government

Forest monitoring data show our forests are homogeneous with respect to age class distribution and species composition as the result of prior land use history. Efforts should be made to rectify this in homogeneous stands using silviculture and other appropriate methods, such as prescribed fire, to restore diversity that makes forests both more resilient to stressors as well as accommodating the full suite of native species, including imperiled disturbance-dependent species.

Friends of Myles Standish State Forest

Name: frances walsh

Affiliation: NGO/Community Group/Non-profit

don't feel my personal opinion on this really matters or would even make any difference in this situation but I agree with John and other members of the Friends group. Sand removal impacts (negatively) surrounding aquifers, this has a predictable, negative cascade on all the creatures relying on it for their survival, not to mention the destruction of this natural area will relocate or kill the creatures living there currently who call it home. Im told this is for a cranberry operation, aren't cranberries not very profitable these days? So sounds more like a cover up for yet another solar farm

Friends of the Middlesex Fells Reservation, Board member

Name: Bob Weggel

Affiliation: NGO/Community Group/Non-profit

Please determine, and disseminate widely the information, the best way to close rogue trails, combat invasive species, and promote the growth of native species.

Grow Native Massachusetts, Board Member

Name: Mark Smith

Affiliation: NGO/Community Group/Non-profit

Biodiversity priorities:

1. permanent protection of natural landscapes
2. protection and promotion of native plants and the native wildlife they support
3. control and removal of invasive species that threaten native plants and wildlife
4. restriction or prohibition of use of chemical pesticides
5. dam removal and restoration of free-flowing rivers

Ipswich River Watershed Association, Executive Director

Name: Erin Bonney Casey

Affiliation: NGO/Community Group/Non-profit

The Ipswich River Watershed Association (IRWA) is happy to support Governor Healey's Executive Order 618 to develop biodiversity conservation goals across the Commonwealth. As the voice of the Ipswich River, we support and promote efforts to ensure that there is enough clean water for people, fish and wildlife now and for the future. We offer the following comments to help the administration in their formulation of these goals.

- Our organization plays a critical role at the interface between the public and government agencies. It is important that the development of these biodiversity goals take into account the ongoing work in our region and prioritize the specific actions that we already know will make significant impacts in key areas. Biodiversity goals should incorporate the high local on-the-ground knowledge of organizations like IRWA already working on habitat restoration and resiliency around the state.
- IRWA has been at the forefront of promoting and working on landscape-scale and watershed-scale restoration. Just in the past few years, we have leveraged millions of local, state, and federal dollars that are already working towards projects that will have watershed-wide benefits on biodiversity, like dam removals. It is critical that the Commonwealth supports these projects at every level in order to ensure that they are completed on a time scale that maximizes the benefits for biodiversity, climate resiliency, and the general public. One key area of support the commonwealth could provide is to streamline the state's permitting process in order to accelerate the pace of these projects.
- In order to achieve any success in conserving biodiversity, the state must make a concerted effort to protect its freshwater habitats. Currently 20% of the streams in the state are categorized at biological levels 4 and 5, the most impacted by water withdrawals. Withdrawals coupled with the increasing incidence of drought caused by climate change are causing the continued degradation of freshwater habitat. In order to protect this critical habitat and the biodiversity it sustains, the state must improve the state's water management program to better balance the need for water supplies with the needs of the ecosystem. We encourage the Commonwealth to include needed revisions to the water management act regulations in its prioritized actions to achieve biodiversity goals.

We look forward to supporting the development and implementation of nation-leading biodiversity conservation goals in the Commonwealth and encourage the Department of Fish and Game to move aggressively to identify executable actions to protect and restore biodiversity now and for the future.

Jones River Watershed Association, Ecology Program Director

Name: Jimmy Powell

Affiliation: NGO/Community Group/Non-profit

Hello,

My name is Jimmy Powell, and I currently serve as the Ecology Program Director for the Jones River Watershed Association – although I want to stress that I am writing this comment as a private citizen.

I want to preface by saying believe that when it comes to setting environmental goals that extend as far in the future as 2050, that it is important to be aggressive in your approach and set aside ample resources for enforcement. Many environmental regulators already seem stretched thin, and having lofty ideas with no one to ensure their implementation will not reverse or repair harms to our natural resources. Climate change, which does not appear to be slowing down – nor is it feasibly in the state's sole power to make it do so, will stymie recovery efforts – hence my request for an approach that aggressively defends our natural resources. We must shoot for the moon, even if we expect to land well short of it.

For some specifics I would like the state to pay more attention to the habitat loss and natural resource degradation that results from suburban sprawl and encourage housing policy which prioritizes redevelopment of already cleared land into dense, walkable communities with mixed commercial space that limits need for travel. Many developments, such as the South Weymouth Naval Air Station have incorporated some of these design principles, but I believe it needs to become the standard so we can free up more land for conservation. Doing so will also reduce the need for future road maintenance, including salting, and reduce road hazards to wildlife.

I would like to see the state either through regulatory frameworks, or effective messaging campaigns, further educate the citizens of our state on what kind of habitat can be cultivated around a single family home – we have too many barren expanses of turf grass in this state that could instead be food for pollinators, or people – but in some communities even attempting to install naturally beneficial landscaping is either not allowed – in most it is strongly discouraged. Movements have started to attempt to convince people of the benefits of a diverse lawn, but they could use more institutional support.

Finally, and most dearly to my heart, we have got to speed up the removal of barriers to anadromous fish passage. The state has helped removed a large number of dams, to its credit, but many still remain and of those few serve any purpose. The state has already invested a lot of money into fisheries restoration, but in many places – such as the Jones River, the work is incomplete. I believe it is important to act fast, as many of these species have already exhibited signs of behavioral change and increased stress due to climate change. Healthier, larger populations stand a better chance of adapting to the warming oceans and rising sea levels.

Furthermore, I believe that restoring these fisheries will be a necessary step to ensuring food security for the people of the Commonwealth. I do not believe our current way of life is sustainable – not for plants,

not for animals, and not for humans either. If we are to consider such far flung goals, I think we should dream big and imagine how we can not only reduce habitat loss, and restore species, but also create a society that can sustain this biodiversity well past 2050.

Thank you for your attention,

Jimmy Powell

Jones River Watershed Association, Exec. Director

Name: Pine duBois

Affiliation: NGO/Community Group/Non-profit

A commitment to strengthen and sustain biodiversity in the Commonwealth is essential to our social welfare and resilience. We have a long way to go. From my half-century engagement, in addition to improving conditions in disadvantaged communities, we must focus on a holistic approach to improving our transportation network. Roads, bridges, culverts, stormwater, in addition to dams and obstacles to safe passage for humans, animals, birds and aquatic species is an imperative to achieving this essential goal. We give far too much freeway to construction, mining, and enterprises of high financial worth, without evaluating their cost to the environment and accurately assessing their impact, and taxing those entities to mitigate the damage they cause.

Stop grandfathering damaging management practices when clear alternatives exist. Do not enable degradation of our natural resources under the guise of water supply demand and economic constraint. Registered water rights were never intended to enshrine a wasteful volume. Conservation became the law of the land. Why are damaging practices allowed beyond the scope of the original practices? Because DEP is not sufficiently funded? Fund the departments needed to implement the strategies! Yes, doing things efficiently and fairly (including respecting nature) is right now more costly than it is to account for all the damage starving a river, selling sand, or dumping sewerage without complete treatment. But only because we don't require an honest evaluation of cost. We can and should be thorough in our assessment of impacts and stop catering to economic pals at the expense of the natural world we rely on for virtually our entire life-support system! To breathe air, we need forests and whales!! We also need industry to control their emissions and much tighter and more equitable guidelines that will stretch across political boundaries. As a society we must own the burden of our own use and impact. We do not. We must if there is to be a future.

Restoration of rivers is critical to our survival. This includes changing our infrastructure. Not only removal of all dams, but roads in estuaries that flood already. Highways that discharge contaminants into our rivers, wastewater discharge from municipal plants or private owners must be upgraded to a standard that removes legacy chemicals so that waters can be improved. Residents and businesses will have to move inland. There will need to be a program to facilitate this or arrange for seasteading without further corruption of the waters that can and do sustain so much of the life we rely on. Salt marshes large and small need restoration! A more enlightened method of the distribution of support is needed to accommodate sea level rise. Wasting resources to bring in sand that washes out to sea, while lowering the landscape near areas vulnerable to SLR is not a beneficial or helpful approach to dealing with the reality we face.

Sustainable and economically sound approaches to aquaculture is essential. We cannot continue to allow commercial fishing that harms endangered species for any reason. Support for practical aquaculture that does improve the quality of waters, supports its workers and an abundance of fish and balances water chemistry in the bays and ocean is a great approach and should be encouraged. We can

and should replace the draggers and the inappropriate gear that contaminates the waters and endangers all manner of life at sea.

Re-connect the glacial lakes to the sea and restore ancestral spawning of river herring and refugia for American eels. Stop transferring shallow polluted ponds with invasive species into clean deep cold waters. Require life sustaining flow. Maintain buffers and habitat continuity for the land and water species to thrive and reestablish the balance of nature. Re-think our zoning to support dense housing, and create local energy networks to transition to multi-use transmission corridors that support biodiversity.

Kestrel Land Trust, Executive Director

Name: Kristin DeBoer

Affiliation: NGO/Community Group/Non-profit

Center biodiversity on expanding wild nature, wild lands, wild preserves, wildness (passive management). Don't get bogged down in expensive restoration projects/active land management that will only affect small amount of acres. We need big, wild and connected landscapes. Then trust nature do the healing. Thank you for your leadership in this space.



1167 Massachusetts Avenue, Arlington, MA 02476 | www.lowimpacthydro.org

August 16, 2024

Commonwealth of Massachusetts,
Department of Fish and Game,
100 Cambridge Street, 6th Floor
Boston, MA — 02114.
Submitted via email to DFG.info@mass.gov

Re: Request for Comments on Biodiversity Conservation Goals for Massachusetts Pursuant to Governor Healey's Biodiversity Executive Order No. 618.

Dear Commissioner O'Shea,

The Low Impact Hydropower Institute (LIHI) commends the ongoing efforts of the Massachusetts Department of Fish and Game (DFG) to develop nation-leading biodiversity conservation goals pursuant to Governor Healey's Biodiversity Executive Order No. 618 (EO 618).¹ LIHI strongly supports DFG's focus on recovering endangered species and preventing extinctions, conserving key habitats to sustain species, and restoring free-flowing rivers and wildlife migration.² These initiatives, especially river restoration, will be key to not only conserving biodiversity but also building resilience to climate change as recognized in the Statewide Hazard Mitigation and Climate Adaption Plan.³

Drawing on LIHI's 25 years of experience of safeguarding ecosystems and supporting river stewardship, these comments offer the following considerations to help shape the state's transformative biodiversity conservation goals that DFG seeks to develop through a whole-of-government approach:

1. Massachusetts' clean energy goals must foster, rather than undermine, biodiversity conservation both within and beyond the state borders.
2. The rights and perspectives of Tribes must be centered in biodiversity conservation efforts.

¹ Massachusetts Executive Order No. 618: Biodiversity Conservation in Massachusetts, September 2023. Available at: <https://www.mass.gov/executive-orders/no-618-biodiversity-conservation-in-massachusetts>

² See, Massachusetts Department of Fish and Game, Biodiversity Goals for the Commonwealth. Available at: <https://www.mass.gov/info-details/biodiversity-goals-for-the-commonwealth>

³ Massachusetts Division of Ecological Restoration, Statewide Hazard Mitigation and Climate Adaptation Plan, Chapter 7: Hazard Mitigation and Climate Adaptation Strategy, September 2018. Available at: <https://www.mass.gov/info-details/massachusetts-integrated-state-hazard-mitigation-and-climate-adaptation-plan>

3. Existing non-governmental efforts and programs can be leveraged to create educational and learning experiences regarding biodiversity conservation.

About the Low Impact Hydropower Institute

LIHI is a national 501(c)(3) organization that was established in 1999 with a mission to recognize and support hydropower that prioritizes environmental, recreational, historical, and cultural resource protection.⁴ LIHI advances this mission by offering the *only* science-based program in the United States for certifying hydropower facilities that avoid or significantly reduce their socio-environmental impacts and that invest in river stewardship beyond regulatory compliance. LIHI has served as a unique bridge between the hydropower industry and the environmental community and has independently reviewed and certified over 300 hydropower facilities in 24 states and 101 rivers based on eight Low Impact Hydropower criteria.⁵

Since its inception, LIHI has worked hard to ensure that furthering hydropower generation does not undermine biodiversity conservation in Massachusetts and beyond. While hydropower is a key renewable energy resource that has a pivotal role to play in the nation's clean energy future, it can have serious impacts on river systems and the people, fish, and wildlife that depend on them. Recognizing the unique challenges and impacts of hydropower operations, the Commonwealth took an innovative and effective step in 2008 of granting renewable energy credits and the accompanying revenue only to hydropower owners that meet key environmental requirements laid out in the Green Communities Act of 2008 (GCA). In implementing the GCA, the Department of Energy Resources (DoER) required hydropower facilities to obtain the Low Impact Certification by LIHI⁶ to reliably demonstrate meeting GCA's environmental requirements on an ongoing basis. Since 2008, LIHI has issued 29 certifications in Massachusetts and 113 certifications in the New England and New York region representing over 5,997 Gigawatt-hours of average annual generation. The GCA and DoER approach to including only socio-environmentally high performing hydropower projects in the state Renewable Portfolio Standard (RPS) program has ensured that these projects remain economically viable while protecting and continually investing in the region's fragile ecosystems. This approach has earned broad support of Massachusetts' environmental community and has been used as a model by other states, notably Vermont, Pennsylvania, Delaware, and Oregon where LIHI Certification is required for hydropower facilities to participate in each state's RPS program.⁷

⁴ Low Impact Hydropower Institute. About us. Available at: <https://lowimpacthydro.org/about-us-2/>

⁵ Low Impact Hydropower Institute. Criteria & Standards. Available at: <https://lowimpacthydro.org/criteria-standards/>

⁶ Low Impact Hydropower Institute. Criteria & Standards. Available at: <https://lowimpacthydro.org/certification-programm/>

⁷ It is worth noting that LIHI's science-based Certification Program is also required and recognized in the voluntary energy market through the [Green-e® Energy Program](#), [RE100](#), and the U.S. Environmental Protection Agency's (EPA) Green Power Partnership Program (GPP). Out of all available hydropower resources, the U.S. EPA GPP specifically includes LIHI Certified® facilities in the subset of 'green power,' which represents renewable energy

LIHI's 25 years of experience of certifying low-impact hydropower facilities has highlighted a critical need to balance climate and conservation outcomes. It has also underscored the need to include the perspectives of Tribes and historically marginalized communities in decisions that affect our natural environment. Building on these experiences, the following section offers considerations to inform DFG's goal development process under EO 618 that seeks to create a vision for biodiversity from the ground up.

Recommendations:

As DFG embarks on its efforts to develop nation-leading biodiversity conservation goals, the following considerations would be important to take into account.

1. Massachusetts' clean energy goals must foster, rather than undermine, biodiversity conservation both within and beyond the state borders.

The electricity sector plays a key role in advancing the goal of decarbonizing the state's economy by 2050 as outlined in the Clean Energy and Climate Plan for 2050;⁸ yet, how the state *sources* electricity can have profound implications for biodiversity protection. Massachusetts has adopted progressively ambitious standards to promote clean energy adoption, with the recent Clean Energy Standard (CES) instituting additional clean energy procurement requirements above those outlined in the state's RPS.⁹ However the quest for procuring 'clean' generation under the CES risks undermining the biodiversity conservation priority highlighted in EO 618 for one key reason: several generation resources that were excluded from the Massachusetts RPS program due to their negative environmental impact qualify for the CES, particularly as eligible 'existing' resources. For example, in the RPS program, hydropower projects have to obtain a Low Impact Certification by LIHI to demonstrate compliance with GCA's environmental requirements of "address[ing] adequate and healthy river flows, water quality standards, fish passage and protection measures and mitigation and enhancement opportunities in the impacted watershed;"¹⁰ however, no such requirement applies to hydropower projects to become eligible as an 'existing' CES resource. As a result, hydropower projects from Quebec that may not meet the stringent environmental standards for the state's RPS program qualify as eligible existing resources under the CES, as do large nuclear facilities such as Millstone Nuclear Power Station.¹¹ Similarly, as part of the renewable energy procurement under Section 83D of the GCA, the legislature required the state's electric distribution companies to enter into long-term contracts with developers of clean energy

resources that provide the greatest environmental benefit. See U.S. Environmental Protection Agency. Green Power Markets. Available at: <https://www.epa.gov/green-power-markets/what-green-power>

⁸ See, Executive Office of Energy and Environmental Affairs, Clean Energy and Climate Plan for 2050, December 2022. Available at: <https://www.mass.gov/doc/2050-clean-energy-and-climate-plan/download>

⁹ 310 CMR 7.75 - Clean Energy Standard. Available at:

<https://www.law.cornell.edu/regulations/massachusetts/310-CMR-7-75>

¹⁰ See, Massachusetts 225 CMR 14.05 and 225 CMR 15.05.

¹¹ Information on facilities eligible for MA CES-E obtained from NEPOOL-GIS on July 26, 2024 available at:

https://www1.nepoolgis.com/myModule/rpt/ssrs.asp?rn=106&r=%2FPROD%2FNEPOOLGIS%2FPublic%2FNEPOOL_Generators&apxReportTitle=GIS%20Generators

generation resources,¹² where ‘clean’ resources included *any* firm service hydropower *regardless* of its environmental performance in addition to new Massachusetts RPS Class I eligible resources that meet a high threshold of demonstrating socio-environmentally responsible operations.¹³ As part of this Section 83D procurement, the Massachusetts Department of Public Utilities ultimately approved imports of large quantities of hydropower from Canada that are not subject to the same social and environmental standards that state RPS eligible hydropower resources must meet, which raised concerns among environmental groups due to purported environmental and ratepayer impacts.¹⁴ Collectively, these examples illustrate how weakening environmental safeguards for the sake of ‘clean’ energy procurement may risk setting climate mitigation and biodiversity conservation efforts on a collision course.

Building on the issues with sourcing electricity, Massachusetts’ strategies to achieve its in-state clean energy goals may have *regional* biodiversity impacts. For instance, the Section 83D hydropower procurement is proposed to be delivered into New England over a new transmission infrastructure project referred to as the New England Clean Energy Connect (NECEC) transmission line.¹⁵ Environmental organizations and the Penobscot Nation have raised concerns with the NECEC transmission line due to its impacts on the largest contiguous temperate forest in the eastern United States, located in Maine.¹⁶ The biodiversity concerns include fragmentation of both forest and aquatic habitat, impacts on access to high quality feeding areas for several species, and long term changes in the characteristics of the forest.¹⁷ These impacts serve as an example of distributional *inequity*. The concept of distributional equity—i.e., equitable distribution of energy and environmental benefits and burdens—was foundational to Massachusetts first-ever Environmental Justice (EJ) Strategy unveiled in early

¹² See 220 CMR 24.00. Available at: <https://www.mass.gov/doc/220-cmr-24-competitively-solicited-long-term-contracts-for-clean-energy/download>

¹³ See 220 CMR 24.02, Definitions, ‘Clean Energy Generation.’ Available at: <https://www.mass.gov/doc/220-cmr-24-competitively-solicited-long-term-contracts-for-clean-energy/download>

¹⁴ See Massachusetts Department of Public Utilities, Order approving PPAs for NSTAR Electric Company d/b/a Eversource Energy, Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, and Fitchburg Gas and Electric Light Company d/b/a Unitil to purchase hydroelectric generation and associated environmental attributes from H.Q. Energy Services (U.S.) Inc., June 25, 2019. Available at: <https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/10881350>

¹⁵ See Massachusetts Department of Public Utilities, Order approving PPAs for NSTAR Electric Company d/b/a Eversource Energy, Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid, and Fitchburg Gas and Electric Light Company d/b/a Unitil to purchase hydroelectric generation and associated environmental attributes from H.Q. Energy Services (U.S.) Inc., June 25, 2019. Available at: <https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/10881350>

¹⁶ See, for example, The Revelator, Is New England’s Biggest Renewable Energy Project Really a Win for the Climate?, September 24, 2020. Available at: <https://therevelator.org/hydropower-neccec/>. See, Letter from the office of the Chief and Council of the Penobscot Indian Nation to Colonel William Conde of the U.S. Army Corps of Engineers, July 22, 2020. Available at: https://www.bowdoin.edu/arctic-museum/pdf/07_22_20_penobscot_nation_letter.pdf

¹⁷ See, for example, Maine Audubon, New England Clean Energy Connect and the Impacts of Forest Fragmentation, April 2, 2019. Available at: <https://maineaudubon.org/news/new-england-clean-energy-connect-and-the-impacts-of-forest-fragmentation/>; The Revelator, Is New England’s Biggest Renewable Energy Project Really a Win for the Climate?, September 24, 2020. Available at: <https://therevelator.org/hydropower-neccec/>.

2024.¹⁸ The concept of distribution equity in the EJ Strategy was proposed in relation to human communities. However, this concept can be transposed to the realm of biodiversity wherein the NECEC transmission line is an instructive example where the benefits of a project may be borne in-state whereas potential biodiversity impacts may be felt regionally.

EO 618 offers an opportunity to align Massachusetts' clean energy and biodiversity conservation goals since achieving both is vital for overall environmental and societal health. Learning from the examples in the previous paragraphs, three key strategies can help prioritize biodiversity conservation while pursuing clean energy generation. First, drawing on the success of the Massachusetts RPS hydropower-related provisions in driving both in-state and regional biodiversity protection and investment, EO 618 goals should adopt stringent baseline standards that require energy generating resources to demonstrate socio-environmentally responsible operations on an ongoing basis to qualify in clean energy procurement initiatives. As part of procurement decisions for both in-state and regional resources, EO 618 goals should require agencies to consider direct, indirect, and cumulative biodiversity impacts, such as from the need for a new transmission line through biodiverse areas to transport electricity from a regional generating resource.¹⁹ Second, EO 618 goals can provide guidance on land use and siting of energy projects such that clean energy procurements prioritize avoiding biodiversity impacts followed by minimizing and mitigating impacts if avoidance is not possible.²⁰ Recently DoER issued a Solar Massachusetts Renewable Target (SMART) Straw Proposal that incentivized solar development on the built environment and outlined a strategic approach to solar on undeveloped land;²¹ such approaches that strategically minimize greenfield development would be vital to protect the region's biodiversity. Last, expanding on the EJ Strategy to brownfield revitalization that prioritizes environmental justice populations,²² EO 618 goals can incentivize clean energy development on brownfield sites that not only remediate the lands but restore them for biodiversity conservation.

2. The rights and perspectives of Tribes must be centered in biodiversity conservation efforts.

Tribes often consider biodiversity as a part of their cultural wealth with broad spiritual and social significance as well as importance for traditional food and medicine.²³ Several

¹⁸ Massachusetts Executive Office of Energy & Environmental Affairs, Environmental Justice Strategy, February 2024. Available at: <https://www.mass.gov/doc/february-2024-environmental-justice-strategy-english/download>

¹⁹ See, for example, 40 CFR 1508 for definitions of direct, indirect, and cumulative impacts. Available at: <https://www.ecfr.gov/current/title-40/chapter-V/subchapter-A/part-1508/section-1508.1>

²⁰ See, for example, 40 CFR 1508 for definition of mitigation. Available at: <https://www.ecfr.gov/current/title-40/chapter-V/subchapter-A/part-1508/section-1508.1>

²¹ Massachusetts Department of Energy Resources, Solar Massachusetts Renewable Target (SMART) Straw Proposal Presentation, July 10, 2024. Available at: <https://www.mass.gov/doc/2024-smart-straw-proposal/download>

²² Massachusetts Executive Office of Energy & Environmental Affairs, Environmental Justice Strategy, February 2024, at p. 21. Available at: <https://www.mass.gov/doc/february-2024-environmental-justice-strategy-english/download>

²³ See, for example, Mashpee Wampanoag Tribe, Natural Resources Department, Our Mission. Available at:

environment-related strategic initiatives in Massachusetts underscore the importance of building relationships and engaging with Tribes on conservation-related efforts,²⁴ including the Massachusetts’s EJ Strategy wherein DFG identifies a goal to work with leaders of both federally recognized and state-acknowledged Tribes to facilitate meaningful participation in their regulatory efforts.²⁵ Against this background, EO 618 offers an important chance to create goals that *center* the rights and perspectives of Tribes in prospective biodiversity conservation efforts rather than accommodate Tribal inputs *after* goals are created.

As DFG continues its engagement and outreach, the office should consider co-developing biodiversity conservation goals with Tribes under EO 618. In this regard, it would be important to review and integrate Tribes’ own values, plans, and strategic priorities into biodiversity conservation goals. For example, the Mashpee Wampanoag Tribe has a Climate Action Plan that outlines not only its climate goals but its environmental stewardship efforts.²⁶ Aligning EO 618 with such efforts can ensure that Massachusetts’ state-led activities enhance and further Tribal efforts and priorities. Separately, emerging federal actions can also provide pathways for closely integrating Tribal rights into biodiversity conservation goals. For instance, the U.S. Environmental Protection Agency’s recent regulatory revisions to the Clean Water Act (CWA) Water Quality Standards (WQS), require, for the first time, states to consider Tribal reserved rights when establishing or revising state WQS.²⁷ This rule offers an opportunity to pair safeguarding Tribal rights to CWA-protected aquatic and aquatic-dependent resources with achieving conservation outcomes.

3. Existing non-governmental efforts and programs can be leveraged to create educational and learning experiences regarding biodiversity conservation.

A key strategy shared in the Public Listening Sessions for developing the biodiversity conservation goals for Massachusetts was creating educational programs—outdoor and in classrooms—to raise awareness and appreciation for conserving biodiversity.²⁸ As part of this effort, DFG can leverage efforts of community-based organizations and non-profits that may already provide opportunities for fostering learning. For example, LIHI helps facilitate

<https://mashpeewampanoagtribe-nsn.gov/natural-resources>. For another example, see, New England Aquarium, The Indigenous History of Boston, April 22, 2024. Available at: <https://www.neaq.org/the-indigenous-history-of-boston-harbor/>

²⁴ See, for example, Massachusetts Executive Office of Energy & Environmental Affairs, Resilient Lands Initiative, January 2023. Available at: <https://www.mass.gov/doc/the-resilient-lands-initiative-2023/download>

²⁵ Massachusetts Executive Office of Energy & Environmental Affairs, Environmental Justice Strategy, February 2024, at p. 111. Available at: <https://www.mass.gov/doc/february-2024-environmental-justice-strategy-english/download>

²⁶ See, Mashpee Wampanoag Tribe, Natural Resources Department, Climate Action Plan 2024. Available at: <https://www.epa.gov/system/files/documents/2024-04/mashpee-wampanoag-tribe-climate-action-plan.pdf>

²⁷ See, U.S. Environmental Protection Agency, Final Rule, Water Quality Standards Regulatory Revisions to Protect Tribal Reserved Rights, May 2, 2024. Available at: <https://www.federalregister.gov/documents/2024/05/02/2024-09427/water-quality-standards-regulatory-revisions-to-protect-tribal-reserved-rights>

²⁸ See, for example, Massachusetts Department of Fish and Game, Developing Biodiversity Conservation Goals for the Commonwealth, Presentation for Public Listening Session #1, July 17, 2024. Available at: <https://www.mass.gov/doc/biodiversity-conservation-goals-public-listening-session-presentation/download>

educational field trips to LIHI Certified® hydropower facilities to help students learn about the benefits and biodiversity impacts of hydropower and the actions that these facilities are undertaking to address socio-environmental impacts and support ecosystem stewardship. DFG can partner with and provide support—both monetary and in-kind—for such activities to expand the scope and reach of its educational programming. Likewise, DFG can consider soliciting direct public help in implementing biodiversity conservation programs. For instance, the Massachusetts Office of Coastal Zone Management runs a Marine Invader Monitoring and Information Collaborative—an environmental monitoring and citizen volunteering effort—that brings together volunteers and scientific experts from state, federal, and non-profit organizations to monitor for marine invasive species along the New England coast.²⁹ Such citizen science and engagement activities can provide hands-on experience to the public to learn about and contribute towards biodiversity conservation in Massachusetts.

Conclusion

LIHI supports DFG’s vision to create transformative goals under EO 618 to conserve species and habitats, build resilience to climate change, and safeguard our collective future. These comments offer considerations to develop goals that help align Massachusetts’ climate and biodiversity priorities, center rights and perspectives of Tribes that have in the past been often left out of decisions affecting the natural world, and leverage efforts of non-governmental organizations to expand the scope and reach of education programs to foster public awareness and participation in biodiversity conservation.

LIHI thanks DFG for considering these comments and is eager to assist in its efforts to protect the state’s iconic biodiversity.

Sincerely,

/s/ Surabhi Karambelkar
Surabhi Karambelkar
Policy Director

/s/ Shannon Ames
Shannon Ames
Executive Director

²⁹ See, Massachusetts Office of Coastal Zone Management, Marine Invader Monitoring and Information Collaborative (MIMIC). Available at: <https://www.mass.gov/info-details/marine-invader-monitoring-and-information-collaborative-mimic>



August 30, 2024

Commissioner Thomas O'Shea
Department of Fish and Game
100 Cambridge Street
Boston, MA 02114

Via Email: DFG.info@mass.gov

Re: **Biodiversity Conservation Goals for Massachusetts**

Dear Commissioner O'Shea:

Mass Audubon strongly supports the Healey Administration's establishment of a Biodiversity Initiative through Executive Order 618 and appreciates this opportunity to comment on the draft framework and goals for this initiative. Mass Audubon is committed to working in partnership with you and others to make this initiative a lasting success. As I'm sure you are acutely aware, achieving goals of this scope over a period of decades requires establishment of programs and norms that will extend well beyond the current Administration.

We appreciate that the draft framework acknowledges not only the critical importance of biodiversity across the Commonwealth but also the important intersections with nature as a climate solution and quality of life for people. As noted in the presentation, this initiative intersects with several important statewide goals and plans, including the role of land in sequestering and storing carbon in the Clean Energy and Climate Plan and in providing resilience for nature and human communities in the face of unavoidable climate impacts that are already impacting coastal and inland areas.

The four pillars of Protect, Restore, Sustain, and Connect provides a logical framework for organizing key goals and then designing strategies and priority actions. We offer the following overarching comments:

- Mass Audubon strongly supports ambitious goals for accelerating the pace of land protection, restoration, and stewardship.
- New and increased, dedicated funding will be needed to achieve these goals.
- Strategies and durable mechanisms need to be established to ensure the biodiversity goals are embedded across all state agencies so that the whole-of-government approach necessary to achieve these goals is implemented on an ongoing basis.
- Public education about and engagement in activities around biodiversity will be essential.

Ambitious Goals, Challenges for Implementation

The presentation on the draft framework and goals is compelling, including information on why biodiversity is important and its major threats. The Biodiversity Strategy will need to be both specific and comprehensive to translate these laudable goals into actions involving all state agencies and the public. DFG and the other state agencies will need considerable support, funding, and staff capacity over

many years to implement this ambitious agenda. We recommend that as the implementation strategy is fleshed out, the goals and associated action plans be prioritized and aligned with realistic capacity and funding projections.

In addition to increased funding for state agencies and investment in public-private/NGO and municipal partnerships, changes will likely be needed in laws, regulations, and programs. The plan for the initiative should:

- Identify existing programs, infrastructure, economic factors, and state actions that impact biodiversity and prioritize those that are having the greatest impact.
- Design practical actions that will ameliorate those impacts without unduly impacting other important priorities such as clean energy deployment, housing developing, transportation, water supply, and economic vitality.

This will require coordination across state agencies within all Secretariats. The plan should clearly identify existing and needed resources across all agencies.

An upcoming opportunity to begin to integrate biodiversity goals and action plans with other key state priorities is the Holistic Land Use Plan that is being undertaken by the Executive Office of Energy and Environmental Affairs (EEA). This plan will provide statewide GIS information that will be an important step toward prioritizing lands for biodiversity, clean energy siting, and housing. This will not address all the issues impacting biodiversity, but will provide a tool for considering how several key state priorities intersect and how land use could be optimized.

Land Conservation, Restoration and Stewardship

The draft goals include reiteration of the state's existing goals of protecting 30% of land across the Commonwealth by 2030 and 40% by 2050, as well as an example restoration goal of removing 300+ dams by 2050. Even more ambitious restoration targets are needed to fully address the roles of land, wetlands, and water resources in biodiversity, climate mitigation and resilience, and quality of life for all.

Partnering with public and private entities to assemble interconnected lands at the landscape scale is an important part of the overall strategy. The implementation plans should also explicitly include coordination and cooperation on land stewardship across these interconnected conservation blocks and corridors. Mapping that identifies where public and private lands will be managed as wildlands or actively managed for specific habitat types should be conducted, with transparency and opportunities for public input and coordination across land ownerships.

BioMap is an excellent mapping tool for prioritizing lands of highest conservation and resiliency values for protection. We recommend that an analysis be conducted of the acreage of each habitat type that is already protected and prioritizing protection of underrepresented habitat types. Tools are also needed to prioritize lands for active vs. passive management, including in the context of landscape-scale conservation across multiple ownerships. Funding and capacity needs for land stewardship on state, municipal, and private lands need to be analyzed, prioritized, and addressed.

The wetlands restoration targets should be increased and a more efficient system for implementing these projects is needed. Healthy wetlands are biodiverse, rich in carbon, provide resilience from floods and droughts, and protect water quality. There are approximately 3,000 dams in Massachusetts (many more if smaller, unregulated dams are included). Removing 300 dams by 2050 would only address 10%

of the total. There are also 25,000 or more culverts, many that block flow and fish passage while posing risks of wash-outs. The grant programs for culvert upgrade projects are perennially oversubscribed. Thousands of acres of salt marsh are at high risk of loss from sea level rise, subsidence, and inadequate sources of sediment, exacerbated by many thousands of historic ditches and embankments as well as tidal restrictions. Cranberry bogs no longer in production offer opportunities to restore thousands of acres of wetlands and miles of stream systems. Streams and rivers across the state are impacted by eroding banks and downcutting, with impacts accelerating due to more intense precipitation events combined with the effects of stormwater runoff from extensive impervious surfaces. Repairing inland and coastal wetlands and rivers will require not only increased funding for these projects but also a new approach to permitting that greatly accelerates the pace and reduces the cost of this important work.

The strategy around green design and planning is positive and will require considerable coordination with and resources for municipalities to update their local land use rules. Regional planning agencies can play an important role and should be included in the detailed strategy and funding. Retrofitting and reducing existing impervious surfaces during redevelopment will need to be included. Programs to encourage people to convert their lawns to natural habitat and/or sustainable sources of food could also be scaled up through local and regional partnerships with NGOs and municipalities.

Coastal Resilience and Biodiversity

Massachusetts' 1,500 mile coastline presents particular challenges and opportunities for biodiversity as well as climate resilience. Mass Audubon is committed to actively participating in the ResilientCoasts Initiative. Protecting and restoring coastal wetlands including beaches and salt marshes are critically important for coastal waterbirds, and other species at risk like the Saltmarsh Sparrow.

We applaud the approach of employing iconic indicator or 'ambassador' species to track ecosystem health and for public communication and engagement purposes. In particular, we recommend that you consider highlighting the horseshoe crab as an iconic indicator or "ambassador" species at the intersection of the coastal and marine environments. Our recent experience with the revision of the horseshoe crab regulations demonstrated the immense public fascination with this ancient species, offering great opportunities to connect the dots on related topics like sea level rise, erosion, salt marsh restoration, and coastal waterbirds.

Urban Greening and Environmental Justice

The draft goals recognize the importance of applying this initiative and its benefits across all communities, including urban areas. The Nature in the Neighborhood concept includes a goal for all people to have access to biodiverse greenspace. Environmental Justice imperatives require prioritizing work to achieve this goal. Urban greening through restoration, land conservation and increased stewardship has multiple benefits including biodiversity, reduced heat islands and stormwater flooding, community engagement and cohesion, workforce development, and local food production.

Key Actions to Support Implementation:

- Secure new dedicated funding for land and stewardship, including an urban component.
- Pass Environmental Bond in 2025: Align with priority goals.
- Streamline wetlands restoration permitting, both coastal and inland.
- Establish mitigation funding for energy (and possibly other categories of development) projects where impacts are unavoidable. Consider expanding in-lieu fee programs.

- Update solar SMART incentives to better align with land goals (underway).
- Prioritize land protection and stewardship funding to protect the most vulnerable species and their habitats.
- Regional conservation partnerships – support and expand cooperative work across federal, state and local governments, NGOs, and landowners to protect and steward interconnected lands at the landscape scale.
- Scale up urban greening in ways that benefit both people and nature.
- Partner with Indigenous people on land conservation and stewardship, and connecting people to nature.
- Continue and expand funding for land conservation for water resources protection. This has been a win-win not only for the MWRA water supply system and Quabbin/Wachusett watershed lands but also across many municipal water supplies.

Prioritizing and Reducing Ongoing Impacts

Protecting, restoring, and stewarding habitat and urban green spaces is essential but insufficient. This initiative needs to be clear eyed in identifying, acknowledging, and tackling other widespread contributions to declines in biodiversity. Examples include:

- The widespread use of rodenticides is poisoning our raptors that have only recently recovered from the effects of DDT decades ago. The death of several Bald Eagles from rodenticides in recent years is unacceptable, particularly following the extensive state investment in restoring this iconic species. More broadly, the prevalence of losses of hawks, owls and mammalian predators like coyotes and foxes disrupts natural ecosystem function and is counterproductive to rodent control. Mass Audubon has launched a campaign, [Rescue Raptors](#), around this issue. We are ready to partner with DFG and others to substitute more sustainable methods of managing rodent pests.
- Excessive use of insecticides is another common practice that requires extensive public education and promotion of alternatives. Programs to promote planting of native plants and pollinator gardens are enormously popular, yet at the same time the public accepts the widespread use of pesticides that are highly toxic to pollinators as well as aquatic life. To restore our native biodiversity, this thorny topic needs to be addressed.
- Roads and highways are important sources of mortality for many populations of wildlife including raptors, mammals, reptiles, and amphibians. In addition to scaling up the installation of more wildlife-friendly road crossings (e.g. replacing undersized culverts), other measures are needed. For example, installation of vertical curbs with closed drainage systems should cease to be the standard utilized in most locations. Open drainage and low impact development (LID) designs not only eliminate traps for turtles, amphibians and small mammals but also are more effective for water quality, groundwater recharge, and minimization of flooding from concentrated stormwater runoff. LID has an added benefit of not creating mosquito breeding habitat, unlike closed systems with catch basins.
- Migratory bird strikes on buildings are a significant source of mortality, and solutions are available with bird-friendly building designs.
- Indirect impacts of ecosystem imbalances need to be included, notably deer overpopulation and the associated impacts on forest plants and animals.
- Management of coastal and marine resources for economic purposes is another difficult topic that does not have easy solutions but should not be ignored.

Conclusion

Mass Audubon is grateful to the Healey Administration and DFG for undertaking this vitally important initiative. We are a committed partner with the state and are eager to assist. Our extensive education activities for all ages reach hundreds of thousands of people annually. Our programs and wildlife sanctuaries not only engage the public in the appreciation of nature and Massachusetts' rich biodiversity, but also move people to take action in their own lives and communities. From Nature in the Neighborhood programs to our two (soon to be three) sustainably managed farms, we provide extensive opportunities for the public to understand and support this initiative. Our land protection and stewardship activities provide demonstration models as well as resources for people to apply lessons learned to new locations.

Implementing and sustaining this initiative will require new resources within DFG and other agencies. We look forward to working with you to help prioritize those needs and identify sustainable sources of funding as well as broad public support.

Regards,

A handwritten signature in black ink, appearing to read "Jocelyn Forbush". The signature is fluid and cursive, with a long horizontal stroke at the end.

Jocelyn Forbush, Chief Conservation Officer



Massachusetts Association of Conservation Commissions

protecting wetlands, open space and biological diversity through education and advocacy

August 30, 2024

Via Electronic Mail: DFG.info@mass.gov

Commissioner Thomas O'Shea
Department of Fish and Game
100 Cambridge Street
Boston, MA 02114

RE: Comments on Draft Biodiversity Conservation Goals for Massachusetts

Dear Commissioner O'Shea:

The [Massachusetts Association of Conservation Commissions \(MACC\)](#) is a statewide non-profit organization that supports more than 2,500 volunteer conservation commissioners in their mission to preserve wetlands and open space. Each of the 351 cities and towns in Massachusetts has a conservation commission responsible for administering the state Wetlands Protection Act and municipal wetland bylaws and ordinances, as well as managing municipally owned conservation land. Our association protects Massachusetts' natural resources through our education and advocacy efforts, and we have been doing this work since 1961.

MACC supports Biodiversity Goals for Massachusetts, including the important recognition that to be successful, this must be a whole-of-government initiative and fully engage the public.

- We applaud the exciting and ambitious goals for Vision 2050 to PROTECT-RESTORE-SUSTAIN-CONNECT. The Green Planning and Design goal of elevating biodiversity as a priority as we work towards our climate, clean energy and transportation goals is extremely important. Avoiding impacts to wetlands, open space, and important habitats is imperative when balancing our clean energy, housing, and transportation needs in the future.
- We agree that biodiversity is in crisis and the statistics outlined by the Department of Fish & Game are staggering. Conservation commissions work to protect wetlands and open space in all municipalities across the Commonwealth. Partnerships and coordination with MACC (as well as other environmental non-profit organizations) can further the biodiversity goals in Massachusetts.
- MACC supports the Administration's Climate Initiatives, and we support the Biodiversity Goals of the Department of Fish and Game. Ambitious goals were presented in the Department of Fish & Game's Public Listening session in July 2024. As the strategy is fleshed out it will be important to identify funding necessary for effective implementation.
- We applaud the "Nature in the Classroom" goal. Education is a huge part of MACC's mission. We train more than 2,000 participants each year and we work to connect with the next generation of wetland/environmental specialists. Coordination with MACC, the [Envirothon](#) program, and other non-profit organizations can help train the next generation and expand the work enhancing biodiversity.

- We support the “Nature in Neighborhoods” to provide a biodiverse greenspace within walking distance of homes.
- We applaud the Food Security focus of supporting farms and working to ensure No Net Loss of Farmland in Massachusetts. We support incorporating goals of the Healthy Soils Action Plan in this work.

Largest challenges we see:

- **Coordination & Integration of Climate & Biodiversity Goals.**
Integration of the biodiversity goals is needed across state agencies and municipalities. A “silo” approach with aspirational goals at Fish & Game will not provide the protections needed. Will MassDOT and other agencies heed the Fish & Game’s Biodiversity Goals when they have other requirements and goals that do not include biodiversity protections?
- **Planning & Design Efforts.**
Green Design can minimize impacts of development on biodiversity as well as build in climate resilience. Extensive efforts are needed to assist municipalities to update their local land use rules to make green design the preferred, easily permitted option for all development and redevelopment. Development is a major cause of habitat fragmentation. Biodiversity suitability tools and siting policy documents should be required for all governmental agencies and implemented throughout the Commonwealth.
- **Public Education Campaigns Needed.**
An ongoing public education campaign is needed to help municipalities, the public, students, and state employees understand the coordinated approach of the Commonwealth’s climate goals, as well as the biodiversity goals.
- **Funding is Needed for Implementation of Biodiversity Goals.**
Without additional funding, how can these programs be implemented? Technical assistance and funding will be needed for municipalities to implement these goals on a local level. The Department of Fish and Game should consider coordinating with grant authorities for additional funding and for more user-friendly funding applications.
- **Invasives Species are a Significant Threat to Biodiversity.**
A statewide program to support the removal of invasive plants is needed.
- **Wetlands Restoration.**
Wetlands restoration projects need to be easier and less expensive to implement. A new approach is needed to greatly accelerate the pace of restoration while reducing costs.
- **True Protection of Open Space is Urgently Needed.**
Best Management Practices (BMPs) and guidance documents are important to safeguarding open space, and we applaud these aspects of the Biodiversity Goals, but guidance documents only go so far in urging the public to “do the right thing”. Mechanisms need to be in place to translate those BMPs into requirements and protections on the ground. MACC observes that even with Public Lands Preservation Act and Article 97 protections that are currently in place, open space continues to be lost to development across the Commonwealth. Issuing the PLPA regulations as soon as possible

will help with some of our public land protections, but additional protections are needed. MACC urges the Biodiversity Initiative team to coordinate with the Executive Office of Energy & Environmental Affairs (EEA) to incorporate consistent siting requirements and land protections into future energy siting (and other land use) requirements.

In summary, MACC is excited to see the Healey Administration's many climate-focused goals, as well as Executive Order 618 directing the Department of Fish and Game to develop these biodiversity targets. We believe the Commonwealth cannot reach these important goals with the efforts of one Department alone. These initiatives will only be successful if the efforts are conducted as a government-wide priority, coordinated across all state agencies, with education and funding for municipalities and the public. Avoiding impacts to wetlands, open space, and important habitats is imperative when balancing our clean energy, housing, and transportation needs in the future.

Please contact our office if we can assist the Department of Fish and Game with educational programs for conservation commissioners, wetland specialists, other environmental scientists, and the public.

Thank you for your Biodiversity Goals for the Commonwealth, and for your consideration of these comments.

Sincerely,

Massachusetts Association of Conservation Commissions



Dorothy A. McGlinchy
Executive Director

dorothy.mcglincy@maccweb.org

cc: Amy Ball, MACC President

MASSACHUSETTS FOREST ALLIANCE

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August 30, 2024

Tom O'Shea, Secretary
Department of Fish and Game
100 Cambridge St, 6th Floor
Boston, MA 02114

Secretary O'Shea:

Thank you for the opportunity to comment on the Department's biodiversity goals. We appreciate your efforts here and the Department's open communication and willingness to listen to feedback.

As an organization that represents forest landowners, foresters, timber harvesters, and forest products companies, we don't have much expertise in the blue economy and other aspects of the plan unrelated to forests, so we will focus our attention on forest-related elements.

We understand that MassWildlife has set habitat goals for its lands based on the needs of plant and animal life in the Commonwealth, and that makes sense. These lands, as Wildlife Management Areas, should be managed with that priority in mind, as there are other forestland owned by DCR that can be managed for other goals.

We support a mix of reserves and actively managed forests on state-owned lands, and MassWildlife has set goals for late successional forest habitat that involves allowing those designated areas to grow old in reserves. At the same time, it has set goals for early successional forest habitat that requires active forest management to mimic natural disturbances.

There are activists that oppose cutting trees for any purpose, including for wildlife habitat. They insist that utility corridors are perfectly suitable to meet the needs of species that need early successional forest habitat. There is substantial scientific evidence that a narrow utility corridor is in fact not ideal for these species. Predators typically lurk at the mature forest's edge nearby, and [many species will not nest too close to it](#). Best practices for early successional forest habitat are to create an opening five acres or more in size to create sufficient distance from the edge.

There is also [growing evidence](#) that even mature forest-dwelling bird species tend to forage for food in early successional forest habitats nearby (because early successional habitat is rich in food and biodiversity), and in fact [tend to dwell there themselves](#) after fledging their young. Early successional habitat is important for more than just migratory songbirds – threatened bees and snakes also thrive in it (and [a study in Massachusetts](#) shows they do not prefer utility corridors).

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Executive Director

Advocating for a Strong, Sustainable Forest Economy


We strongly support MassWildlife's efforts to create and maintain early successional forest habitat, and believe this effort is squarely within Governor Healey's biodiversity order. Without it, biodiversity would clearly decline in the Commonwealth.

We also support the restoration of pine barrens in Massachusetts – a globally rare habitat that is strongly fire-influenced. MassWildlife has been restoring pine barrens and maintaining them with prescribed fire with great success, with groups of wildlife biologists coming from across the country to observe and learn more.

In summary, we support the Department's efforts on habitat management, believe they are well-supported by science, and urge you to continue in order to comply with the biodiversity executive order.

Thank you for the opportunity to comment.

Sincerely,

A handwritten signature in black ink, appearing to read 'Chris Egan', written in a cursive style.

Christopher Egan
Executive Director

Biodiversity Conservation Goals For the Commonwealth

July 23, 2024 6:00-7:00pm

The Massachusetts Lobstermen's Association (MLA) has worked closely with the MA Division of Marine Fisheries (DMF) since its inception in 1963 to protect the ecosystem and resources our members depend upon to earn a living.

The MLA is continually engaged in all things ocean related to ensure the ecosystem is protected as well as the species that are highly managed by the DMF to safeguard sustainability and resiliency. The MLA advocates for the protection of ALL Eel Grass beds

The numerous marine species that are responsibly and sustainably harvested from the Commonwealths waters as these species are highly migratory and travel beyond the Commonwealths management area.

There is not one commercial fishing gear type that is not subject to a seasonal closure for one reason or another. Currently, the Massachusetts Commercial Lobstermen are beheld to the most restrictive regulations for the protections of the Right Whale anywhere in the United States.

With a 3-month closure to over 12,000 square miles the commercial lobstermen have had to adjust their businesses to absorb this 5-month economic loss as it takes one month on either end of the closure to set and remove their gear.

When we talk about biodiversity and what this means, we believe Massachusetts is a leader and has made great strides to protect many species such as the Right Whale. With every conservation and regulation change, the commercial lobstermen continue to comply at their own expense. It must be noted that the compliance rate is upwards of 93% for the commercial lobster industry.

In closing, we would ask that the Commonwealth have a direct and in person meeting with the commercial fishing industry as their livelihoods

depend upon the smart, conscientious, and well laid out planning when talking about biodiversity in the oceans.

Thank you for taking our comments.



MASSACHUSETTS Rivers Alliance

11 Curtis Avenue, Somerville, MA 02144
617-714-4272 • massriversalliance.org

August 28, 2024

Commissioner Tom O'Shea
Massachusetts Department of Fish and Game
100 Cambridge Street, Floor 6
Boston, MA 02114

Commissioner O'Shea,

Re: Biodiversity Conservation Goals for the Commonwealth

The Massachusetts Rivers Alliance is a statewide organization with 86 member groups dedicated to protecting and restoring the rivers and streams of the Commonwealth. Thank you for the opportunity to provide our input on the development of biodiversity conservation goals for the Commonwealth, and for presenting on the subject to our members in June.

Overall, we were thrilled to see Governor Healey issue Executive Order 618, and are deeply supportive of the outline shared by the Department of Fish and Game (DFG). We look forward to seeing the full goals this fall. Below are our comments on the goals outlined thus far.

Interagency Coordination

No matter how ambitious the Biodiversity targets are, the initiative will only be successful if DFG is able to successfully work with other state agencies on implementation. We urge the Healey administration to make this initiative a government-wide priority, and to follow through with funding, clear communication, and accountability. Agencies outside of EEA must understand that protected, thriving biodiversity in the state yields healthy communities, and thus is vital to their missions as well. The state has already set precedent for interagency coordination. Two recent examples are EEA's recent expansion of the Office of Environmental Justice and Equity, and the Massachusetts Drought Management Plan, which details each agency's duty to respond to drought events.

Make Room to Move

Dam Removals. Dam removals are absolutely essential to increasing biodiversity for aquatic species, and we are excited to see DFG set an ambitious goal as part of this Executive Order. The goal of 300 dam removals by 2050 would certainly be an increase from the current pace of restoration. However, with approximately 3,000 dams in the Commonwealth, each with its own local impacts to ecology, 300 is only a small fraction of the work that's needed to restore aquatic habitats. Hundreds if not thousands more of these dams must be removed in order to bolster

biodiversity in every community. This goal must also address the state's 28,000 culverts which can similarly block wildlife passage and become hazardous in extreme weather.

While the Division of Ecological Restoration has grown into an impressive team who are the state's experts in dam removals, we urge the state to complement DER's in-house work by devoting more funding to DER's grant programs that build external capacity by training municipal and nonprofit employees to do the same work.

Blue Economy

No Net Loss of Shellfish Growing Areas. We strongly support upgrading water infrastructure in order to restore shellfish growing areas. Inadequate stormwater and wastewater infrastructure have plagued water quality for centuries, both in our rivers and on our coasts, and upgrades will have myriad positive impacts on both habitats. Combined sewer overflows continue to occur as a result of our increasing impervious cover and "flashier" precipitation patterns.

We look forward to details from DFG on how the agency intends to achieve this goal, including how the Healey administration will provide the necessary additional funding. Progress on wastewater and stormwater infrastructure funding has not kept up with environmental and public health needs, and municipalities will need significant financial, logistical, and political support to move forward. We urge the Healey administration to provide grants, rather than loans, for this work. Low-interest or no-interest loans through the State Revolving Fund have been the primary way Massachusetts municipalities have funded large infrastructure projects, but since all the municipalities with combined sewer overflows have environmental justice populations, and most are Gateway Cities, even generous loan terms are still not enough to make progress feasible.

DFG's work toward this goal should employ green infrastructure wherever possible. As a low-cost complement to "grey" infrastructure projects, green infrastructure installations also yield bonus benefits for biodiversity. Bioswales can add pockets of pollinator habitat throughout a city, land conservation in headwaters provides habitat for a huge range of forest and meadow species, and street trees in urban environments bring the temperature down for everybody. Massachusetts' State Revolving Fund *can* fund green infrastructure projects, but they are typically in the minority of projects receiving awards. The deployment of green infrastructure as a major tool for improving water quality and biodiversity would serve as an excellent example for municipalities and property managers statewide.

Green Planning and Design

Managing our Freshwater Resources. In order for aquatic biodiversity to thrive, there must first be enough water in rivers and streams to support life. The Commonwealth's waterways have struggled under the dual threats of climate change and overwithdrawals, particularly during the droughts of 2016, 2020, and again in 2022. In October 2020 alone, rivers experienced record low flows, including the Three Mile River in Dighton with a 54-year low, and the North Nashua River in Leominster with an 85-year low. The Parker River is currently experiencing a Level 1 drought because of critically low flow. The impacts from such low water levels are devastating to plant, animal, and fish life, and require bold coordinated action from the state.

The top goal of DFG's aquatic biodiversity targets should be improvements to the state's Water Management Act program to ensure healthy flows year-round. The Water Management Act is the state's most important law intended to balance environmental needs with human uses of our

waters, and the most significant recent regulatory update (promulgated ten years ago, in 2014) to that law failed to achieve that balance and should be rewritten. A 2023 Mass Rivers analysis of permits issued under these regulations showed that they do not protect rivers and streams, and that rivers that are already flow-depleted have no protections at all and are most at risk. We ask that DFG prioritize this issue as it develops its biodiversity goals. A full discussion of this critical issue is beyond the scope of this letter, but Mass Rivers and our watershed partners look forward to partnering with DFG staff on sustainable water management.

At a minimum, DFG should work with DEP and EEA to require that all water users, including those with private wells, comply with the state's Drought Management Plan non-essential outdoor watering recommendations.

The second water-related requirement for biodiversity is clean water. Stormwater is the top cause of water pollution in Massachusetts, and we urge DFG to support EPA, MassDEP, and municipal efforts to improve stormwater management across the state. The primary vehicle for this is the federal Clean Water Act, and its MS4 permits. The EPA expects to issue new permits within the next few months, requiring municipalities across the state to improve their stormwater management by reducing the flow of polluted water into local waterways. For the first time, the EPA is expected to expand MS4 coverage in three watersheds (Charles, Neponset, and Mystic) to include some private entities as well (those with large impervious surfaces). It is our hope that DFG staff can inform this work as well, by sharing staff expertise on green infrastructure for stormwater recharge and ensuring that biodiversity is considered a priority in infrastructure implementation and planning.

Food Security

Reducing Pesticides. The Biodiversity targets are an opportunity to reduce the use of pesticides that harm pollinator populations and risk human health. DFG should work with the Department of Agriculture to rethink pesticide regulations, including to prohibit the use of neonicotinoids and second-generation anticoagulant rodenticides on public lands due to their deadly impacts to non-target species.

Massachusetts's current mosquito control program has not been proven effective at reducing disease, while employing pesticides that harm aquatic ecosystems and pose risks to human health, including through our food supply. There is no reason to continue this practice when science-based, ecologically-minded alternative approaches exist, such as the program proposed in [S.445/H.845](#), legislation filed this past session. Such an alternative would prohibit the aerial application of larvicides and adulticides, automatically opt out organic farmers and beekeepers from any pesticide application, and provide a "menu" of options for municipalities so they can tailor their response to local needs.

In the summer of 2021, EEA's Mosquito Control for the Twenty-First Century Task Force received over 300 individual comments from the public in opposition to the use of pesticides for mosquito control. This opposition comes from environmental organizations, farmers, boards of health, scientists, municipal staff, and concerned residents. This strong consensus is emblematic of the public's desire for a modern mosquito management system that supports a toxic-free environment.

Through the Biodiversity Executive Order, DFG should work to reform the Mosquito Management and Reclamation Board, which must create a statewide mosquito management plan with quantifiable thresholds for action, and prioritize education, monitoring, and habitat modification.

Nature in Neighborhoods

Green Infrastructure. Mirroring green infrastructure's usefulness in improving water quality, green infrastructure is just as useful in bringing nature to neighborhoods. The wide range of installation types make green infrastructure adaptable to many spaces - sidewalks, road medians, yards, roofs, parks, shorelines, and parking lots. Co-benefits in an urban environment can include reducing localized flooding, reducing the urban heat island effect, and providing recreational amenities for residents.

Once again, we urge the Healey administration to make funding available for these projects, for example through the Municipal Vulnerability Preparedness program which has been hugely popular in funding numerous projects across the Commonwealth.

Thank you for your consideration of these comments. We look forward to serving as a partner to DFG in making the biodiversity goals a reality for the Commonwealth.

Sincerely,

A handwritten signature in black ink, appearing to read 'KAL', with a stylized flourish extending from the end.

Katharine Lange
Policy Director
Massachusetts Rivers Alliance

Lecturer, Mass Nurses Assn; Energy Committee Member, Sierra Club; Visiting Scholar, Harvard Divinity School.

Name: Sue Butler

Affiliation: NGO/Community Group/Non-profit

Dear DFG and Governor Healy,

Please protect and restore our woods, wetlands and wilds. They have been harmed by clear cutting and by development and land use change. Native biodiversity stabilizes the climate and protects us from the terrible heat that has begun to happen. Native biodiversity moves atmospheric CO2 into sugars for the trees and the soil biome. The soil biome is our greatest carbon sequesterer. Protect and restore the soil biome, throughout our fair Commonwealth.

Protect wild life corridors. We have a responsibility to care for Nature, to maintain it's many ways of keeping the climate in equilibrium. The vast complexity of Nature and her stabilizing forces is unknown to mankind. We must protect it as it keeps the climate stable.

Thank you,

Sue Butler, RN, MSN, PhD

Please see this film, Regenerating Life. You will learn about what Nature offers and why to protect it!

<https://bio4climate.org/regenerating-life/>

MA Army National Guard, Natural Resources Manager

Name: Jacob McCumber

Affiliation: Government

I recommend that the Biodiversity Initiative establishes an interagency scoping and planning group. As the manager of a highly dedicated and effective conservation program it's absolutely essential that the required plans incorporate varying agency missions, land use priorities, and effective strategies for mixed land use planning. There are tremendous opportunities, and a strong track record of success, managing for mutual benefit when focused on biodiversity and long-term sustainability and resilience. Effective planning and building of success for the overall initiative will explicitly and thoroughly incorporate and review the various land use priorities and needs within the Commonwealth and highlight areas of successful management, such as pine barrens restoration. The more explicit that the plans can be cataloging properties, conservation planning blocks, and management goals, the stronger these plans will be through an informed public and openly addressing the complexity of conservation management in a human dominated landscape. The more thoroughly the Initiative also catalogs ongoing climate impacts and the ecological tools for increasing resilience and biodiversity the stronger the planning and projects will be. This can all best be done by establishing a broad, interagency working group to provide input and scoping for the plan(s) and including other key stakeholders with a focus on the priority objectives and ecologically based solutions. Including and supporting all Executive Branch agencies with land management responsibilities is critical to our mutual success meeting the ongoing challenges of climate change and biodiversity. It will also help identify ways to grow our existing partnership efforts and improve stewardship for the future. There are many voices from outside the Commonwealth government that seek to fracture existing conservation partnerships or ignore the importance of integrating conservation missions with agency missions. Meeting agency missions is the fundamental facilitator for conservation success - providing the land and funding for conservation stewardship. Explicitly acknowledging such and building it into biodiversity planning will strengthen the entirety of our Commonwealth's conservation efforts. Establishing interagency planning groups and highlighting ongoing successes with biodiversity and resilience - while meeting the variety of mixed land use objectives - will establish a collaborative and successful process.

Our existing partnerships and efforts are a credit to the Commonwealth and a model for others working to restore natural communities and biodiversity while improving climate resilience and supporting our people. The Biodiversity Initiative is an important opportunity to expand on how our current conservation plans incorporate ongoing and emerging climate threats (forest pests, wildfire, etc.), better address the complexity of our Commonwealth's landscape and development, and support agencies and partnerships will expanding on already successful biodiversity initiatives. Thanks to the Sikes Act, Chapter 47 (Acts of 2002, MGL), and a dedication to sustainability and conservation Camp Edwards and the MA Army National Guard have strong interagency partnerships and extensive conservation successes while supporting high quality soldier training. While improving overall ecosystem health through stewardship and restoring listed species populations, such as the eastern whip-poor-will, the focus on biodiversity provides for a wide array of species, many of which are so rare as to not be found elsewhere

in the northeast or included in the State Wildlife Action Plan. Wildlife Management Areas, State Forests, and other Commonwealth lands have similar successes in meeting priority land uses and managing for ecosystem health and biodiversity. I hope to bring that knowledge, the success stories, and the capitalization on agency missions and capabilities together.

MA Pollinator Network, Elders Climate Action

Name: Amy Meltzer

Affiliation: NGO/Community Group/Non-profit

A very well run meeting on a very important and until now, a disregarded topic. I appreciate the opportunity for so many people to speak and bring up important issues. I sincerely hope these perspectives are taken into account! I look forward to the next meeting.

MA Pollinator Network. Elders Climate Action

Name: Amy Meltzer

Affiliation: NGO/Community Group/Non-profit

Received via email: Hello - I am glad you are holding the listening sessions, but I am puzzled as to why the description is so focussed on the ocean and coastal land. Certainly they are essential ecosystems, but so are land ecosystems. Many species on land are at risk of extinction. Our land ecosystems need protection to support biodiversity, and to mitigate climate change as well. Will those ecosystems get attention and public input too? Thank you, Amy Meltzer, Cambridge MA

MA Sierra Club Exec.Com.

Name: LAURA ROJO MACLEOD

Affiliation: NGO/Community Group/Non-profit

The ecocide unfolding everywhere clearly displays the rampant biodiversity destruction at best. Serious environmental groups have always condemned and opposed logging public forests and "early successional habitat" management. They DO NOT promote biodiversity. Check Michael Kellett's 2023 peer-reviewed article, "Forest-clearing to create early-successional habitats: Questionable benefits, considerable costs," <https://doi.org/10.3389/ffgc.2022.1073677>. High time for this administration to change the toxic narrative and actions to falsely claim that clearcutting forests to achieve "early successional habitat" (meadows with saplings) achieves biodiversity. Totally wrong view.

Manchester Essex Conservation Trust, Trustee

Name: Frances R. Caudill

Affiliation: NGO/Community Group/Non-profit

Executive order 618 signed by Gov. Healey sounds great. However the Commonwealth leaves intact the outdated law enacted in 1969, which favors Mass. Housing's 40B Comprehensive Permit for development projects that are 25% "affordable", even when serious environmental consequences are at stake. The Town of Manchester-by-the-Sea and our local land trust (MECT) oppose a 136-unit project on a steep forested outcrop of bedrock at the headwaters of Manchester's main watershed, Sawmill Brook, a rare home for native brook trout. The directly adjacent Wilderness Conservation Area, part of Mass. Biomap's Critical Natural Landscape, provides everything our state needs desperately to save: biological diversity (rare flora, amphibians, rare insects, nesting birds, fish); a carbon "sink"; flood protection; clean drinking water — in addition to respite from noise and light pollution, and the passive recreational opportunities that humans need in these fraught times. The developer has requested, and expects to receive, 21 waivers, 19 of which are from the local wetland bylaw created 2 decades ago to protect this land. The decision now sits with the Mass. Housing Appeals Committee. The Commonwealth needs to reconcile the opposing goals of these major state agencies! Is Massachusetts on Mother Nature's side or not? Thank you.

Mass Nurses Assn, Sierra Club, Harvard Divinity School

Name: Sue Butler

Affiliation: NGO/Community Group/Non-profit

We must preserve our forests, wetlands and wilds. They shelter a vast biodiversity of native animals and plants. There has been too much clear cutting and land use change to built land from forests and wetlands. We must put them back. We must make them continuous, to give wildlife corridors for safe passage and safe living. Please protect existing forests and wetlands. No nature destruction for solar. Nature cools. Heat is the greatest problem now. Protect native woods and wilds, and build better wildlife corridors.

Thank you,

Sue Butler, RN, MSN, PhD

See: <https://bio4climate.org/regenerating-life/>

Massachusetts Envirothon Coordinator

Name: Brita Dempsey, on behalf of the MA Envirothon Steering Committee

Affiliation: NGO/Community Group/Non-profit

To: The 2024 Massachusetts Biodiversity Initiative

From: Members of the Massachusetts Envirothon Steering Committee

Thank you for the opportunity to comment on Governor Healey's Executive Order No. 618 Biodiversity Conservation in Massachusetts. As a leading natural resource education program for Massachusetts high school age youth with more than three decades of experience preparing young people for environmental careers and active citizenship, the Massachusetts Envirothon looks forward to assisting in this effort! (massenvirothon.org)

We welcome this recognition of biodiversity conservation as a critical element in all environmental issues. We are especially cheered by the emphasis this initiative will place on education and citizen action, in schools and neighborhoods.

Several aspects of the Envirothon program may be particularly helpful in this initiative:

- We are known and valued by a wide network of stakeholders who see the importance of environmental education. The Massachusetts Envirothon is officially a program of the State Commission for the Conservation of Soil, Water, and Related Resources. Our Steering Committee (MESC) reflects the membership of that Commission, including EEA agencies, academic institutions, conservation districts, and environmental education and advocacy organizations. MassWildlife of the Department of Fish & Game has been an Envirothon partner for decades. These broad governmental and community relationships put us in good position to connect high school educators and youth with real world experiences and issues.
- Further, we will be a helpful partner in outreach to neighborhood youth groups as well as to schools. Our program emphasizes hands-on, team-oriented experiences of local ecosystems, and encounters with critical environmental issues in Massachusetts communities. Our approach can enhance both classroom-based learning and extracurricular programs.
- We look forward to assisting in developing educational strategies and metrics for the biodiversity initiative. Our curriculum focuses on the practical management of water, forest, soil, and wildlife resources. At the same time, we are committed to weaving important cross-cutting themes – climate resilience, environmental justice, and biodiversity – into all elements of our curriculum. And we maintain that environmental education is not complete without experiences in civic engagement as well as science and resource management. We welcome the review and critique of our work. The young people of Massachusetts deserve the best we can offer them!
- Our Steering Committee has a reputation as a group of knowledgeable, creative, hardworking

individuals who want to engage the next generation in environmental solutions. We expect that this initiative will draw new interest in environmental education, within and beyond EEA agencies. We are ready to welcome such new energy and put it to work for maximum effect!

Thank you again for this opportunity. We look forward to working with you. Our liaison with EEA agencies is Thomas Anderson, Executive Secretary for the State Commission. He can be reached at at Thomas.anderson@mass.gov or via phone at 617-519-4587.

Lexington Living Landscapes, Secretary/treasurer

Name: Sara Bothwell Allen

Affiliation: NGO/Community Group/Non-profit

On behalf of Lexington Living Landscapes, a nonprofit volunteer initiative in Lexington with over 500 on our mailing list, I'd like to offer the following comments on the Biodiversity Conservation Goals for the Commonwealth. We are heartily in support of the Governor's executive order and an intensified effort to protect our biodiversity, for all the reasons outlined in the public meetings. We ask that this include (1) greater effort to address the root causes of biodiversity loss, including widespread use of pesticides, habitat loss, and climate change, and (2) in suburban communities like Lexington, educational and technical support for schools, town government, and nonprofits seeking to support biodiversity conservation and modify unsustainable landscaping practices. Too much of our suburban landscape is not only wildlife desert, lacking in suitable vegetation for food and shelter our yards could provide, but is also managed in ways that directly threaten the health of our ecosystems through use of poisonous lawn chemicals, SGARs, and other toxins. Yards and other small green spaces can instead become supportive pieces of a Massachusetts landscape mosaic that allows wildlife to move and thrive. Most people want to do the right thing, but need help understanding what that is, why, and how.

MAARNG, Training Lands Specialist

Name: Sean Rigney

Affiliation: Government

This past year I became a permanent employee with the ITAM division of the MAARNG Natural Resource Department at Camp Edwards. I have worked in sensitive habitats in New York and New Jersey, from Pine Barrens to Coastal Dunes. The Camp Edwards Pitch Pine - Scrub Oak Barrens, as well as the Grassland Management Units, are an exemplary example of what good resource management can do. The reason why the Pine Barrens on base are rich in diversity, is thanks to the proactive nature of the Natural Resource Program and the many agencies it cooperates with. One of the reasons the base is able to maintain healthy Pine Barrens is because of our strong Prescribed Fire program. This program relies on our friendly relationship with MA DCR and the JBCC Fire Department.

The goal of strengthening the biodiversity of Massachusetts should reflect places like Camp Edwards. The goals of Governor Healey's Biodiversity Executive Order No. 618 will only be achievable through multi-agency efforts to protect and restore rare habitats and species. These efforts have to use science driven, best practice management if they are to have success similar to Camp Edwards. Aside from the work land managers need to do, there is also a need for community outreach and education about the benefits of restoring biodiversity, why it's important, and how everyone in the state is connected through our shared landscapes.

Melrose UU Church Climate Action Team

Name: Daniel Franklin

Affiliation: NGO/Community Group/Non-profit

We must be smart in our support of biodiversity. We should NOT clear-cut state forests in order to create "early successional habitat"; this is a false "solution" that only benefits the forestry industry.

Consult non-forestry-research by tree scientists, such as Michael Kellett's 2023 peer-reviewed article, "Forest-clearing to create early-successional habitats: Questionable benefits, considerable costs," <https://doi.org/10.3389/ffgc.2022.1073677>

Massachusetts Nurses Association

Name: Susan Farist Butler RN, MSN, PhD

Affiliation: NGO/Community Group/Non-profit

Biodiversity is central to climate stability.

Native biodiversity has evolved together over billions of years. The complex interactions among biodiverse groups of plants and animals are vast in their number and in their multi-dimensionality.

It is of utmost importance that we protect and preserve the highly interactive web of life. It preserves climate stability.

Protect our forests. Protect our old trees. Protect our complex web of life.

We have been cutting too many trees, harvesting too much moss, bulldozing too many native plants. Once gone it is often not replaceable. Protect our Biodiversity.

Thank you, Sue Butler

Massachusetts Oyster Project

Name: Andrew A. Rosenberg, Ph.D.

Affiliation: NGO/Community Group/Non-profit

On behalf of the Massachusetts Oyster Project (MOP), a 501c3 organization dedicated to the restoration of oysters, oyster reefs and the ecosystem services they provide to the Commonwealth's coastal waters, I would like to submit the following comments to the Department of Fish and Game. We fully support Governor Healy's Executive Order No. 618 for Developing Biodiversity Conservation Goals.

In setting these goals for the Commonwealth, the MOP urges state government to consider the vital role that oysters and oyster reefs play in biodiversity conservation. Oysters are most commonly thought of as a food resource that can be commercially and recreationally harvested or farmed in Massachusetts coastal waters. But, , these bivalve shellfish do so much more. Oysters can clean our coastal waters by filtering particulates and sequestering nitrogen and carbon. Oysters, if restored along our coasts where they were once abundant, are one of nature's great natural architects building reefs that become critical habitat for many other species, supporting biodiversity and sheltering coastal waters from natural hazards, as well as the effects of ongoing anthropogenic climate change, including increased storm intensity. Each oyster is a mini water treatment plant. Each reef is home to hundreds of other species. All at the cost of restoration as they do the building themselves. A key goal of biodiversity conservation for the coast of Massachusetts must be the restoration of oysters in coastal bays and estuaries.

Restoring natural oyster reefs is not in conflict with commercial shellfish farming, wild harvest and recreation. Rather it supports these important activities along our coasts. That includes supporting stock replenishment for commercial and recreational harvest and direct and indirect support for commercial farming. Cleaner water, better storm protection and greater biodiversity benefits us all. MOP has found that coastal cities and towns are interested in and largely supportive of oyster restoration if given the opportunity. Setting a goal for biodiversity conservation for restoring natural populations of oysters and other shellfish along our coasts would benefit and give impetus to these communities with the support of state agencies to take steps along the restoration path. Thank you.

Massachusetts Pollinator Network

Name: Amy Meltzer

Affiliation: NGO/Community Group/Non-profit

EDUCATE ABOUT ECOLOGY AND BIODIVERSITY

Establish an advisory council on biodiversity protection and restoration that largely consists of ecologists and educators, who will base their guidance on the most recent and best research.

Partner with the non profit groups in MA that provide education about the essential relationships among native plants, insects, birds and other species, and how citizens, businesses, municipalities and institutions can take action to support biodiversity by planting native plants and using ecological landscape practices. (Grow Native MA, Pollinator Pathways groups, The Wild Ones, MA Pollinator Network, Native Plant Trust, Tufts Pollinator Initiative, Lexington Living Landscapes, Association to Preserve Cape Cod, Xerces Society.)

With the above groups, start a series of educational initiatives to educate municipal decision makers and public works employees about the ecological principles that underlie any biodiversity initiatives.

Provide funding and curriculum for technical high schools and community colleges to teach ecological landscape practices.

DEVELOP GUIDELINES FOR ALL STAKEHOLDERS

Develop requirements for state-funded landscaping installation and maintenance that supports biodiversity.

Develop and widely disseminate guidelines on supporting biodiversity for homeowners, municipalities, businesses and institutions; make recommendations to municipalities to remove ordinances and regulations that oppose ecological landscape practices.

Offer a website with education and resources on biodiversity support

AVOID PESTICIDE USE TO PROTECT ENDANGERED INSECTS AND BIRDS

Stop spraying for mosquitos

Outlaw all systemic pesticides (neonics) in MA

Educate the public on best “pest management” practices to avoid the spraying of beneficial insects

REMOVE INVASIVE PLANTS

Stop selling all plants listed on the two invasive species lists. Buy out old stock if needed.

Provide free or deeply discounted invasive plant removal services to homeowners, businesses and institutions.

Pay homeowners to replace invasive trees and shrubs with native trees and shrubs.

Remove invasive plants from all state and town owned properties.

Create a job program that trains people to manually remove invasives and replant with native species, to reduce widespread herbicide use

PROMOTE THE USE OF NATIVE PLANTS

Pay homeowners to replace lawns with native plants.

Plant state highway road margins and all ROWs with native plants. Mow minimally.

Require that all municipal and state plantings be at least 70% native plants, trees and shrubs.

Require that developers 1) protect existing plantings, especially trees, on any property; 2) follow guidelines in the Healthy Soils Action Plan for protecting and restoring soil health 3) provide new plantings consisting of at least 70% native plants, shrubs and trees (not cultivars unless straight species are unavailable). Levy fines for violating these requirements.

SOLAR SITING

Do not site solar panels on existing forested land or agricultural land.

Where solar panels are on the ground, require the use of native plants as the ground cover.

Incentivize building solar panels on parking lots and rooftops.

MINIMIZE NIGHT LIGHT

Develop Dark Sky requirements for all state construction projects.

Provide guidelines and incentives for dark sky requirements for homeowners, municipalities, businesses and institutions.

INCREASE NATIVE PLANT AVAILABILITY - There are not enough native plants in the pipeline to supply the plants needed to adequately restore biodiversity in Massachusetts.

Provide funding for nurseries to expand their capacity to grow native plants, trees and shrubs from seed. Seed grown plants maintain the genetic diversity necessary for resilient plant populations.

PROTECT NATURAL ECOSYSTEMS - forests, grasslands, wetlands

Intervene only to address threats such as invasive species. "Active" forest management to protect biodiversity is not supported by recent science.

Massachusetts Society of Municipal Conservation Professionals, President

Name: Regen Milani

Affiliation: NGO/Community Group/Non-profit

Conservation Commissions hold a significant amount of land in open space for the sole purpose of conservation, yet few have the ability to conduct species inventories or properly manage these lands so they remain "paper parks" in many respects. Not enough attention is given to Commissions in this landscape even though they are major contributors when considered together. We would advocate for the following:

- Coordinate with grant authorities for additional funding and more user friendly applications
- Streamline the requirements for Open Space and Recreation Plans
- Coordinate with permitting agencies like DEP for expedited processes for invasive species control and dam removal
- Coordinate with permitting agencies to better protect vernal pools and surrounding habitat
- Create a public information or marketing campaign to raise public awareness

National Wild Turkey Federation, District Biologist

Name: Matt DiBona

Affiliation: NGO/Community Group/Non-profit

PART 1 OF 2

August 21, 2024

Tom O'Shea

Commissioner

Massachusetts Department of Fish and Game

100 Cambridge Street, Floor 6

Boston, MA 02114

Dear Commissioner O'Shea,

On behalf of the more than 1,100 members of the Massachusetts State Chapter of the National Wild Turkey Federation, we commend Governor Healey's Administration and the Department of Fish and Game for their efforts to advance biodiversity conservation within the Commonwealth of Massachusetts under Executive Order 618.

As the Department moves forward with developing goals and strategies and incorporating feedback from the general public and conservation partners, we offer the following comments for consideration.

- We believe that efforts to conserve biodiversity through Executive Order No. 618 "Biodiversity Conservation" will be largely complimentary with the Forests as Climate Solutions Initiative and the recent report of the Climate Forestry Committee (CFC). However, one concerning aspect of the CFC report was the overall deemphasis on the creation and maintenance of early successional habitat in favor of late successional habitat, due to carbon storage considerations. Prioritizing late seral stage forests and carbon storage to the extent we are losing opportunities to create and maintain important early successional habitat will have negative repercussions for protecting biodiversity and ignores the carbon sequestration benefits of young forest that will be critical to securing our forests' carbon mitigation benefits well beyond our goal of achieving net zero emissions by 2050. Management activities in support of biodiversity conservation may sometimes result in short-term tradeoffs in carbon storage, but over the long-term, foster greater landscape resilience and support species persistence and adaptation to future conditions.
- Biodiversity goals for young forest and early successional habitat should be based on the best available science, unconstrained by carbon policy considerations. As noted in the Massachusetts State Wildlife Action Plan, "Preserving biodiversity in temperate forest requires the maintenance of all successional stages and managers should recognize the role of disturbance in maintaining biodiversity." Therefore, to conserve the full suite of species and habitats found in Massachusetts, a range of passive

and active management strategies will be required. Active management, whether through timber harvest, prescribed fire, or mowing/mastication, is particularly critical for conserving the 92 Species of Greatest Conservation Need that depend on young forest, shrublands or grasslands in MA. Without active management, species populations may decline further, almost certainly creating greater regulatory burden and straining finite resources to support species recovery.

- Public lands have a critical role to play in conserving biodiversity, especially with regards to providing the suite of forest conditions and successional stages that many species of plants and wildlife depend on in Massachusetts. As the largest public landowners in the Commonwealth, the Department of Fish and Game and the Department of Conservation and Recreation, are in a unique position to have the greatest impact on conservation of rare, threatened, and endangered plants and wildlife, as well as 'keeping common species common' on the landscape. They have the expertise and resources to protect, conserve, and manage habitats at a scale that few, if any, other entities can attain. Biodiversity conservation should be the greatest priority guiding public lands management, especially on Wildlife Management Areas. In turn, those management goals and activities will sustain multiple other benefits/priorities, including forest health, carbon storage and sequestration, and outdoor-based recreation that connects people with nature.

National Wild Turkey Federation, District Biologist

Name: Matt DiBona

Affiliation: NGO/Community Group/Non-profit

PART 2 OF 2

- Biodiversity goals and strategies should include additional resources and programs to incentivize private landowners and municipalities to manage their property for habitat benefits. While there are existing programs at both the state and federal level that address some of these needs, additional outreach and resources would help address remaining barriers and bolster engagement.

NWTF recently launched a new initiative called Forests and Flocks to help address wild turkey habitat needs and declining hunter participation trends in the Northeast. As an umbrella species for conservation that utilizes an array of forests, early successional habitats, and agricultural working lands, we see our work and mission as very complimentary to Commonwealth's efforts to conserve biodiversity and foster greater connections between people, their food, and the natural world that surrounds them. We look forward to working together to address these challenges and opportunities in the future.

Yours in Conservation,

Chuck DuPont

NWTF State Chapter President, Massachusetts



September 6, 2024

Hon. Tom O'Shea
Commissioner
Department of Fish and Game
100 Cambridge Street, Floor 6
Boston, MA 02114

Re: Biodiversity Conservation Goals for the Commonwealth of Massachusetts

Dear Commissioner O'Shea:

The New England Aquarium appreciates this opportunity to provide comments and recommendations to the Commonwealth in its effort to establish goals under Governor Maura Healey's Executive Order No. 618: Biodiversity Conservation in Massachusetts. Preserving biodiversity, and the creation of these goals, are key strategies for climate adaptation.

The Aquarium works to protect marine ecosystems and marine life in waters offshore of the Commonwealth, throughout the region, and beyond. We are a decades-long leader in applied marine research and conservation practice in assessing and monitoring the impacts of human activities on marine species. The Aquarium is one of the preeminent marine research and conservation institutions in the United States, educating over 1.3 million visitors annually. Located on Boston's Central Wharf, the Aquarium has a unique vantage point on the Commonwealth's coastline, providing us with the opportunity to observe the direct impacts of climate change on ecosystems, marine life and local communities. The Aquarium is dedicated to translating its research, conservation education and engagement into policy and management solutions that help address such impacts. To this end, we provide the following comments on the Department of Fish and Game's Vision 2050 for Biodiversity, which seeks to establish biodiversity conservation goals for 2030, 2040, and 2050.

Clearly define marine biodiversity targets with focus on data collection and public-private partnerships

The Aquarium recommends that the Commonwealth ensures its biodiversity goals are grounded in science and knowledge that prioritize the protection of marine ecosystems and species; equitably considers community input and cultural benefits; and supports a vibrant and sustainable blue economy. The Commonwealth should set clear targets that capture the interplay between number and types of species and number and types of ecosystems; define how species are weighted including rare or endemic species; and ensure marine biodiversity has parity with terrestrial biodiversity.

The Commonwealth's biodiversity goals must account for the cumulative impacts of all marine uses, including those that promote climate resiliency but have new regulatory frameworks, such as offshore renewable energy. To address these knowledge gaps, the Aquarium conducts research to understand and mitigate offshore wind development's impacts on whales, highly migratory fishes, and



Protecting the blue planet

turtles. For the Commonwealth to accomplish its complementary biodiversity and offshore energy goals, such data collected before, during, and after construction of these projects should be considered to inform adaptive management and guide best practices. As the Commonwealth pursues its 2035 offshore energy goals, it should invest in partnerships that assist in this level of data collection and analysis.

To best monitor changes in marine biodiversity, the Commonwealth should consider ecosystem-level data from multiple sources using multiple methodologies, such as aerial surveys, boat-based monitoring, or passive acoustics. This approach will help the Commonwealth adequately detect and better understand the distribution, abundance, and biodiversity of species. All published data should be available at the most detailed scale possible to allow for complete filtering and sorting of information.

Inform biodiversity goals through diverse public engagement

In shaping final biodiversity goals, the Aquarium recommends that the Commonwealth continuously engage with a diverse set of stakeholders and experts. We recommend developing strong relationships with and prioritizing input from Tribal Nations, Indigenous communities, maritime historians, archaeologists, and other experts in the Commonwealth's coastal and marine areas. Incorporating the knowledge and perspectives of those with cultural relationships and historical understanding of habitats, ecosystems, and species will promote biodiversity and long-term success.

Further, the Commonwealth should partner with and invest in research scientists, academic institutions, and Indigenous experts on joint research, data collection, capacity sharing, and learning opportunities. This would allow the Commonwealth to recognize the full scope of Indigenous and community-based knowledge, as well as traditional scientific information. The Commonwealth should make all such information available, as appropriate, for public consumption in a simplified and readily understood manner.

The Commonwealth should also engage underserved, environmental justice, and youth communities. The Commonwealth's coast and waterways remain inaccessible to many of our residents, which is compounded by a history of discrimination around access to nature. This inaccessibility and lacking sense of belonging limits certain communities from learning about and engaging with marine environments and from providing input on management decisions to address coastal resilience. Through the Aquarium's Downtown Waterfront for All Campaign and our ClimaTeens program, we hold listening sessions for traditionally disadvantaged neighborhoods and engage youth on the impacts of climate change, to influence city planning and to create a more climate-ready, inclusive, and accessible waterfront. The Aquarium recommends that the Commonwealth adopt similar approaches to help increase engagement by and to gather input from traditionally excluded voices and communities to inform the Commonwealth's biodiversity goals.

The Aquarium and other research-based institutions play critical support roles in increasing public input, education about, and participation in promoting marine biodiversity. We hold a unique position



Protecting the blue planet

as both a beloved cultural institution and credible science-based institution rooted on Boston's waterfront. As a place that people can both visit and engage with marine life, we invite the Commonwealth to utilize our unique location as a convening space to solicit public input and a near-shore area to implement biodiversity goals.

Develop biodiversity goals that can support a sustainable blue economy

The Commonwealth is well-positioned to contribute to and benefit from a sustainable blue economy. The blue economy focuses on the sustainable use of our waters and its resources for economic growth. In 2021 alone, the Commonwealth's marine economy accounted for \$8.3 billion in GDP and employed 86,859 employees across 5,891 businesses.¹ In addition to protecting marine ecosystems and promoting equitable access as described above, the Aquarium recommends that the Commonwealth develop biodiversity goals that support a vibrant and sustainable blue economy.

Protecting our marine habitats will promote biodiversity and climate resilient outcomes, while also sustaining the growth of our blue economy. For example, restoring wetlands such as salt marshes and other seagrasses can maximize carbon sequestration, provide critical nurseries for commercially important fisheries, and reduce impacts of flooding on nearby communities. Further, the Commonwealth should make direct investments in improving municipal infrastructure (e.g., through stormwater utility upgrades), water quality monitoring, and regulatory protection of groundwater. These actions would reduce threats to animals and their habitats toward improving biodiversity and support the local economies that depend on them.

The Commonwealth can be a national leader in biodiversity. By establishing biodiversity goals that benefit our environment, communities, and blue economy, we will ensure a healthy and vibrant marine ecosystem for future generations. The New England Aquarium welcomes the opportunity to further discuss these goals, our recommendations, and partnership opportunities. We are prepared to work with the Commonwealth and its stakeholders to make a positive impact on our ocean, including by protecting and improving marine biodiversity.

If you have any questions or require additional information, please contact our Associate Vice President of Conservation Policy Anthony Gesualdi at agesualdi@neaq.org.

Sincerely,

Letise LaFeir, PhD
Chief of Conservation and Stewardship

¹ NOAA Regional and State Report on the U.S. Marine Economy (2024) <https://coast.noaa.gov/data/digitalcoast/pdf/econ-report-regional-state.pdf>

North County Land Trust, Director of Conservation and Climate

Name: Anna Wilkins

Affiliation: NGO/Community Group/Non-profit

Upland habitat restoration and management should be in the priorities as well. DFG has land management grants that are too restrictive. They aren't announced until October and then must be completed by June. Anyone who has worked in living systems knows that work that is weather dependent and requires contractors and specialists who may or may not get you onto their schedule knows, single year, tight timeline grants are almost useless. Many existing habitats could be managed better for increased diversity with a better designed grant program.

Long-term land management and stewardship should be promoted and municipalities should be rewarded for having natural resource management money set aside to conduct CR monitoring, have land management plans written and followed, whether it's a position on the DPW or in the ConsComm or a hired contractor from a Land Trust or consulting firm, there should be municipal positions supported by the state for land management issues. For example, decommissioned gravel pits are often required to have topsoil placed and seeded. That is actually the least beneficial for biodiversity. The town should have access to expertise on how to manage land use issues, from dam removal, to town forest stewardship plans, to hazardous site clean ups. This will continue to be an area where the state will be able to restore habitats and increase opportunities for diversifying habitats and supporting more species, appropriately.

Fire management is something that has been proven to be beneficial in many rare and endangered habitats. The number of people certified to write fire management plans is dwindling. The whole northeast region should work cooperatively to ensure we have the expertise to implement the fire regimes we hope to enact in the future.



Protecting our water, our land, our communities

August 29, 2024

Commissioner Tom O'Shea
Massachusetts Department of Fish and Game
100 Cambridge Street, Floor 6
Boston, MA 02114

Re: Comments in Support of Developing Biodiversity Conservation Goals for the Commonwealth

Dear Commissioner O'Shea:

The Nashua River Watershed Association (NRWA) appreciates the opportunity to comment on the biodiversity conservation goals outline shared by the Massachusetts Department of Fish and Game (DFG). The NRWA is a member-supported organization based in Groton, Massachusetts that works to restore and protect water quality and quantity for people, fish, and wildlife; conserve open spaces for water quality, wildlife habitat, farms, forests, and recreation; encourage careful land-use with well-planned development; and address the impacts of climate change with nature-based solutions.

The NRWA is grateful to DFG for developing these goals and appreciates the steps the agency is taking to protect, restore, sustain, and connect with biodiversity. We strongly support DFG's focus on conserving priority habitats and addressing stressors such as pollution, habitat loss, invasive species, and the climate crisis. We are submitting this letter to highlight areas we would like to see strengthened or addressed.

Priority Conservation

The NRWA strongly supports DFG's 30x30 conservation goal and the focus on preserving core habitats, critical natural landscapes, and globally rare "hot spots." The NRWA specifically encourages the prioritization of riparian corridors to protect sensitive wildlife species, create wildlife corridors, and reduce pollution in our waterways. Our organization advocates for a transparent, community-driven, science-based approach to managing public conservation lands, which accounts for both biodiversity considerations and the role that forests play in sustaining a healthy climate and robust ecosystem. The NRWA also supports DFG's focus on addressing the disparities that exist in Environmental Justice communities in the Commonwealth.

The NRWA believes that Priority Conservation goals could be strengthened in several ways:

- The NRWA strongly advocates for greater transparency surrounding DFG’s land management policies and procedures. DFG’s decision-making should be data-driven and site-specific, with the scientific rationale behind all restoration activities clearly conveyed to the public. The implementation of this Priority Conservation initiative and the development of active management goals provides DFG with a critical opportunity to involve stakeholders and experts from across the Commonwealth as the agency evaluates its land management options.
- Relatedly, as DFG develops management guidelines, we encourage the establishment of a defined public input and participation process. This includes the production of a state-wide management plan that describes applicable state programs, identifies both forest reserves and actively managed forests, and identifies the management guidelines applicable to each project underway. Information about the selection criteria for particular project sites, as well as baseline surveys and project data should be made publicly available.
- DFG should solicit public comment on and publish a set of criteria that define the Commonwealth’s biodiversity and land management priorities across all state agencies. The NRWA believes a standardized system built with public input will foster public confidence in, and support for, the Commonwealth’s land management decisions.
- Before proceeding with any restoration project targeted at maximizing species diversity, DFG should evaluate all ecological and recreational values, current and future carbon sequestration potential, and wildlife habitat values for each proposed restoration site to balance biodiversity goals with climate goals. With a proper data set, the value of active management efforts can be measured against any potential carbon storage loss caused by management activities. This process would be consistent with DFG’s data-driven approach, and would foster climate-informed decision-making in tandem with the agency’s biodiversity goals. Furthermore, the NRWA hopes that the recommendations of the Forest as Climate Solutions committee – that Massachusetts should “keep forests as forests” – be kept forefront in DFG’s goals as they continue to explore this initiative.
- For future restoration projects, dedicated funding should be required to support ongoing stewardship at each site to ensure that biodiversity goals are not extinguished by unintended outcomes, such as the emergence of invasive species following management activities. This stewardship will be particularly critical for grassland and shrubland areas.

Make Room to Move

The NRWA is enthusiastic about DFG’s goal to create climate corridors for migration and resilience. Dam removals are an essential restoration activity to improve biodiversity for aquatic organisms, and the NRWA is glad to see this important activity included in DFG’s goals.

The NRWA encourages the agency to consider increasing the targeted number of dams to be removed, and to address the significant number of problematic culverts across the State that inhibit fish passage and affect migration. The NRWA hopes that in addition to the funding for the Division of Ecological Restoration, the state will grow DER’s grant programs that encourage municipal and non-profit employees to assist with, or manage, restoration activities.

As a part of this initiative, The NRWA also suggests that the impact of stocking non-native fish species be evaluated.

Nature in the Classroom

Education is central to the mission of the NRWA, and a core aspect of the programs we offer to our communities. We strongly support DFG's goal to encourage inherent appreciation for nature from a young age. Before launching the new Nature in our Schools Initiative, the NRWA encourages DFG to consider working with existing partners that share this mission, and which are already well established and successful in their communities.

Green Planning and Design

As a watershed organization, the NRWA is concerned with the increased demand for water usage as Massachusetts' population grows. This issue, compounded by the impacts of climate change, have resulted in record low flows in areas such as Leominster. We recommend that DFG include improvements to the Commonwealth's Water Management Act to protect our waterways against overwithdrawals and low flow.

Partnership and Collaboration

The NRWA urges the DFG to collaborate closely with other state agencies while pursuing their biodiversity goals to ensure the success of the initiative. The NRWA echoes the call for this initiative to be a government-wide priority by the Healey Administration.

The NRWA hopes that these goals will be accompanied by a transparent and publicly accessible regulatory process, as DFG works with other governmental agencies to receive approvals to pursue management activities in jurisdictional areas and those identified as priority habitat.

Thank you for this opportunity to provide written comments.

Respectfully submitted,



Lauri K. Johnson
Acting Executive Director

North W

Name: walter

Affiliation: NGO/Community Group/Non-profit

this is a welcome initiative. the commitment to land protection/conservation is great but insufficient to offset the harms associated with human development across the commonwealth that have adversely disrupted our natural world as evidenced by dramatic losses of critical habitat, functioning of resources and huge losses to insect, bird and other wild life.

so the policy needs to address a complex set of contributing factors that might not immediately come to mind when the term biodiversity is mentioned through the lens of land conservation (and I know your ideas are not that straight jacketed). some factors that might be more fully addressed include excess nutrient loading from human waste and fertilizer; over use of chemical insecticides and pesticides; smarter solid waste management; addressing the huge costs associated with pfas contamination; mitigating, reducing and eliminating plastic use; better planning to reduce road kills and to protect wildlife corridors terrestialy (stronger zoning to prevent/minimize/offset clear cutting of trees and incentivize more green space in urban areas and reductions in impervious surfaces more generally), under water (whale transit for example with noise pollution, waste and entanglement risks) and in the air (stronger efforts to reduce kills from high and other built structures); investment in mass rapid transit; promulgation of a commonwealth wide dark sky policy, better protections for sensitive coastal areas, including developing a smart retreat/smart development policy; and - I am sure others could add to the list.

Finally, realizing how complicated and interactive these and other factors are, it would be interesting if your experts might develop a matrix showing how these and other factors interact and which ones might be really impactful and less costly to address, those that might be costly and have less of a payoff, and so on - a way to look at tradeoffs between economic and biologic outcomes.

Again, really welcome the initiative, energy and thought that has gone into this and look forward to seeing how it evolves.

NRWA, Conservation and Climate Resilience Specialist (MVP Project Manager)

Name: Sara Singh

Affiliation: NGO/Community Group/Non-profit

It would be unfortunate if the MA Department of Fish and Game continues to perpetuate anthropocentrism, where human interests are prioritized above all else. This has always been the dominant paradigm in US and Massachusetts history, and it's not working out very well for us or our lands and water bodies. If the DFG really studies the approach of the Indigenous stewards of past and present, they will see the value of the Reverence for Life / deep ecology ethos.

Since 1970, there has been a 69% decline in populations of all vertebrate species. That's an extreme biodiversity crisis. At this rate, there will be hardly any wildlife left by the end of the 21st century. Fish stocks in the oceans are set to collapse by 2050.

Among mammals, at this time, only 4% of remaining mammals are wild. The remaining mammal biomass is comprised of humans + livestock belonging to humans (like cattle).

Should the DFG really be centering human interests — what hunters, fishermen, and farmers want? Why not give equal weight to what's best for wildlife? Without the ecosystem services provided by wildlife and intact habitats, there would be no abundance for us to enjoy and exploit.

A Reverence for Life ethos — one that involves protecting wildlife rather than managing them for human interests — is the way of the future. THAT is something that watershed associations, land trusts, and compassionate members of the public will passionately support.

1) <https://ourworldindata.org/living-planet-index-decline>

2) <https://www.pnas.org/doi/10.1073/pnas.1604008113>

3) <https://ourworldindata.org/wild-mammals-birds-biomass>

4) My summary of Global Wilderness & Wildlife Degradation: <https://arcg.is/4fSmO>

OARS, Executive Director

Name: Matthew Brown

Affiliation: NGO/Community Group/Non-profit

Dear Commissioner O'Shea,

OARS is the watershed organization for the Sudbury, Assabet, and Concord rivers and watershed. Our watershed covers nearly 400 square miles and includes over 30 cities and towns. Thank you for the chance to provide our input on developing biodiversity conservation goals for the Commonwealth.

Overall, we were thrilled to see Governor Healey issue Executive Order 618, and we are deeply supportive of the outline shared by the Department of Fish and Game (DFG). We look forward to seeing the full goals this fall. Below are our comments on the goals outlined thus far.

Interagency Coordination:

We urge the Healey administration to make this initiative a government-wide priority, and to follow through with funding, clear communication, and accountability. Agencies outside of EEA must understand that protected, thriving biodiversity in the state yields healthy communities, and thus is vital to their missions as well.

Make Room to Move:

Dam Removals. Dam removals are essential to increasing biodiversity for aquatic species, and we are excited to see DFG set an ambitious goal as part of this Executive Order. The goal of 300 dam removals by 2050 would certainly be an increase from the current pace of restoration. However, with approximately 3,000 dams in the Commonwealth, each with its own local impacts on ecology, 300 is only a small fraction of the work that's needed to restore aquatic habitats. This goal must also address the state's 28,000 culverts which can similarly block wildlife passage and become hazardous in extreme weather. In addition, we advocate for a streamlining of dam removal permitting as well as stricter and swifter penalties for dam owners with dams out of compliance.

Green Planning and Design:

Managing our Freshwater Resources. For aquatic biodiversity to thrive, there must first be enough water in rivers and streams to support life. The top goal of DFG's aquatic biodiversity targets should be improvements to the state's Water Management Act program to ensure healthy flows year-round. The Water Management Act is the state's most important law intended to balance environmental needs with human uses of our waters, and the most significant recent regulatory update (promulgated ten years ago, in 2014) to that law failed to achieve that balance and should be rewritten.

The second water-related requirement for biodiversity is clean water. Stormwater is the top cause of water pollution in Massachusetts, and we urge DFG to support EPA, MassDEP, and municipal efforts to improve stormwater management across the state.

Road salt in our rivers and streams presents another issue. There is a condition called Freshwater Salinization Syndrome which refers to the issues caused when rivers and streams become saltier. Aquatic biodiversity suffers in these streams, such as River Meadow Brook in Lowell. Only the most resilient plants and animals can survive in streams polluted by road salt. We would like to see a reduction in the quantity of salt entering our waterways as a priority for DFG.

Nature in Neighborhoods

Mirroring green infrastructure's usefulness in improving water quality, green infrastructure is just as useful in bringing nature to neighborhoods. The wide range of installation types make green infrastructure adaptable to many spaces - sidewalks, road medians, yards, roofs, parks, shorelines, and parking lots. Co-benefits in an urban environment can include reducing localized flooding, reducing the urban heat island effect, and providing recreational amenities for residents.

Once again, we urge the Healey administration to make funding available for these projects, for example through the Municipal Vulnerability Preparedness program which has been hugely popular in funding numerous projects across the Commonwealth.

Thank you for your consideration of these comments. We look forward to working with DFG in making the biodiversity goals a reality for the Commonwealth.

Ocean Solutions Inc, Founder and President

Name: Carl Persson

Affiliation: Business

Thank you for your efforts to promote biodiversity in Massachusetts. Thank you also for linking Biodiversity and the Blue Economy together. As a startup company in this space that is what we do while most others in Massachusetts are classified as BlueTech. We are pioneering new approaches for in-situ water quality improvement across marine, estuarine, and fresh waters. We are developing a process for the restoration of nutrient impaired eelgrass meadows for which we are planning a project to restore eelgrass in Popponesset Bay, Mashpee. We are working with the Mashpee Wampanoag Tribe, the Town of Mashpee, and are talking with Waquoit Bay National Estuarine Research Reserve. We are seeking funding for this from the Federal Government, especially NOAA. Our process is based on biogeochemistry, turbulent mixing, and semi-automated seed planting. Besides habitat restoration and improvement in biodiversity the process methods can be extended to coastal and erosion protection for which the mechanism is currently unfolding. Innovating Private Companies can provide important benefits to Massachusetts as well as most places on earth. Please continue to include us.

Ocean Solutions Inc, Founder and President

Name: Carl Persson

Affiliation: Business

After quickly review Massachusetts' comments' plan for Biodiversity and Executive Order No, 618 I am in agreement with these goals although it is very general in nature, My work in developing solutions to protect and restore nutrient impaired waters from nearshore ocean to estuaries and freshwater bodies takes me to a common cause, deoxygenation. Deoxygenation of all waters is being proposed by a Programme within the UN Ocean Decade (I am a stakeholder) as one of Earth's boundaries that we are approaching. Low oxygen harms biodiversity, destroys the functioning of marine and aquatic biogeochemistry, causes a loss of habitat for many species, and destroys natural capital that supports life and our enjoyment of it. This is a place for creative solutions. Where past emphasis has been on watersheds with long times for benefits to be realized, our needs are pressing NOW! Nature-based and in-situ solutions fill a missing gap in past efforts while delivering much faster beneficial results. This is what we are doing.

Opacum Land Trust, Executive Director

Name: Laney Wilder

Affiliation: NGO/Community Group/Non-profit

Local Land Trust and conservation organizations are the on-the-ground front lines of this type of work and can have the greatest impact. We can also connect with private landowners to provide information, education, and opportunities to them that will support these biodiversity goals. Providing unrestricted funding opportunities to local land trusts to build capacity will help to implement and fulfill some of these goals like Conserving key habitats to sustain species; preserving salt marshes and wetlands for wildlife, carbon storage, and flood resilience; Restoring free-flowing rivers and wildlife migration; and protecting farmlands to bolster food security by promoting biodiversity on farms, supporting pollinators, and encouraging sustainable wild harvest.

Organic farmer

Name: Jim MacDougall

Affiliation: Business

Congratulations for acting on Executive Order 618.

In your presentation, you miss on the most important benefit from biodiversity, the trapping of light energy (heat) and binding it to a chemical bond (sugar). Biodiversity and all the trophic steps in the transfer of chemical energy, thus keeping it "cool" in carbohydrates, proteins and lipids, helps to keep our atmosphere cooler. The process is called "maximizing entropy production", MEP. A simpler way to say it is, "nature is the eddy in thermal chaos."

Unless we keep all the organisms and pathways of chemical energy intact and working toward the most complex system of sequestering thermal energy, all other adaptations to our new climate will fail. We need to protect all our species and we need to protect the masses of each species that make up nature. That is the system that has brought us climate stasis for centuries.

PVPC Commissioner East Longmeadow, Vice-Chair PVPC

Name: George Kingston

Affiliation: Government

One key to biodiversity is to maintain and expand wildlife corridors to connect key habitats. Another is to prioritize the elimination of invasive species.

River Valley Democratic Socialists of America, Ecosocialist Committee

Name: Zachary John Bouricius

Affiliation: NGO/Community Group/Non-profit

First, ask ECOLOGISTS. It is those who committed their lives to studying biodiversity who should lead the biodiversity effort. Everyone else has different priorities and tends to view our lands as resources to be exploited, often unsustainably. Distrust council from those who advocate that we interfere more in the natural world - preservation and healing can best be achieved by reducing our impact on biodiverse land.

Numerous pesticides and herbicides in use by state agencies and certainly some farms have now been linked heavily to human cancer and pollinator loss. As such their use should be discouraged for biodiversity and human health.

Do not allow loss of biodiverse habitat to solar farms which could be sited more beneficially. Barren rooftops and parking lots must be utilized before habitat is cleared. The coordination obstacles between who has land or rooftops suitable for solar power, both public and private, cause a lazy destruction of biodiverse ecosystems, because we can't align our interests on power generation. If a statewide solar/energy siting board does come into existence, it must pay more than lip service to biodiversity and be willing to incur higher costs to the state and developers to practice responsible siting of energy infrastructure.

Preserve as forever wild and untouchable all the oldest remaining forests in the Commonwealth, and the entire border and watershed of the Quabbin Reservoir. Lesser plans than total preservation have in the past allowed sneaky and destructive logging projects to threaten the water of the Quabbin, and the health of animals and people. Continue the Governor's former moratorium on logging state land while preservation priorities are studied.

Ruffed Grouse Society & American Woodcock Society, Northeast Forest Conservation Director

Name: Todd Waldron

Affiliation: NGO/Community Group/Non-profit

Thank you to EEA, Department of Fish & Game, and all our highly professional agency partners at MassWildlife for your leadership in developing the Biodiversity Goals for the Commonwealth. Ruffed Grouse Society & American Woodcock Society (RGS & AWS) supports and applauds this ground-breaking work. We are enthusiastic about working with our agency and conservation partners to achieve these targets and look forward to collectively building out the diverse toolkit of management approaches needed to achieve them.

According to the Vision 2050 document, “Biodiversity is the extraordinary variety and abundance of living things and their complex interactions. In Massachusetts, biodiversity includes iconic landscapes, seascapes, and species that define our state's identity, sustain our health and economy, and determine our collective future.” Habitat loss is recognized as one of several impact drivers, as Massachusetts is losing critical natural spaces at an alarming rate due to rapid development of unprotected lands. We fully agree and would like to add that what is happening within our forests is as equally important as what is happening to our forests, in terms of the multitude of habitat threats, vulnerabilities, and losses which will continue to impact biodiversity and will be exacerbated by climate change. This includes an alarming rate of decline in forest age class diversity across the Commonwealth, which is important to forest ecosystem functionality, biodiversity, and climate solutions.

Massachusetts Department of Fish & Game is actively engaged in a range of planning tools and management protocols that work toward State Wildlife Action Plan issues and align with the Biodiversity Targets. We support DFG’s leadership and field staff and reiterate that there is not a one-size fits all approach to biodiversity, climate solutions or forest resilience. We need to keep as many tools in the toolkit as possible when it comes to management options, and this includes active forest management as well as protection, restoration, connectivity, and sustainability. Please continue to give the field staff and leadership at DFW the support and resources they need to do their jobs - so we can reach our world class ambitions for nature and stand as a global leader in biodiversity outcomes.

RGS & AWS has concerns with the either-or recommendation from the Forests as Climate Solutions panel in relation to young forests’ role in biodiversity, and the pressure that is being applied by a small cohort of individuals who have dominated the power dynamics to date in that discussion. While the CFC panel has a great deal of expertise regarding climate solutions, biodiversity expertise wasn’t well-represented in that cohort, and we disagree with their emphasis on prioritizing old forest habitat outcomes at the expense of young forest outcomes, carte blanche. Massachusetts’ biodiversity outcomes rely upon both approaches, and there is a “right thing for the right place” solution when we embrace science, work on the landscape level and support agency field staff and protocols.

RGS & AWS stands together with conservation partners for the future of Massachusetts’ forests as climate solutions, and to advance biodiversity, resilient forests, thriving communities and places of respite that provide us all with so many co-benefits.

Thank you.

Todd Waldron

Northeast Forest Conservation Director

Ruffed Grouse Society & American Woodcock Society

Hello - **Thanks** for the opportunity to present written comments on the Biodiversity Conservation Goals.

My main comment has to do with deer, i.e., **the adverse impact of the overpopulation of deer** in many areas of the Commonwealth.

I have seen firsthand a great drop in the amount and diversity of understory plant species, and seedling trees, in the woods caused by too much herbivory by too many deer.

So I strongly support efforts that are likely to help reduce the impact of excessive deer herbivory on native plants, such as the **Hunters Share the Harvest** program (<https://www.mass.gov/info-details/masswildlifes-hunters-share-the-harvest-program>), which I have read about in Massachusetts Wildlife magazine. I noticed, on the state website, the opportunity to make a financial donation to this worthy effort, and have just done so.

I am particularly encouraged to see that this program is collaborating with indigenous groups such as the Herring Pond Wampanoag Tribe and Wampanoag Tribe of Gay Head (Aquinnah), and hope that can expand in the future. If you haven't already, I suggest contacting Ms. Burne Stanley Peters of the Danvers, MA-based [Mass. Center for Native American Awareness](#) (MCNAA). This organization provides direct assistance to tribal members and families in need. Burne's email is mcnaa@aol.com.

Also - I'd like to suggest that you consider the possibility of expanding deer hunting opportunities for enrolled Tribal members, e.g., by allowing them to take more deer than what is currently permitted by non-tribal members.

Having said all that: while I am aware that allowing hunting on Sundays could be one of the biggest steps we could take to increase hunting pressure on deer and increase the deer harvest, **I remain supportive of there being one day per week where hunting isn't allowed**, so that people like me who like to hike in the woods during hunting season can do so without being worried of being inadvertently shot. Perhaps the "no hunting" day could be switched to another day, like Friday, that would have less impact on hunters.

Another method I'd like to see a greater deployment of, to reduce the impact of deer on native plants, is the use of more **deer exclosures**: areas where deer are prevented from entering by the use of fencing, slash piles or the like.

Usually, where I have seen this technique deployed, tall fences without gates are erected in the woods, surrounding small areas, to exclude the deer, with the hope and anticipation

that native plants vulnerable to deer browse will eventually appear inside the enclosure (from, e.g., native seed still present in the soil, brought to the site through bird droppings, or from the resprouting of plants whose roots are still present within the enclosure). The concept is that, over time, there should be a marked difference in the amount and diversity of vegetation between what is growing inside the enclosure and what is happening outside the protective fencing.

While this passive, “wait and see” technique is certainly worth doing, ►I’d like to suggest a greater **deployment of a more active form of deer enclosure**: one where, after the fence is erected, native species vulnerable to deer browse, and suitable for the area where the enclosure is located, are deliberately planted within the enclosure. Secondly: I suggest that gates be installed as part of the fencing so that the public can enter and observe for themselves the increased plant growth and diversity that is possible when deer herbivory is deterred. This, I think, could help build **public support for expanding efforts to reduce deer populations**. such as allowing deer hunting on places that are not currently open to it.

I also have a hunch that there could be **considerable interest amongst folks willing to step up and take a volunteer stewardship role in these active enclosures**, by helping to erect and maintain the fences, build and take care of the pathways inside the enclosures, making sure the gates are closed, planting and taking care of the vulnerable-to-browse plant species inside the fenced-in area, etc. An example of where this is already happening (although admittedly the chief herbivory pressure in this location is not from deer but rabbits) is the [Lusitania Woodland Habitat Restoration Project](#), in Cambridge, MA, where a section of the City’s Fresh Pond Reservoir Reservation has been restored with native vegetation, and is actively managed by a corps of volunteers.

Here are two additional examples of places that have **“active” deer enclosures** where: (a) native plants were planted inside the enclosure (they didn’t just wait to see what seed would sprout naturally) and (b) public pathways run through the enclosures, so people can see the plants inside.

(a) [Norcross Wildlife Sanctuary, Wales, Massachusetts](#)



And
(b) [Cornell Botanic Gardens, Ithaca, NY](#)





I know people at both these places if/when you want to get more details about these.

And here's a link to a third example: a video from NJ Audubon:

<https://www.youtube.com/watch?v=kxsaiQIa2bY>

And another example, from Hastings-on-Hudson, NY:

<https://www.hastingsgreen.org/protect-our-woods/what-hastings-is-doing/work-to-date/replanting/demonstration-site>

If and when these "active" deer exclosures are created, on state land or otherwise, I would be happy to donate plants from [my native plant nursery](#) to help diversify these sites with native species that are often missing from the landscape exposed to too much deer browsing.

Thanks for the opportunity to share these comments with you.

Russ Cohen
57 Chester St.
Arlington, MA 02476



Russ Cohen - Naturalist & Wild Foods Enthusiast
Wild Seed Seeker & Sharer
eatwild@rcn.com, (781) 646-7489 (h)
<http://users.rcn.com/eatwild/bio.htm>



lakiesel@gmail.com

Dear Massachusetts State Officials,

I am writing on behalf of [Save Arlington Wildlife](#) and the [Save Massachusetts Wildlife Education Fund](#) to make several requests of the State of Massachusetts to adequately conserve biodiversity in service of Biodiversity Executive Order No. 618. I was present at one of the Zoom PowerPoint presentations. Conspicuously missing from the presentation was inclusion of the adverse impacts rodenticides (rat poisons)--namely anticoagulant rodenticides (ARs)--have on our native wildlife. This includes species listed under the Massachusetts Endangered Species Act (MESA), namely the American bald eagle.

As noted by the US Environmental Protection Agency executive summary of its 2020 Ecological Risk Assessment of ARs: ***"The nature of risk to mammals and birds from ARs is well-established and includes mortality from primary and secondary exposure, as well as chronic growth and reproduction effects."*** Despite this conclusion, the EPA has continued to allow licensed pest control professionals to use these poisons in the absence of any peer review research supporting their efficacy in reducing rodent populations. In fact, the data available reveals that rodent populations in the Bay State have continued to increase in tandem with the rise of AR use. A study conducted by Tufts Clinic examined the liver tissues of dozens of raptor carcasses found in Massachusetts between the years 2006 and 2010. Tufts found that 86 percent of them tested positive for SGARs exposure. A follow up study by Tufts duplicating the same survey protocols--but now covering the time span of 2012 to 2016--found that number spiked, with the ratio of SGARs-exposed raptors jumping to 96 percent. In a separate study by Tufts Wildlife Clinic focusing solely on Red-tailed hawks, 100 percent of the 43 carcasses from that species were found to be exposed to SGARs. Additionally, Tufts Wildlife Clinic tracked the use of SGARs applied by pest control companies licensed to operate in the state between the years of 2008 and 2015, relying on data recorded by the Massachusetts Department of Agricultural Resources (MDAR), which tracks and reports the use of rodenticides by that industry. Despite gaps in the data, the study found an "overall increase in AR use" over that time period from pest companies. For most of the years evaluated in the study, bromadiolone was the most used SGAR by pest companies in the state--and again, was also the most detected SGAR in necropsied Massachusetts raptors by the Tufts study on AR exposure for that corresponding time period. In particular, Tufts found that reports by pest companies submitted to MDAR for three of the SGARs--brodifacoum, bromadiolone, and difethialone--each increased by 50 percent.

In March 2021, the Town of Arlington became home to the first pair of breeding bald eagles--known as "MK" and "KZ" (after the initials on their wristbands MassWildlife fitted them with) to nest inside its borders since DDT wiped the species out of the state and much of the nation some sixty years earlier. Only the year before, the Commonwealth had upgraded the status of the bald eagle on MESA from "Threatened" to "Species of Special Concern." As recently as 2012, the species was still listed as endangered in the state and even as early as seven or eight years ago there was no sign of the species in the Boston metro area. That spring 2021, MK and KZ hatched their first viable offspring--C25 and C26.

In July 2021, C25 fell off her tree branch and planted face down on the ground. She was rushed to Tufts Wildlife Clinic, where she died not even two hours later. Some weeks later, a necropsy confirmed she

died of secondary anticoagulant rodenticide poisoning. She was [the second bald eagle in the state](#) to be confirmed to have died from this culprit in just a few months' time. The first eagle was nesting on the Charles River in the City of Waltham and was a cousin of C25 and MK. She was found dead on top of her unhatched eggs. Last year, C25's mother MK also was found ill on the ground of the cemetery that had been her home for two years. She was rushed to the New England Wildlife Center (NEWC), where blood samples showed her blood was not clotting, a symptom associated with anticoagulant poisoning. While she survived the first night, the second she died of a fatal hemorrhage, and choked on her own blood. The day after her death was announced, over 300 people gathered on the town green demanding these poisons be banned. Unfortunately, the bald eagles were not the only high profile wildlife deaths in Arlington. In spring 2022, [we lost three Great Horned Owls](#)--a mother and her two fledglings--that had been nesting in our town parks--leaving behind a single survive--the adult male owl. In December 2023 the male owl attracted a new female owl, but not even two weeks later, she too died. Many of us crowd-funded for her necropsy, which showed lethal levels of the anticoagulant rodenticide, Difethialone.

Another very sensitive species that is vulnerable to the impacts of anticoagulants is the Snowy Owl. Of the 196 bird necropsies conducted or evaluated by [Project SNOWStorm](#) between 2013 and 2023, more than a third (35 percent) had more than a trace amount of anticoagulants in their liver tissue. Moreover, 44 of the Snowy owls tested for AR rates over .03 parts per million (ppm), which is the threshold often considered fatal in raptors, with 93 percent of them showing signs of internal bleeding. Overall, the rate of anticoagulant rodenticide exposure has increased from nearly zero a decade ago to more than half (54%) of owls tested. Not only that, in follow up conversations I had with the organization, they informed me that Massachusetts both yielded the largest proportion of poisoned Snowy Owls and the highest poisoning rates in individual owls. Snowy owls are currently Red Listed as “vulnerable” to global extinction (the classification before “endangered”) by the International Union for Conservation of Nature, or IUCN, and has the status of Bird of Conservation Concern by the US Fish and Wildlife Service. Yet for some inexplicable reasons, despite the disproportionate vulnerability they face in Massachusetts, they are not MESA listed.

The state has so far not listened to or heeded the growing demands of its residents to ban the use of anticoagulant rodenticides in our borders. Not only that, the state actively hamstring municipalities from being able to regulate and restrict rodenticides on private property due to state laws that preempt that action at request of the pesticide lobby. The state government should not be prioritizing the pocket books of private industry over our natural resources.

So, even as the Town of Arlington suffers wildlife losses with clearly identifiable culprits, the state will not allow us to take the action needed to try to prevent further losses to our remaining owls and eagles. In 2022, Arlington's Town Meeting had passed by a landslide vote a resolution to submit a Home Rule petition to the state legislature to ask to ban the use of Second Generation Anticoagulant Rodenticides (SGARs) on private property. In 2023, the City of Newton followed suit with a unanimous vote to submit a Home Rule petition making the same request; in 2024, the Town of Newbury did as well. While both Arlington's and Newton's Home Rule petitions did make it out of Committee, neither were brought to the Senate or House floors for a vote and it seems unlikely either will pass.

In the meantime, Save Arlington Wildlife recently joined a coalition of other environmental groups and wildlife rehabilitator organizations, including Save Lexington Wildlife, Friends of Horn Pond, Cape Ann Wildlife, and Newhouse Wildlife Wildlife Rescue--in [submitting a legal petition](#) to the Massachusetts Department of Agricultural Resources (MDAR) requesting that it immediately suspend registration and use of anticoagulant rodenticides in the state. In the legal petition, submitted by Harvard Animal Law & Policy Clinic, it notes dozens of cases of AR poisoning of wildlife confirmed by independent liver necropsy.

Yet, MDAR has taken no such action and instead has taken the position that it has been unaware that rodenticide poisoning of wildlife has been a problem. At the same time, MDAR has voiced that the state is limited in its resources to test dead wildlife, which is problematic. The state wants to keep allowing poisons that it doesn't seem to want to measure the impacts of in the state. I think it is because the state knows it will find compelling evidence to support immediately and indefinitely discontinuing the use of anticoagulant rodenticides.

In order for Massachusetts to create policy consistent with its biodiversity goals it must:

- Immediately suspend the use of anticoagulant rodenticides in the state by pest control professionals and conduct a thorough analysis of the far reaching ecological impacts on these poisons in the Commonwealth.
- This thorough analysis will require earmarking comprehensive funds to subsidize necropsies and forging partnerships with approved laboratories for testing dead wildlife for lethal exposure to rodenticides.
- The state should release a public service announcement to all potential public entities that are likely to get reports of dead wildlife like the Department of Conservation and Recreation; municipal Animal Control Officers and Department of Public Works; and Department of Parks and Recreation.
- The state should downgrade the status of the Bald eagle from "Species of Special Concern" to "Threatened" and enact more stringent protections for the species.
- Snowy Owls should be listed under MESA as either "Threatened" or "Species of Special Concern."
- The state should repeal its preemption laws so that municipalities can make decisions to restrict rodenticides and other dangerous pesticides that cause undue harm to our fragile native wildlife.

Please be aware, my familiarity with this topic is also due to extensive research I have conducted on it as a journalist, including this [2021 investigative feature](#), that was short-listed for a national award. I am currently under contract with a publishing company to expand this article for a book-length exploration of the topic, of which Massachusetts is a prominent case study.

Please let me know if you have any questions or need any additional information.

Sincerely,

Laura Kiesel
SaveArlingtonWildlife.org

Dear Governor Healey,

I am writing these personal comments as a lifelong conservationist, advocate and community organizer from Plymouth MA, a global biodiversity hotspot.

Over the last 40+ years I served on the boards of land trusts including the MA Chapter of TNC. I've worked tirelessly to conserve thousands of acres of land in Southeastern Mass and to clean up and undam our rivers, co-founding and supporting numerous initiatives and campaigns that continue to this day, including the Watershed Action Alliance of Southeastern Mass.

I have watched NHESP and DFG systematically allow the destruction of biodiversity, one "take" permit a time. I've watched NHESP approve the destruction of MESA habitat under the false pretense of agriculture, allowing industrial sand mines to take advantage of agricultural loopholes.

A few of these destructive projects include the new operating mine at 104 Tremont Street (EJ Pontiff Cranberries) which is mining in Priority Habitat 601. MassDEP and MEPA are allowing the work without a wetlands Final Order under the Wetlands Protection Act. See the blog here about the destruction of Priority Habitat 601 and MassDEP and NHESP complicity in this destruction.

<https://communitylandandwater.org/mass-dep-refuses-to-stop-environmental-violations-at-104-tremont-st-carver-ma/>

NHESP recently signed off on a new 25+ mine for EJ Pontiff at 71 Hedges Pond Road in Plymouth.

At the 46 Federal Road (AD Makepeace Cranberries), NHESP's actions can only be described as participating in fraud and the corruption that the OIG is investigating in the sand industry. NHESP allowed the destruction of at least 24 acres of Priority Habitat and renewed a take permit in 2022 for a cranberry bog that is still not built, 14 years later, but the mine expands. The 24 acres of Priority Habitat has been destroyed, literally wiped off the map. MassDEP is siding with AD Makepeace in the effort to hold Makepeace accountable for abuse of the wetlands law. An Administrative Hearing is underway. OADR WET 2024-13 is the docket number where testimony is being filed about Makepeace's abuses of the MESA and wetlands laws.

<https://communitylandandwater.org/shut-down-makepeace-sand-trucking-terminal-read-custom-soils/>

The list goes on and on.

These comments could be extensive. Instead of repeating the detail that Save the Pine Barrens and its allies have provided to DFG over the years, I refer you to the report, "Sand Wars in Cranberry Country: An investigation into the money, politics and corruption and the silent environmental crisis of sand mining in Southeastern MA." Part II(A) is about Biodiversity and how the state allows it to be destroyed.

I also refer you to the CLWC website for examples like the AD Makepeace Cranberry Co 50 acre strip mine and solar project that NHESP approved for the take of 12 MESA listed species.

<https://communitylandandwater.org/tihonet-east-160-tihonet-road-wareham-strip-mine-solar/>

See also, <https://communitylandandwater.org/challenge-to-massachusetts-smart-solar-subsidies/>

The most disturbing and even corrupt aspect of the state's "biodiversity" programs is the DFG Board. Did you know it is almost all hunters/fishing interests and pro-development interests? When I presented information about the destruction of the Southeastern MA Pine Barrens in Sept. 2022, we were met with a wall of bureaucratic obfuscation. <https://www.youtube.com/watch?v=cDM4fhzJuc8>

The board operates behind a wall of secrecy and does not livestream or record its meeting. I was told this was because of "security concerns." What might those be?

It seems to me that the new Biodiversity initiative is window dressing to cover up for pro-development interests and the corruption with the state environmental agencies. What we need is money and enforcement of our environmental laws. We need qualified, unbiased leadership. One need only follow DFG on social media to see that their sole interest is engaging with the hunting and fishing lobby. Where are the posts about the rare biodiversity in our state and how people can get involved and what the law says about protection of these natural resources? Instead we spend thousands of taxpayer dollars on stocking non-native fish, non-native pheasants in Myles Standish State Forest and other initiatives like this that are directly contrary to preserving our biodiversity.

We need a complete overhaul of the DFG board.

We need a stop to covering up for sand mining as agriculture.

We hope you will answer the 5 questions we have posed in our open letter on violations of environmental laws by the sand mining industry, posted on the CLWC blog.

<https://communitylandandwater.org/response-to-gov-healey-is-this-really-legal/>

Our July 2023 meeting with your environmental staff was superficial and did not provide the opportunity to address the real impacts of state environmental policies and programs.

I would like to meet with you to discuss this.

Thank you.

--

Margaret E. Sheehan

C. 508-259-9154

PO Box 1699

Plymouth MA

Sanofi, Environmental Associate Director

Name: Mike Ryan

Affiliation: Business

Please prioritize the protection of our native perennials and pollinators.

Save Greater Dowses Beach, Chair

Name: Susanne H. Conley

Affiliation: NGO/Community Group/Non-profit

I'm sorry, but this is an extremely hypocritical effort to lull the public into thinking the Healey Driscoll administration cares at all about the environment — especially life in the ocean. The amount of devastation that ocean industrialization on the scale you are supporting will cause cannot be overstated. Ocean wind farms are going to destroy two of the richest fisheries in the northern hemisphere — Cox's Ledge and Stellwagen Bank. The turbine blade failure at the Vineyard Wind site has put 70 tons of toxic PVC foam in the ocean. It is washing up on our beaches and disintegrating daily. Environmentalists call this material "poison plastic." There is no doubt it will work its way into the food chain. Seek ways to transition to renewable energy that does not sacrifice life. If not, stop painting a picture of endless abundance in our future, because you are killing it.

Save Lexington Wildlife, Founder

Name: Marci Cemenska

Affiliation: NGO/Community Group/Non-profit

If we want to ensure biodiversity in Massachusetts, then we need to reduce or eliminate the use of anticoagulant rodenticides. These chemicals are affecting animals up and down the food chain - like owls, hawks, bald eagles, fox, coyote, fisher, skunk, and more. These animals are nature's rodent controllers! And it is important to note that some of the affected animals, like the bald eagle, are MESA listed species. Published research shows that SGARs are even showing up in earthworms and fish. Given the half-life of these chemicals, they are undoubtedly ending up in our soil and water. In 2022, 530,000 pounds of SGARs were applied in Massachusetts. The Pesticide Board Subcommittee approves these chemicals for use and does not allow cities and towns to further restrict, so even if some municipalities would like to add some additional controls, and thus improve biodiversity, they are not allowed to do so. In Lexington alone, we have had 4 known cases of rodenticide poisoning since May 2024. This is particularly frustrating because there are readily available, effective alternatives to these poisons so this impact on wildlife is totally unnecessary and contrary to supporting biodiversity. Massachusetts needs to reduce or eliminate the use of anticoagulant rodenticides, and they should start by prohibiting these chemicals on state-owned land. They should also allow individual cities and towns to restrict within their boundaries. This can be done now - there is no need to wait until 2030.

For more information, please see this press release from Harvard Law Animal and Policy Clinic:
<https://animal.law.harvard.edu/news-article/rodenticides-are-killing-massachusetts-wildlife-will-authorities-step-up/>

Marci Cemenska, Cindy Savage, and Karen Hartford on Behalf of Save Lexington Wildlife

Senior Communications Manager at Harvard

Name: Marina Jokic

Affiliation: NGO/Community Group/Non-profit

Mitigating habitat loss in urban green spaces by addressing user trails and park overuse.

Creating invasive species management plans at the city level.

Implementing native planting plans at the city level to support beneficial insects, in collaboration with city invasive management plans.

Phase-out pesticide use throughout cities, following the example set by other countries.

Reducing noise and light pollution.

Educating the public and communities in depth about the need to tackle climate change and biodiversity loss jointly.

Supporting and working with local environmental initiatives.



Comments Regarding Massachusetts Biodiversity Goals August 2024

The Massachusetts Sierra Club Forest Protection Team applauds Governor Healey for calling attention to the critical importance of biodiversity protection in Massachusetts with her Executive Order 618. We support much of the direction of the process already underway. We welcome, for example, the emphasis on “Nature in the Classroom” and “Nature in Neighborhood” as a broader awareness of the living world and how humans participate in that world are of critical importance in building a livable future for all residents of Massachusetts.

Nonetheless, we believe that much more should be done to protect older forests and the myriad of species they contain. Prior to colonization, Massachusetts was carpeted with ancient forests with very limited amounts of young-forest habitat¹ as a result of natural disturbances and some local activities of native people². Now, after four centuries of intense agriculture, industrialization, and ongoing timber harvesting, only tiny amounts of old-growth forest remain, mere specks in a landscape overwhelmingly shaped by human activities. It is therefore of paramount importance that biodiversity goals for the Commonwealth include focused efforts to permanently protect our older forests and allow them to reach their full ecological potential. Fortunately, we are blessed with sizable areas of mature forest, much of it on state-owned land. This provides a priceless opportunity to do something of great significance and lasting importance for the people of Massachusetts by protecting significant amounts of older forest habitat for future generations. After all, human health and welfare cannot be separated from the health and welfare of the innumerable beings with whom we share our only planet. Indeed, this is a guiding principle of Executive Order 618, and it is in this spirit that we offer the following comments.

I. Create More and Better Protected Reserves

Reserves are places where natural processes are allowed to predominate with only minimal human intervention. Such places are rare in Massachusetts, so expanding the areas under such protection must be a fundamental goal of any effort to protect biodiversity in the Commonwealth. The role of reserves in protecting biodiversity and the ecological services natural ecosystems provide is widely recognized and well documented. The *Response to the Climate Forestry Committee (CFC) Report*³ states that the

“The Commonwealth will expand the number and size of reserves to reach 10% of forested land of all ownerships (about 300,000 acres) as recommended by the CFC.”

We applaud such an effort as a step in the right direction but consider 10% an inadequate goal. A target of at least 20% would move us closer to the national goal of protecting 30% of land area by 2030 and have a greater impact on both biodiversity protection and climate mitigation. There is growing appreciation of reserves as critical components of forest stewardship here in New



England, even among foresters. A recent report from the Highstead Foundation (coauthored by Harvard Forest and the pro-logging New England Forestry Foundation, among others) calls for setting aside a minimum of 10% of New England’s forests “to grow and mature without the influence of any extractive land use”⁴. Another recent report⁵, “Wildlands in New England,” raises the prospect of increasing the regional goal to 20%, a suggestion we fully support, as stated above. Reserves also feature prominently in the recent report from the Climate Forestry Committee⁶, which includes the specific recommendation (on p. 48) that the Commonwealth

“Codify reserves on state land to provide a higher level of protection than the administrative designation that currently applies.”

Currently, reserves on state-owned land enjoy only administrative protection, which can be revoked by a mere stroke of a pen, and this is not sufficient. **We need full statutory protection of reserves with clear limits on acceptable activities.** This must be a goal for biodiversity protection in Massachusetts.

We support setting aside most, if not all, state-owned forest land in Massachusetts in legally protected permanent reserves. The watershed lands currently managed by DCR’s Division of Water Supply Protection are especially attractive in this regard, since logging does not further the stated goal of protecting the water supply. This will allow these forests to develop into old growth, support the many species that flourish in such forests, and improve the wildlife corridor that runs from Connecticut, through Massachusetts all the way to Canada.

II. Decrease Emphasis on Early Successional Habitat and Questionable Restoration Efforts and Increase Emphasis on Preserving Older Forests

We strongly support the arguments advanced in [this letter](#) dated May 22, 2024 from David Foster, Richard Birdsey, and William Moomaw to Stephanie Cooper, Melissa Hoffer, and Tom O’Shea re “Clearing forests by DFW for early successional habitat is not appropriate for protecting biodiversity and is detrimental for meeting carbon net-zero goals.”

In order to better serve the public good, Massachusetts needs to shift our current forest protection practices from a traditional emphasis on timber and game production to a broader and more ecological vision that encompasses ecosystem function, climate mitigation, and biodiversity protection. An important step in this direction would be to increase staffing by ecologists and conservation biologists.

We need to broaden our vision of biodiversity protection from one narrowly focused on the protection of individual species to one that centers protection of representative natural ecosystems as self-supporting wholes, in which all constituent species participate in richly connected networks of ecological interaction. A narrow focus on a selective list of threatened or endangered species is an often helpful but generally inadequate approach to biodiversity protection. In most cases, this means doing less to allow nature to do more.



III. Establish a Comprehensive Biological Inventory and Require Comparative Monitoring of Land-Use Practices

A clear picture of which species actually live here is fundamental to any serious effort to protect biodiversity in Massachusetts. To this end, a critical goal must be compiling a comprehensive inventory of existing flora and fauna across all habitats and taxa. This can begin with a thorough literature review and the development of a publicly accessible state-wide database of species occurring in the Commonwealth. This should be followed by targeted field work to inventory particular habitats, especially those, such as older forests, that are currently poorly represented on the landscape. Such an inventory would be an enormous task to be sure, but there are many specialists, expert amateurs, and citizen scientists that would jump at the opportunity of participating, providing yet another important way to engage the public in biodiversity protection.

The simple fact is that we are routinely making significant land management decisions with little understanding of the consequences for biodiversity and a thorough biological inventory is a logical place to start. A mere list, of course, tells us little about how natural ecosystems actually work, any more than a list of players tells us about how the game of baseball is played. It is for this reason that we applaud the goal of developing “a monitoring protocol to compare reserve outcomes to actively managed areas,” as stated in the Response to the CFC Report³. Given the history of active management of state-owned forestland, there are many plots that have been subjected to various interventions at different times in the past, and there is much to be learned about carbon sequestration and biodiversity by studying how these plots have responded to past treatments. By creating reserves today, this approach can only become more valuable in the future.

IV. Minimize Natural Land Disruption for Renewable Energy Development

Work with the DOER to establish responsible guidelines for siting renewable energy projects on already disturbed land while minimizing harm to natural lands.

VI. Increase Transparency and Accountability

Additional transparency and accountability regarding land-management decisions in Massachusetts is clearly needed in order to further public understanding and trust in such decisions. It is unclear how public input is utilized in policy, strategic, and programmatic decision making. The current process of identifying biodiversity goals for the Commonwealth is a case in point with most of the discussion and the actual decision-making taking place behind closed doors. At a minimum, there should be at least one more public listening session and round of public comments once the suggested goals are available but before they are approved.

All too often, the Commonwealth creates commissions or committees of selected “stakeholders” – mostly players with a monetary interest in the decisions – and the public is left wondering



whether or not their input has had any meaningful impact. This is far from an inclusive democratic process and more representative alternatives are needed.

The public should be able to follow how their public lands are being managed. We propose an online dashboard where information on all state-run management projects can be easily accessed, including such details as timing, location, acreage, and treatments applied (e.g. timber harvesting, thinning, scarification, herbicide use, controlled burning, etc.) Such a dashboard should also include follow-up monitoring of the effects of each project on carbon sequestration and biodiversity.

Thank you for considering our recommendations to strengthen biodiversity protection in Massachusetts. We would be happy to provide additional details and documentation at your request.

Sincerely,

Lynne Man, Ph.D. for the
Sierra Club, MA Chapter
Forest Protection Team

Endnotes:

1. Lorimer, C.G. & White, A.S. 2003. Scale and frequency of natural disturbances in the northeastern US: implications for early successional forest habitats and regional age distributions. *Forest Ecology and Management* 185: 41-64.

2. Oswald, W.W., Foster, D.R., Shuman, B.N., Chilton, E.S., Doucette, D.L., Duranleau, D.L. 2020. Conservation implications of limited Native American impacts in pre-contact New England. *Nature Sustainability* 3:241- 246.

3. Available here: <https://www.mass.gov/doc/forests-as-climate-solution-response-to-cfc-report/download>

4. Meyer, S.R. *et al.* 2022. *New England's Climate Imperative: Our Forests as a Natural Climate Solution*. Highstead Foundation, 44 pp.
https://highstead.net/wp-content/uploads/2022/10/Natural-Climate-Solutions_LR-1.pdf

5. Foster, D., Johnson, E.E, et al. 2023. Wildlands in New England. past, present, and future. *Harvest Forest Paper* 34. Harvard University.

6. Available here:
<https://www.mass.gov/doc/forests-as-climate-solutions-climate-forestry-committee-report-final/download>

Sherborn Open Space Committee, Volunteer

Name: Thomas Trainor

Affiliation: Government

Great session! Thank you.

Summer Village Conservation

Name: Kim Lee

Affiliation: NGO/Community Group/Non-profit

I'm concerned about

Central Mass Mosquito Control Project using Zenivex (is toxic to bees, other beneficial insects, fish, and aquatic animals) in wetland areas. This study suggests drifting from ULV applications occurs from as far as 100 to 180 meters (about 600 feet)

Fireworks displays are approved by the fire department (with fire safety concerns), but not the board of health with public health concerns and not the conservation committees with environmental concerns. Fireworks contain heavy metals and perchlorates that can contaminate surface water, area wells, soils.

Solitude works with the state to monitor our pond. There has not been public awareness campaigns about town bylaws, soaps, fertilizers, pesticides use near the wetlands but they use many products (fluridone (trade name Sonar) and diquat dibromide) that are harmful to aquatic life for weed and algae control.

Swansea Harbor Advisory Board, Vice Chair

Name: Michael Rapoza

Affiliation: NGO/Community Group/Non-profit

Biodiversity forum wasn't well structured.

The part of the forum where public input was allowed was a mishmash of different organizations that had totally different agendas.

I am not blaming any groups involved but, to have someone talking about forest Biodiversity is good.

Then ,the next speaker was talking about seashore Biodiversity . Two totally different subjects. Biodiversity affects all parts of our surroundings .I get that part of the session.

I understand this was the first session and there are always growing pains.Please have more structured sessions or half the listeners will just tune it out.

Kudos for trying to get something important going.

Thanks,

MR

Swansea Harbor Advisory Committee

Name: Michael Rapoza

Affiliation: NGO/Community Group/Non-profit

Not much information given by state.



The Trustees of Reservations
200 High Street | Boston, MA 02110

August 30th, 2024

Commissioner Thomas O'Shea
MA Department of Fish and Game
100 Cambridge Street
Boston, MA 02114

Re: Comments on Biodiversity Conservation Goals for Massachusetts

Commissioner O'Shea;

The Trustees is grateful to you and your staff for inviting such extensive public comment and collaboration in developing the state's Biodiversity Goals in response to the Healey-Driscoll Administration's landmark Executive Order #618. We are proud that Massachusetts is stepping up to be a leader in the global movement honoring the importance of biodiversity protection.

As the state's oldest conservation and preservation non-profit organization, The Trustees has been stewarding biodiversity at our reservations and protected lands for over 130 years. Since its founding, the Trustees has protected over 75,000 acres of conservation lands including forests, wetlands, coastal habitats, and grasslands. We are working to accelerate the pace of land conservation in this next critical decade to help the state achieve its ambitious biodiversity goals.

The Trustees respectfully offers our ongoing support, feedback, and recommendations below.

Priority Conservation

This goal addresses two aspects of biodiversity conservation: acquiring/protecting land and managing land to support biodiversity. On the acquisition side, The Trustees seeks to acquire large landscapes to help the state reach the 2030/2050 Clean Energy and Climate Plans' goal to conserve 25,000 acres every year. Specifically, conserving land with a focus on enhancing terrestrial and freshwater connectivity to help fish and wildlife migrate and adapt to climate change is a focus of ours. **To help implement the state's bold vision, State agencies will need to directly invest in the acquisition of land, participate in public-private partnerships on landscape scale conservation projects, and support private conservation through grants.** The Trustees and our partners hope to work with the Healey-Driscoll Administration to create a new, permanent source of dedicated public funding for these purposes. We are currently working with nonprofit partners on a feasibility analysis to identify funding mechanisms and look forward to sharing those results and our recommendations when the study is finalized later this year.

Increasing the Conservation Land Tax Credit (CLTC) funding allocation from \$2 million to \$5 million annually will also be critical in supporting biodiversity conservation. Since 2011, the CLTC has helped conserve 16,000 acres worth \$212 million, leveraging \$1 in state funds to \$9.65 in conserved value. There is an unprecedented transition in ownership across the state and a two+ year waiting period for landowners hoping to conserve land under this program, which has a chilling effect on participation. We need every tool available to conserve 25,000 acres per year, and the state could more than double the CLTC program's impact with a modest expansion of the annual cap.

Land stewardship for biodiversity has several critical elements. The Trustees is increasingly focused on employing Natural and Working lands to help support the state's Net Zero 2050 goals, while protecting climate resilient landscapes on behalf of human and natural communities. We plan to increase carbon sequestration on our lands, while enhancing biodiversity across the state. These synchronistic goals can work well together if planned correctly. For example, we've embarked on a pilot project at our 3,000+ acre Notchview Reservation in Windsor where we're implementing a forest management plan to support natural communities, while increasing carbon mitigation and resilience. We recently initiated a Climate Vulnerability Analysis of our natural landscapes with the goal of identifying forests and other habitats that are susceptible to climate related impacts and pests. This will inform future resilience projects such as the one at our Notchview reservation, where a more managed approach to retaining carbon and biodiversity as forests transition due to climate change is warranted. **This can serve as a model for the state in assessing the vulnerability of forestland and providing further direction that builds off the recent Forests as Climate Solutions Work Plan (2024).**

Deer management is a key component of maintaining healthy and resilient natural areas, particularly forests and the myriad species of plants and animals dependent on these habitats. The Trustees manages a successful statewide hunting program that is tailored to the amount of public use at each property. We commend the state for its efforts to address overabundant deer and **we urge the state to open more lands to managed hunts, encourage communities to do the same while providing tools and technical support and finally, providing more pathways for venison to enter the food stream.** The Trustees welcomes these efforts and look forward to expanding its deer management efforts in partnership with the state and local communities.

One habitat type that requires continued investment to maintain biodiversity is fire-adapted ecosystems. Massachusetts has one of the northeast's greatest cover and concentration of barrens; at least 40 percent of the state's listed species depend on this habitat type and prescribed fire is one of the most effective and affordable means to restore and sustain this habitat. **We request state agencies hire staff to manage a comprehensive, statewide prescribed fire program to facilitate fire on private and municipal lands.** A pay-for-service option where state burn crews/boss are hired would be an important step forward to strengthening biodiversity in these habitats. Leadership and support must come from the state if fire-adapted habitats are to continue to support the state's biodiversity goals.

A key tool for controlling invasive plants to maintain biodiversity of some habitat types is responsible and judicious use of pesticides. As is well-documented in scientific literature, pesticides can negatively impact the health of pollinator species if not properly used, many of which are on the State Wildlife Action Plan list. **We encourage the state to take a pro-active and thoughtful approach to better managing pesticide application to reduce use but also allows for use by licensed pesticide applicators for habitat management and invasive species control in natural areas.** The state could start by coordinating implementation of the 2022 Mosquito Task Force recommendations and incorporate key

policy recommendations into the Biodiversity Plan, including new rules to control and mitigate wide area application of non-selective pesticides. **Similarly, we encourage the state to be more proactive in regulating the use of pesticides statewide where they are a critical tool for land managers managing for biodiversity.**

Communities are increasingly passing bylaws and district overlays that prohibit habitat restoration and management for critical biodiversity by landowners (e.g., banning pesticides or tree cutting). While these bans are often well-intended, they can have negative impacts on biodiversity. **We encourage the state to explore regulatory pathways similar to the Forest Cutting Act that allow maintenance of natural resources by landowners while meeting regulatory standards such as the Wetlands Protection Act.**

Biodiversity management on municipal and private lands often does not happen due to high costs, lack of technical expertise or fear of public reaction. When it does occur it is often limited in scope and size and follow up stewardship rarely happens. While The Trustees has embraced biodiversity goals in its mission, external funds in the form of grants, donations and contracts are needed to fully implement and sustain management of our more than 2,000 acres of grassland habitats, nearly 1,000 acres of barrens habitat, and more than 150 rare species that require monitoring and management. **We advocate for bolstering the Wildlife Habitat Management Program with larger multi-year grants that allow land stewards the ability to restore and steward land effectively over the long-term.**

Make Room to Move

Protecting habitat connectivity to allow habitat types and wildlife to migrate as the climate changes should be a priority for land conservation efforts. This includes not just forested land, but also salt marshes, beaches, and dunes that are migrating inland with sea level rise. In many cases, however, this migration is blocked by roads, buildings, homes, and farms. In the Neponset River estuary, The Trustees is working with partners to model the effects of marsh loss or expansion on flooding in adjacent Environmental Justice neighborhoods. **This type of science-based planning to determine priorities for interventions that allow for coastal habitat migration is critical for protecting these biodiverse habitats as well as our communities.**

The Trustees owns approximately 40 dams across the state on its 27,000 acres. Most of these are no longer needed, most block wildlife migration, and some pose a resilience threat to downstream communities. **We applaud the goal of 300+ dam removals by 2050 as stated in the recently released Department of Fish and Game 5-Year Strategic Plan and hope to work with the Division of Ecological Restoration to begin removal of priority structures.**

Blue Economy

Restoring native plant and animal biodiversity of our coastal and marine habitats is critical for ensuring the integrity of the numerous ecosystem services they provide, including clean air and water, flood protection, and carbon sequestration. The Trustees is successfully healing salt marsh in Ipswich, Newbury and Essex and plans to expand this urgent work in the Great Marsh, as well as Greater Boston, the South Shore and Islands. We are coordinating closely with MassDEP officials on permitting reform to expedite this work, as climate change impacts are quickly drowning and degrading these critical ecosystems, endangering saltmarsh sparrows as well as habitat for numerous fish and bird species. **Agency flexibility, regulatory changes, and partnership among agencies will be needed to ensure that conservation partners like The Trustees can implement nature-based solutions and restoration strategies that will benefit biodiversity and habitat protection as the climate changes.** We look forward

to supporting the Administration's new Resilient Coasts Initiative to help communities across Massachusetts to rapidly bring coastal remediation work to scale.

We applaud the Department's recent ban on horseshoe crab harvest during the spawning season and we encourage consideration of additional protection measures. Migratory shorebirds are declining across the globe and their survival is intimately connected to that of the horseshoe crab. **Connections between species should be considered when establishing protections and listing determinations if we are to protect the ecosystems that support overall biodiversity.**

Green Planning and Design

The Trustees supports the state's efforts to reduce emissions, increase production of clean energy, and sequester carbon on natural and working lands as outlined in the 2030/2050 Clean Energy and Climate Plans. We have launched an internal effort to reduce emissions by 85% by 2050 in alignment with the state's goals and are also working to offset emissions by increasing carbon storage on our marshes, forests, and farms. Climate change is a major driver of biodiversity loss and The Trustees' believes we can both protect biodiversity and increase carbon storage through a thoughtful and balanced approach. Funding is needed to help us transition our buildings to clean energy and existing incentive programs are not always available to non-profit organizations. **We advocate for a funding source such as Mass Save to be created for non-profits to assist in this transition to clean energy.**

An example of how the state can take a balanced approach to achieving net zero and protecting biodiversity is through appropriate siting of solar production. **The Trustees supports efforts by our non-profit partners, including Mass Audubon, to assist the state in developing a plan for siting of solar arrays in areas that do not negatively impact natural habitat and biodiversity.** In their *Growing Solar, Protecting Nature* report, Mass Audubon outlines an approach for achieving net zero by 2050 through siting of solar projects in parking lots, on rooftops, and on other developed lands. To date, over 60% of solar projects have been sited on farms and forests, decimating the biodiversity of our natural areas that we are trying to protect.

Nature in the Classroom

Connecting the next generation to the Commonwealth's biodiversity and ecosystems is critical in ensuring its future. There continues to be a disconnect with children and nature as technology increases in our lives and access continues to be a challenge for our urban communities. Research shows that children spend on average 7.5 hours on screens each day and only 2 hours outside. We are pleased to see the Nature in the Classroom initiative to build appreciation for and belonging in nature.

Every Massachusetts school district should have the opportunity to incorporate authentic learning experiences that deepen students' understanding of the role biodiversity plays in the health of our state. The Trustees partners with several school districts and youth organizations providing place-based education that immerse youth in local ecosystems and introduces them to real world challenges all while supporting their classroom learning and state educational standards. Fifth grade students from Beverly middle school visit Crane Beach each spring to learn about coastal ecosystems and the impacts of climate change. Citizen science projects are also an effective method to connect youth to local wildlife (Blanding's turtle, horseshoe crab, trout). At a higher level, collaborating with the Department of Education on their Science & Technology Frameworks, Fish and Wildlife can share examples of local biodiversity projects that high school students can investigate and be inspired by. **Strengthening the**

connection with K-12 education will deepen the connection students across the state have to the natural world and expand their understanding of its importance in our lives.

Building career pathways for youth into the conservation field is a key step in establishing a diverse workforce of the future. The Trustees have a few initiatives in this area and are looking to expand. One is a partnership with the Norfolk County Agricultural School on a 5-week internship with their 11th grade environmental study students. Regional Vocational & Technical schools are prime partners as they have internships and co-op programs that can connect highly engaged high school students to the conservation field. Youth conservation corps programs like TerraCorps, Green Teams, and The Trustees Waterfront Ambassadors are also impactful experiences as they introduce youth to conservation work while gaining important job skills and earning a wage. These programs are positive pathways for urban youth to be introduced to environmental field.

Grant funding is critical to the longevity of all these programs. By establishing a funding pipeline, schools and environmental organizations can build lifelong learning opportunities for the state's youth as they move through the K-12 grades and beyond.

Nature in Neighborhoods

In addition to conserving large landscapes, we need to increase investments to enhance biodiversity in cities and improve quality of life in neighborhoods without access to nature. With a focus on Environmental Justice populations, The Trustees would love to partner with state agencies and communities to create new community gardens; help urban neighborhoods transform degraded landscapes into nature playgrounds and parks; plant native trees and manage urban forests; and create pollinator habitat for birds and insects while mitigating stormwater pollution and heat stress.

The Trustees manages City Natives, a native plant nursery in Mattapan that is one of few if not the only native plant nursery in Boston. **We encourage incentives for homeowners and municipalities to incorporate native plants into urban and suburban forests, open spaces, and yards as well as partnerships with local nurseries encouraging them to stock and promote native plants.**

Through an extensive network of community volunteers, we help coordinate over 200 community gardens throughout Boston and directly manage 56 of them. We have a waitlist that is several years long for every garden. The Trustees is actively working to grow this program in Boston as well as other urban centers across the state but land is the limiting factor. Large flat parcels that would support gardens are also highly prized by developers. **We would appreciate the opportunity to work with the state to develop approaches to protecting available land for use as public gardens to promote equity, access to nature and food, and enhance biodiversity in urban and Environmental Justice communities.**

Ensuring that every person has access within walking distance to biodiverse greenspace will require local leadership and state support for land conservation. Local land trusts and municipalities are best equipped to identify neighborhood greenspace but need resources to acquire and manage that land, especially as development pressures make conservation more costly. The Community Preservation Act (CPA) is an effective tool for local conservation and recreation and is currently only utilized by 196 communities. **We advocate for continued expansion of the Community Preservation Act and stabilizing the state match to allow communities to lead conservation efforts that promote biodiversity.**

The Trustees had supported unsuccessful passage of the Dark Skies legislation in past years and promotes inclusion of this legislation and other incentives and resources for municipalities and homeowners into the state’s biodiversity goals. Light pollution has significant impacts on numerous nocturnal species including migrating shorebirds. Shorebird populations are declining worldwide due to many factors including habitat loss and climate change; reducing light pollution is a simple solution that reduces one key stressor. Efforts should also include an education program that encourages owners and operators of tall buildings as well as individual homeowners to turn off lights at night.

Implementation of Goals

The key to success of developing Biodiversity Goals will be both action planning and implementation. **Drafting statewide and/or regional plans that prioritize habitat for protection, restoration, and stewardship will help partners organize around specific implementation tasks and prioritize resource investments.**

In addition, we suggest the Department of Fish and Game (DFG) create a Steering Committee to help oversee implementation of the Biodiversity goals. This committee could include agencies, nonprofit partners, and municipal officials and provide a venue to coordinate efforts and allocate resources. Other successful Steering Committees have included a funding source and mandate to rank and award grants for on-the-ground implementation.

We look forward to discussing ways The Trustees can help the Department of Fish and Game and other agencies and partners to help implement biodiversity goals. We would be happy to serve on committees, help develop policies and programs, and launch and manage projects on our properties.

Thank you again for your dedication to the state’s incredible biodiversity; we are excited to work together!

Sincerely,



Cynthia Dittbrenner
VP Conservation and Resilience

August 30, 2024

Commissioner Tom O'Shea
Massachusetts Department of Fish and Game
100 Cambridge Street, Floor 6
Boston, MA 02114

Via Email: DFG.info@mass.gov

RE: *The Nature Conservancy in Massachusetts Comments on Biodiversity Conservation Goals*

Dear Commissioner O'Shea:

The Nature Conservancy thanks the Healey-Driscoll Administration for its leadership on addressing three of the greatest crises of our time – biodiversity loss, climate change, and environmental justice. We applaud nation-leading *Executive Order No. 618: Biodiversity Conservation in Massachusetts* for its holistic, all of government approach to addressing the biodiversity crisis, and the Department of Fish and Game for their science-based and stakeholder-driven process to define ambitious biodiversity conservation goals. We are grateful for your collaboration, and we appreciate the opportunity to provide comments regarding the development of biodiversity conservation goals for Massachusetts.

Founded in 1951, The Nature Conservancy (The Conservancy) is a global environmental nonprofit working to create a world where people and nature can thrive. We have over 34,000 members in Massachusetts supporting our mission to protect the lands and waters on which all life depends. Our work falls into three themes that align closely with the biodiversity EO approach – tackle climate change; healthy oceans and coasts; and healthy rivers and lands. The Conservancy is a leader in the science and dialogue around mapping key areas for biodiversity and protecting, restoring, and managing those important places. We have a long history of collaboration with the Department, including co-creating the Natural Heritage Program and BioMap and serving on DFG advisory bodies. We are thrilled to be partners in the Department's efforts to advance the EO, and we respectfully offer the following comments and recommendations to advance ambitious biodiversity goals and strategies.

Cross-Cutting Recommendations

Before diving into specific recommendations, we would like to highlight some cross-cutting needs that are critical and urgent to address for work under this EO to accelerate strategies at the scale needed to achieve the vision for 2050:

- ***Rebuild Biodiversity*** – Globally, the focus on biodiversity is rapidly evolving from protecting what we have left, to actively rebuilding natural systems. The Conservancy is a leader in the global [Nature Positive Initiative](#), which aims to halt and reverse biodiversity

loss by 2030, with ambitious recovery goals by 2050. With this biodiversity initiative, Massachusetts is positioning itself, along with leaders like the United Kingdom, to show the world how restoring biodiversity is possible and can be a key strategy for climate resilience and healthy, thriving communities.

- We encourage the Department to, whenever possible, substitute phrases like ‘conserve biodiversity’ with more ambitious language, like ‘restore’ or ‘rebuild’ to show that the goals for 2030 or 2050 are not to only maintain status quo, but to markedly improve biodiversity.
- ***Reform restoration permitting*** – We were glad to see aquatic connectivity, right-sizing road-stream crossings, dam removals, and salt marsh, oyster reef, and floodplain restoration highlighted in the listening sessions; however, all of these projects are currently limited by the existing permitting process, which adds significant time, delays, and expense for projects, hindering efforts to accelerate project delivery.
 - This initiative could provide the catalyst needed to prompt a comprehensive review of the current status of restoration permitting; how the permitting process is managed at the national, state, regional, and local levels; an analysis of alternative pathways to reforms; and recommendations for consolidating, streamlining, and improving the process. Many regulations were crafted decades ago to manage the use or harvest of natural resources and did not contemplate restoration. We appreciate the steps currently being taken by the Department of Environmental Protection to begin to address these challenges, and we hope this current work can be used as a foundation for a more transformative, comprehensive, and system-wide approach.
- ***Increase Agency and Partner Capacity*** – We are grateful that the Healey-Driscoll Administration is supportive of ambitious climate, conservation, and biodiversity goals; however, it is critical to ensure that these efforts are sufficiently resourced, both within and outside of state government.
 - We recommend the administration work with the legislature to ensure robust state funding to meet agency needs to achieve the EO’s goals. We suggest conducting a review of current operating and capital expenditures, as well as bond authorizations, and an assessment of what is needed to fulfill the pillars of this effort. That should then be followed by a substantial increase in operating and capital funding, where necessary, to reach the proposed goals. This must include both funding for staff to implement programs across agencies, as well as funding for the Executive Office of Energy and Environmental Affairs (EEA) and its agencies’ grant programs, which have been extremely successful in leveraging private, local, and federal monies and moving the conservation needle. We also recommend exploring new, dedicated sources of funding to complement and augment existing operating and bond funding.
 - In addition to increasing funding for state agencies, it is also crucial to support capacity building and technical assistance at the municipal level so that our communities have the staff and expertise they need to take advantage of state programs, leverage other funding sources, and design and implement impactful and innovative on-the-ground projects. Municipalities play vital roles in land conservation, land use planning, deployment of clean energy infrastructure,

ecological restoration, and more, and we are increasingly finding that they do not have the resources to support the state's ambitious goals and programs. We recommend a specific focus on under resourced communities, as well as creative approaches to bundling projects.

- Finally, we urge you to recognize the critical role of collaboration to make meaningful progress across the pillars; it will be particularly critical to mobilize the nonprofit community. We recommend allowing nonprofit partners, such as land trusts, watershed associations, and community-based organizations, to be eligible for grant programs whenever possible, as they are often responsible for helping cities and towns with planning, funding, and completing complex land and water conservation and restoration projects, and for leveraging significant private investments. Moreover, nonprofits have the flexibility and expertise to spend this money quickly and efficiently.

Pillar Recommendations

Below, we respectfully provide the following recommendations and comments within the four pillars under the *2050 Vision for Biodiversity* presented at the public listening sessions. Some recommendations are relevant to more than one pillar.

Protect Key Habitats, Landscapes, Seascapes

- **Resilient Lands Initiative** – We recommend strong support for, and integration with, the collaborative, comprehensive, and well-vetted land and water conservation strategies documented in the [Resilient Lands Initiative](#). These approaches will expand upon direct land protection by agencies, land trusts, municipalities, and others; breaking down barriers to protection, expanding new revenue streams, and advancing innovative policy mechanisms to achieve the state's ambitious 30 x 30 and 40 x 50 goals. The strategies are designed to benefit all residents of Massachusetts, enhancing all sectors – social, economic, and ecological.
- **BioMap** – We applaud and strongly support the use of the new BioMap in defining biodiversity goals and metrics. We support the draft proposal that 75% of the Commonwealth's 40 x 50 goal be accomplished within BioMap Core Habitat and Critical Natural Landscapes (500,000 acres). This will ensure that state investment in land and water protection provides a high return-on-investment, while allowing ample resources to protect lands and waters that support other values, as well.
 - BioMap components (Rare Species Core, Wetland Core, Forest Core, etc.) can also be used as fine scale metrics to measure success and ensure representation and conservation of the full breadth of biodiversity across the state.
- **Integrate freshwater and land priorities and planning** – Freshwater connects us all and healthy and resilient freshwater is crucial for biodiversity. Globally, freshwater habitats have suffered an 83% loss in biodiversity since 1970, compared to a 39% loss of terrestrial biodiversity; freshwater conservation is falling significantly behind. To sustain our freshwater biodiversity, we urge DFG to integrate planning for aquatic and terrestrial

habitats and species. Current research shows that conservation planning designed for terrestrial species and habitats that then incorporates aquatic considerations does not ensure aquatic biodiversity. However, planning for aquatic biodiversity that incorporates terrestrial species and habitat (an integrated cross-realm approach) could increase freshwater benefits up to 600%. An integrated, watershed-scale approach also maximizes cross-cutting benefits to biodiversity, people, and the built environment. For example, approaches that improve water quality by reducing wastewater pollution or stormwater runoff can restore aquatic and riparian habitats, protect drinking water supplies, reduce flood risk for people and infrastructure, and increase community resilience to climate impacts.

- **Land protection for aquatic biodiversity** – For aquatic biodiversity, protecting discrete sites is not sufficient. We urge DFG to prioritize protecting forested landcover and river headwaters in watersheds with aquatic biodiversity priorities.

Restore Habitats, Species, Connectivity

- **Coastal habitat restoration** – The Conservancy looks forward to continued collaboration related to coastal resources management, and we appreciate the commitment from the Division of Marine Fisheries (DMF) to work with us and others to develop a statewide critical coastal habitat restoration plan. Saltmarsh, seagrass, and shellfish habitats are vital to functioning coastal ecosystems and support a diversity of marine life and coastal communities. These coastal habitats play a critical role in productivity and recruitment for many commercially and recreationally important fish species. Holistic restoration planning will result in developing a pipeline of prioritized projects that will increase coastal and ocean biodiversity.
- **Forest habitat management** – The Conservancy understands and supports the goals and methods to create and maintain early successional habitat, including grasslands, shrublands, and young forests, which are critical for a large percentage of the Species of Greatest Conservation Need (SGCN) in the state. We intend to continue to support these efforts on public and private land. At the same time, we would like to see the inclusion of a similar emphasis on the conservation of late successional forests in the state’s biodiversity goals. This balanced approach is critical for biodiversity and will allow The Conservancy to fully support, champion, and publicize this historic opportunity and milestone for biodiversity. The structure and dynamics of late successional forests, which are significantly under-represented across Massachusetts, support aspects of biodiversity found nowhere else, including the abundance of many vertebrate, invertebrate, lichen, and other populations. In particular, we have the following recommendations:
 - o We would like to see the biodiversity goals, communication materials, and metrics include a clear and compelling case for forest reserves and late successional forests. For example, the bolded phrase should be added to this line from the Listening Session slide titled “Priority Conservation:” “Active **and passive** management goals established for forest biodiversity.” Not only is this critical for biodiversity in the state, but it also adds credibility and rigor to the initiative and the agencies and will go a long way to engaging support from a wider variety of

stakeholders and residents across the state. We think it would be a lost opportunity to under-emphasize old forests and forest reserves on the Massachusetts landscape.

- It will be important to center large forest reserves on public lands, augmented by private forest reserves, as these are the only places where reserves can achieve the spatial scales necessary for large-scale forest dynamics and disturbance regimes. Reserves should be sited and designed to fully meet biodiversity and climate goals, in keeping with the Administration's Forests as Climate Solutions initiatives, the latest science, and public input.
 - Operationally, we think it is critically important to adopt a single definition for Forest Reserves for all Massachusetts agencies, which will allow for public clarity, consistency, and transparency. The definition should match the current DCR Landscape Designation definition. We recognize the agencies have different goals and will manage non-reserve lands for different values and functions.
- **River connectivity** – We support and applaud DFG for setting ambitious goals for dam removal and road-stream culvert upgrades. This is an urgent need to help people and biodiversity to adapt to the increased severe weather events due to climate change and the longstanding barriers to upstream aquatic species migration. During the first two years of the Biodiversity EO implementation, we strongly urge DFG, in collaboration with all responsible state, regional, and local government divisions and programs, including permitting agencies, grant making programs, technical assistance, and local, regional and state transportation agencies and authorities, to develop recommendations to foster opportunities to, and remove procedural or programmatic barriers to, bundling implementation of projects at the state and local level for increased efficiencies in cost, capacity and pace of restoration.
- **Wildlife connectivity** – We support a focus on the protection and restoration of lands and waters to support terrestrial and aquatic wildlife movement, both local connectivity (the movement of individual organisms needed throughout their life cycle) and regional connectivity (long distance and multigenerational movements, or range shifts, in response to climate change). To this end, we have some specific recommendations:
- Conserve BioMap to enhance wildlife connectivity. BioMap Landscape Blocks, Forest Cores, and Wetland Cores include a local connectivity metric that identifies places where wildlife can safely move across the landscape. The BioMap “Regional Connectivity” data (a simplification of TNC’s “Climate Flow” data) identifies priority areas that support range shifts and other wildlife movement in the context of climate change.
 - Protect land to provide permanent movement corridors across major roadways (average annual daily traffic over 10,000 vehicles) at priority locations.
 - Support and expand Department of Transportation (MassDOT) efforts to implement wildlife crossings and wildlife crossing enhancements (fencing, wildlife shelves, etc.) at priority locations at highway construction projects.
 - Assess all road-stream crossing projects for terrestrial wildlife enhancement benefits and implement at priority locations.

- Provide technical assistance and funding for municipalities to implement wildlife crossings and wildlife crossing enhancements on municipal roads.

Sustain Ecosystem Services, Food Security, Economy

- **Restorative aquaculture** – Along with coastal habitat restoration, the restorative aquaculture sector (comprised of unfed species including shellfish and macroalgae) can provide valuable ecosystem services in the form of water quality and functional structural habitat benefits along with locally grown seafood. The restorative aquaculture sector is also a meaningful contributor to the blue economy, including by providing year-round employment opportunities in rural communities. The management of shellfish resources, including those harvested by farmers is governed via a federal/state co-management scheme between state resource agencies and the Food and Drug Administration (FDA). For shellfish products to be sold into interstate commerce, all states must adhere to federal guidelines, as outlined in the National Shellfish Sanitation Program. In recent years, those requirements have become onerous, leading to increased capacity needs on DMF to ensure public health of harvested shellfish. The Conservancy requests that this challenge is considered as part of the EO and that DMF is adequately funded to address current and future management challenges. These challenges stem not only from new management requirements but also from changing conditions due to climate change, leading to more frequent and severe weather impacts, nutrient pollution from wastewater and stormwater runoff, and harmful algal blooms.
- **Recreational and sustenance fishing and shellfish harvesting** – We also encourage the prominent inclusion of both recreational and sustenance fishing and shellfish harvesting in the language of the blue economy, food security, and connecting people with nature. Recreational fishing, which is often catch and release, is not only a huge economic driver in Massachusetts, but it is also one of the best ways for people of all ages to build a tangible relationship with the ocean. This is one way to connect people with nature, and recreational fishing depends on fish abundance. And for food security, across the state, and particularly in environmental justice and Indigenous communities, many people depend on fishing to put healthy protein on the table for their families. When fish stocks are depleted, contaminants are present, or access is restricted, it is these people who have the least ability to chase the fish someplace else.

Connect All People with Nature

- **Celebrating urban biodiversity** – We are excited to increase opportunities for all people to experience nature in their neighborhoods and reap its many benefits. We encourage DFG to explore opportunities to designate or create urban wildlife refuges and urban arboretums. These could be modeled off of the U.S. Fish and Wildlife Service’s [urban partnerships](#), [urban wildlife refuges](#), and [urban bird treaty](#) programs, or the City of Boston’s [Urban Wilds Program](#). Urban arboretum could be a new designation for neighborhoods with a high diversity of tree species and urban wildlife (not only reserved for discrete locations, like the Arnold Arboretum). These could help build local support for and pride in biodiversity initiatives, provide educational and outreach opportunities,

and build connectivity throughout urban areas. The Department should also explore developing a grant program aimed specifically at urban biodiversity, which could support a host of other benefits, like cooling and stormwater retention, as well. Such a program should be developed in partnership with community-based organizations and municipalities.

- **Local BioMap Components** – Local Landscapes, Local Rare Species, Local Aquatic Habitats, Local Wetlands, and Local Vernal Pools in BioMap provide a great opportunity to meaningfully engage with communities and community groups interested in their local environment. It was envisioned that these data would be integrated with, and complemented by, local knowledge and lived experience to craft a biodiverse future for communities, and provide access to nature, cleaner air, cooler neighborhoods, and other benefits along the way.
- **Nexus with climate adaptation** – Recognize and act on opportunities to increase biodiversity in and near developed areas in ways that also increase resilience to climate vulnerabilities, like flooding and heat island effects. For example, pocket forests provide habitat supporting many species in an urban area, while also providing cool spaces for people and absorbing stormwater to reduce flooding.

Cross Agency/Cross Initiative and Regional Recommendations

Finally, we urge you to continue to explore novel opportunities to work across agencies, departments, and initiatives to maximize contribution to these goals and to the well-being of the Commonwealth's human and natural communities. Indeed, such work will be vital to reaching any goals set through this effort. Below are some opportunities we see for enhancing these collaborations:

- Form a **Massachusetts Biodiversity Initiative Working Group** with membership from across state agencies, institutions, and other entities to coordinate actions to advance biodiversity goals. All of the Commonwealth's agencies need to see the role they play in advancing biodiversity goals, and there needs to be clear communication and accountability. There are many models of interagency coordination that could be replicated.
- Led by the Office of Environmental Justice, EEA has been exploring how to **increase nursery capacity** for urban tree planting and restoration projects. This seems like an ideal partnership, as it could be an opportunity to 1) grow species important for restoration/increase the biodiversity of nursery stock; 2) engage urban and environmental justice communities through urban nurseries; 3) work together on public awareness/education about the importance of biodiversity and urban wildlife; 4) provide workforce development opportunities; and more.
- We recommend a community-driven process of **engagement, collaboration and co-creation with community-based and environmental justice organizations** in coordination with EEA's Office of Environmental Justice. This process will enable

hearing the lived experiences of residents from underserved communities and identifying solutions that meet needs of both people and nature. We also hope this report on *Building Equitable and Sustainable Climate Change Funding for Massachusetts* can be helpful as the Department thinks about developing equitable processes and programs:

<https://www.nature.org/content/dam/tnc/nature/en/documents/Report-MA-Equitable-Sustainable-Climate-Funding.pdf>.

- MassDOT, MassWildlife, DER, municipalities, and other public and private organizations currently collaborate on **ecological restoration that both enhances road safety and resilience and supports wildlife habitat and connectivity**. Additional opportunities to build on these existing partnerships include: 1) implementing the MassDOT State Wildlife Transportation Action Plan that is under development; 2) supporting development and implementation of a statewide MassDOT state-road culvert infrastructure upgrade prioritization program for resilience, habitat, and connectivity; and 3) proactively identifying local and regional partnerships and opportunities to enhance proposed MassDOT road and bridge projects for multi-benefits, including flood resilience, wildlife connectivity, and habitat restoration and protection. Enhanced capacity, funding, and collaboration will result in faster and better results.

- The Commonwealth is facing a paradigm shift with the amount of land needed to build **distributed renewable energy generation, storage, and transmission infrastructure** to meet increased energy demand from the transition away from fossil fuels and electrifying our transportation and buildings sectors, with the goal of reaching net zero emissions by 2050. The Conservancy has consistently advocated to ensure that the Commonwealth's energy policies and incentives provide better outcomes for people and nature, and we want to be sure that the Commonwealth's energy and biodiversity goals work in a complementary fashion and avoid working at cross-purposes. Here are some examples that we would like to see reflected in the Department's effort to establish biodiversity goals:
 - o Governor Healey established the Commission on Energy Infrastructure Siting and Permitting and charged it with developing recommendations to make the siting and permitting process more efficient and equitable for renewable energy infrastructure. We would like to see the recommendations of the Commission upheld that support biodiversity goals, including: establishing robust site suitability standards that would include biodiversity, natural carbon, resiliency, and environmental justice; and including DFG on the Energy Facilities Siting Board.
 - o The current DOER SMART solar incentive program Straw Proposal adds significant protections for habitat and biodiversity. In addition, [DOER's Technical Potential of Solar study](#) showed that Massachusetts can meet its solar energy development goals, while conserving important lands and waters for biodiversity, agriculture, carbon sequestration and storage, and other values. Given the huge potential for solar energy development to convert natural lands, we would suggest that DFG collaborate closely with DOER on understanding and developing renewable energy policies and current and future incentive programs with the goal

of increasing the pace of solar development in a way that does not harm nature and people.

- We see an opportunity for the Healey-Driscoll administration to develop a broad approach to establishing and administering a **mitigation program** on all types of development and land use conversion that will employ a hierarchy to avoid, minimize, and mitigate impacts on biodiversity, carbon, and resiliency. We urge DFG to encourage EEA and the Office of Climate Change Innovation and Resilience to launch a whole of government initiative to establish a mitigation program. Although we are not recommending or prescribing the policies or methods by which the mitigation program would function, one vehicle for the mitigation hierarchy could be state agency environmental permitting programs and broader approaches, such as the Massachusetts Environmental Policy Act. At a minimum, the program should include a hierarchy that would follow a sequential process: first, all impacts that can be avoided must be avoided, then, remaining impacts should be minimized and appropriate mitigation actions should be taken to address these remaining impacts. Fees for compensatory environmental mitigation could support the restoration, establishment, enhancement, or preservation of comparable environmental resources through funds paid to the state, a local government, or a non-profit entity. DFG's experience with the Box Turtle Mitigation Program could be very useful in thinking through how to stand up a broader mitigation program.
- We strongly support the alignment and integration of the Biodiversity Initiative with the **Administration's policies and goals on climate, land protection and climate resilience**. This includes the Resilient Lands Initiative (Coalition), the Clean Energy and Climate Plan, the Forests as Climate Solutions plans and programs, Holistic Land Use Planning efforts, the Healthy Soils Plan, the Farmland Action Plan, the Resilient Coasts initiative, and other initiatives. This also creates opportunities to engage and collaborate with state agencies not mentioned above, such as the Executive Office of Housing and Livable Communities, among others.
- Finally, as biodiversity knows no political boundaries, we urge you to **think beyond Massachusetts' borders**. There are numerous existing regional partnerships that could present opportunities for amplifying and expanding your work. We recommend you further explore:
 - o The New England Governors and Eastern Canadian Premiers' (NEG-ECP) [Resolution 40-3](#), a *Resolution on Ecological Connectivity, Adaptation to Climate Change, and Biodiversity Conservation* (adopted in 2016). The Resolution highlights the importance of the region's ecologically connected landscape for wildlife and people in the face of climate change and instructs state and provincial agencies to work both within their jurisdictions and collaboratively across borders to advance ecological connectivity conservation and restoration. It also created the NEG-ECP Ecological Connectivity Working Group to coordinate and report back on efforts to advance the Resolution's goals.
 - o Multiple entities currently exist for cooperative management of aquatic and marine resources, including the Northeast Regional Ocean Council, the Atlantic States Marine Fisheries Commission, the New England Fishery Management

Council, Atlantic Coast Fish Habitat Partnership, and the Eastern Brook Trout Joint Venture.

- For forward-looking inspiration on a regulatory package that requires Biodiversity Net Gain, there is considerable material available on the United Kingdom government sites accessed here:
<https://www.gov.uk/government/collections/biodiversity-net-gain>

Massachusetts has long been a leader in biodiversity conservation, and the implementation of this EO will further that legacy. We are excited to be partners in this effort and stand ready to assist however we may. Please do not hesitate to reach out with any questions, and thank you for your consideration of our comments.

Sincerely,



Emily Myron
Senior Policy Manager
The Nature Conservancy in Massachusetts

cc: Rebecca Tepper, Secretary, Executive Office of Energy and Environmental Affairs
Melissa Hoffer, Climate Chief
Stephanie Cooper, Undersecretary for the Environment, Executive Office of Energy and Environmental Affairs
Jennifer Ryan, Assistant Commissioner for Strategic Initiatives and Climate Policy, Department of Fish and Game

Trust for Public Land, Massachusetts State Director

Name: Jodi Valenta

Affiliation: NGO/Community Group/Non-profit

Thank you for the opportunity to comment. Please consider developing biodiversity goals for urban ecosystems. Though limited in ability to significantly support endangered species and large populations of flora and fauna, urban environments, especially those owned and stewarded by MA public agencies can support the regeneration of a multitude of species. This is particularly true when using open space and parks as opportunities to increase native plants, trees, and shrubs. When considering that just one public agency, such as the Boston Housing Authority, can be the largest landowner in a city, the opportunity for landscape-level impact is important to consider. Small plots compounded over large areas can positively support insects, birds, and a variety of species. Similarly, urban schoolyards in urban areas represent a solution hiding in plain sight. Plans for supporting biodiversity in these settings would be valuable, particularly when coupled with educational opportunities and implementation guidance for agency leaders who do not normally oversee greenspace or manage species populations. The Trust for Public Land is available to collaborate with the Department to support its strategic vision and goal implementation.

The Food Project

Name: Alexandra Nicolas

Affiliation: NGO/Community Group/Non-profit

As the non-profit stewards of more than 70 acres in the Boston metro area, where we grow mixed vegetable and run our youth programming, the goals of "Bolstering food security by promoting biodiversity on farms, supporting pollinators, and encouraging sustainable wild harvest

+ Nature in every neighborhood and every classroom" are in line with The Food Project's.

"Bolstering food security" also aligns closely with the third goal of our soon-to-be-released strategic plan "Respond to challenges facing New England agriculture by embracing our farms as learning laboratories."

Like most growers, challenges from climate change and a unsustainable model for distribution and labor are impeding our ability to make our highest contribution to a sustainable, local food system.

One of the ways we plan to pursue our Goal 3 over the next three years is to "Engage in a multi-year process to better analyze the specific needs of each piece of land we steward and pilot new production and distribution schemes."

We plan on doing this in partnership with other nonprofits working in this area, using our farms as learning laboratories (we're already pursuing funding to support this work.) and plan to leverage our organizations long history, and track record for informing state policy to amplify the importance of these issues.

We're pleased to see Gov. Healey's Biodiversity Executive Order No. 618 in alignment with these goals, and would welcome any invitations to share more of what we're learning with the Department of Fish and Game.

The Enviro Show, Co-founder & Co-host

Name: Don Ogden

Affiliation: NGO/Community Group/Non-profit

The science is well established with regard to the Climate Crisis and its threat to a livable planet for future generations. We, as citizens of the nation, and the Earth are obligated to do all we can to protect our children, grandchildren and their grandchildren, as well as other lifeforms we share space with. A critical part of that work not only concerns ending our dependence on fossil fuels and other burn technologies, it also means we are obliged to remove as much CO₂ and methane from the atmosphere as possible. The technology to do that has not been developed and we have

little time to wait for it to be established and perfected. The science tells us we are in a race against time.

Thankfully, a natural carbon capture and storage system already exists and operates 24 hours a day, 365 days a year for free. It is our forests, both public and private, and the soils that sustain them. Those very same public forests are being logged under the direction of our own state agencies! These agencies are destroying one of the few natural carbon capture options we have available regardless of what you may hear from vested interests.

Town of Arlington, Environmental Planner

Name: David Morgan

Affiliation: Government

As you consider implementation, please increase the attention paid to urban biodiversity and the roles that municipalities can play in supporting this Order and the policies that follow. Our community strongly supports setting and achieving biodiversity goals at the local and, I imagine, state level. Wherever possible, please consider technical assistance to municipalities.

Additionally, please give special attention to the climate adaptation capacities of nonnative, noninvasive species. Having studied shifts in habitat and species ranges for EPA Region 1, I'm aware of how much the composition of local species is already changing and will accelerate. It will be essential to help our ecologies adapt through a balanced approach to preserving native ecosystems and helping them adapt to new circumstances.

Town of Stow, Conservation Director

Name: Kathy Sferra

Affiliation: Government

I may have missed it, but did not hear discussion of control of invasive species in the goals of the opening presentation, so I certainly hope that will be on the list of strategies.

Town of Sturbridge, Conservation Agent

Name: Lauren Vivier

Affiliation: Government

When planning the Biodiversity Conservation Goals for Massachusetts, it's essential to consider how these goals intersect with other state priorities, such as advancing clean energy initiatives and expanding solar development. Integrating biodiversity conservation with sustainable energy efforts can ensure that environmental protections and renewable energy growth complement each other, leading to holistic and mutually beneficial outcomes for the state's ecological health and climate objectives.

Uxbridge Board of Health, Vice Chair

Name: Joann Lindenmayer

Affiliation: Government

I would add that conserving biodiversity is essential not only for the enrichment of health, well-being, and quality of life of Massachusetts' residents but also for the health and well-being of other species, nature, and our natural resources.

I work in an area called "One Health," a concept that the health and well-being of people, other animals and the environment are interrelated and interdependent. One Health has been codified by the One Health High Level Expert Panel in the following definition:

One Health is an integrated, unifying approach that aims to balance and optimize the health of people, animals, and ecosystems in a sustainable way. This approach recognizes that the health of these entities is closely linked and interdependent.

The Quadripartite Agreement among the World Health Organization (WHO), Food and Agriculture Organization of the UN (FAO), World Organization for Animal Health (WOAH) and UN Environment Programme are signatories to the Quadripartite. But the application of the One Health concept to research, policies and programs extends beyond the international level to national, regional and local levels. I'd like to see the term "One Health" mentioned in the document.

Upper Housatonic Valley National Heritage Area, Executive Director

Name: Dan Bolognani

Affiliation: NGO/Community Group/Non-profit

UPPER HOUSATONIC VALLEY NATIONAL HERITAGE AREA (HOUSATONIC HERITAGE) 2050 VISION

Our vision for nature in 2050 prioritizes broader understanding that life, as we know it, depends on Pollinators. More than 75 percent of flowering plants are pollinated by insects and animals. These plants help stabilize our soils, clean our air, supply oxygen and support wildlife. Promoting regenerative growing practices avoiding pesticides toxic to pollinators supports cleaner water for all living creatures. For humans, 35 percent of food crops depend on pollinators to reproduce.

In “The Little Things That Run the World” renowned entomologist E.O. Wilson calculated that if invertebrates were to disappear, it was doubtful the human species could last more than a few months. With human survival at stake, we now hear alarms about the “insect apocalypse.” Washington Post columnist Dana Milbank warned that our gardens are “killing the earth” along with the environmental wastefulness of most lawns (50 million acres of turf grass in the US).

VISION 2050 STRATEGIES to advance POLLINATOR PROTECTION and CLIMATE RESILIENCE:

> TRANSFORMING SCHOOL and COLLEGE CAMPUSES into LIVING LABORATORIES.

CLIMATE CHIEF MELISSA HOFFER has enthusiastically supported the Healy Administration encouraging climate resilient/pollinator-friendly healthy campus landscapes. For example, BERKSHIRE COMMUNITY COLLEGE collaborated with Housatonic Heritage and THE CONWAY SCHOOL Graduate Program to implement "A Living Laboratory on the Learning Landscape at Berkshire Community College." Recently, “Nature’s New Classroom” about college campuses converting to native ecosystems and organic land care were featured by Doug Tallamy’s HOMEGROWN NATIONAL PARK. Also, BEE CAMPUS USA has 193 affiliations engaging in a broad range of pollinator protection activities.

> INSTITUTING LANDSCAPE WORKFORCE DEVELOPMENT AND ENVIRONMENTAL JUSTICE.

In response to Housatonic Heritage's question, CLIMATE CHIEF HOFFER also supported this strategy for Massachusetts to advance campus and community career education with climate resilient, pollinator-friendly, healthy ecological landscapes. This helps all (including many BIPOC) workers in landscaping jobs-along with their diverse residential, business, education and nonprofit clients.

> SUPPORTING MASSACHUSETTS NONPROFITS PROMOTING POLLINATORS.

2050 vision benefits from alliances with leading statewide organizations such as MASSACHUSETTS POLLINATOR NETWORK, GROW NATIVE MASSACHUSETTS, NOFA/MASS. Regionally: HOUSATONIC HERITAGE, BERKSHIRE ENVIRONMENTAL ACTION TEAM and GREENAGERS, plus LEXINGTON LIVING LANDSCAPES and ASSOCIATION TO PRESERVE CAPE COD.

> ALIGNING WITH PRO-POLLINATOR NATIONAL RESEARCH, EDUCATION, ADVOCACY.

For example, OPERATION POLLINATION originating via the National Park Service and featuring collaboration among NATIONAL HERITAGE AREAS and ROTARY DISTRICTS. Nonprofit HOMEGROWN NATIONAL PARK helping generate and map new cultural values where we all make a difference in our habitats. XERCES SOCIETY playing a leading role in researching and promoting conservation to protect bees, butterflies, freshwater mussels and other invertebrates encompassing all landscapes.

> EXPLORING OUR BIODIVERSE INDIGENOUS HERITAGE.

For thousands of years native tribes considered ecosystems as communities of sovereign persons including not only humans, but also plants and pollinators. For example, in western Massachusetts, the Stockbridge-Munsee Community Band of MOHICAN Indians related to nature as "People of the waters that are never still." Adapting their biodiversity values can help mitigate the impact of climate change.

> ADVOCATING POLICIES TO ADVANCE BIODIVERSITY, PUBLIC AND POLLINATOR HEALTH.

"An Act Establishing an Ecologically-Based Mosquito Management Program in the Commonwealth to Protect Public Health" (S.445/H.845) would provide effective, affordable, transparent, ecologically responsible, scientifically based mosquito management.

**Wellesley Natural Resources Commission Environmental Education, Outreach and Compliance
Coordinator**

Name: Lisa Moore

Affiliation: Government

Conserving wetlands and mature trees should be a priority.

Wilderscaping, Founder

Name: Dan Bender

Affiliation: Business

As a professional working in the landscape gardening, invasive species migration, and habitat restoration space I'm thrilled to see the program goals taking shape. I've spent hundreds of hours volunteering in the DCR Park system where I have helped lead efforts to hold back invasive plant inundation of key habitats. I'm concerned that park neighbors are both uninformed and in some cases, outright uncaring when it comes to rules about discarding yard waste into public lands. I've witnessed numerous incursions that have included invasive plant material. I have discussed the problem with DCR staff and found that they are essentially powerless when it comes to enforcement of attending rules.

I would highly encourage a program to share existing rules, the reasons for their existence, current goals, and resources for proper disposal of plant materials with communities that host important public lands. Equally important, the Commonwealth needs to strengthen and enforce the laws on the books when it comes to dumping.

I envision a relationship with between the DCR and neighbors that involves active communication, support, and encouragement of best practices.

Perhaps programs to support park neighbors with access to high quality native plants that are appropriate for their local habitat at affordable prices would help encourage the public to plant native where it will have the greatest impact, on the borders of public lands. I've long thought that enjoying a handful of botanists to collect seeds and help save plants that will be removed during road and trail work would be a great way to support maybe plant nurseries and supply the public with local - ecotype natural for landscaping projects.

Similarly, shutting down the planting of non-native plants on public lands with strict rules and pooled resources for low cost native tree and shrub production would be incredibly powerful and set a great example. Why local governments spend hundreds of thousands on Bradford pear cultivars and mimosa trees is beyond me. That money would go a long way to support habitat restoration and preserve biodiversity in the Commonwealth.

Lately, the department must work with the public health to strictly limit the use of non-target specific insecticide. The recent news about EEE has the public in an uproar that will lead directly to significant damage to the already threatened pollinator population while making trivial progress in the fight against the spread of the disease. Public awareness campaigns about how best to protect yourself from mosquitos must focus on personal responsibility and explain how spraying kills everything and is damaging to our food security. The risk of loss of pollinators must outweigh the benefit of spraying.

Thanks for considering my feedback,

Dan

WSCAC

Name: Bruce Spencer

Affiliation: NGO/Community Group/Non-profit

DCR/DWSP refuses to follow the guidelines and recommendations of the Climate Forestry Committee. Their recent timber sales continue to clearcut older/late successional stands that are healthy but of high value which brings in large amounts of revenue. The largest of local logging equipment is allowed to travel on much of the harvest area, compacting and rutting soils. Carbon sequestration is not a priority!

Name: Elaine Abrams

Affiliation: NGO/Community Group/Non-profit

Ongoing community education is vital to the success of this initiative. I hold a public facing position for a well-regarded statewide conservation organization and can attest to a general lack of understanding of the urgency of protecting biodiversity in our state. I urge the Div of Fisheries and Wildlife to start a robust communications campaign early on that promotes public buy in.

Submitted via email to: DFG.info@mass.gov

TO: Massachusetts Department of Fish and Game

DA: August 30, 2024

RE: Comments on Department of Fish and Game Implementation of Executive Order No. 618

On September 21, 2023, Governor Maura Healey issued Executive Order No. 618: Biodiversity Conservation in Massachusetts (E.O. 618).[1] E.O. 618 declares that “biodiversity conservation is a priority for the Healey-Driscoll Administration.” The order directs the Massachusetts Department of Fish and Game (DFG) to “conduct a comprehensive review of the existing efforts of all executive department offices and agencies to support biodiversity conservation in Massachusetts” and to “recommend biodiversity conservation goals for 2030, 2040, and 2050 and strategies to meet those goals.”

Our comments:

Our vision for nature in 2030, 2040, and 2050 includes the following, many of which were recommended in the report of Climate Forestry Committee (CFC) appointed by the Executive Office of Energy and Environmental Affairs (EEA).[2][3]:

1. Acknowledge and be guided by the CFC conclusion that, “Unsurprisingly, disturbing the forests of Massachusetts as little as possible and allowing forests to grow and age through passive management is generally the best approach for maximizing carbon, ecological integrity, and soil health.” [2, page 4]

2. Expand forest reserves on all Commonwealth-owned lands, including the designation of all Division of Watershed Supply Protection lands as reserves. Reserves are defined by the Department of Conservation and Recreation in their March 2012 report, Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines, as

“areas where the dominant ecosystem service objectives will be biodiversity maintenance, nutrient cycling and soil formation, and long-term carbon sequestration.... Forest management will generally consist of letting natural processes take their course....”[4]

3. Support permanent statutory protection of reserves.[2]

4. Provide, at a minimum, a comparable level of public input, involvement, and transparency for management on Department of Fish and Game and Division of Watershed Supply Protection properties as currently exists for Department of Conservation and Recreation (DCR) properties.[2]

5. Protect all mature forests and allow them to grow back and recover old-growth forest characteristics through proforestation.[5][6] There is no credible scientific evidence that any species requires the clearing of standing forests to survive or thrive in its natural range, but ample evidence that it reduces long-term carbon sequestration and storage.[6]

6. Comprehensive research experiments related to early-successional habitats may be conducted, but only in limited areas on lands that have existing open habitats.[2][6]

7. End pine barrens restorations, which are not supported by credible scientific evidence:

"As you may recall, the Committee on Forests and Climate (CFC) raised strong concerns in its report and in discussions with agency heads over the practice of creating early successional habitat through artificial means that reduce forest area and prevent natural forest regrowth. The arguments behind this opposition are based on extensive peer-reviewed literature that shows that (1) early successional habitat of grasslands, shrublands, and young forests is an artifact of Colonial deforestation and environmental degradation; (2) the practices employed by DFW are completely inconsistent with the historical (colonial) practices that created extensive open lands and thus are creating a novel form of artificial habitat; and (3) the creation and maintenance of these habitats decreases the extent of natural forest cover thus harming native biodiversity and reducing the carbon storage and climate mitigation potential of the state."[7]

8. End prescribed burning on state-owned lands. There is no credible scientific evidence that fire is naturally a major disturbance factor in New England.[6][7][8]

9. End the stocking of non-native fish in Massachusetts waters. These fish cause significant negative ecological impacts, including competition with native species.[9]

10. Discontinue the stocking of non-native game species, such as ring-necked pheasants, on state-owned or managed land. These birds are raised on farms in pens and do not have the normal wild animal's fear of humans. If they are not immediately shot, they are killed by predators or hit by cars, or they die of starvation.[10][11]

11. Discontinue logging, prescribed burning, and other active forest management on publicly owned watershed lands, which are unnecessary except in limited circumstance for public safety or manual invasive species removal.[2]

12. Promote a reduction in the consumption of wood and other forest resources to reduce pressure on climate and natural ecosystems.[2]

13. Strengthen regulations and enforcement of the Wetlands Protection Act including a reduction in the number of exemptions for forest cutting.

14. Strengthen enforcement of roadside Wetlands Protections by training and supporting municipal capacity and encouraging public engagement.
15. Provide training and funding for invasive species removal with a focus on municipal lands and roadways.
16. Acknowledge the findings and recommendations of the Climate Forestry Committee report excerpted here [3] and incorporate them in the DFG recommendations, to the extent that they relate to E.O. 618.

References

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- [2] Executive Office of Energy and Environmental Affairs (January 3, 2024). Report of the Climate Forestry Committee: Recommendations for Climate-Oriented Forest Management Guidelines. <https://www.mass.gov/doc/forests-as-climate-solutions-climate-forestry-committee-report-final/download>
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- [4] Department of Conservation and Recreation (2012). Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines. <https://www.mass.gov/doc/landscape-designations/download>
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- [6] Kellett et al. (2023). Forest-clearing to create early-successional habitats: Questionable benefits, significant costs. <https://www.frontiersin.org/journals/forests-and-global-change/articles/10.3389/ffgc.2022.1073677/full>
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- [8] Oswald et al. (2020). Native people did not use fire to shape New England's landscape <https://theconversation.com/native-people-did-not-use-fire-to-shape-new-englands-landscape-129429>
- [9] MacDonald (2001). The Dark Side of Fish Stocking. JSTOR. <https://daily.jstor.org/fish-stocking-the-dark-underbelly-of-resource-management/>
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- [11] Savio (2019). Pheasant hunt phasing out at Cape Cod National Seashore. Cape Cod Times.

<https://www.capecodtimes.com/story/news/politics/government/2019/03/10/pheasant-hunt-phasing-out-at/5746130007/>

Thank you for the opportunity to comment on Executive Order No. 618.

We look forward the Healey-Driscoll Administration's careful consideration regarding our vision for protecting and enhancing biodiversity in Massachusetts.

Sincerely,

Michael Kellett
RESTORE: The North Woods
Lincoln, Massachusetts

Janet Sinclair
Save Massachusetts Forests
Shelburne Falls, Massachusetts

Noel Abbott
Amherst, MA

Ashley Adler
Stoneham, MA

Louise Amyot
Greening Greenfield
Greenfield, MA

Glen Ayers
The Enviro Show
Greenfield, MA

Mary Ann Babinski
Westfield Concerned Citizens
Westfield, MA

Ralph Baker
Fitchburg, MA

Maiyim Baron
Brookline, MA

Kirstin Beatty
Last Tree Laws
Holyoke, MA

Fred Beddall
Holyoke, MA

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Pelham, MA

Barbara Rokosz
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Jacqueline Royce
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Renée Scot
Somerville, MA

Frederick Spence
Westhampton, MA

Sylvia Staub
South Hadley, MA

Rebecca Stevenson
Medford, MA

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Wendell State Forest Alliance
Wendell, MA

Mary Thomas
Wendell, MA

Liz Thomson
NEC Solar
Milford, MA

Jane Urban
Shutesbury, MA

Russ Vernon-Jones
First Church Amherst
Earth Ministry Team
Amherst, MA

Ellen Villani
Greenfield, MA

Lynn Waldron
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Climate Action Group of
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Northampton, MA

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Coordinator
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Concord, MA

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Seth Wilpan
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Pam Youngquist
Great Barrington, MA

Regarding the Massachusetts Biodiversity Goals, EO 618 and DFW's plans to promote its definition of biodiversity:

1. "Listening Sessions" where the public is barred from asking questions and no discussion occurs is undemocratic and in opposition to the scientific principle of open inquiry.

2. The information provided by DFW at these sessions and on the internet provides a one-sided view, omitting the work of independent scientists. David Foster, Professor Emeritus of Harvard Forest, and Richard Birdsey and William Moomaw who were both lead authors of sections of the IPCC 2007 report that was awarded a Nobel Prize, wrote to EEA and DFW in May of this year. They stated that they were: "writing out of concern that the Division of Fisheries and Wildlife is continuing to clear forests and advance mechanical treatments and prescribed fire to perpetuate early successional habitat based on faulty information and under false premises." DFW's continuation of these practices deserves nothing less than a full public discussion.

3. Foster, Birdsey, and Moomaw recommend that there be a "cessation of DFW policies and management activities that seek to maintain or expand early successional habitat on public and private lands," noting further that DFW has not provided important supporting information for their current policies:

1. How much early successional habitat is currently available throughout the Commonwealth?
2. What impact will forest clearing and the maintenance of early successional habitat have on the forest carbon cycle, carbon sink, reservoir and climate?
3. Are the consequences of current policies consistent with state climate legislation?
4. What are the consequences of forest loss and fragmentation for other species of birds, animals, soil fungi and other organisms that require large intact areas of middle aged and older forests?

In order to insure a full public discussion, DFW needs to publish the letter by these scientists, answer the questions above, and hold interactive public meetings where citizens can ask questions and discuss the science and facts that should shape DFW's activities regarding EO 618 and any biodiversity action plans. After a full public brief and discussion, DFW should then solicit public input.

4. The trade-off resulting from the current and proposed DFW management and expansion of early-successional habitat means worldwide species on the brink of extinction will reach that threshold more quickly because DFW decided to increase population numbers for species in MA that are not endangered and that are not supported by existing natural habitat. As citizens of the nation that has contributed most to climate change, we have an obligation to stop contributing to global habitat degradation.

Sincerely,
Karl Dziura
Conway, MA

RE: Biodiversity Conservation Goals for the Commonwealth

- support pollinators
- biodiversity in every neighborhood and every classroom

I grew up in Massachusetts. In high school, I realized that I had crossed a river every day of my life on the school bus and had no idea where it started and where it ended and I wondered how I could go through that many years of schooling and not learn such a real, basic piece of information. Any plant or animal that I learned the name of was due to a grandfather that was a nature enthusiast and parents who had learned some on their own with the one exception of the “tree project” I did in middle school. This project included having to find fifteen different leaves and identify the trees including the scientific name. It was fun, I felt like a scientific investigator, and to this day forty years later there are trees I can identify based on that project

I can't tell you how many times, I've heard a student say the "red bird" or "red jay" instead of cardinal. Knowing any local plants or animals by name isn't in our state science standards for elementary school students.

Our school grounds often still have shrubs that are no longer permitted to be sold in MA such as burning bush and barberry. Many schools have taken on creating a "pollinator garden". Too often this project isn't done with much fidelity to native plants and is done under the guise of helping honeybees. Honeybees are not the pollinators that I and many ecologists are concerned about saving. Insects as a group have declined tremendously. Insects are utilized by a huge amount of other species either as a food source or as pollinators as well as having intrinsic value of their own. Many schoolgrounds also have large campuses often with much of it as lawn. There is a huge opportunity to collectively and holistically look at schoolgrounds as not only a place for learning but as a place for habitat creation and increasing biodiversity. When I say this, I don't just mean adding a pollinator garden. I do mean, creating comprehensive landscape plans – removing non native invasives from current landscaping and replacing with natives. I mean instead of an odd landscaped bed here or there something that wraps around the school or reduces existing lawn area. Native trees, shrubs, grasses, herbaceous perennials, and suggestions for some annual flowers and herbs could be added to many school campuses.

As a MA resident, an environmental educator, and science teacher, what would my ideas for “biodiversity in every classroom” be? List below, but first – WHY?

- Authentic, place- based education is engaging and beneficial for local communities
- Using our local environment as an integrating context for learning has multiple benefits
- NUMEROUS studies prove the benefits of time spent in natural settings – see <https://www.childrenandnature.org/resource-hub/resources/> for research papers and other resources on children and nature. Oregon's Outdoor School – also has information on why that program exists and the benefits of being outside and learning in an outdoor context. Oregon's Outdoor School could also be inspiration or a model for something we could do in MA
- Activities like gardening or creating a nature trail on school grounds increases student self efficacy with such an accomplishment

- Paying attention to the garden and/or natural world– using science skills of observation and social emotional skills such as empathy and compassion
- Biophilia – our natural connection to other species – our natural tendency for a love of life – and other life forms!
- You need to know about it to notice changes, to think about affects and consequences of changes, to advocate for nature, to work with it in sustainable systems

Biodiversity in every classroom:

DESE and/or MA Wildlife – DCR -Natural Heritage – could go through the science standards and find the places where the state’s biodiversity –learning about local species could be used in support of the standards. This could have suggestions for lessons/activities. For example – 2nd grade students learn about how plants depend on animals and animals depend on plants – including pollination and seed dispersal. Instead of leaving it at this vague notion – specific examples could be given – Liriodendron is pollinated by this bumble bee, this hummingbird, this beetle, etc. (I wanted to be more specific but when I googled it I could only quickly find this general info). That is something I’ve found over and over when working on these kinds of projects with students. There is a need for a quicker bridge between academia and general knowledge and a definite need in student friendly materials. What’s endangered in MA – why? What is its life cycle – inherited traits – parent/offspring behavior – where is it in the food chain/web? What adaptations does it have? How can we help? – when studying any animal these are the kinds of things that fit with what an elementary school student needs to know in science but it can be difficult to simply and easily find this kind of information.

Schoolyards – remove invasive non -native shrubs no longer approved for sale in MA that are part of school landscaping and replace with appropriate native species.

Many schools have large campuses that could be used for food production and increasing native plantings. Landscaping for habitat creation and outdoor classrooms. Pollinator plantings at every school.

Professional Development for teachers who could also benefit from learning more about local natural resources be it rivers, lakes, geology, hills, flora and fauna, biomap, natural heritage endangered species, etc. I know about these things because it has been my interest in life and I do a lot of personal research and reading...I’m not sure knowledge of these things is widespread however.

Landscaping around schools could be reimagined to include planting for pollinators within existing beds and creating new “gardens” or areas of native plants.

New school construction – landscaping must be to create habitat- list of vetted ecologically minded landscape architects, suggested plants/designs, outdoor classrooms...language written into contracts.

Student- friendly materials for identification of native plants and native pollinators could be developed. The species fact sheets that I can find on mass.gov are not written for young students. I have had to

translate every other sentence to help students understand what is being said as there is a lot of technical jargon.

DESE exemplar units or suggested lesson plans for 2nd (habitats, biomes, pollinators) 3rd (weather/climate, inherited vs environmental traits, changes in environment) 4th (plant and animal adaptations), & 5th grade (ecosystems, food webs, watersheds) that focus on local species and habitats and/or pollinators.

Programs such as Oregon's outdoor school could be created for MA.

Travelling biodiversity push in programs could be created for schools. Having state experts that come into the classroom or having state parks, local parks, or non-formal environmental education providers for classrooms to visit are essential. My fear is that teachers alone, with so many existing demands, who may lack the time, energy, knowledge in environmental education topics, will not be able to successfully and comprehensively increase incorporating biodiversity into their classrooms. Being able to sign up for a program at a park or having an expert come to the school grounds for example would be welcomed by many, I'm sure.

Scavenger hunts, parks passes, passports, coloring books, field trips on state resources, and materials sent to schools for distribution.

A MA Biodiversity website – just for kids! Species profiles, how to identify different pollinators, keystone pollinator species, ecoregion descriptions and maps, what fish are in the CT River or other rivers in MA, etc. etc. maybe even a video game where biodiversity has to be protected or increased

Restore and expand the DCR position once held by Ginni Traub as the connection between schools and field work in state forests and parks. As a 7th grade science teacher, I utilized this offering more than once. I had students exploring the geology of Mt. Tom, looking at dinosaur footprints with Ms. Traub....who also brought a stream table to our classroom to investigate.

<https://www.mass.gov/guides/guided-educational-field-trip-opportunities-in-west-central-massachusetts> She has retired and my understanding is the position wasn't posted/filled -the link I shared -is still available on the website ...

A week or month long celebration of the state's biodiversity with accompanying materials and suggestions for classroom involvement – sponsor bioblitzes in every county.

Hire naturalists and environmental educators that can partner with schools for projects on their school grounds or local environs.

Send books such as Critters of Massachusetts, the MA Wildlife magazine, Natural History of Western Massachusetts, Dragonflies of Massachusetts, the poster with MA turtles on it, various state publications, etc. to classroom teachers & school libraries.

Revisit the Environmental Literacy Plan from MassMEES – MA Environmental Education Society created in 2016

We already have the Green Team that gives out compost and recycling bins and we have Growing Wild MA that provides two no-cost to consumer native plants at participating nurseries. We could start a bee and bird bath at every school initiative. The state could buy in bulk and send out to all K-5 schools along

with information from the National Wildlife Federation about creating habitat on school grounds and certifying it.

I'd love to see field trips encouraged and more agricultural field trip opportunities in my part of the state. Imagine every 3rd grader in MA visiting a farmer/farm to reinforce weather/climate science standards – how do farmers prepare for weather events? How do they use their knowledge of our climate to plan their crops? Imagine if every 5th grader got out on a water body as part of their watershed unit. I was fortunate enough to work with MA Audubon as part of grant and was able to take 5th graders canoeing in Easthampton. I know this could be the only time that many of those students would get to do such a thing. I can't tell you how many students were telling me they wanted to do that again, it was better than they thought, they didn't know they could "drive" a canoe, etc.

On a personal note - no pesticide spraying company should be going door to door in MA – I've been visited twice this summer by the same company wanting to spray my lawn. I'd also like to have the choice when purchasing plants at nurseries to know that I'm not buying plants sprayed with neonics. Labelling or forbidding this class of pesticides would be very helpful.

Encourage municipalities to use yellow lights at night and/or motion detected lights. A program similar to Mass Save could be started that switches out light bulbs to yellow for streetlights etc.

Incentivize using existing homes/buildings/developed land versus cutting into more habitat. In the last two years, ten houses have been built on the road that I grew up on. With many vacant buildings, we could do less destruction and further fragmentation of habitat with new developments.

The giant fields of solar panels where woods have been cut down. I know we need to go solar, but I don't know why rooftops and parking lots aren't the location for these solar panels.

Benefits of Time Spent in Nature

<https://richardlouv.com/>

<https://www.childrenandnature.org/>

<https://health.cornell.edu/resources/health-topics/nature-rx>

<https://www.nrdc.org/bio/maria-mccain/bringing-outdoors-benefits-biophilia>

<https://www.psychologytoday.com/us/basics/biophilia>

"A VERY EXCITING BOOK of enormous interest for everyone concerned with the future of our species—environmentalists and legislators, industrialists and educators, you and me. Its message should become part of Western thought." —JANE GOODALL

Ecopsychology

RESTORING THE EARTH
HEALING THE MIND



Edited by THEODORE ROSZAK,
MARY E. GOMES, and ALLEN D. KANNER

Forewords by LESTER R. BROWN
and JAMES HILLMAN

<https://e360.yale.edu/features/ecopsychology-how-immersion-in-nature-benefits-your-health>

<https://www.antioch.edu/centers-institutes/center-place-based-education/#:~:text=What%20is%20Place%2Dbased%20Education,other%20concepts%20across%20the%20curriculum.>

<https://www.ahta.org/about-horticultural-therapy>

<https://plantbiology.rutgers.edu/hort-therapy/whatis.html>

Dear Commissioners,

In your July 2024 listening session #2 one of the commissioners mentions, prior to public comment, reducing pesticides as one of the goals you are endeavoring to include in your compliance with the Healey administrations Executive Order No. 618.

We need to see an enforceable regulation that requires a ban on the use of all chemical pesticides (herbicides, pesticides and rodenticides) for the entire state and in place make a requirement for creative cooperation task forces to achieve workable alternatives (list provided below) applied across management practice locations, both land and water. We have heard repeatedly from all state agencies and many municipal health agencies that there is not enough funding to seek or use alternative methods to pesticides for invasive species or insect/rodent disturbances. One of the first priorities of Executive Order No. 618 to begin implementing now is to provide financial incentives to state agencies and municipalities to stop using pesticides through grants or other sources that provide education and thorough application instruction on alternative control methods. This is an imperative goal to eliminate all pesticide chemicals and their known disastrous effects on land and water which impact every species and whole ecological balance.

DFG and all it's partner state agencies do have the ability to place a ban on the use of all pesticides on state lands. To that end the scientific paper attached to this email regards the use of pesticides on forest ecosystems and their long term impacts. We have abundant studies and documented medical reports on the dangerous effects of pesticides within home, agriculture, and municipal usage. We need to make the connection between these evident facts and the effects on our state lands and waters entire ecosystems over decades of time. We are asking you to seriously contemplate this study in order to change the narrative and methods around invasive species control in much needed updated management plans across the state.

We know that there are limitations for DFG in terms of engaging farmers and private land holders/home owners on the effects of the use of glyphosates on their properties and your ability to enforce alternatives there. However this is a ripe opportunity for DFG and other agencies to activate the change they have been seeking with the public's opinion on lack of education, public connection and transparency. DFG could emphasize in its programming extensive education for private owners and financial incentives coupled with education for farmers on the effects of these chemicals and trusted alternatives to their use. Additionally incentives can be provided to state energy source and power companies to eliminate the use of these chemicals in power line cuts and solar array locations.

There were many public oral comments during your listening session speaking specifically to this issue. We do not know if your tallying method for serious consideration of concerns will relate to the number of each specific issue comments you receive. Whatever your method for inclusion in goals and regulations we urge you beyond measure to tackle a ban on pesticide usage in the state. Without that baseline ban biodiversity protection and all other efforts

towards healthy ecosystems will flounder. The pesticides chemical long life and insidious dangers underpin erosion of water and soil, the very basics upon which all biodiversity must be nourished to flourish.

Thank you for this opportunity to provide comment suggestions at the crossroads of what we all hope is a road forward that truly enforces and implements the proposed goals of Executive Order No. 618.

Sincerely,

Pam Youngquist and Terry Goodman

Great Barrington, MA

(413) 229-9013

List of Alternative to Glyphosate Usage on Land

ALTERNATIVES TO GLYPHOSATE-BASED HERBICIDES

HARVESTING

-For food (cattails, Japanese knotweed) and for fuel (cattails) - uses for invasive species in your community.

MANUAL UPROOTING/CULTIVATION/PULLING/CUTTING

(pruner, lopper, hoe, mattock, handsaw, shovel).

MOWING HEIGHT

Allow lawn areas to grow higher, preventing weeds from flourishing so grass outgrows weeds; cut at no less than 3" height and mow monthly.

LAWN REPLACEMENT

Meadowscaping with "plant communities" - plants that grow together in nature; create three seasons of bloom to benefit native pollinators and wildlife species; no mowing; maintain once per year in spring to allow food/shelter resources over the winter.

COMPETITION PLANTING/SMART DESIGN/OVERSEEDING

Plant grasses and flowers that are native to the area and are hardy; planting of grass seed directly into existing turf

REPEAT CUTTING

Plants' photosynthesis will be disrupted; remove leaves and stems seasonally; plant are forced to burn up its nutritional reserves and dies off naturally.

GOAT GRAZING

Tethered or temporarily fenced grazing services are available for residential, commercial or town properties; great for poison ivy areas, power lines, encroaching bushes & trees.

WEED WHACKING

Use metal blades for heavy-duty cutting (e.g., Phragmites, cattails and other tall-stalked plants).

MOWING

Repeat cutting down of a plant will kill it; maybe weed whack then mow

HOT WATER

Pour directly onto plants; be careful to not harm non-target plants and soil organisms.

STEAM

Uses only water; hand-held devices (for walkways, building entries, etc.) and large drivable machines (for roadsides, rail lines, golf courses, ball fields).

INFRARED AND FLAME WEEDING

With heat, weeds die; hand-held devices to large drivable machines; good for walkways, driveways, building entrances, parking lots, roadsides; electric or propane.

VINEGAR (20% ACETIC ACID)

Kill selected/targeted plants when young; use only on a dry hot day when weeds are thirsty.

ESSENTIAL OILS

Clove oil (eugenol) is a natural herbicide; deter insects with citrus oil that repels mosquitoes; peppermint oil repels mosquitoes and heals mold and mildew situations.

ORGANIC CORN GLUTEN

Sprinkle on lawn areas in springtime to deter weeds.

MULCHING

Covering with organic matter or stones, seashells or wood chips to prevent photosynthesis.

SMOTHERING

Tarp an area for a few weeks to kill unwanted plant vegetation; helps worms.

SOLARIZING

Covering the ground with a tarp, usually a transparent polyethylene cover, to trap solar energy that heats the soil enough to kill weeds and weed seeds.

TOLERANCE

A plant will be found where overall conditions are suitable for its survival.

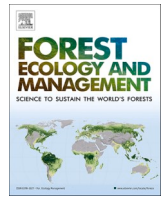
NATURAL ROUNDUP ALTERNATIVES USE SOAP, VINEGAR, SALT COMBINATIONS, CORN GLUTEN MEAL AND IRON-BASED HERBICIDES TO KILL WEEDS



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Glyphosate remains in forest plant tissues for a decade or more

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ABSTRACT

Glyphosate-based herbicides are highly effective, non-selective, and broad-spectrum herbicides that have been used in British Columbia's forest industry since the early 1980's. Over this time, long-term persistence of glyphosate has not been measured, largely due to the inability to analyze glyphosate at low concentrations. Given the advancements in analytical techniques that are now available, we have extended the persistence curve of glyphosate to elucidate the actual length of time of persistence in northern British Columbia, rather than relying on estimations of persistence based on half-life curves that are quite often modelled from incomparable environments. We collected plant tissues from five forest understory perennial species growing in two distinct biogeoclimatic regions of northern BC to map out how glyphosate residue quantities change over time according to species, plant tissue type, and climate regime. We found that residues persisted for up to 12 years in some tissue types, and that root tissues generally retained glyphosate residues longer than shoot tissue types. We also found that samples from the colder, more northern biogeoclimatic zone investigated retained significantly higher levels of glyphosate for longer than samples collected from the warmer biogeoclimatic zone.

1. Introduction

Glyphosate (N-(phosphonomethyl) glycine) is the most widely used herbicide in the world, in both agricultural and forestry industries, as well as for invasive weed control and household yard and garden use (Henderson et al. 2010). A highly effective, non-selective, broad-spectrum herbicide first introduced in 1974, it is present as the active ingredient in numerous glyphosate-based herbicides (GBHs), including the Roundup®, Vision®, and VisionMax® formulations manufactured by Monsanto Company (Baylis 2000; Dost 2003; Thompson & Pitt 2011). Innumerable studies on glyphosate, especially in the form of Roundup®, have been published in relation to its agricultural use. In comparison, there is a deficiency of research available focusing on the Vision® group of formulas and their use in forestry.

Upon application, glyphosate is absorbed through leaves, stems or roots (Bernards et al. 2005), and is translocated throughout the plant. This translocation follows the source to sink flow of photosynthates (sucrose and other carbohydrates) through the phloem, and after cycling throughout the plant for at least 72 h, glyphosate accumulates in the apical meristems of roots and young leaves (Fadin et al. 2018; Machado et al. 2009; Bernards et al. 2005). Glyphosate can be released to the

surrounding soil by plant roots, where it may be strongly adsorbed to soil particles, degraded by microorganisms, or absorbed by adjacent plant roots (Viti et al. 2019).

Once inside plant tissues, glyphosate inhibits 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS), an enzyme required for the biosynthetic shikimic acid pathway that produces the amino acids tyrosine, phenyl alanine and tryptophan (Duke et al. 2012; Richmond 2018). These amino acids are vital to protein synthesis and plant growth; thus, disruption of the shikimic acid pathway by glyphosate effectively kills the plant (Henderson et al. 2010; Richmond 2018). The enzyme EPSPS is present in plants and microorganisms, but not in animal cells (OECD 1999). For this reason, it is widely believed that glyphosate is harmless to humans and animals (Dost 2003; Duke et al. 2012). However, there continues to be much debate and controversy about the safety of glyphosate (Landrigan & Belpoggi 2018; Richmond 2018; Larsson et al. 2018; Zhang et al. 2019).

Glyphosate is degraded in the soil through metabolization by microorganisms, a complex process, the rate of which depends upon multiple factors, including the type of microbe, soil pH, moisture, temperature, and other climatic variables (Helander et al. 2012). In northern climates, prolonged freezing of the soil during winter months may

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reduce the rate of glyphosate degradation by microbial action (Stenrød et al. 2005), though it is possible that microorganisms may adapt somewhat to subfreezing soils (Newton et al. 2008). The primary metabolite of glyphosate is aminomethylphosphonic acid (AMPA), and both glyphosate and AMPA negatively impact plant physiology (Gomes et al. 2014). Presence of AMPA in plant tissues may be due to absorption from the soil (Gomes et al. 2014), or may be evidence of degradation of glyphosate within the plant (Tong et al. 2017). The effects of cold climate on the degradation of glyphosate within plant tissues are unknown.

In Canada, glyphosate has been used on over 90% of herbicide-treated forest areas nationwide (Thompson & Pitt 2011). The province of Ontario accounts for over 40% of glyphosate use in Canada, with British Columbia (BC) ranking second at 17% (Govindarajulu 2008). Silvicultural applications of glyphosate account for approximately 34% of total glyphosate use (by weight sold) in BC, with the majority being used for agriculture and horticulture (Govindarajulu 2008). In BC, approximately 17,000 ha/year of forested land has been sprayed with herbicides (primarily GBH) since 1985, largely for conifer release (Government of British Columbia 2016).

When herbicides are sprayed on forest cutblocks aerially, it is difficult to predict the exact dosage that any individual plant will receive (Feng & Thompson 1990). The concentrations reaching understory plants growing closer to the forest floor, such as small herbs and shrubs, are affected by overtopping vegetation structure and height, wind, precipitation, and overlap as the aircraft makes multiple passes over the cutblock (Lloyd 1990). In both forestry and agriculture, there is also a risk of GBH reaching non-targeted species in adjacent areas through spray drift or overspray (Boutin et al. 2014; Cederlund 2017), or through runoff (Govindarajulu 2008). Further, in a forest ecosystem, the targeted species rarely grow isolated from other plant species, and many non-targeted plants are sprayed with GBH simply due to their proximity to the targeted species, often at a sub-lethal dose as a result of being located in the understory (Wood 2019). Conversely, a targeted species may also receive a sub-lethal dose due to incomplete coverage.

The effects of low concentrations of spray drift on non-targeted plants are complex and not well-understood (Cederlund 2017). Due to variable levels of sensitivity to glyphosate, some non-targeted plants die, and surviving plants may translocate and store glyphosate within their tissues (Florescia et al. 2017; Székács & Darvas 2012). Glyphosate and AMPA may persist in perennial plant tissues for an extended duration of time of a year or more (Roy et al. 1989; Mamy et al. 2016; Wood 2019). These plants may experience deformities, growth suppression and other negative effects, even though the concentration reaching non-targeted plants in this situation is typically very low (Timms & Wood 2020; Florescia et al. 2017). The exact duration of residue persistence is unknown for plants in forested environments of British Columbia. Many of these non-targeted plants are foraged upon by various wildlife species, and some are also wild-harvested by humans for consumption or medicinal usage. The value of these plants may be questionable if they contain glyphosate.

Very little research has been conducted on glyphosate storage and persistence within plant tissues, and to our knowledge, no research has yet been conducted on long-term glyphosate persistence in perennial forest plants beyond one year after treatment. Most of the existing data on this topic refer to glyphosate content in the tissues of harvested food crop species, particularly glyphosate-resistant crops (example: Bøhn et al. 2014), or in forest plants immediately after GBH application (Roy et al. 1989; Feng & Thompson 1990). The perennial nature of the majority of forest plants, combined with a growing awareness of adverse effects of chronic, low-doses of glyphosate on health and the environment, indicates that more research should be conducted regarding the long-term effects of glyphosate in a forested environment. Further research is required to determine the duration of glyphosate persistence in plant tissues, particularly in a forestry context. The aim of this research project was to determine the duration (from one year up to

twelve years) of glyphosate persistence in selected perennial forest plant tissues, and to compare residue levels within roots, shoots, and fruits. Presence of AMPA was also evaluated.

2. Methods

2.1. Study areas

The Province of BC maintains a Biogeoclimatic Ecosystem Classification (BEC) system, which delineates the 900,000 + km² province into fourteen ecological zones and numerous subzones based on differences and variation in climate, soils and vegetation (Meidinger & Pojar 1991). Our sampling sites were chosen from two different BEC zones within the interior of BC: the Boreal White and Black Spruce (BWBS) zone and the Sub-Boreal Spruce (SBS) zone (Fig. 1). The BWBS zone extends across Canada, and on a global scale, is part of the circumpolar boreal zone (DeLong et al. 2011). It features a northern continental climate with frequent exposure to arctic air masses, short growing seasons, and long, very cold winters during which the ground freezes deeply (Meidinger & Pojar 1991). This zone is generally colder and drier than adjacent zones in the winter, and can be warmer in the summer (DeLong et al. 2011). The SBS zone is a montane zone that dominates BC's central interior and adjoins the BWBS zone to the north. The SBS zone features a continental climate with seasonal extremes of temperature: severe, snowy winters, moderate annual precipitation, and relatively warm, moist, and short summers (Meidinger & Pojar 1991). The sub-boreal climate of the SBS zone is slightly warmer in January and cooler in July, and has shorter winters and a slightly longer growing season than the more continental boreal climate of the BWBS zone (Meidinger & Pojar 1991). Table 1 provides a comparison of some climatic features and the dominant tree species in each zone.

The forest cutblocks sampled had all been clearcut logged prior to GBH treatment. The cutblocks were planted 1-4 years after logging and the GBH treatments were applied 3-5 years post-plant as a means of controlling the competing aspen (*Populus tremuloides*) stems. As a result, the vegetation sampled for this study were considered largely "non-target", and were likely exposed to varying concentrations of GBH as droplets fell through the young, inconsistent aspen canopies.

2.2. Experimental Design & sampling

Samples of roots and shoots were collected from four species of plants chosen for their importance to the diet of moose, bears and other wildlife, their importance to local traditional plant users, and to represent various plant growth strategies: *Salix* spp. (willow), *Cornus sericea* L., syn. *C. stolonifera* (red-osier dogwood), *Rubus idaeus* L. (red raspberry), and *Chamaenerion angustifolium* (L.) Scop. (fireweed). Fruits were also collected from *R. idaeus* and *Vaccinium caespitosum* Michx. (dwarf blueberry) plants, both of which are commonly eaten by humans and wildlife.

Fireweed is an herbaceous perennial with rhizome-like roots and 0.5-3 m tall stems, and is especially common in disturbed areas and open forests (MacKinnon et al. 1999). Despite its prolific wind-borne seed distribution, fireweed reproduces primarily by sending up new shoots each spring from buds that formed late in the previous growing season along a complex horizontal root system that may survive for decades (Broderick 1990). It is considered "an early to mid-successional invader of the boreal forest," with the ability to colonize from seed in disturbed sites and quickly dominate, persisting in later successional stages (Pinno et al. 2013). Fireweed is consumed by wildlife, including both moose (Broderick 1990) and bears (Ciarniello 2018).

Red-osier dogwood is a stoloniferous shrub (meaning that it has horizontal stems, or stolons, at the soil surface) 1-4 m tall, growing in moist soils. It is an extremely important winter food source for moose (Zach et al. 2011), and the berries are an important food for bears in Northern British Columbia (Noyce & Garshelis 2011; Benson &

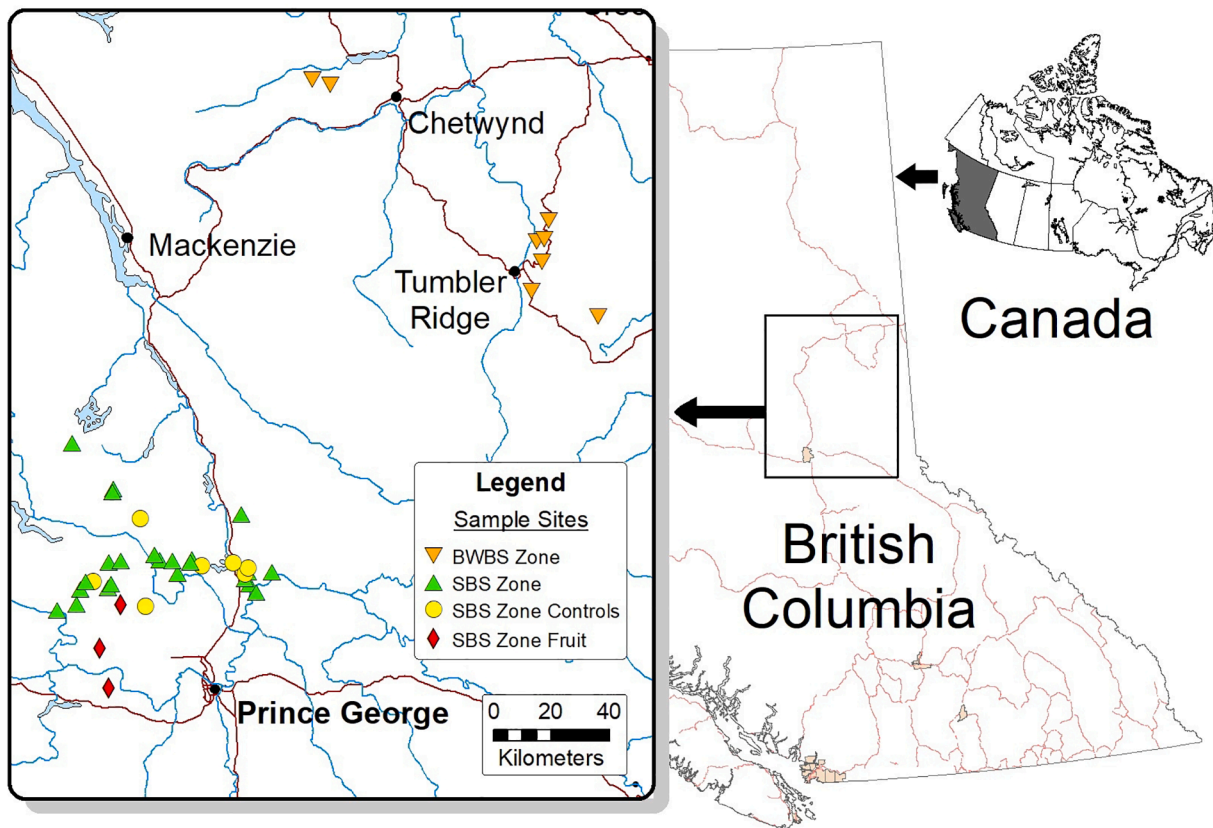


Fig. 1. Study sites: Samples were collected from forest cutblocks in British Columbia, Canada, within the Sub-Boreal Spruce (SBS) Biogeoclimatic zone near the city of Prince George, and within the Boreal White and Black Spruce (BWBS) zone near the towns of Tumbler Ridge and Chetwynd.

Table 1

Comparison of Boreal White and Black Spruce (BWBS) and Sub-Boreal Spruce (SBS) Biogeoclimatic Ecosystem Classification (BEC) zones (adapted from Meidinger & Pojar 1991). ^a – Updated with 1971–2000 climate normals (DeLong et al. 2011). The BWBS zone has a colder climate with longer winters and less precipitation than the SBS zone.

	BWBS	SBS
Mean annual temperature ^a	1.7 (range 2.4 °C to 3.6) °C	2.2 (range 0.7 °C to 4.2) °C
Months with average temperature < 0 °C	5–7	4–5
Months with average temperature > 10 °C	2–3	3–5
Mean temp, coldest month	24.5 °C to 17.7 °C	14.6 °C to 7.7 °C
Mean temp, warmest month	12.0 °C to 16.6 °C	12.9 °C to 16.9 °C
Mean annual precipitation ^a	525 (range 341–897) mm	708 (range 436–1893) mm
Proportion of annual precipitation falling as snow	35–55%	25–50%
Mean annual snowfall	135–269 cm	111–379 cm
Major tree species	White spruce, trembling aspen, lodgepole pine, black spruce, balsam poplar, tamarack, subalpine fir, common paper birch, Alaska paper birch	Climax species: hybrid white spruce, subalpine fir, black spruce. Seral species: lodgepole pine, trembling aspen, paper birch, douglas-fir.

Chamberlain 2006).

Willows are known for being difficult to identify to the species level (MacKinnon et al. 1999), and commonly form hybrid subspecies. For

this reason, we have not identified the species, but collected samples from a variety of available *Salix* spp. shrubs. Willow is a staple diet item for moose and other herbivores, and is also important for bedding and cover (MacKinnon et al. 1999).

Red raspberry is a perennial shrub, up to 1.5 m tall with upright stems (canes), typically found in low to moderate elevation habitats that have been disturbed by logging, silvicultural operations, or fire (MacKinnon et al. 1999). Bearing biennial canes from a perennial root system, which produce fruit in their second year, red raspberry is a pioneer invader that rapidly develops an extensive root system and foliage to colonize recently disturbed open forest areas, surviving for many years afterward (Oleskevich et al. 1996). Although initial colonization is generally via seed germination, and abundant quantities of seeds are produced thereafter, red raspberry spreads primarily via vegetative reproduction once established, through short-lived root suckers from extensive clonal colonies (Oleskevich et al. 1996). Raspberry fruits and foliage are eaten by both wildlife (Oleskevich et al. 1996; Ciarniello 2018) and people, and the leaves are used medicinally (MacKinnon et al. 1999).

Dwarf blueberry is a perennial deciduous shrub that grows up to 0.3 m high and can be found throughout northern BC (MacKinnon et al. 1999). Blueberries are eaten by wildlife, including bears (Ciarniello 2018), and people (MacKinnon et al. 1999).

Root and shoot samples were collected in July of 2018 on forestry cutblocks where VisionMax® glyphosate-based herbicide was aerially applied at a rate of 3.3–4.0 L/ha (resulting in a concentration of 1.78–2.16 kg a.i./ha), one year, three years, six years, and twelve years before sample collection (corresponding to the treatment years 2017, 2015, 2012, and 2006), following standard forestry operational procedures for aerial herbicide application. In each region, for each application year, composite samples were collected for each species and tissue type, from each of ten plots in treated areas. In the BWBS zone,

corresponding control samples were collected from ten plots in untreated areas within the same cutblocks (Fig. 2). In the SBS zone, control samples were collected from separate cutblocks of the same age (logged in the same year). Plots were each a minimum of 100 m away from any other plot and 20 m from the edge of the treatment zone. Separate samples of roots and shoots were collected for each species. Each composite sample contained tissues from a minimum of three individual plants of the same species, collected using pruning shears, treeplanting spades, and trowels. Unless absent, one sample of each tissue type of each plant species was collected in each plot, resulting in up to ten treated sample replicates and ten control sample replicates of each type for each spray year in each BEC zone (fewer control samples were collected in the SBS zone). The ten sample replicates of each type were collected over at least two different cutblocks per exposure year to ensure a genetically diverse sample selection. Plant samples were frozen in sealed plastic bags until they were processed.

Fruit samples were collected in August of 2019 on forestry cutblocks in the SBS BEC zone where VisionMax GBH was applied aerially at a rate of 3.3 L/ha (resulting in a concentration of 1.78 kg a.i./ha), one year prior (i.e. sprayed in 2018). Sampling was done in the same manner as described above, resulting in the collection of nineteen treated and six control raspberry fruit samples from three different cutblocks, and ten treated and ten control blueberry fruit samples from one cutblock. A further nine treated and four control samples of raspberry fruits were picked off of shoot samples that were collected in July of 2018 from sites treated six years before sample collection (in 2012).

2.3. Sample processing and laboratory analysis

Plant samples were individually washed with a minimum of three rinses to remove all traces of soil (with the exception of raspberry fruit samples collected in 2019, which were too juicy to wash and lacked visible soil particles), dried, ground to a powder, and returned to the freezer until they could be sent to the lab for chemical analysis. Root and shoot samples were dried at 80 °C, and fruit samples were dried at 60 °C, in a Lindberg / Blue Gravity Oven (Model # GO1330SA). Grinding was accomplished with the following, depending on tissue type and mill availability: Thomas Wiley Mini Mill (T4276M) with a 40 mesh (0.425 mm) screen; IKA A 11 basic Analytical mill; Kinematica POLYMIX® PX-MFC 90 D with a 0.8 mm or 0.5 mm screen; Hamilton Beach Custom Grind coffee grinder (80393C) or Cuisinart Grind Central coffee grinder (PG-13658FA-CAN), each with a removeable washable stainless steel grinding bowl; and a mortar & pestle. Grinders were blown clean with forced air between similar samples from the same spray year, and washed with soap and water and dried between samples of different types or spray years.

Samples were analyzed for presence of glyphosate and AMPA by the University of Guelph Agriculture & Food Laboratory, using high performance liquid chromatography – mass spectrometry (HPLC-MS). Since costs for residue analysis were high, we selected priority sample groups for chemical analysis (Table 2).

Table 2

Plant species & tissue types analyzed by the University of Guelph Agriculture & Food Laboratory, using high performance liquid chromatography – mass spectrometry (HPLC-MS), for glyphosate and aminomethylphosphonic acid residues sampled from two different biogeoclimatic zones in forests of northern British Columbia, Canada.

Species	Tissue Types	
	Sub-Boreal Spruce Zone	Boreal White & Black Spruce Zone
<i>C. angustifolium</i> (fireweed)	Shoot: 9 controls; 44 treated Root: 12 controls; 44 treated	Shoot: 35 controls; 40 treated Root: 35 controls; 39 treated
<i>Salix</i> spp. (willow)	Shoot: 13 controls; 40 treated	Shoot: 32 controls; 38 treated
<i>C. sericea</i> (red osier dogwood)	Shoot: 10 controls; 46 treated	–
<i>R. idaeus</i> (red raspberry)	Fruit: 10 controls; 28 treated	Shoot: 24 controls; 27 treated Root: 26 controls; 21 treated
<i>V. caespitosum</i> (dwarf blueberry)	Fruit: 10 controls; 10 treated	–

Willow, dogwood, and fireweed shoots are key components in the diet of moose, and were chosen specifically for this reason, though they are also consumed by other herbivores and omnivores. Raspberry and blueberry fruits were chosen because they are commonly consumed by humans, bears, and other wildlife. Although they may also be foraged upon or have ethnobotanical uses, fireweed and raspberry roots, as well as raspberry shoots, were chosen primarily to provide a means of comparing residue allocation between different plant tissues. A total of 377 treated and 216 control (untreated) samples were analyzed.

2.4. Statistical analysis

The residue data received from the laboratory (Wood et al. 2021) included numerical values where the amount detected was > 0.03 ppm, and non-numeric values including: “not detected”; “<MDL” = Less than the minimum detection limit of 0.008 ppm; and “<MQL” = Less than the minimum quantification limit of 0.03 ppm. The < MDL and < MQL categories indicate a confirmed presence of the compound (whether glyphosate or AMPA) by HPLC-MS but at less than the routine detection limit, or the defined quantification limit, respectively. To include these qualitative results as detected numeric quantities in the analyses, “not detected” was given a value of zero, and we substituted the average between the minimum and maximum possible concentrations for < MDL and < MQL. Concentrations of < MDL were taken as 0.004 ppm (median between 0.000 and 0.008) and concentrations of < MQL were taken as 0.019 ppm (median between 0.008 and 0.03) (Wood et al. 2021).

With a high proportion of zero values resulting from samples with no detected residues, the glyphosate and AMPA concentration data errors were strongly skewed to the right, and thus did not satisfy the assumption of normality, as confirmed by Shapiro-Wilk tests.

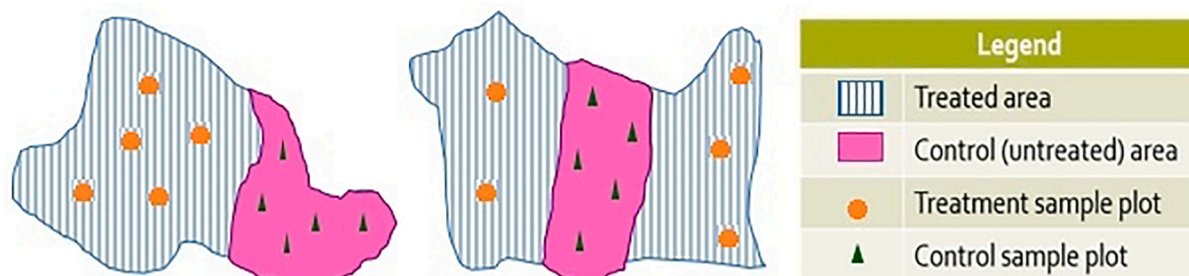


Fig. 2. Sampling Design – Examples of sampling plot layouts in forest cutblocks in northern British Columbia, Canada, where cutblocks were composed of both glyphosate-based herbicide treatment areas and untreated areas (stratified for specific management at the time of treatment).

Accordingly, Kruskal-Wallis H tests (analysis of variance by ranks for non-parametric data) were conducted, using Stata Statistical Software 14.2 (StataCorp LLC 2018), to determine the effects of the independent categorical variables (“year”, “BEC zone”, “species”, and “tissue type”) on glyphosate and AMPA concentrations, and are reported using the standard χ^2 with degrees of freedom in parentheses. We compared only same tissue types between species (i.e. shoot to shoot, root to root, or fruit to fruit) because of the differing storage capabilities of plant tissue types. Significant test results were followed by post hoc multiple pairwise comparisons between groups, using Dunn’s Test with a Sidak adjustment for multiple comparisons. Throughout, an α of 0.05 was used to assess significance.

Generalized Linear Models (GLMs) were run in IBM SPSS Statistics 26.0 software (IBM Corp. 2019) to determine the value of each independent categorical variable as a model predictor for both concentration and presence of glyphosate and AMPA in plant tissues. GLMs with a Tweedie distribution and a log link were used to determine the value of the independent variables as predictors for residue concentrations. The two dependent variables, glyphosate concentration and AMPA concentration, were considered as covariates. Next, binary variables were created from the residue concentration data, to indicate whether or not glyphosate and AMPA were detected in each sample. With the binary variables, GLMs with a binomial distribution and a logit link were used to determine the value of each independent variable as a predictor for residue presence.

3. Results

The 216 control samples collected from untreated areas were expected to be free from glyphosate and AMPA residues, yet 5.5% of control samples contained trace amounts of either glyphosate (seven samples, or 3.2% of the total) or AMPA (five samples, or 2.3% of the total) (Table 3). These samples, both roots and shoots, were all among those collected from untreated areas within treated cutblocks in the BWBS BEC zone. In contrast, over all years, 45% of the total 377 treated samples contained residue, with 167 (or 44%) containing glyphosate, and 69 (or 18%) containing AMPA (Table 3). All but one of the treated samples containing AMPA also contained glyphosate, for a total of 68 (18%) of treated samples containing both residues. Statistical comparison of residue concentrations showed significant differences between control and treated samples for both glyphosate ($\chi^2(1) = 111.998, p < 0.001$) and AMPA ($\chi^2(1) = 31.974, p < 0.001$) concentrations.

Table 3
Total number of combined root, shoot and fruit samples containing glyphosate and aminomethylphosphonic acid (AMPA) residues from managed forest cutblocks in northern British Columbia, Canada, for each treatment year investigated (*ypt = years post-treatment with glyphosate-based herbicide).

	n	Glyphosate		Aminomethylphosphonic Acid (AMPA)	
		Detected	% Detected	Detected	% Detected
Control Samples					
1 ypt*	71	0	0.00%	1	1.41%
3 ypt	39	5	12.82%	4	10.26%
6 ypt	61	1	1.64%	0	0.00%
12 ypt	37	1	2.70%	0	0.00%
All Years	216	7	3.24%	5	2.31%
Combined					
Treated Samples					
1 ypt	118	110	93.22%	60	50.85%
3 ypt	76	34	44.74%	7	9.21%
6 ypt	100	21	21.00%	1	1.00%
12 ypt	83	2	2.41%	1	1.20%
All Years	377	167	44.30%	69	18.30%
Combined					

3.1. Residue persistence over time and by biogeoclimatic zone

Glyphosate and AMPA were significantly reduced over time, in terms of both presence and concentration, in all plant tissues ($p < 0.001$) (Table 3). The proportion of samples containing glyphosate decreased exponentially from 93% to 2% over the twelve-year period. Over the same time period, the proportion of samples containing AMPA decreased to 1% at 12 years after treatment, approximating a logarithmic decline.

Glyphosate and AMPA both remained in plant tissues for a longer duration in the BWBS zone compared with the SBS zone. The rate of decrease, expressed as the proportion of detections, varied between the zones, with the proportion of samples with detected glyphosate much higher at years three and six in the BWBS zone compared with the same years in the SBS zone (Fig. 3). No AMPA was detected in any samples from the SBS zone at three or more years after treatment. The trend is nearly identical whether considering only the sample types that were collected from both BEC zones (fireweed roots and shoots, and willow shoots), or when all sampled species are plotted together, including those that were sampled from only one BEC zone (Fig. 3).

Generalized linear models validated the trend shown in Fig. 3, indicating that samples from the BWBS zone have a greater likelihood of containing detectable amounts of glyphosate ($p < 0.001$) and AMPA ($p < 0.001$), as well as higher concentrations of both residues ($p < 0.001$ for each), compared with samples from the SBS zone. The difference in residue concentrations, however, was not always statistically significant when looking at individual treatment years, species, or tissue types.

Kruskal-Wallis tests confirmed that there were significant differences in both glyphosate ($\chi^2(1) = 14.668, p < 0.001$) and AMPA ($\chi^2(1) = 11.219, p < 0.001$) concentrations between the two BEC zones, when all samples were considered together. The difference in residue concentration across BEC zones remained significant for all species combined when considering only samples taken at one and three years after treatment, as well as through year six for glyphosate; however, there is no significant difference in either residue type across BEC zones after twelve years, nor for AMPA concentration after six years.

3.2. Plant species and part-tissue type

Residues dropped below detection limits within the timeframe of this study for some, but not all, sample types. Glyphosate was not detected in any shoots, fruit, nor in raspberry roots, by year twelve. There was no detectable AMPA in any shoots, nor in raspberry roots by three years after treatment (Fig. 4). Both glyphosate and AMPA were detected in fireweed roots up to twelve years after treatment in two out of 20 samples (Fig. 4). Generalized linear modelling (of all samples together) showed that species, except for dogwood ($p = 0.499$), and tissue type were significant predictors of glyphosate presence ($p = 0.042; p = 0.012$), while only tissue type was a significant predictor of AMPA presence ($p < 0.001$). Fruit, however, was not found to be a significant predictor of glyphosate presence ($p = 0.541$) or concentration ($p = 0.185$). Similar to residue presence, species and tissue type were found, through GLMs, to be significant predictors for glyphosate concentration ($p < 0.001; p < 0.001$), but not for AMPA concentration. However, glyphosate and AMPA residue concentrations between species and tissue type were only significantly different in the first year after treatment.

Excluding fruit samples, at one year after treatment: only three samples did not contain glyphosate; eleven samples contained glyphosate at concentrations $< \text{MQL}$; ten samples contained glyphosate at concentrations $< \text{MDL}$; and the remaining 21 root and 44 shoot samples contained glyphosate ranging in concentration from 0.033 to 1.800 $\mu\text{g g}^{-1}$, plus a 6.500 $\mu\text{g g}^{-1}$ outlier.

Roots of both raspberry and fireweed consistently contained more glyphosate than shoots did, and raspberry fruits contained the least. This difference, however, was only statistically significant for fireweed in the first year after treatment ($\chi^2(1) = 4.136, p < 0.041$; roots ($n = 21$) and

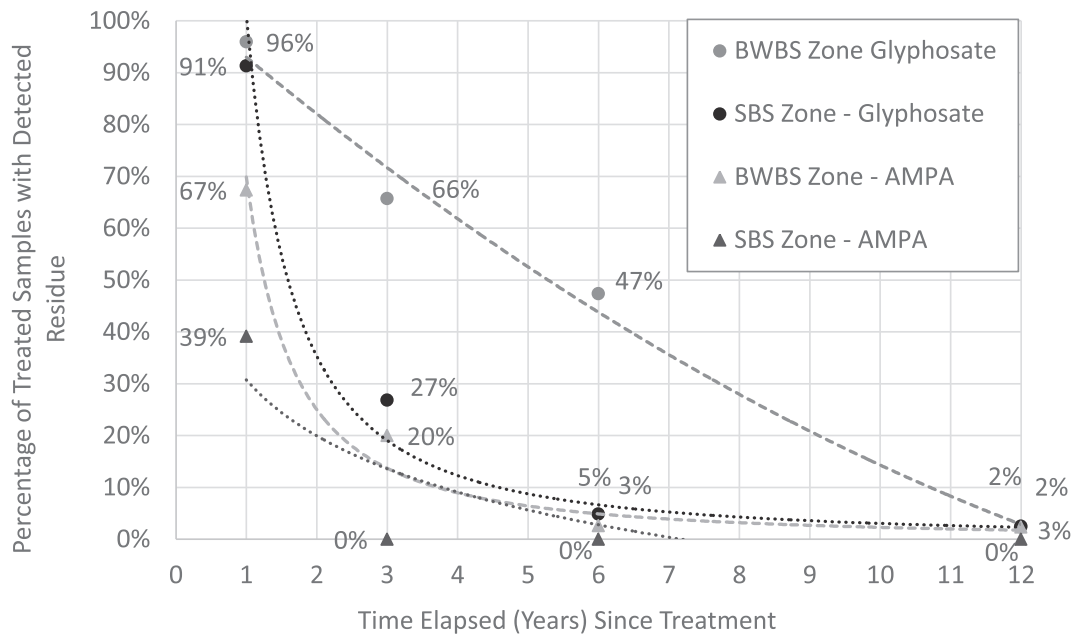


Fig. 3. Proportion of samples treated with glyphosate-based herbicides with detected glyphosate and aminomethylphosphonic acid (AMPA) residues, by time and biogeoclimatic (BEC) zone, out of those sampled from managed forests of northern British Columbia.

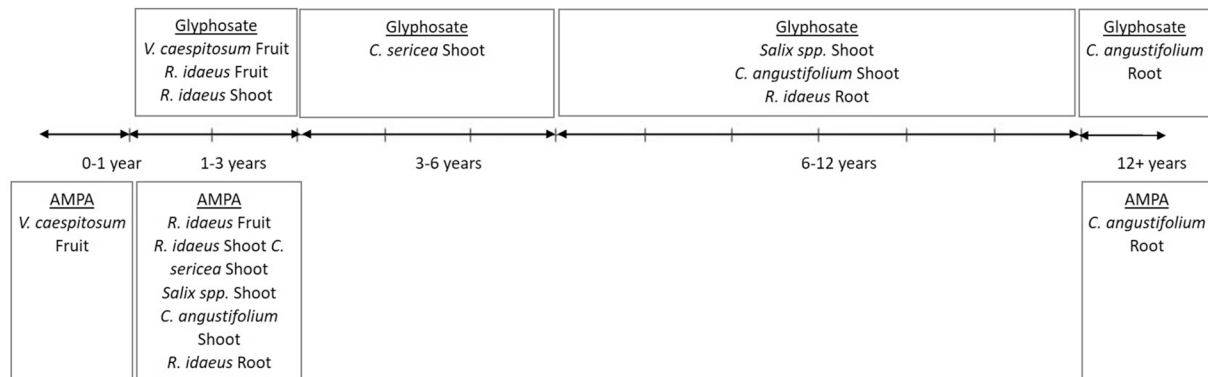


Fig. 4. Timeline of glyphosate residue persistence in native plant species and individual tissues of those species, after treatment with glyphosate based herbicides in forests of northern British Columbia, Canada. Species include: blueberry (*Vaccinium caespitosum*), raspberry (*Rubus idaeus*), fireweed (*Chamaenerion angustifolium*), red osier dogwood (*Cornus stolonifera*), and willow (*Salix spp.*). Each sample type is labeled at the approximate point in time at which residue concentrations dropped below detection limits. Some fireweed root samples still contained trace amounts of glyphosate and aminomethylphosphonic acid (AMPA) at 12 years post-treatment.

shoots (n = 19)). In the first year after treatment in particular, both fireweed and raspberry roots contained relatively high concentrations of glyphosate, with averages greater than 0.4 µg g⁻¹ (0.467 µg g⁻¹ and 0.437 µg g⁻¹ respectively). The difference in glyphosate concentration between years one and three was not significant for fireweed roots, and there was significantly more glyphosate in fireweed and willow samples after three years than at twelve years post-treatment (Fig. 6). Glyphosate concentrations > MQL ranged from 0.037 to 0.33 µg g⁻¹ after six years, and one fireweed root sample contained 0.17 µg g⁻¹ of glyphosate twelve years after treatment. Two fireweed root samples collected at one year after treatment contained the greatest concentrations of glyphosate in this study, at 1.800 µg g⁻¹, and 6.500 µg g⁻¹ (an exceptionally high value relative to other values in this study). The concentrations of both residues were determined to be statistically different between the roots of fireweed and raspberry ($\chi^2(1) = 6.481, p = 0.011$ and $\chi^2(1) = 8.154, p = 0.004$, respectively). Fireweed roots were the only sample type that contained any residue at twelve years post-treatment, and the only ones that contained AMPA at six years post-treatment (Fig. 6). Fireweed roots contained statistically more AMPA than the shoot portion of the plants

sampled, after one year ($\chi^2(1) = 15.111, p < 0.001$) and three years ($\chi^2(2) = 7.417, p = 0.007$), but not after six years ($\chi^2(2) = 1.286, p = 0.257$), or twelve years ($\chi^2(2) = 0.950, p = 0.330$), when concentrations were very low in both shoots and roots.

In the first year after treatment, 100% of dogwood, raspberry, and willow shoot samples and 89% of fireweed shoot samples contained glyphosate, and the highest concentrations of glyphosate residue in shoots were found in dogwood, followed by willow, and raspberry. Fireweed shoots had the lowest concentrations of glyphosate compared to the other species, and the only statistically significant difference in quantity at one year after treatment ($\chi^2(3) = 30.743, p < 0.001$) (Figs. 5 & 6). Raspberry shoots contained no glyphosate at year three and beyond, and dogwood shoots had no glyphosate by year six. It should be noted that the raspberry shoots in years one, three, and six are represented by a low sample number (n = 3–4) and more statistical verification in future studies may be warranted, although the decline in samples containing glyphosate follows a similar trendline as the other species. All four species were devoid of glyphosate in their shoots by twelve years post-treatment.

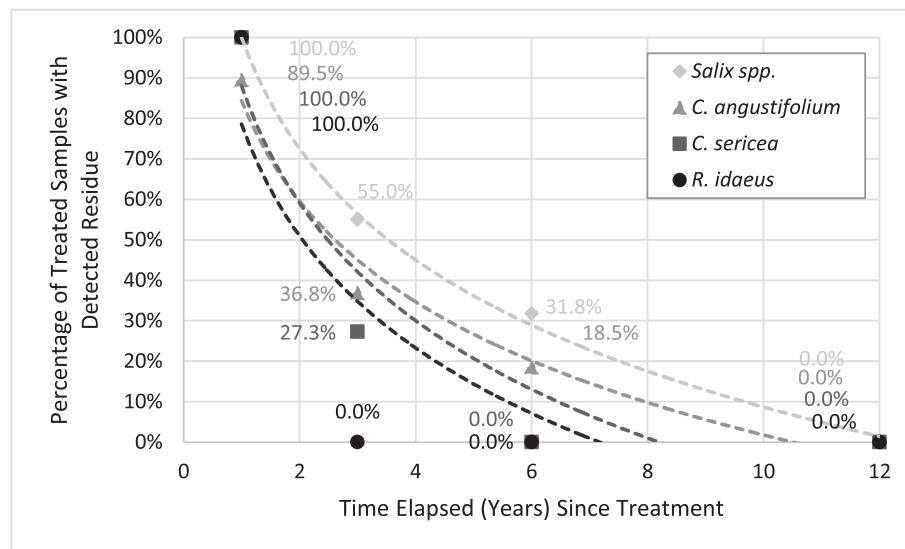


Fig. 5. Proportion of glyphosate-based herbicide-treated shoot samples with detected glyphosate residue, by species. Glyphosate was present in all samples except for some *C. angustifolium* samples at 1 year post-treatment.

Raspberry shoots contained the most AMPA, followed by willow, dogwood, and fireweed (Fig. 6). AMPA concentrations in fireweed shoots were significantly lower than in raspberry shoots ($p = 0.001$) and willow shoots ($p = 0.013$), and AMPA in dogwood shoots was significantly lower than raspberry ($p = 0.020$) one year post-treatment. There were no significant differences in the concentrations of either residue between the shoots of any species at three, six, or twelve years post-treatment (Fig. 6).

Generalized linear models predicted the significant decrease in residue concentrations for all species and tissue types over time ($\chi^2(3) = 213.708$, $p < 0.001$) (Fig. 6). In most cases, Kruskal-Wallis tests showed that the concentrations of both glyphosate and AMPA in samples collected one year after treatment were significantly greater than in samples collected three, six, or twelve years after treatment.

In fruit samples collected from the SBS BEC zone one year after treatment, a greater number of raspberries were detected with residue than blueberries: 90% of raspberries ($n = 19$) and 70% of blueberries ($n = 10$) contained glyphosate, and 68% of raspberries and none of the blueberries contained AMPA. Raspberry fruit samples had an average glyphosate residue concentration that was ten times greater than blueberry fruit samples ($0.074 \mu\text{g g}^{-1}$ compared to $0.007 \mu\text{g g}^{-1}$ for blueberries) ($\chi^2(1) = 9.064$, $p = 0.002$), and significantly greater AMPA as well ($\chi^2(1) = 10.970$, $p < 0.001$). Of the thirteen raspberry fruit samples, in which glyphosate residue was detected at levels $>$ MQL, the average glyphosate concentration was $0.105 \mu\text{g g}^{-1}$, ranging from 0.057 to $0.21 \mu\text{g g}^{-1}$, and five of these samples (26%) contained glyphosate at concentrations greater than the maximum residue limit (MRL) of $0.1 \mu\text{g g}^{-1}$, set by the Government of Canada for foods (Health Canada 2012, Kolakowski et al. 2020). Only in the first year after treatment were raspberry fruits ($n = 19$) found to have a significantly lower concentration of glyphosate than either roots ($n = 10$) or shoots ($n = 10$) had ($\chi^2(2) = 20.654$, $p < 0.001$). All glyphosate concentrations in blueberry fruit were $<$ MQL.

4. Discussion

It is widely claimed that glyphosate does not remain in the environment for any significant period of time (Newton et al. 1994; Duke 2010). Contrary to this belief, this study clearly demonstrated that surviving plants in forest cutblocks treated with GBH may contain glyphosate residue in their roots, shoots and fruits for the first full year or more after treatment, and many also contain AMPA, with some plants

retaining these residues for twelve years or more. Previous research on perennial forest plants has primarily considered only short-term (much less than one year) persistence of glyphosate (or AMPA) in plant tissues. Wood (2019) showed that glyphosate ranging in concentration from 0.077 to $1.050 \mu\text{g g}^{-1}$ could be detected in the tissues of non-targeted perennial forest plants at one year after operational treatment with GBH. Prior to this, Newton et al. (1994) reported $0.162 \mu\text{g g}^{-1}$ glyphosate residue remaining in herbaceous vegetation 346 days after treating the canopy with a high dose of glyphosate. Newton et al. (1994) concluded that, since 96% of initial residues had dissipated to “levels below any known herbicidal activity” within 30 days at most sites, and because it is commonly believed that glyphosate poses no risk of toxicity, the low concentrations remaining after a year were inconsequential.

Persistent residue concentrations detected in our study were larger than some previously reported, perhaps due to improved methods of detection. For example, in fruit, where detected after one year, we found an average of approximately $0.105 \mu\text{g g}^{-1}$, ranging from 0.057 to $0.21 \mu\text{g g}^{-1}$ using a method of low-detection HPLC-MS, where Roy et al. (1989) reported concentrations of $1.23 \pm 0.248 \mu\text{g g}^{-1}$ and $1.22 \pm 0.122 \mu\text{g g}^{-1}$ in fruits sampled at 33 days after treatment with GBH, and $0.19 \pm 0.035 \mu\text{g g}^{-1}$ after 61 days using a GC-MS method. Keeping in mind that the concentrations reported by Roy et al. (1989) were from fruit that was sprayed directly, it is interesting that we recorded similar concentrations after one year in fruit that could only have acquired glyphosate through translocation from other tissue types. This illustrates the importance of continually revisiting policies based on science using techniques such as chemical analysis, where significant advancements in laboratory processes have evolved over the last few decades.

The concentrations of glyphosate we found present, in non-targeted plant tissues one year after treatment (0.033 to $6.500 \mu\text{g g}^{-1}$), and even some concentrations recorded at three years after treatment, are similar to concentrations reported by these previous studies. The levels detected are also greater than the default MRL of $0.1 \mu\text{g g}^{-1}$ used by the Canadian Food Inspection Agency (CFIA) to assess foods destined for human consumption (Kolakowski et al. 2020). It may therefore be asked whether these concentrations are considered safe for wildlife to consume, especially considering that large areas of forested land are cleared and treated with GBH every year. Moose have been observed to preferentially browse in cutblocks 7–11 years after treatment with GBH, probably since the conditions at that time include a favourable combination of forage and conifers for bedding and cover (Eschholz et al.

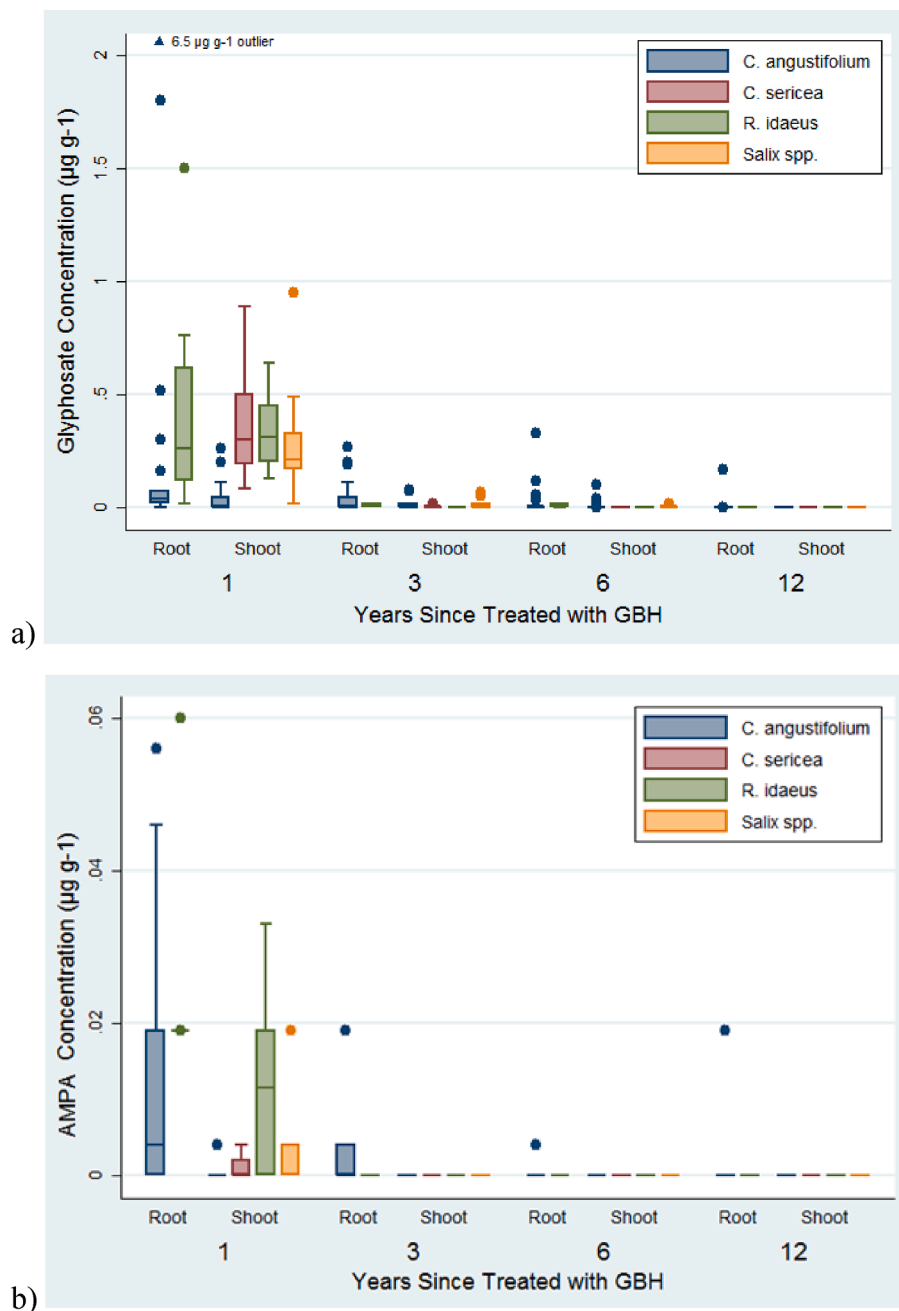


Fig. 6. Change in glyphosate and aminomethylphosphonic acid (AMPA) residue concentrations over time in plant tissues (roots and shoots) treated with glyphosate-based herbicides in forests of northern British Columbia, Canada. a) Glyphosate by species & part, b) AMPA by species & part. Note that y-axes are different scales.

1996). Whether persistent glyphosate in plant tissues in these areas might have an effect on the health of moose and other wildlife species is not known.

Trace amounts of glyphosate have been documented in soil, air, water, and food (Landrigan & Belpoggi 2018); exposure to sub-lethal concentrations of glyphosate is likely to be chronic for both humans and wildlife, especially in urban and agricultural areas, and a growing body of research has linked such exposure to various negative health effects (Kissane and Shephard 2017; Barnett and Gibson 2020). Little information is available on long-term health effects of chronic exposure to glyphosate (Richmond 2018), but it can be expected that wildlife exposed directly to glyphosate during or shortly after application, as well as to low concentrations of glyphosate residue in their foods, may be at greater risk of developing chronic health problems (Barnett and Gibson 2020). However, limited research has been conducted regarding

the effects of glyphosate on wildlife (Kissane and Shephard 2017), and due to divided factions regarding whether or not glyphosate is toxic (Zyoud et al. 2017), it is difficult to determine the extent of such effects at this time.

The persistence of glyphosate and AMPA within perennial forest plant tissues is a source previously unaccounted for, and the knowledge that these residues remain in plant tissues for much longer than previously suspected, even at very low concentrations, must be considered by forest professionals when making vegetation management decisions. Further, whether or not glyphosate and its metabolic products are considered harmful to flora or fauna at low concentrations, any compound deliberately added to the environment by humans should be accounted for appropriately. That some control samples unexpectedly contained residues further highlights the fact that even at very low application rates such as those experienced by understory plants

through spray drift, trace amounts of glyphosate and AMPA may be stored within plant tissues for twelve years or more.

As expected, AMPA was detected less frequently and in lower quantities than glyphosate. It also decreased over time more rapidly than did glyphosate, however, the fact that plant tissues contained any amount of AMPA may indicate metabolic breakdown of glyphosate within the plant tissues (Tong et al. 2017), a phenomenon that is not well understood. It is known that some plants have a gene for a microbial enzyme (GOX) that converts glyphosate to AMPA, which has been used in genetically engineered plants to make them resistant to glyphosate (Heap and Duke 2018). It is possible that another mechanism for glyphosate degradation within plants exists.

The clear differences in both presence and concentrations of glyphosate and AMPA in samples from the two different BEC zones are likely a result of differences in climate regime. Degradation of glyphosate in plant tissues may be affected by duration of plant dormancy, which is in turn associated with climatic conditions. The more northern BWBS zone has a colder climate than the SBS zone has, with slightly longer winters and 5–7 months with average temperatures below freezing, compared with only 4–5 months below freezing in the SBS. This difference in climate regime undoubtedly affects the rate of glyphosate and AMPA decomposition in the soil, since microbial activity is reduced under freezing conditions (Newton et al. 2008). Increased duration of persistence of glyphosate in soil in colder climates could play a role in the quantities of residues observed in plant tissues if reuptake by roots occurs (Tong et al. 2017). Glyphosate can reach the soil directly, during GBH application; through exudation by plant roots (Viti et al. 2019); as well as through leaves shed by contaminated plants (Mamy et al. 2016), whether due to seasonal defoliation or die-off as a result of herbicidal action (Newton et al. 1994). Prior research has suggested that glyphosate applied to soil is strongly bound and very slow to leach regardless of soil type (Al-Rajab and Hakami 2014). Therefore, any movement of glyphosate from soil to plant or plant to soil would more likely be attributed to differences in plant species physiology rather than the soil type.

It might be expected that individual species of plants will demonstrate unique tolerances to and storage capacities for glyphosate and AMPA (Flores et al. 2017), however, the differences in concentrations found in tissues were mostly insignificant, especially when compared with the effects of BEC zone (Fig. 3). The only differences found between glyphosate and AMPA concentrations across species, were at one year after treatment. At this point, residues were significantly lower in shoots of fireweed, an herbaceous perennial, compared with shoots of the other species, all woody perennials. This finding could be because the entire shoot of an herbaceous perennial plant dies off annually, while woody species retain their stems. The shoots of herbaceous plants analyzed in this study (fireweed) were never directly in contact with the GBH that was applied a year or more before sampling occurred, so any glyphosate present in the shoots of herbaceous plants must therefore have been translocated from roots. Woody plant shoots, in contrast, may contain glyphosate and AMPA residues that were stored in shoots since the original application, as well as residues that were translocated back into shoots from the roots. Wood (2019) suggested that the strategy of herbaceous perennials to store all resources in the root over winter may result in a greater storage capacity in roots for molecules such as glyphosate, which was reflected by the roots of herbaceous perennial plants containing the highest concentrations of glyphosate and AMPA. Our present results are consistent with this finding, but only if mean concentrations are considered rather than median: in this case, the herbaceous fireweed roots have slightly greater concentrations than the woody raspberry roots have, as a result of a few fireweed root samples containing far greater concentrations than the majority of other samples. However, the differences between raspberry and fireweed roots are not that simple, as raspberry roots actually had a greater median concentration. Further study would be of benefit.

Furthermore, we observe that across the four species tested for shoot

residues, the frequency of occurrence varies by species, but residues in all species follow a similar rate of degradation over the 12-year period (Fig. 5). However, the trend shown in Fig. 5 is nearly identical whether considering only the species that were sampled in both BEC zones (fireweed and willow), or when all sampled species are plotted together, including those that were sampled from only one BEC zone. This similarity indicates that BEC zone has more of an influence on the presence of glyphosate and AMPA residue in plant tissues over time than has species.

The other significant difference found between species at one year after treatment was between blueberry and raspberry fruits: raspberry fruits had greater incidence and concentration of glyphosate and AMPA than did blueberry fruits. Plant height could be a contributing factor to this difference; *V. caespitosum* is a very low shrub, up to 0.3 m high, while *R. ideaus* grows up to 1.5 m tall (MacKinnon et al. 1999), although the canes in this study were generally under 1 m in height. It is conceivable that the taller raspberry plants received a higher dose of GBH than did the potentially more sheltered blueberry plants. Leaf size may be another factor: raspberry leaves are much larger than blueberry leaves, possibly resulting in more interception of spray (Timms & Wood 2020). It is also plausible that the two species have different storage capacities for glyphosate.

Fruits clearly contained the lowest residue concentrations in this study, and roots contained the highest concentrations overall. Once absorbed by plant foliage, glyphosate moves from source to sink, accumulating primarily in the roots. In addition, since perennial plants shed their leaves annually, and the stems of herbaceous perennials also die off in the winter, some of the residue stored in the leaves (and stems of herbaceous plants) is lost to leaf litter. Although fruit contained the least residue of all tissue types on average, 26% of fruit samples contained concentrations greater than the 0.1 $\mu\text{g g}^{-1}$ MLR used by the Canadian Food Inspection Agency to assess glyphosate residue content in foods. These 26% of fruit samples would be deemed unfit for human consumption if assessed in the marketplace. Residual glyphosate in fruits in the year following treatment with GBH could have chronic implications for wildlife such as birds, bears, and other mammals consuming large quantities of berries in forest cutblocks.

5. Conclusions

Glyphosate, when applied at sub-lethal doses, such as that experienced by plants in the understory and in adjacent areas during standard applications of GBH in forest cutblocks, persists in plant tissues for a minimum of one year after treatment, and in some cases still remains in trace amounts after twelve or more years. The quantities of glyphosate contained in plant tissues after 3–12 years are extremely low, and should not be considered an immediate hazard, however, the cumulative effects of long-term residual glyphosate should be considered when assessing exposure of humans and wildlife to chronic, low-concentrations of glyphosate and other chemicals in the environment.

Climatic conditions can impact the duration of glyphosate persistence in plant tissues, as indicated by the clear differences in both glyphosate and AMPA concentrations in plant tissues from two different BEC zones. This should be considered by forest managers, especially in the more northern boreal forests of Canada, where glyphosate may persist in both soils and plant tissues for longer than previously expected.

Roots retain more glyphosate than do shoots, and they retain it for a longer duration. Although many shoot samples contained glyphosate at one year post treatment, no shoot samples contained glyphosate at three or more years after treatment. Herbaceous and woody perennial plants may have differing abilities to store glyphosate and AMPA, though more research is required before a definitive statement can be made on this subject. AMPA detected within plant tissues may indicate metabolism of glyphosate within plant tissues.

Although residue concentrations in fruits were lower than those in

root and shoot tissues, both raspberry and blueberry fruits contained low quantities of glyphosate in fresh growth at one year after treatment, some of which were above the MRL for human consumption. Further research on glyphosate and AMPA content in edible portions of plants at 1–5 years after treatment with GBH would be beneficial.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Update

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Volume 521, Issue , 1 October 2022, Page

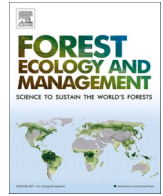
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Corrigendum

Corrigendum to “Glyphosate remains in forest plant tissues for a decade or more” [For. Ecol. Manage. 493 (2020) 119259]



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The authors regret, that on page 9, the third paragraph of “Section 5. Conclusion”, it incorrectly states: “Although many shoot samples contained *glyphosate* at one year post treatment, no shoot samples contained *glyphosate* at three or more years after treatment.” This statement should

read that “Although many shoot samples contained *AMPA* at one year post treatment, no shoot samples contained *AMPA* at three or more years after treatment.

The authors would like to apologise for any inconvenience caused.

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albert costa

Something should be done about bear pguuulation. To help we should have a 2 bear limit and leave the season open from when it starts in Sept. until December 31st. Also since we have bow hunters out in the woods starting early Oct. now, let them add the bonus of a bear. We also know we should leave the season as I stated until the end of the year, as bear will stay out later if they fine plenty of food and if we get warm days and very little snow. Thanks, Al

alicia lenci

Citizen Scientist

We cannot meet Biodiversity Conservation Goals for Massachusetts if we still use harmful pesticides.
Thank you for all you do to get harmful pesticides off of shelves and out of nature.

Amy Perlmutter

I am writing as a citizen (one working in the environmental field) who is very concerned about the loss of biodiversity in the state and around the planet. So often, the focus on preserving biodiversity is on charismatic animals, and those are important and I assume the Commonwealth will consider them. But my particular interest in submitting my thoughts is the estimated 80% reduction in insects around the planet (though that is happening at the same time that ticks and mosquito born diseases are increasing). Insects are essential for supporting biodiversity all the way up the food chain.

I see signs for tick and mosquito spraying everywhere. It's impossible to just kill those two species when spraying, these sprays broadly kill insects while poisoning the environment with PFAS, neurotoxins, and more.

I would like to see:

- regulation of how these companies advertise so it is clearer to customers the harm they do to other important insects as well as impacts on humans, aquatic environment, wells, etc, as well as looking into the active and inactive ingredients they use to understand their harm;

- identification of ways the commonwealth can reduce EEE without broadly spraying the environment; efforts to identify, test, and promote safer alternatives to pesticides (bat boxes, red cedar oil, using bug spray on bodies instead of the environment) and helping to promote them through the state's purchasing contracts;

- promotion and education of gardening and farming methods that attract instead of kill insects;

- regulations and education to citizens about how bright outdoor lighting is bad not only for insects, but other nocturnal animals (and ourselves-- the organization dark skies international has very helpful resources and information);

- saving of species that eat mosquitoes, such as bats, in order to reduce the need for pesticides;

- safe biological methods to reduce insect-born diseases (one example: <https://usbiologic.com/>);

- working with the various startup accelerators in the state to identify and attract startups that might help measure and increase biodiversity; and

- using state contracts to research and test various ideas to protect biodiversity.

I am very glad to see this EO and the efforts to get input from the public.

Andrea Bogomolni

Independent Community Scientist

I would like to encourage that thought, discussion and resources are placed into recovering, rebounding and "sustained" populations in the biodiversity conservation Goals for MA. Too few resources and thoughts are placed into what to do when recovery is met that allow for continuous healthy ecosystems. "Not endangered, does not mean not in danger."

I urge that this plan take a steadfast future forward approach, rather than the emergency response for endangered or threatened species approach of the past, that does not continue to address what to do when success is on the horizon -or is met. (ESPECIALLY WHEN CLIMATE CHANGE can impact these successes in a heartbeat). This is especially true for protected species (marine mammals/sea turtles/apex predators land and sea) that are recovered.

This includes specifically setting aside resources for human-wildlife conflict (especially marine) strategies and regional plans in recovery plans; support as many long term biodiversity monitoring efforts as possible for foundational baseline data; resources for multigenerational education and outreach efforts, specifically to educate on what healthy populations and oceans look like to generations that have never seen this recovery; support social science and human dimension efforts focused on recovery in conservation; continue to support needs for recovered species and habitats; Put ecological value first,- rather than capitalistic/economic value with an emphasis on indigenous value and knowledge - as well acknowledge where this knowledge has been taken away; Support community science (not citizen science) to better address issues and concerns in EJ communities, with harvesters and with fishermen and others who's voices might not be heard but extremely important in the biodiversity conservation where anecdotal information could be key to identify areas in need of resources for conservation.

Resources to support healthy populations and biodiversity conservation should also tie strategically into a One Health framework with MA Dept. public health where conversations intersect with the natural landscape.

Resources provided should also allow for coordination between municipal, state, tribal and national entities with ease.

Aranya Karighattam

Co-founder of Appreciate Biodiversity

I am Aranya Karighattam, a co-founder of Appreciate Biodiversity, and I am 17 years old. I enjoy taking walks in nature and love observing and photographing wildlife.

I have learned from my observations that birds, arthropods, and other animals, plants, and fungi are crucial components that have interconnected relationships with their environment to keep the ecosystem functioning. If any component is removed, the whole ecosystem will collapse.

I am very disappointed that, throughout Massachusetts, forests are being destroyed for the construction of buildings, apartments, schools, and solar farms. Trees and understory are being destroyed, rocks and soils are being blasted, eliminating all life that exists there.

I tried to help save a beautiful forest in Wakefield along with many other citizens. The forest had a great diversity of wildlife and plants, vernal pools and rock outcrops, and I enjoyed walking in the forest. There were Eastern Whip-poor-wills, Scarlet Tanagers, American Toads, and Spring Peepers. Despite our repeated urgings to the state agencies to protect the forest, our voices were ignored. Now the forest is decimated, and I will never see it again.

This is happening with many other forests in Massachusetts. Each time, the state agencies refuse to listen to us.

I am very concerned that when I grow up, we will be facing a climate and biodiversity crisis far worse than it is right now.

I want to be able to walk in nature and listen to the songs of crickets, the trills of toads, and the calls of the Wood thrush. I want to be able to see rock outcrops and the tiger beetles who reside there.

The Blackpoll Warblers travel over 3000mi to reach their nesting grounds. They need to stop over in forests along the way to rest and forage. If forests are destroyed, they will have no place to go.

I want to be able to see them on a branch next to me and I want to hear their songs fill the forest.

Each one of us needs to protect every single habitat, every single forest, no matter how big or small, to help Biodiversity thrive.

Please listen to our voices this time and protect biodiversity. Please protect forests and other intact ecosystems for my generation, and future generations.

Thank you.

Barthold Bouricius

Retired

It is highly inappropriate that an agency focused on expanding habitat particularly for species that are hunted or fished has been tasked with promoting in various ways the opposite of what its goals are. This agency releases thousands of non native birds and fish into state waters and forests to compete with native species. Two examples are Eurasian Ring-necked Pheasants and European Brown Trout.

This agency has never supported genuine biodiversity except in service to hunting and fishing. They have captured the Natural Heritage Program which now focuses on rare and endangered species, but not overall biodiversity protection, and never criticizes the priorities of the Fish and Game Department for its terrible record on producing a huge deer population which has caused the decline of many plants that are now over browsed, and probably the local extinction of some species.

It would have been a reasonable approach if independent conservation biologists and ecologists who do not have a vested interest in the hunting and fishing agenda had instead been tasked with this job. For the reasons I have given, it would take a volume to discuss everything that is wrong with this proposal, but I simply don't have the time.

Bennie Rickard

Please do everything you can to keep Mass as beautiful and full of life as possible. For too long we have taken biodiversity for granted or just not cared at all about it, despite it sustaining our own lives. This is not really an option- we must act now and with as much energy as possible. Thank you

Brittany Gravely

It is past time to permanently and actually protect state forestland and reserves. I am seconding the concerns and calls for action by my environmental colleagues. The Climate Forestry Committee has already concluded that “disturbing the forests of Massachusetts as little as possible and allowing forests to grow and age through passive management is generally the best approach for maximizing carbon, ecological integrity, and soil health.”

Additionally, we need to expand forest reserves on all Commonwealth-owned lands, including the designation of all Division of Watershed Supply Protection lands as reserves. Reserves are defined by the Department of Conservation and Recreation in their March 2012 report, Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines, as “areas where the dominant ecosystem service objectives will be biodiversity maintenance, nutrient cycling and soil formation, and long-term carbon sequestration.... Forest management will generally consist of letting natural processes take their course....”

Protect all mature forests and allow them to grow back and recover old-growth forest characteristics through proforestation. There is no credible scientific evidence that any species requires the clearing of standing forests to survive or thrive in its natural range, but ample evidence that it reduces long-term carbon sequestration and storage.

Provide, at a minimum, a comparable level of public input, involvement, and transparency for management on Department of Fish and Game and Division of Watershed Supply Protection properties as currently exists for Department of Conservation and Recreation (DCR) properties.

Comprehensive research experiments related to early-successional habitats may be conducted, but only in limited areas on lands that have existing open habitats.

Clearing forests by DFW for early successional habitat is not appropriate for protecting biodiversity and is detrimental for meeting climate carbon net zero goals.

End prescribed burning on state-owned lands. There is no credible scientific evidence that fire is naturally a major disturbance factor in New England.

End the stocking of non-native fish in Massachusetts waters. These fish cause significant negative ecological impacts, including competition with native species.

Discontinue the stocking of non-native game species, such as ring-necked pheasants, on state-owned or managed land. These birds are raised on farms in pens and do not have the normal wild animal's fear of humans. If they are not immediately shot, they are killed by predators or hit by cars, or they die of starvation.

Discontinue logging, prescribed burning, and other active forest management on publicly owned watershed lands, which are unnecessary except in limited circumstance for public safety or manual invasive species removal.

Promote a reduction in the consumption of wood and other forest resources to reduce pressure on climate and natural ecosystems.

Strengthen regulations and enforcement of the Wetlands Protection Act including a reduction in the number of exemptions for forest cutting.

Strengthen enforcement of road side Wetlands Protections by training and supporting municipal capacity and encouraging public engagement.

Provide training and funding for invasive species removal with a focus on municipal lands and roadways.

Acknowledge the findings and recommendations of the Climate Forestry Committee report and incorporate them in the DFG recommendations, to the extent that they relate to E.O. 618.

Thank you for listening to me and my fellow concerns citizens of this beautiful state.

Brooke Warrington

Independent Consultant

My name is Brooke Warrington, and I live in Hudson, MA. My Master's thesis at Virginia Tech was regarding riparian buffer protection and wildlife, and I published a paper on this in 2017. I firmly believe the state of MA should increase protections for perennial, intermittent, and ephemeral streams statewide and increase riparian buffer requirements to protect biodiversity.

Vegetative buffers provide a wealth of benefits to both water quality and ecosystem health. These benefits include: (1) reducing sedimentation; (2) preventing increase light; (3) preventing altered hydrological regime; (4) protecting natural chemical regime; (5) providing wildlife corridors; and (6) encouraging natural input of coarse woody debris and leaf litter. All these protections create cleaner water and a healthier ecosystem, both on land and in the water.

A 1985 study found that a buffer strip of 30 feet removed approximately 80% of suspended sediment in Pennsylvania. Sedimentation can have severe detrimental effects to water quality and wildlife. Sediment particles that float in our water can lodge into fish gills, potentially causing death, and the settling of this sediment eliminates crucial spawning habitat. North American freshwater fish evolved in a forested landscape, and from 1898 to 2006, 57 North American freshwater fish became extinct, along with the extirpation of three distinct populations from the North America.

Reduction of tree canopy cover over a stream can have a drastic effect on stream temperatures. A recent study found that upon removal of vegetative buffers, the maximum stream temperature increased by 12.6°F (7°C) (Johnson and Jones, 2000). Increased temperature and light from reduced tree canopy can also lead to algae blooms, which hurts both people and wildlife.

Clearing riparian buffers can also increase stream flow, which can negatively impact stream microhabitat and ecology, and increase flooding risks. Vegetative buffers protect water quality, and provide crucial wildlife habitat and travel corridors. In all cases, eliminating vegetative buffers has negative impacts on reptiles; amphibians; fish; mussels; crayfish; snails; macroinvertebrates; and insects (dragonflies, caddisflies, stoneflies, etc.). Reducing healthy populations of wildlife, such as dragonflies and amphibians, creates an imbalance and can increase mosquito populations. Retaining vegetative buffers along streams and wetlands has a positive impact on our wildlife and helps to preserve the balance of our local ecology.

Amphibians are extremely reliant on these riparian buffers. "Damage to vertebrate populations in streams due to increased temperature may also occur. The headwater streams at Hubbard Brook, where the temperature measurements were made, do not support fish populations but do support large populations of larval two-lined salamanders, *Eurycea b. bislineata*. These larval populations were eliminated in an adjacent clear-cut watershed (W-2), probably due to increased temperatures and loss of organic debris" (Burton and Likens, 1973). It's so important that we protect our salamander populations by providing riparian buffers to their habitat. (This is not the only study that supports this idea.)

I also believe that increasing biodiversity can happen with local residents and landowners. Microhabitats created by MA citizens, no matter what the size, can help create a mosaic of landscapes that are so crucial for biodiversity. Backyard habitats, public space rewilding, and sustainable forest management are all fantastic ways to increase biodiversity in our region.

I've done extensive research on this subject, of which I likely can't get into too much detail here. I'd be more than happy to chat with the state about my thesis and research regarding riparian buffers and their benefits to a variety of aquatic and riparian wildlife. Please feel free to reach out to me if that might be of interest, and I'd be more than happy to chat. Thank you.

Bruce McCarter

Clinical psychologist

I am writing to applaud your efforts to maintain biodiversity in Massachusetts. As a life long resident and as someone who has deeply appreciated our wild flora and fauna I certainly value those efforts. However, I can't voice strongly enough my opposition to the use of Glyphosate/Roundup. When Roundup first came out they advertised that it started to break down 45 minutes post application. I believed that assertion and used it to control invasive plants such as barberry, bittersweet, and asian multi-flora rose on our property in the southern Berkshires. Now we know from recent studies that it can persist in the landscape for a decade or more. It kills not only the plant that it was applied to but also the microbes in the soil. As you are probably aware glyphosate has been designated a probable carcinogen by the WHO and Monsanto has had to pay out millions due to court cases where it's detrimental effects were proven. We now know that it is also an endocrine disruptor and that negatively impacts gut microbiome in humans. The jury isn't out. The jury is in. As much as I am concerned about invasive species, I am far more concerned with both the short and long term effects of Glyphosate. It poses a serious threat to not only humans but to most vascular plants and certainly to all mammals. There is no longer any justification for its application and it should be banned from any and all uses in Massachusetts. Thank you for your consideration on this extremely important matter.

Cara Lawrence

Thank you for beginning this endeavor and giving me a chance to comment. I am deeply concerned about the proliferation of invasive plants in MA, which seems to have increased substantially in recent years. For example, Japanese Knotweed lines our roadways, highways, and waterways, especially in places where road work or construction equipment have disturbed the soil and distributed fragments along roadsides; vines such as oriental bittersweet, porcelain berry, and English ivy strangle and smother trees and native vegetation; berry-producing shrubs such as burning bush, privet, and honeysuckle have supplanted the native plants that birds and wildlife rely on for food, and these animals spread these invasives further.

We need stronger environmental regulations to limit the spread of invasive plants, and state-wide measures to raise awareness of the importance of native plants to wildlife, and to encourage property owners and communities to address invasive plants and protect native

Carol Mcpheerson

Stop clear cutting forests for commercial solar arrays, Encourage local control and stop interference by the State. Encourage placing commercial solar arrays on commercial, industrial and public buildings rather than in open space.

Dale Bryan

retired

Stop mining sand! Further extraction will compromise the vitality of the ecologically rare Pine Barrens. Once undermined in one locality, the entire ecosystem will be stressed. The cascading effects will hurt the health and wellbeing of biodiversity, including human wellness and community health.

Dan McKanan

Emerson Senior Lecturer, Harvard Divinity School

I am very excited about the biodiversity vision outlined in the presentation. I especially appreciate the clear understanding that humans are an integral part of every ecosystem, and also the commitment to fostering greater biodiversity in ordinary places, as well as areas that are currently very biodiverse. My one suggestion is that I hope the plan will have very specific targets about how we are going to increase the economic productivity of our ecosystems AT THE SAME TIME we make them more biodiverse. I say this not because I think economic growth is a good thing; I actually think we should be moving more toward a steady state economy. But here in Massachusetts we have a special temptation to protect our own ecosystems simply by bringing in more agricultural and other products in from outside the state. That's foolish, because the whole world is interconnected. So I think it is necessary to have a plan that does not just say, "we're going to support sustainable agriculture and forestry," but also "we are going to increase the share of food and wood products used in Massachusetts that are produced in-state, and we are going to do that while increasing the biodiversity of the places where that food and wood is produced."

Dee Boyle-Clapp

Director, Arts Extension Service, UMass Amherst

Thank you for your efforts to protect our biodiversity. As a landowner who has put their land in conservation to protect it in perpetuity, I know first hand how vital information is as well as help and support from land trusts, forestry programs, and tax incentives. In this moment of climate change and need to create clean energy, I ask that the state consider the following:

Critical to any biodiversity plan is preventing forests from being cut down for solar. I fully, completely, support solar, but I ask that towns retain the right to control their communities and prevent large corporations from overwhelming them through litigation and other measures. Biodiversity must require that wild spaces remain wild.

I ask that these plans protect tracts of contiguous land are prioritized and protected from development across the state, especially in Western MA where the majority of wild spaces exist by offering landowners and communities the resources they need to keep these tracts from development.

I ask that Indigenous people be given access to forests and other lands for ceremony, wildcrafting, teaching youth and those interested in learning more, that their collective knowledge be honored and needs be prioritized.

I ask that foresters, those who are currently employed to cut down trees, and youth are (re)trained and SUPPORTED by the state to plant trees, enhance forests by removing invasive species, and do the work to protect and treat existing trees from Ash borer, Woolly adelgid, and other pests on state and where appropriate, private and conservation land.

Thank you.

Denise Stowell

Protect our Horseshoe crabs in Mass. We need to stop allowing the taking of this million years old species before they are gone from our shores. Immediate action is needed. Harvesting for bait in Mass. in all areas and should be stopped and allowing the medical industry to continue the larger numbers of bleeding is unsustainable and needs strong immediate regulation.

We also are in dire need of help in Plymouth County!!! Our forests are being leveled daily by the greed of developers selling and trucking out the sand to other parts of the world. This is a natural resource that is protecting our water quality from contamination, our air quality, wind protection from our ever aggressive storms and helping with global warming, not to mention the species that can no longer live here. Who do we hold responsible if we are unable to drink our water because of short oversight and greed. This is a huge threat that is pushed aside. Our town is allowing this with no State oversight. Please help us. Our State Forest is at risk and we are all crying out for help. Drive down the highway and you will see Massive yes Massive piles of sand heading out to other areas hourly. Please come and see what is happening here. Hilltops flattened, species obliterated in massive killings, adding to the the stronger wind speeds that are threatening our houses and all areas of our town. Sand is being shipped out to fill in along the coast after the ocean has pulled the sand out to sea. When will this stop? Has history not taught us any lessons? Sending our natural resources that are not replaceable out of our county is just heartbreaking and threatening our lives and we need help. Please help us!

Diane card

Retired

Plymouth and surrounding towns are endangering our aqueducts and waters ounces by careless mining of sand.

Don Ogden

The science is well established with regard to the Climate Crisis and its threat to a livable planet for future generations of all beings. We, as citizens of the nation, and the Earth are obligated to do all we can to protect our children, grandchildren, grandchildren and non-human species. A critical part of that work not only concerns ending our dependence on fossil fuels and other burn technologies, it also means we are obliged to remove as much CO₂ and methane from the atmosphere as possible. The technology to do that has not been developed and we have little time to wait for it to be established and perfected. The science tells us we are in a race against time.

Thankfully, a natural carbon capture and storage system already exists and operates 24 hours a day, 365 days a year for free. It is our forests, both public and private, and the soils that sustain them. Those very same public forests are being logged under the direction of our own state agencies! These agencies are destroying one of the few natural carbon capture options we have available regardless of what you may hear from vested interests. The present biological crisis demands an end to logging on our Public Lands.

Elisa Campbell

none

I am distressed by the declining diversity of living organisms in the world overall and Massachusetts specifically. We must reduce our greenhouse gas emissions, and our human use of natural resources; we must not destroy the other species on this planet either by refusing to reduce our impacts, or by choosing "solutions" that destroy habitats that are essential to biodiversity. The decisions should be based on the best science, not the resistance of people to change in their immediate neighborhood.

Elizabeth Coughlin

Principal & Practitioner Elizabeth Coughlin Associates

thank you for the presentation

hope that the very practical comments regarding both policies and procedures can be addressed,
including the coordination and cooperation of silo-ed departments

EC

Elizabeth Heck

Retired

Many of us in Western Ma have unbuildable Forest acreage. Currently law rewards "harvesting" wood lots by reduced taxes. I promote the idea of rewarding conservation of these forests. Thank you

Emma Stamas

Individual

I have lived in rural areas and i have found that the less we mo, the more pollinating wildflowers.clovers, and perennials flourish and make seeds for birds to spread so that next year more diverse plants grow up and thrive. Waiting until late fall to mow a fireld saves money and time and creates a beautiful meadow ecosystrm.

Eric Silveira

Good afternoon,

Firstly, I commend all parties involved for these excellent conservation goals, they are both responsible and necessary.

For my comment, I want to address the Green Planning and Design aspect of the publicly available information. Specifically, I urge the use of biomimicry principles in constructing new infrastructure, public housing, and municipal buildings alongside other established sustainable building practices.

Thank you for your time,

Eric S.

Felix

Reduction of light pollution and noise pollution as well as more timely responses from cities regarding invasive plant species near hiking trails

Fran Raleigh

I volunteer as a field guide with the Cape Cod Museum of Natural History, and probably heard about this through their email list, but I am not responding to the survey as a representative of that organization.

Fran Raleigh

I listened in on one of the listening sessions, though I did not contribute. I'm not sure what I want to ask you to take into account in your work. Everything. I was impressed with the breadth of advocacy, and the many people who urged cooperation among interested groups. I volunteer at the Cape Cod Museum of Natural History, and value the educational and stewardship roles of the museum. I am also a member of the Master Gardener Association of Cape Cod, giving talks in which I encourage people to incorporate native plants into their landscapes - in support of pollinators, birds, wildlife in general. And to reduce lawn, avoid pesticides and most fertilizers, excessive watering. My wife and I are having solar installed on our house in the next week or two.

This is such a special place! I learned to ID plants in college in Ohio, and went botanizing during grad school in Syracuse, and while teaching in NJ. Here, I have met plants I have never met before, in the salt marshes and around a nearby kettle ponds; and, here grows the mayflower that my mother remembered fondly from the sand hills of North Carolina, but I had not known elsewhere. I grieve for the whales that are lost in our waters, and admire the folk who work to disentangle them, or to walk the beach in search of cold-stunned turtles. I am grateful for the work of the APCC in advocating, working on ecosystem restoration, and fighting HOLTEC's efforts to pollute our environment, and Joint Base Cape Cod's efforts to skirt EPA environmental impact assessment of the potential impact of their proposed gun range. I am grateful for the town land trusts and other conservation organizations that are so plentiful here. I support the Native Plant Trust in my small way, and believe they are doing essential, invaluable work. And the Trustees of Reservations. And Mass Audubon. And I value the care with which the Eastham transfer station has us sort out recyclables. They ask more of us than Dennis did when we lived there, having us separate plastic from cans, and deposit cans and bottles from the non-deposit ones.

There are so many threats and they are so interconnected - It will take us all to preserve life as we know it. I apologize for my stream-of-consciousness comments. I'm sure I've forgotten important issues.

Fred Beddall

farmer

Appreciate your overall goal and the inclusion of biodiversity promotion on farms. This is an effort I have been undertaking for many years, unfunded except for a small NRCS contract (Conservation Stewardship Program, CSP). Additional funding from the State, perhaps on a matching basis, would be an excellent way to leverage the CSP groundwork. Habitat and pollinator enhancement on private farmland is practical, fast, and scalable. Farmers have the tools, the expertise, and the boots-on-the-ground presence to establish, and more importantly, maintain habitat areas. Let's move this effort beyond white papers and into greenbacks!!!!

Frederick Spence

According to the UN, Forests harbor most of Earth's terrestrial biodiversity. The conservation of the world's biodiversity is thus utterly dependent on the way in which we interact with and use the world's forests. Forests provide habitats for 80 percent of amphibian species, 75 percent of bird species and 68 percent of mammal species.

The net loss of forest area worldwide has decreased substantially since 1990, but deforestation and forest degradation continue to take place at alarming rates resulting in significant loss of biodiversity. Large-scale forest restoration is needed and to prevent, halt and reverse the loss of biodiversity.

To create the restoration and preservation needed to preserve biodiversity in Massachusetts, we ask that the commonwealth:

1. Expand forest reserves on all Commonwealth-owned lands, including the designation of all Division of Watershed Supply Protection lands as reserves. Reserves are defined by the Department of Conservation and Recreation in their March 2012 report, Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines, as "areas where the dominant ecosystem service objectives will be biodiversity maintenance, nutrient cycling and soil formation, and long-term carbon sequestration.... Forest management will generally consist of letting natural processes take their course..."[1]

2. Protect all mature forests and allow them to grow back and recover old-growth forest characteristics through proforestation.[2] There is no credible scientific evidence that any species requires the clearing of standing forests to survive or thrive in its natural range, but ample evidence that it reduces long-term carbon sequestration and storage.[3] [4]

3. End pine barrens restorations, which are not supported by credible scientific evidence:

"As you may recall, the Committee on Forests and Climate (CFC) raised strong concerns in its report and in discussions with agency heads over the practice of creating early successional habitat through artificial means that reduce forest area and prevent natural forest regrowth. The arguments behind this opposition are based on extensive peer-reviewed literature that shows that (1) early successional habitat of grasslands, shrublands, and young forests is an artifact of Colonial deforestation and environmental degradation; (2) the practices employed by DFW are completely inconsistent with the historical (colonial) practices that created extensive open lands and thus are creating a novel form of artificial habitat; and (3) the creation and maintenance of these habitats decreases the extent of natural forest cover thus harming native biodiversity and reducing the carbon storage and climate mitigation potential of the state." [4]

4. End prescribed burning on state-owned lands. There is no credible scientific evidence that fire is naturally a major disturbance factor in New England.[4]

[1] Department of Conservation and Recreation (2012). Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines. <https://www.mass.gov/doc/landscape-designations/download>

[2] Moomaw et al, (2019). Intact Forests in the United States: Proforestation Mitigates Climate Change and Serves the Greatest Good. <https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full>

[3] Kellett et al. (2023). Forest-clearing to create early-successional habitats: Questionable benefits, significant costs. <https://www.frontiersin.org/journals/forests-and-global-change/articles/10.3389/ffgc.2022.1073677/full>

[4] Foster et al. (2024). Clearing forests by DFW for early successional habitat is not appropriate for protecting biodiversity and is detrimental for meeting climate carbon net zero goals. <https://static1.squarespace.com/static/5a230104914e6b1c9b2dfddb/t/668563d52b13fa75e49594a7/1720017879035/Cooper+Hoffer+O%27Shea+memo+on+Early+Successional+Habitat.pdf>

George Davis

I attended Biodiversity EO No. 618 Public Listening Session #2 on 7/24. It was designed and conducted very well and I applaud the department for organizing these sessions. There were many very worthwhile comments provided by participants.

Governor Healey's executive order 618 is a very welcome proclamation. While I suppose the order needed to be directed to one department, it is not clear to me that the Department of Fish and Game has sufficient authority to accomplish the full intent of the order.

The executive order included the requirement for the Commissioner to update the Governor and Lieutenant Governor on his review and recommendations within 180 days of the order. Where can I see the Commissioner's report?

I do note that section 2 of the order directs all executive department offices and agencies to support the Commissioner of the Department of Fish and Game in this comprehensive review of biodiversity conservation goals. It appears to me that the goals of the Secretary of Housing and Livable Communities (who serves in the Governor's cabinet, unlike the Commissioner of Fish and Game) may not be sufficiently aligned with the intent of executive order 618. How has the Executive Office of Housing and Livable Communities responded to the executive order?

Heather Morton

Senior Editor--MindEdge

I think you should facilitate individuals and local organizations to maintain neglected public lands, such as road medians and sides, railroad edges, and municipal buildings--areas that are not used by people and that no one does more than mow. The road edges are full of invasive species and don't require any aesthetics so they're perfect for ecological landscaping to support native plant and insect species. I've been just weed wacking the mugwort near the railroad and the common milkweed has gained a competitive advantage. It requires very little intervention to allow native species to flourish. Can the state facilitate volunteer organizations "owning" certain areas? Anything you can do to better facilitate interested parties in clearing invasive species and planting native ones would be helpful. These are small tracts of land, but again, the point is that there are no competing uses. The pollinators and native insects can have them!

Heidi Dollard

Massachusetts Pollinator Network

Preserving biodiversity is as important to life on our planet as climate change. I am very encouraged that the state of MA is recognizing and taking action. Thank you.

Henry Geddes

Retired professor @ UMass Amherst

I, and many of my neighbors, are concerned about the threat to biodiversity and local water supplies posed by large scale solar array development in Western Massachusetts. Clear-cutting forests that serve to support biodiversity, absorb carbon, filter water, mitigate soil erosion is a misguided policy. Please consider the scientific evidence that questions this approach.

Isabel Bailey

I am concerned that the sustainability departments in towns are not really addressing biodiversity. They often (concord ma) depend on the natural resources department (conservation commission) to work on biodiversity but their focus is on conservation lands not public works ie town and residential properties.

To whom it may concern:

I'll get right to the point about the effect this has had on my husband and I.

No one within the town this happens in cares about the people who abutt the site OR the others in the neighborhood.

We have to tolerate being restricted from opening windows, excessive noise, vibration from tractor trailers, vehicles and property being covered in sand. Our well being affected whether it's no pressure or testing positive for chemicals.

Not being able to get anyone to help because they are supportive of the person causing the problems in the first place. This issue gets swept under the rug more often then not. We get treated like crazy people for even trying to get help or speaking out at board/committee meeting.

How about the effects this digging has on wildlife.

How about this sand mining is out of hand. People who do the mining are so used to doing whatever they damn well please this has become 2nd nature to them.

Sanding ones cranberry bog and sand mining are 2 different things. One deals with the normal procedure of sanding a bog in preparation for the winter. The other deals with digging-removing sand, sometimes digging into the sole source aquifer, which serves 7 towns, just to make money off of the sale of this precious sand.

Why does it always appear those that are NOT ADVERSELY AFFECTED just can't be bothered with doing what's right.

WHEN will every day people be treated like we matter, like our voice matters.

Thankyou,

Jo

J Dawson

NA

Given these two stated goals....

Recovering endangered species and preventing extinctions

Conserving key habitats to sustain species

When will the state be taking action to restrict/ban the use of deadly Second Generation Anticoagulant Rodenticide (SGAR) poisons throughout our communities? It is well past time for the state, legislature and MDAR to act. These poisons are killing our wildlife and poisoning our environment needlessly. They are not required to keep communities safe. See recently published expert Boston Plan by Dr. Bobby Corrigan. Massachusetts should be a leader akin to California in removing these poisons from our ecosystems.

Thank you

Jacob McCumber

Natural Resources Manager, MA Army National Guard

I am commenting as an individual, but strongly informed by my career as a conservation biologist and land manager, dedicated to our Commonwealth's biodiversity. MassWildlife leads the way in biodiversity planning and conservation through BioMap, the State Wildlife Action Plan, etc. I hope the Executive Order for Biodiversity in Massachusetts can be seen by all as supportive of the other critical initiatives recently signed (e.g., climate, housing) and that those other major initiatives will fully integrate biodiversity prioritization consistent with this Executive Order - incorporating conservation management and prioritization. Much public conversation has been dominated by climate change discussions lacking an ecological foundation, but MassWildlife, The Nature Conservancy, and others have thankfully been discussing the complexity of restoration and stewardship focused on meeting biodiversity and climate goals together. Separating the issues will likely lead to catastrophic results, but seeing climate change initiatives through an ecological lens sets the Commonwealth and all of us on a path to success.

It is imperative that the Commonwealth start to better support the strong scientific expertise held by our state employees. Too often, priority restoration efforts have been delayed or stalled indefinitely due to activist opposition that is counter to ecological science. Strengthening the focus on regionally appropriate land use goals and techniques and supporting our Commonwealth's planners, biologists, and land managers is essential to meeting our current and future needs. Incorporating long-term land use history and the need for active stewardship in a human dominated landscape is also essential. We need stewardship and management that is focused on restoring and/or maintaining biodiversity in the face of ongoing climate change impacts. Each region has differing needs based on current condition, conservation prioritization, ongoing/emerging threats, and achievable outcomes. Much of what climate activists are advocating for is actually damaging to long-term ecosystem health and biodiversity, ultimately impairing climate resilience and community safety. Ecologically informed planning and stewardship provide for enhanced climate resilience through biodiversity and community health.

Biodiversity Initiative plans should look for collaborative solutions that directly address concerns and barriers to stewardship and habitat restoration. Active forestry, including timber harvest, fire, and other tools are essential to provide for ecosystem health and diversity throughout MA, but significant barriers exist and are worsening, just as the needs for such stewardship increase with climate change. Southern Pine Beetles, wildfire hazard, droughts, and much else are ecosystem level threats that will have severe climate and community impacts if not addressed holistically through land management and conservation. Addressing barriers such as project costs, public opposition, and carbon storage will be essential to meeting biodiversity and climate needs. Building public understanding and supporting our Commonwealth employees and existing conservation plans will set us on a path to success. Conversely, losing sight of biodiversity and taking a "hands off" approach based on uninformed activist opinion on climate will be damaging and will very soon impair programs actively working on holistic solutions.

This initiative is timely and essential for the health of our Commonwealth and our sustainability for future generations. Long-term plans should prioritize rare natural communities, such as pine barrens and grasslands, for their inherent value and role in resilience. Plans should prioritize active stewardship

informed by resource monitoring. The science shows broad ecosystem benefits to forestry and fire guided by conservation and biodiversity. Stewardship for resilience and future generations.

Jacqueline Bernstein

To preserve and support biodiversity in the commonwealth, it is critical that we dramatically increase the amount of land conserved as wildland. Wildlands are areas protected from development where natural processes prevail with minimal human interference. We need to make these protections clear - general conservation is not enough. We need wild spaces, both for our own health and the health of our environment. According to Wildlands, Woodlands, Farmlands & Communities' 2023 report "Wildlands in New England:

Past, Present, and Future", Massachusetts should aim to triple its amount of conserved wildlands by 2060. It is imperative that we put these protections in place as soon as possible.

Jennifer Kendall

One often overlooked aspect in maintaining biodiversity is road ecology. Massachusetts should ensure that funds be set aside to develop and maintain well-designed wildlife crossings, wildlife corridors, and animal overpasses/underpasses to preserve animal life. Thank you.

Jenny Bell

N/A

Thanks for this opportunity to comment. I think our state biodiversity conservation goals should center around the elimination of the vast monoculture of lawns all around our state. Golf courses should be encouraged to plant native species of plants and trees except where necessary to play their game. There should be a blitz PSA campaign "Make meadows/forests/wetlands cool again" to encourage homeowners/businesses and all other land owners to get rid of their lawns in favor of planting trees and native plants. The state should seek to create a program similar to MassSave (but better run!) funded by a small gas (or other) tax to give rebates to homeowners/businesses and other landowners for the purchase/planting of native trees and plants. And the state should be mandated by law to review all of their own landholdings (airports, parking lots, etc) and lead by example by eliminating lawns and as much asphalt as possible and replant these areas in native trees and plants.

Thanks again for this opportunity to comment.

Jo bealding

To whom it may concern:

I'll get right to the point about the effect this has had on my husband and I.

No one within the town this happens in cares about the people who abutt the site OR the others in the neighborhood.

We have to tolerate being restricted from opening windows, excessive noise, vibration from tractor trailers, vehicles and property being covered in sand.

Our well being affected whether it's no pressure or testing positive for chemicals.

Not being able to get anyone to help because they are supportive of the person causing the problems in the first place. This issue gets swept under the rug more often then not. We get treated like crazy people for even trying to get help or speaking out at board/committee meeting.

How about the effects this digging has on wildlife.

How about this sand mining is out of hand. People who do the mining are so used to doing whatever they damn well please this has become 2nd nature to them.

Sanding ones cranberry bog and sand mining are 2 different things. One deals with the normal procedure of sanding a bog in preparation for the winter. The other deals with digging-removing sand, sometimes digging into the sole source aquifer, which serves 7 towns, just to make money off of the sale of this precious sand.

Why does it always appear those that are NOT ADVERSELY AFFECTED just can't be bothered with doing what's right.

WHEN will every day people be treated like we matter, like our voice matters.

Thankyou,

Jo

Joanna Brown

2030 goals: 1. Document that all indigenous and underserved, environmentally -affected communities in MA have been directly involved in setting these goals. 2. Forbid the sale and use of Glyphosate, neonics, and broad-leaf and other weed-killing products to consumers. 3. Create and hold public education campaigns in MA via traditional media and social about the importance of building and maintaining soil health through organic means, not using pesticides and herbicides, reducing the size of turf-grass lawns, and adding native plants, shrubs, and trees to private property. 4.

Create public PSA campaigns to highlight successes in the above listed steps.

John McDonald

Professor, Environmental Science, Westfield State University

Thank you for the opportunity to provide comments on this plan. My primary concerns are to ensure Massachusetts conserves habitats for the entire range of species which we have, across all taxa.

Thus, I have the following to share:

- Ensure that public lands (state forests, water supply lands, and wildlife management areas) are managed to ensure that both young forest and shrubland habitats are created at scales which allow them to function, and that mature forests are allowed to persist in the most suitable locations.
- Remove arbitrary acreage restrictions on forest harvesting operations and opening size on state-owned lands.
- Continue restoration of rare and uncommon habitats, such as pine barrens, where appropriate soils and topography are present and where these habitat types likely occurred historically. Many species of greatest conservation need are associated with these habitat types and biodiversity will only be sustained through conservation actions that restore and maintain such habitats.
- Manage forestlands to mitigate the effects of invasive species of plants, and to counter the effects of pests and pathogens, particularly non-native species. This may include forest harvesting and applications of herbicides and pesticides, as appropriate.
- Encourage the use of prescribed fire as a habitat management tool to maintain grasslands, forestlands, and shrublands, particularly on state-owned properties. Prescribed burning is a natural disturbance that historically occurred with varying frequencies in different forest types and stimulates nutrient cycling and plant regeneration in ways mechanical actions can not replicate.
- Build on the success of the State Wildlife Action Plan to continue to collect baseline inventory and monitoring data on species of greatest conservation need and use that information to develop and implement management plans and actions to sustain and enhance those species.
- Encourage and work to increase landscape connectivity, both terrestrial and aquatic, through increased use of road-crossing structures (e.g., tunnels and overpasses) and modern designs of culvert and stream crossing structures that allow for natural high water volumes to pass under, have natural stream bottoms, and do not result in perched outlets preventing upstream passage of fish and other aquatic species.
- Recognize that some species of plants and animals are disturbance dependent and require habitat management to persist and thrive in our developed landscape and encourage landowners, both public and private, to manage rare and uncommon habitats so they persist in the landscape.
- Oppose any arbitrary and ideological initiatives to prohibit forest harvesting on public lands, to eliminate various kinds of fish stocking, and to restrict recreational activities involving fish and wildlife.

All forms of fish and wildlife-dependent recreation can stimulate increased appreciation for and interest in biodiversity and should be encouraged.

Joyce Galkiewicz

Member of Friends of Myles Standish State Forest

Please put a halt to extensive sand mining operations near Plymouth MA, this puts our water source at risk, destroys forest land needed to help fight climate change - discourage the corporate greed that cares about dollars at cost of harm to our natural environment. From Joyce Galkiewicz

Judith Boroschek

retired

I oppose clear cutting state forests in order to create "early successional habitat. Mature trees will become old growth trees. Both provide many more resources for climate mitigation (carbon absorption, Stormwater control) than newly planted replacement trees. They also amply provide for habitat for a range of plant and animal life. Don't fall for US Forest Service current plans that are acting as a front for the logging industry..

Judy Asarkof

Land Stewardship Committee volunteer- Chair

To me, the most important focus right now is this biodiversity EO! I am so pleased you did it! However, a town like Carlisle, MA is extra important because it is a source of biodiversity that helps to feed other places! The fact that you also have the forest/tree EO focusing on carbon uptake pairs well with it. However, Carlisle is a "certain" distance from the MBTA and YOU are telling us we need to destroy a large area of our natural habitat areas to meet your requirements! I believe you should examine places near the MBTA mandated extreme density zoning and exempt towns that are serving as sources and habitat of biodiversity and trees for carbon uptake. You are otherwise- asking us to destroy our habitat that could help Massachusetts stay safer during climate change just to satisfy a mandate that doesn't work in a town that has NO sewer, NO public water supplies, NO public transportation and minimum 2 acre zoning. These measures are WHY we have decent biodiversity but we need to focus on improving our land, NOT destroying it!

Julie Richburg

I would encourage the Commonwealth to more aggressively prevent the introduction of potential invasive species as a way to proactively protect biodiversity. This could be done by creating an invasive species program (with funding) within DFG or MDAR to proactively review and prohibit the introduction of species (particularly plants). The Massachusetts Invasive Plant Advisory Group has done this process for many years, but has been hampered by no staff support or funding. With recent research being done at UMASS Amherst and the RISCC Management program, there is more information out there on which species could become invasive. But there is no efficient process to get these species on the prohibited plant list before they become more widespread and even in some cases sold. The most cost effective and efficient way to control invasive species is prevention.

Kate Burgess

The word "justice" does not appear in the Executive Order once, but it is imperative that biodiversity conservation in Massachusetts is implemented in a way so that marginalized communities no longer experience the worst of the effects of nature loss. As part of Section 1, the Dept of F&G Commissioner should make sure the biodiversity goals are in line with federal and state Justice40 metrics, and should also, in setting new goals, make sure they prioritize access to nature for nature deprived communities (ex: public transportation to beaches, interpretative signs in multiple languages that tell the full story of public areas, etc). These data are available on the Conservation.gov atlas under Social Vulnerability Data and Nature Deprived Communities. Lastly, The Governor's Office should work with the legislature to fund the new Biodiversity Trust Fund to allow for the state to continue to fund biodiversity conservation and increase eligibility for federal pots of money like the Wildlife Crossing Pilot Program, and the America the Beautiful Challenge.

Kate O'Connor and Frederick Spence

we are disappointed that the comments section does not accommodate our full comments.

There is increasing evidence and recognition that we need more mature and old growth forests (not just management for old growth characteristics) to improve biodiversity. Given the large areas still available as mature forests, particularly in Western Massachusetts, we have an opportunity with MA public forests to permanently protect more forests to achieve mature and old growth status by following these recommendations:

- Increase the amount of state-owned land that is placed in permanent reserves. The Response to the Climate Forestry Committee (CFC) Report states that the “Commonwealth will expand the number and size of reserves to reach 10% of forested land of all ownerships (about 300,000 acres) as recommended by the CFC.” This will be accomplished through acquiring and increasing reserves on state lands as well as incentivising private landowners to designate their land as reserves. If 100% of state-owned land is permanently protected from human intervention, as well as increasing reserves on private land, this goal could have an even greater impact on preserving biodiversity than the modest 10% that is currently proposed.
 - a. At a minimum, make all public forests in the Quabbin, Wachusett and Ware watersheds permanent reserves with minimal human intervention. This means discontinuing the creation of young successional habitats, single species restorations, disease control with pesticides and tree removal and wood products extraction on state-owned land in these watersheds. This will allow these forests to develop into old growth, improve the wildlife corridor that runs from Connecticut, through Massachusetts up to Canada and support the ecosystems that flourish in those conditions.
 - b. Discontinue any further destruction of pine barrens in southeastern MA, whether for “restorations” or sand mining/renewable energy installations. These are rare habitats that will regenerate on their own if not destroyed by human extraction or interventions
 - c. Cease all timber harvests as well as mechanical and chemical treatments that are conducted for the purpose of “early successional habitat.” There is substantial evidence that this practice does not benefit habitat, is harmful to many species and always results in net carbon losses., , , While there was some disagreement in the Climate Forestry Committee Report on this topic, the committee did agree that passive management is best for biodiversity and the climate. This implies that the primary reason for management is extraction. We understand this tension and support using the most sustainable methods to achieve the state’s goals of producing local wood products. However, this should be done on private land, leaving public land unmanaged for the benefit of the public, which includes maximizing state-owned forests’ potential to support biodiversity.
- Update/conduct a comprehensive inventory on all state-owned lands of existing flora and fauna, including species that need older forests and woodlands. For all areas, note additional defining characteristics and dates of prior management activities. Make this information readily available to the public. (Update An Assessment of Forest Resources of Massachusetts, 2010)

- Inventory all existing land that could be considered “early successional,” including all logging projects sponsored by state agencies, logging projects on private land, utility corridors, roadside easements and other “edge” forests. Identify how all such areas can be used to meet agencies’ objectives to maximize early successional habitat.
- Work with the DOER to ban clearcutting land for renewable energy projects and use already disturbed landscapes instead.
- Develop “a monitoring protocol to compare reserve outcomes to actively managed areas.” Please ensure that this information is readily available to the public.
- Create a Research and Information webpage that includes all peer reviewed scientific research literature used to inform state agencies’ decisions.

Kathryn Kavanagh

Biology Professor, UMass Dartmouth

The most effective strategy for biodiversity security is large, connected parcels of wild lands, which allows ecosystem-level functions and facilitates the upcoming climate migrations. Calculating the 30% conservation goal should not include every tiny garden; although they do provide oases for species, they are not sustainable and lack the ecological benefits of large complex ecosystems. With planning, human industry, residential and recreational needs can all occur in 50-70% of the land. Aiming for large, functioning, buffered, interacting ecosystems through terrestrial, coastal, and offshore protected areas should always be front and center in decisions. I suggest asking each time -- How does each decision move us toward that goal?

Ken Crouse

Hi, as a native plant enthusiast and someone interested in preserving the natural heritage which makes our Massachusetts a unique place, I applaud the effort. Firstly though, as part of the program, I think there should be more focus on managing existing state resources appropriately. For example, please fund the DCR properly to address invasive plants and environmental degradation caused by over-use in our scarce natural areas such as the Middlesex Fells. The Fells may just seem like an urban park, but is actually a last refuge for many species in the Boston Basin ecoregion with many specialized habitats. In another example, a large amount of public land is under the control of Mass departments and agencies. They should be instructed to manage their existing land as natural areas. From what I have seen these agencies generally view environmental considerations as a hinderance and not an opportunity to contribute to the biodiversity goals of the state. I think of the antagonist stance of the education building department with the recent expansion of N.E. Metro Tech into a scarce metropolitan remnant forest which was once part of Breakheart reservation and is adjacent to a quality powerline cut. I would add that power line cuts are some of the most bio-diverse landscapes inside of route 495. For example the cut in Lexington starting at Land Locked Forest is a highly diverse native plant landscape, I've been told by experts more so than the rest of that city. I'm not sure about their legal status, but surely the state has some authority to direct that these should be managed as such, including invasive plant removal and power infrastructure maintenance that reflects the sensitivity of the area. Finally, I suggest the state promote and manage a "re-seed Massachusetts" program where local ecotype seeds are collected from appropriate public lands by professionals and distributed to nurseries and the public to promote preservation of our ecoregion plant genetics. Most of the public and private "native" plantings, restorations, and pollinator gardens are using plants that aren't actually even native to Massachusetts and when they are most likely are not of local ecotype. I think of purple coneflower as one example that pretty much everyone believe is native to Mass., but is not, actually being a prairie plant of the Mid-west. People will not want to save our Mass. plant communities if they can't even identify them or have the opportunity to visit and learn from them near urban areas. Thank you for your consideration. Ken

Kerry Cesan

Science Teacher/School Garden Teacher Springfield Public Schools

I had some trouble copy and pasting from a Word Document so I'm sharing my ideas/comments about biodiversity in every classroom via my google drive -

<https://docs.google.com/document/d/1lBafCSYLqU11k5ih8lpQrMau017vzC6P/edit?usp=sharing&oid=114769179063678937090&rtpof=true&sd=true>

Thank you,

Kerry

Kimberlee Clark

To. The Department of Fish and Game,

I am asking that you include in your biodiversity recommendations and goals that all herbicide use be stopped immediately on all Department of Fish and Game lands in MA. Not just glyphosates, but all chemical herbicides and pesticides must be completely halted as a tool for invasive species or logging preparation. Please see attached paper giving clear information on just how long these chemicals live in every part of the ecosystem and bring harm in ways we cannot even guesstimate. This "good forestry" practice of spraying chemicals must end now.

Thank you for taking my comment into serious consideration.

Sincerely,

Kimberlee Clark

413-695-3627

Clarkkimberlee@comcast.net

sciencedirect.com

Sent from Susie, the Oracle (aka my iPhone)

Lara wahl

Ecologist

Good evening,

Thank you for the opportunity for discussion on this important topic. My strongest feelings revolve around the abuse of zoning laws for the clear cutting of thousands upon thousands of rich, biodiverse forest lands containing HEALTHY vital ecosystems for giant mega ton watt, industrial solar arrays to meet the Commonwealth's goals.

These And ALL new energy infrastructure no matter how important or green- need to be sited on Industrial Zoned lands, Commercial Zoned lands, or possibly Business zoned lands, only. Period. Not on farm or residential zoned lands and certainly not on our precious Forest zoned lands where built in protections do not allow massive clear cutting hundreds of acres at once. Forest zones don't allow more than a certain number of cords of wood on any one spot to be cut, and cutting plans need to be selective at that.

For the Commonwealth to achieve its GREEN goals by these outrageous means is ludicrous at best. As a progressive renewable state we need to do this responsibly and set the bar for how to transition to our green future for other states to follow our example. Massachusetts would simply be the laughing stock of the nation and world if achieve these goals by counter-productively eliminating our rich bio-diverse, carbon sequestering, old growth rich, self regulating mechanism! Our forests. Land holdings by the state are a fraction of what our total Forest Zoned lands owned privately comprise.

A very simple remedy towards the preservation and conservation of our states biodiversity would be to simply not allow industrial solar in forest zoned lands. Whether this can be achieved by the removal of the "Dover Amendment," which is what has been allowing this loophole, and is an antiquated amendment from the 1980's- from when solar arrays were not at an industrial scale; or otherwise, this must be done expediently and as a first priority.

I live in Shutesbury, Massachusetts, west of the Quabbin Reservoir, home to some of the Commonwealth's "richest carbon stocked lands- " according to the State's own website showcased on the map on their multi page study assessing carbon rich lands. The going rate of forest zoned lands that have been CLEAR-CUT for solar is nearly 5,000 acres in just the last 10 years. This is a FAILURE of our legislature.

The Audubon, equally concerned over this abominable practice- has produced a study proving there is adequate available rooftop, developed lands, and parking lot space to meet 100% of our states renewable energy goals without having to touch forest zoned lands. And yet- the commonwealth hesitates to provide clear and definitive measures ensuring Forest Zones are off the table for new energy infrastructure. (Beyond trying to pass a bill that would take individual towns abilities to protect their own forest lands away and appointing a state board that will take biodiversity into "consideration" when approving projects.) This fingers crossed strategy is simply NOT GOOD ENOUGH.

Please recommend to the state they make this a priority and write hard language ensuring our forest zoned lands are OFF THE TABLE for energy infrastructure projects.

Thank you.

Lara Wahl

413 559 8556

305 Montague Rd

Shutesbury, Ma 01072

Lara Wahl

Of Shutesbury Ma

Massachusetts prides itself on being progressive and also as being a renewable energy leader, setting the standard and example for the rest of the country of how to transition to green energy. We are failing at this if we achieve our goals by clearcutting intact healthy biodiverse ecosystems and forests to achieve our green energy goals. What kind of example would we be setting for the rest of the country? What would happen if all of the states in this country were to follow suit, allowing greedy industrial large scale energy infrastructure developers to clear this nations forests?

In the town of Shutesbury Massachusetts one of the largest landowners, Cowl's lumber has proposed to clear-cut the absurd and outrageous amount of nearly 300 acres of rich bio-diverse forest zoned land using and abusing the Dover Amendment which allows developers to break Forest zoning laws normally preventing any clear cut and ensuring that no more than a certain amount of cord wood only be cut Selectively.

This is happening in Massachusetts' most biodiverse and carbon stock-rich land bordering the Quabin Reservoir. The administrations own map shows our area of Massachusetts as some of the richest land in carbon value from its forests staying in tact.

The biggest goal for protecting biodiversity in Massachusetts should be to pass an executive order repealing the Dover amendment or at the very least banning all clear cutting of forest zoned land for energy infrastructure. This practice is an appalling abuse of the law (one created in the 80's when large scale solar was not scaled to such a level.)

Our town is being sued and these companies are actually being empowered to clear cut. This must end. You have the power to make Massachusetts the exemplary role model for The rest of the 49 states. Imagine what good we could do by achieving all our goals AND protecting forests? Don't blow it Healey Administration. The world is watching and I believe in you!! You helped close the loophole making rate payers pay for pipelines. Now close the loophole to protect our forest zoned land! Thank you!!

Leah Giles

MA's biodiversity goals cannot be furthered without a comprehensive and enforceable plan to limit the spread of invasive species, in particular Japanese knotweed (which cannot be controlled with methods that often work on other plants), bittersweet, and tree of heaven. I encourage the planners to ensure adequate methods to control these invasive species which reduce biodiversity by crowding out native plants that are beneficial for our pollinators and other animals.

Lee Mondale

To maintain and increase biodiversity especially during this period of climate change, do not allow logging in State Parks and State Natural Reserves.

Lenna Matthews

None

Please stop the sand mining in the southeastern portion of the state to protect the aquifer and biodiversity. Also please stop the widespread use of broadcast spraying of pesticides which kills more than just the targeted pests. People need to take responsibility for protecting their selves and not just create wildlife deserts. Thanks

Leslie Cerier

The Organic Gourmet, Leslie Cerier

These are important to me, Nature and the biodiverse world of beings that live in land, sea and air.

Please

Recover endangered species and preventing extinctions

Conserve key habitats to sustain species

Restore free-flowing rivers and wildlife migration

Preserve salt marshes and wetlands for wildlife, carbon storage, and flood resilience

Reduce pollution

Bolster food security by promoting biodiversity on organic farms, supporting pollinators, and encouraging sustainable wild harvest

Nature in every neighborhood and every classroom

Linda Ireland

Please educate decision makers, including politicians, about the importance of preserving what remains of the most untouched areas near urban spaces to allow us to continue to experience the beauty and wonder of natural spaces before they are irrevocably lost. A lack of awareness of the meaning and importance of biodiversity led Wakefield's NEMT school committee together with local leaders to choose to destroy an environmentally and archeologically significant part of Wakefield's history and biodiversity. The people making decisions about public land use should have to consider the importance of conserving areas already identified in Biomap as important parts of our natural heritage. The 14 acres and over 2000 trees destroyed had virtually no invasive species and multiple assemblages of uncommon species, including those of greatest conservation need. The beauty and accessibility of this parcel was extraordinary, irreplaceable, and completely unrecognized by school administrators and politicians. It is a shocking misuse of almost \$400 million dollars to destroy what was essentially part of Breakheart Reservation as far as the public was concerned. Why was there no requirement for any environmental review of the significant cost to biodiversity including destruction of vernal pools and rare species habitat?

Lori Bradley

Visiting Professor, Bridgewater State University

The letter I sent out today about a local issue to our city council, state and local representatives summarizes my opinions on logging in public lands statewide:

We are calling for the City of North Adams, in consort with Mass Audubon, the Massachusetts Forestry Foundation, and the Mohawk Trail Woodlands Partnership, to immediately halt their plans to log the 1088 acres for town forestland surrounding the Notch Reservoir watershed. We ask instead that the Town of North Adams and State of Massachusetts create a permanent protected recreational reserve at the Notch Forest and Reservoir.

Every year, I teach outdoor painting classes at the top of Mount Greylock for an arts organization in the southern Berkshires. Hikers come up from the Bellows Pipe Trail and many stop and talk with us. This summer I met hikers from all over the country and from England and Australia. All were impressed and overwhelmed by the beauty of Mount Greylock and the Mount Greylock Reservation. They enjoyed the experience of a pristine forest ending in a magnificent view. Many hiked over to the Bellows Pipe Trail from the Appalachian Trail. So, why is a logging project planned at the very base of the renowned Bellows Pipe Trail? The mud, the skidder trails, the water bars are all antithetical to a recreational forest experience that attracts thousands of tourists to the northern Berkshires.

In 2024, Condé Nast Traveler named the Bellows Pipe Trail the best hiking trail in the USA.

<https://tinyurl.com/bdz9j3vs>

Does it really make sense to allow groups with logging interests set up an “experimental” forestry project on and around a famed trail and established tourist destination for the City of North Adams? If Mass Audubon wants to experiment with “climate forestry,” they should use their own previously logged-out forests. They own many. Instead, why not protect the Notch Forest from logging by Mass Audubon, NEFF and the MTWP, and let the City of North Adams collect the carbon credits for saving the forest?

Most contemporary forest scientists and biologists agree that the best practice for conserving carbon to offset climate change is to leave old forests with large native trees alone. The “climate-resilience” project proposed by the North Adams Commission of Public Works, in conjunction with the organizations mentioned above, is not needed to protect the forest from future climate change. It is just a tree-grab. They’ll be logging out the old, healthy trees in the Notch Forest for profit. These trees are already marked with tape for destruction. After the cull, Mass Audubon will plant new seedlings, purchased from nurseries in the mid-west. How does this make sense for such a visible, renowned recreational forest? No experimenting with “demonstration forest” land disturbance, as proposed by Mass Audubon for the Notch Forest, should be taking place on pristine public land. Despite the “conservation” language used by these organizations, the actual result is just old-school logging of mature trees which further exacerbates negative climate-change outcomes.

Quotes from the REPORT OF THE CLIMATE FORESTRY COMMITTEE:

RECOMMENDATIONS FOR CLIMATE-ORIENTED FOREST MANAGEMENT GUIDELINES

Massachusetts Executive Office of Energy and Environmental Affairs

January 3, 2024

- Comprehensive research experiments related to early-successional habitats may be conducted, but only in limited areas on lands that have existing open habitats.
- “The Division (DCR) acknowledged to the Committee that active forest management is not necessary to maintain an abundant and clean water supply.”
- Discontinue logging, prescribed burning, and other active forest management on publicly owned watershed lands, which are unnecessary except in limited circumstance for public safety or manual invasive species removal.[2]

North Adams is becoming a progressive city with a world-class contemporary art museum and surrounded by culture. Instead of logging out this beautiful, precious na

Louise

Please do more during the MEPA process for biodiversity/wildlife/conservation. Please REQUIRE large companies to either cut back on their projects or JUST SAY NO all together. Big business can find other places for their large projects without disrupting Mass biodiversity.

Lynne Pledger

writer

We must have biodiversity below the soil line as well as above. A diversity of soil organisms (including microbes) is critical for human existence. Therefore, in addition to forests we need to address fields, wetlands, and waterbodies. Around the world animals have gone extinct because of habitat destruction from agriculture. Preservation of biodiversity must involve agriculturalist as well as soil scientists and ecologists. For example, the Conservation Reserve Program should preserving perennial pastures for regenerative grazing of 100% grass-fed beef.

Mark Roblee

Citizen of Shutesbury

Dear Governor Healey: In your important work to protect the environment, please be mindful of the current threat to biodiversity in our region posed by the destructive Cows/Puresky plans in Shutesbury. Solar at the expense of our forests is bad for biodiversity and for sustainable economic growth. Thank you, Mark Roblee

Martha

just a citizen of Massachusetts

Thank you for these biodiversity conservation goals.

Keep the state's air, water, and land as clean and pristine as possible.

Martha Painter

NA

Although interested in all the biodiversity conservation goals in the Commonwealth, my top priorities are: Phasing-out pesticide use throughout cities; creating invasive species management plans at the city level; and educating the public and communities about the need to tackle climate change and biodiversity loss jointly.

Maureen doyle

n/a

Thank you for accepting comments. I want to encourage the preservation of wetlands, in particular, for preserving biodiversity in MA. Wetlands maintain a lot of biodiversity as well as storing huge amounts of stormwater that is increasing as the planet warms. So, they serve a function for biodiversity and as a help to human civilizations. Many plants and flowers, such as irises and cardinal flower provide adsorptive properties as plants and food sources for pollinators. Dragonflies, darners, water striders, and many other insects live in wetlands and serve as sources of food and ecological functions in the wetland. As well as providing spots for ducks and other birds to take haven in or use as a stopover on a longer flight (north or south). Vernal pools, which exist in the spring, as their name implies, serve as birthing spots for salamanders, turtles, and frogs as well as creating habitat for new snakes.

Preserving wetlands, even more than the Wetlands Protection Act does , would be a huge step in protecting our diversity. This includes cleaning up the invasive species such as milfoil that are changing our wetlands into something else.

Michelle brodeur

Retired

Interested in getting more involved with conservation and biodiversity for Massachusetts. We need to share our space with all species native to this environment

Miriam Kurland

citizen of Massachusetts

On September 21, 2023, Governor Maura Healey issued Executive Order No. 618:

Biodiversity Conservation in Massachusetts (E.O. 618).[1] E.O. 618 declares

that “biodiversity conservation is a priority for the Healey-Driscoll Administration.” The order directs the Massachusetts Department of Fish and Game (DFG) to “conduct a comprehensive review of the existing efforts of all executive department offices and agencies to support biodiversity conservation in Massachusetts” and to “recommend biodiversity conservation goals for 2030, 2040, and 2050 and strategies to meet those goals.”

Our comments:

Our vision for nature in 2030, 2040, and 2050 includes the following, many of which

were recommended in the report of Climate Forestry Committee (CFC) appointed by the Executive Office of Energy and Environmental Affairs (EEA).[2][3]:

1. Acknowledge and be guided by the CFC conclusion that, “Unsurprisingly, disturbing the forests of Massachusetts as little as possible and allowing forests to grow and age through passive management is generally the best approach for maximizing carbon, ecological integrity, and soil health.” [2, page 4]
2. Expand forest reserves on all Commonwealth-owned lands, including the designation of all Division of Watershed Supply Protection lands as reserves. Reserves are defined by the Department of Conservation and Recreation in their March 2012 report, *Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines*, as “areas where the dominant ecosystem service objectives will be biodiversity maintenance, nutrient cycling and soil formation, and long-term carbon sequestration.... Forest management will generally consist of letting natural processes take their course...” [4]
3. Support permanent statutory protection of reserves.[2]
4. Provide, at a minimum, a comparable level of public input, involvement, and transparency for management on Department of Fish and Game and Division of Watershed Supply Protection properties as currently exists for Department of Conservation and Recreation (DCR) properties.[2]
5. Protect all mature forests and allow them to grow back and recover old-growth forest characteristics through proforestation.[5][6] There is no credible scientific evidence that any species requires the clearing of standing forests to survive or thrive in its natural range, but ample evidence that it reduces long-term carbon sequestration and storage.[6]

6. Comprehensive research experiments related to early-successional habitats may be conducted, but only in limited areas on lands that have existing open habitats.[2][6]

7. End pine barrens restorations, which are not supported by credible scientific evidence:

"As you may recall, the Committee on Forests and Climate (CFC) raised strong concerns in its report and in discussions with agency heads over the practice of creating early successional habitat through artificial means that reduce forest area and prevent natural forest regrowth. The arguments behind this opposition are based on extensive peer-reviewed literature that shows that (1) early successional habitat of grasslands, shrublands, and young forests is an artifact of Colonial deforestation and environmental degradation; (2) the practices employed by DFW are completely inconsistent with the historical (colonial) practices that created extensive open lands and thus are creating a novel form of artificial habitat; and (3) the creation and maintenance of these habitats decreases the extent of natural forest cover thus harming native biodiversity and reducing the carbon storage and climate mitigation potential of the state."[7]

8. End prescribed burning on state-owned lands. There is no credible scientific evidence that fire is naturally a major disturbance factor in New England.[6][7][8]

9. End the stocking of non-native fish in Massachusetts waters. These fish cause significant negative ecological impacts, including competition with native species.[9]

Monica Young

A key part to ensuring biodiversity remains in both our state's natural and developed areas is to ensure that our night skies remain as dark as possible. The encroachment of unnaturally blue LED lights hurts reproduction by insects such as fireflies and pollinators, bird migration, and the survival of sea turtles, to name a few wild creatures. It also hurts humans, and for some of the same reasons — artificial light at night, particularly at daylight-hued blue wavelengths, interferes with circadian rhythms. Animals may also mistake such lights when navigating — for example, artificial lights at night are known to interfere with bird migration, according to the Audubon Society, and can trick sea turtles who are trying to find their way from the beach to the sea at night. Lights can fool fireflies looking to mate, and studies have shown that artificial light interferes with pollinators' reproductive behaviors. Light pollution is a growing problem, but the good news is that — unlike climate change — light pollution has easy fixes! Even better, those fixes don't have to mean turning all lights off at night. We can use shielding to ensure that lights are directed downward, where they're needed. We can use timers so that the lights are on only when they are needed. And we can replace blue LED lights with amber-colored ones. The latter are more pleasant to look at, too! Most importantly, lights that are better for light pollution are safer, since they direct light where it's needed rather than providing glare, and amber-colored lights interfere less with our night vision, making it easier to see at night.

Nancy Haver

Retired

Deforestation is our biggest threat to biodiversity; let's do all we can to save our forests and wild lands—our pollinators and oxygen makers. Please keep our resources (plus solar and hydro power) in Commonwealth hands instead of selling them to foreign companies.

—And through education promote environmentally-friendly practices to offset biodiversity loss.

Patrick Thayer

Just following up on my comment at the call today. I am an associate member of the Hudson Conservation commission and am leading the efforts to remove invasive plants from town lands, I am speaking as a citizen and not on the behalf of the commission with these comments.

At the moment we are mechanically removing barberry, burning bush, honeysuckle, etc from Danforth Falls which has a substantial infestation and have plans to expand to other lands in town once Danforth is undercontrol. In the time since April we have been focusing on this project with volunteers, removal of the invasive plants has lead to the rapid reemergence of the native understory plants such as jack in the pulpit, geraniums, baneberry, blueberry, and others, we have seen many frogs, birds, and other small mammals in the areas we have cleared. We have many volunteers that participate in our weekly pulls on Saturdays. We are doing mechanical removal as much as we can because we do not want to use herbicides that may harm the native plants and animals. We are doing this on a volunteer basis because outsourcing our efforts to improve the health of the forest in very costly. One way to reduce cost for the towns is to subsidize or mandate the department of public works or a similar town department to have license or the ability to apply herbicides on difficult invasive species such as Japanese Knotweed or tree of heaven which require herbicide application to remove. Contracting out herbicide treatment is cost prohibitive to us and towns since it is generally expensive, and requires follow up and monitoring to make sure the invasive plants do not return. Monitoring can easily be done by the commission or a group of volunteers while reapplication of herbicides should be handled by the Department of Public Works. Just a proposal.

Additionally, it is important to expand invasive plant outreach to private individuals. While banned for sale by the state, many potential source of invasive plants remain on private property whether commercial or private homes which are sources for reinfestation. I feel that alot of people don't know what is invasive and what is not invasive. It would be great if incentives for removal and replacement of invasive ornamental plants were incorporated through the state or local towns (or a combination). I've seen articles of towns in other states offering vouchers for purchase of a native plant or 2 at local nurseries in exchange for removal an invasive barberry or burning bush for example. Perhaps a program where the local town verifies the existence and removal of invasive plants from a property and the private landowner submits their receipt prior to receiving the voucher could work and ensure that the invasives are removed and native plants are planted. The commerical properties is another major source of invasives. For example, Highland Commons in Hudson has many Bradford/Callery pears planted ornamentally. While the plant is not banned for sale in MA just yet, I see it is under consideration. I have observed these Bradford pears already escaping into the surrounding woods on their property. I grew up in Maryland which has a massive Bradford pear problem and a monoculture of white flowered trees awaits Massachusetts if this specific tree isn't addressed. But back to the main proposal. there needs to be incentives for these shopping centers and businesses to remove these plants and replace them with trees that provide shade and wildlife value. There are alot of these legacy plants all around at businesses that should be removed.

Finally, at the state level, Mass DOT (or whomever maintains the state roads) should incorporate invasive species management in their regular road and roadway edge maintenance plans). There are tons of invasive plants along the roads and the roads are vectors for spreading of seeds. These reservoirs of potential infestations should be eliminated.

Thank you.

Rachel Mulroy

Voter

I ask that state officials closely consider the broad implications of adopting existing Climate/Resilience/Sustainability language into the Biodiversity Goals, and how we may build a more robust lexicon to support policy and regulatory framework.

Attempts to reframe how we exist now with these environmental consequences still rely too much on the discourses that brought us here.

For example, the Biodiversity Goals target education but do we account for the way we value public K-12 curriculum, or how good science communications messaging is co-opted by the Media? We devote billions of dollars to “educational programming” yet our Youth are still expected to become devoted Capitalists, as if caring for our environment is a phase to be outgrown.

As the Biodiversity Goals take shape, can the framers account for the fact that our societal emphasis on bootstrap individualism puts the onus of change on people who have little to no resources to effect change we urgently need? Social constructions of time value and individualism as we commonly understand them lend more to blame than to accountability, and encourage objectification of our land and sea as stagnant resources each of us must compete for.

Concepts of rights to property and ownership are the foundation block of our nation, but we know these ideas can be problematic. So, how will the ways we understand our Biodiversity Goals navigate between imaginary lines on paper versus the continuity of our land in reality? And how will this inform us culturally as to what is shared and shareable?

The vision, strategies, and tactics of the Biodiversity Goals should be conveyed in a way that (a) disrupts discourse and brings us closer to the truth, (b) withstands co-option (unlike so many “sustainable practices”), and (c) embraces the temporal and subjective nature of our world.

The lexicon should enable us to challenge fear of the unknown and embody the reality of change as a process of expansion and contraction. We need a lexicon that lives not only in our planning documents and state contracts but manifests in our daily lives. I think the framers could look to the October 2023 Recommendations of the Climate Chief for inspiration to implement new lexicon into the Biodiversity Goals. We’re getting better at it, but we need to do more with more consistency.

The State documents how our policy makers and regulators are working across agencies and levels of government to address Climate Change impacts. An interdisciplinary approach requires scrutiny of those discourses since they are nuanced, dynamic and imbalanced. A new lexicon is required since the world itself does not rely on the linear concepts we impose upon it (such as household income, fiscal year deadlines, or 10-year goals). Environments and ecosystems change over time and are not fixed in place. We do not live in a laboratory of sterile conditions, but we communicate as if we do. Adoption of a subjective, spatio-temporal lexicon will maximize our adaptability in obtaining the Biodiversity Goals.

Thank you.

Rebecca

Writer

There is a current threat to biodiversity in the Pioneer Valley (Shutesbury, MA) posed by the destructive companies Cows/Puresky plan. The misguided plan is to tear down forests in order to build multiple industrial solar farms. Please help stop this.

Rene Schweickhardt

Want to be part of this awesome initiative

My comments are: The need for better siting for solar energy, specifically to protect our forests/trees and open space/farmland. Why take down the trees and cover the fields to put up solar? According to the clean energy siting reports from Harvard Forest and Mass Audubon, we have plenty of space for solar on rooftops and as canopies over parking areas. All of this serves multiple purposes - generating green energy AND preserving and providing habitat for biodiversity as well as providing shade and reduced temperatures in this HOT time.

I also encourage the various departments to work together on the EO #618 in the protection of raptors and carnivorous mammals by prohibiting anti-coagulant rodenticides (first and second generation). These predators are at serious risk of death from these anti-coagulants as they eat the rodents and are then themselves poisoned, leading to a horrible death of uncontrolled bleeding. These poisons need to be banned.

As was stated throughout the seminar today, this EO #618 initiative is vital to protect our wildlife and to have a healthy ecosystem. We are 'a part' of nature, not 'apart' from our environment and we must continue to try and protect it as best we can. Thank you for this informative seminar, and looking forward to the work to come!

Rene Schweickhardt

Vernal Pools

Hello and thank you for having these sessions. I have written earlier to Governor Healey's office through the administrations portal, but will also write here of my concern about protecting vernal pools. In Medfield we have a developer and the Town of Medfield Conservation Commission at odds over GIS Map 33, Parcel 87 on Elm St.. This property contains a certified vernal pool and our Conservation Commission denied this build but this order was superseded by the Mass DEP under case #214-0691. My hope is that this case is reviewed again (by various State departments as needed) to conserve this vernal pool and the surrounding area, as I know this unique environment is needed to preserve species that need these rare, non-fish containing bodies of water. I also hope that EO #618 will allow all the State Departments to work together, and share information, to truly be able to protect environments when they are in peril, and therefore have even greater impact to conserve and preserve our biodiversity.

Rene Schweickhardt

I would love to see the Certified Vernal Pool #8327 saved from having home built right next to it, within 53 ft. We should start actually protecting landscapes such as vernal pools if we are serious about biodiversity EO #618. Let's walk the walk ... protect this plot please, GIS map 33-087, Elm Street Medfield. Thank you!

Rinky Black

Community volunteer - pollinator gardens

Supporting pollinator projects across the state:

Ban neonicotinoids, both the use and sale of plants containing it

Control other pesticide use

Regulate or stop commercial backyard pesticide companies using chemicals that harm other species

Support communities with consultants to provide education and support to install or expand pollinator habitat

Support high schools with dormant greenhouses to grow native seedlings

Pollinator education - in the community, libraries and schools

Rose Saeed

City of Medford MA Special Education instructor

We need to take *extensive* steps to avoid / prevent flooding: marsh protection and expansion, buyout housing and businesses for managed retreat, reduce coastal building. Increase coastal planting for migratory birds and dune stabilization, phytoremediation along rivers & streams, etc. Very costly to fix flooding issues and too damaging for individuals and companies where they work. Besides, coastal habitats are critically important for the ocean ecosystem, so win win! Please emphasize closing the loop on returning oyster shells back to the ocean from the restaurants, build new cement reefs embedded with oyster shell material, simultaneously protect the coastline and increase aquaculture and bivalve biomass. Combine your goals with practical business goals: the business community always pivots faster than government agencies. For example, increase blue and green jobs with tax incentives & training for current residents to work & get paid to protect what they love so much about Massachusetts, work with the multi generational residents and their knowledge of the land! People hate it when beaches are closed, please continue work on combined sewer outflow issues for water quality improvement! I know it's expensive but issue Municipal Bonds, we need new culverts for the sudden downpour issues coming our way: sewage pollution and street flooding is much more problematic for everyone.

Legislate to ban harmful forever chemicals, products like Roundup, and particularly those which harm bees and pollinators, we have lost so much biomass amongst the insects. Involve the schoolchildren in this, get them working on these issues through mandated Pre-K to 12 curriculum so they see and value the Earth and its systems: we're not able to move everything to Mars! Let's remediate and protect our air quality, soil tilth, smaller scale farms interspersed around the State, increase green space & reduce heat island effects where most residents live, so much to do but without action we'll face excessively problematic future costs that residents can't shoulder and insurance won't cover, no one needs that happening. Thank you!!

Sandra DeRosa

Of the proposed biodiversity goals for Massachusetts, I believe the top three most important ones are the following:

--Conserving key habitats to sustain species

--Restoring free-flowing rivers and wildlife migration

--Preserving salt marshes and wetlands for wildlife, carbon storage, and flood resilience

Sara Aierstuck*Citizen*

The forest behind my home in Shutesbury is filled with a rich and beautiful variety of trees, ferns, mushrooms and fungi, salamanders and bird song. In the spring there are wild orchids and trillium; and in the summer, wild blueberries and blooming mountain laurel. Moose, bear, otters, bobcats, deer, raccoons, porcupines, and martins live in the forest. There are streams and vernal pools. I'm concerned that the Cows/Puresky plan to clear cut many acres of forest to erect an industrial solar farm will threaten the biodiversity and the many benefits a mature forest brings to the air, land, animals, birds, plants, and people of Massachusetts.

Sarah Freeman

Retired

There are multiple conflicting claims about "biodiversity" and how to achieve it. Once a mature tree is cut down, it takes many decades to replace it. That's an action that should not be taken lightly during a time of climate crisis. I OPPOSE logging in public forests, and I seriously question the claim that clearcutting forests is the best way to achieve "early successional habitat" (meadows with saplings) and promote biodiversity. Please consider Michael Kellett's 2023 peer-reviewed article, "Forest-clearing to create early-successional habitats: Questionable benefits, considerable costs," <https://doi.org/10.3389/ffgc.2022.1073677>, in developing any policy.

Sarah Jordan

The most important thing we can do to increase biodiversity is to educate. I was planning to submit a statement about protecting farmland and limiting outdoor lighting, but as I write this my new 20-something neighbors are removing all the herbaceous plants and shrubbery from their yard and have contracted with both a mosquito-spraying company and an exterminator. They use bright outside lighting. They clearly have no idea how unnecessary these actions are or how damaging they are. I live in Middlesex County and through involvement with Massachusetts Pollinators Network and Massachusetts Audubon I know that Middlesex County is the most backward of counties in terms of environmental awareness and action. I also know that where groups have begun educational programs about native plants/pollinators and dark skies that awareness has increased among the general population.

I am a life-long outdoors person and hiker. I moved to Eastern Massachusetts (from Western Massachusetts) 15 years ago. I hike almost every day, year round. Every single conservation area that I hike has degraded, sometimes badly, through bad management. Again, more education would help.

Sarah O'Neill

Retired Health Administrator

You have noted many key things so just to add - work with landscapers and garden centers to transition to fertilizer free and native landscapes (Weston's Nursery has taken the lead on this). Stop spraying insecticides for mosquitos - doesn't work and kills everything else too....educate the public about how biodiversity can create a better balance (bats, insect eating birds, vibrant vernal pools where larvae get eaten, etc.)

Sharon Adrian Dunn

Protecting biodiversity begins with protecting natural habitat from logging, application of herbicide and pesticides, from over-culling of wildlife, and from pollution from human sources like factories, dumps, etc.

Steve Trombulak

Emeritus Professor of Biology and Environmental Studies, retired, Middlebury College

I believe that the state's conservation goals should include the following:

1. Connectivity within and across state boundaries, particularly along the north-south axis, to contribute to the larger region's ecological functionality in the face of climate change.
2. Protection of all native communities/ecosystems; terrestrial, freshwater, and marine.
3. Regional participation in restoration/reintroduction/recovery of rare/threatened/endangered/extirpated species, especially carnivores in order to restore the natural "checks-and-balance" to herbivore populations.
4. Non-extractive access and uses to public lands, especially for educational purposes.
5. Elimination/control of invasive exotics.

Susan Purser

Citizen Scientist

The best way to ensure biodiversity is to allow our state forests to grow naturally without timber harvesting. It has been shown that undisturbed forests offer the best habitat for plant and animal diversity. Massachusetts has some of the most carbon dense forests in the NE, thus diversity-rich natural areas. We have a responsibility to protect them.

Management practices such as cutting eight 5-acre holes in the forest with associated paths between them (October Mountain Ant Lot project, for example) is disruptive as it fragments the forest, causes greater fire danger, invites invasives and often uses herbicides. This in turn reduces biodiversity by changing the nature of the forest and disrupting the natural order for plants and animals.

Other practices of cutting forests and woodlands for large solar farms is irresponsible and should be stopped immediately. With so many other options for solar fields, cutting down forests is irrational.

Thank you for soliciting the citizens input on biodiversity.

Tim Simmons

Conservation Ecologist, semi-retired

I commend the administration for the executive order focusing on biodiversity conservation. The following comments are based on 40 years of planning and implementing conservation activities to benefit biodiversity on state and NGO lands primarily in Massachusetts. I also currently serve as the Massachusetts state representative for the Society for Ecological Restoration's Northeast Chapter.

Nature is complex and our understanding at any given moment can only be characterized as uncertain.

The hallmark of modern natural areas management recognizes uncertainty and leads practitioners to apply some modified version of adaptive management (AM). AM fundamentally relies on feedback loops that require monitoring and management of outcomes to determine whether management goals are being achieved. At its best, assumptions and theories underpinning management goals are revisited and revised based on research and monitoring results. Monitoring techniques may also be modified as results indicate. While classification of our natural areas is important, it is only a small fraction of comprehensive planning. Setting goals and conducting comprehensive planning requires systematic assessments of natural areas and should include methods more intensive and rewarding than can be achieved through remote sensing of forest cover types alone.

At this time, during the United Nations Decade on Ecological Restoration, it is critical to recognize that Massachusetts is not alone in struggling with exactly what a comprehensive biodiversity restoration and stewardship program entails. I take this opportunity to call attention to The International Principles for the Practice of Ecological Restoration, 2nd Edition and The Global Biodiversity Standards Manual for Assessment and Best Practices.

Comprehensive assessments of state owned conservation lands and waters should include assessments of all resources, including personnel and financial, required to achieve conservation goals. While the Commonwealth continues to find success conserving important places and their habitats, the staffing required to provide high quality stewardship to these places has not kept pace. Setting unachievable goals is a recipe for broad scale failure.

The rate and magnitude of climate alterations we are currently experiencing requires greater investment in research and monitoring, basic assessments of current conditions and determining and articulating desired future conditions for all of our protected lands. Recognizing nature's dynamism and complexity is vital to natural areas planning and implementation and should leverage a cautious but progress based approach. The vision presented by the executive order can only be sustained by a comprehensive, systematic adaptive management approach that relies on and encourages the best available science be applied to setting short and long term conservation goals.

Thank you for the opportunity to reflect and comment on this important initiative.

Tracy Olson

The Commonwealth needs to place more restrictions on the sale of invasive and potentially invasive species. In addition, funding for control and removal of invasive species by municipalities and NGOs is needed. Native species will return and biodiversity will increase if invasive species are better controlled. Financial Support of organizations like the Native Plant Trust that grow less common native species would help their propagation.

Victoria DeMoranville

Retired

I am concerned by the huge piles of sand being shipped out of Plymouth County to other parts of the world. This natural resource that should not be for sale from this area. It is helping keep our sole source aquifer clean. The sand mining is obliterating our forests, along with many species living there, creating huge wind tunnels and releasing carbon into the atmosphere. Care is needed to maintain biodiversity of the natural resources in our area.

Victoria Frothingham

N/A

I strongly support biodiversity conservation goals for MA. We need to preserve wetlands and other habitats that support biodiversity and bring nature into every neighborhood. We should also make it a requirement that all new real estate development protect biodiversity.

Please support bio diversity in Mass. Thank you!