



September 15, 2023

Stephanie Cooper, Undersecretary for the Environment
Executive Office of Energy and Environmental Affairs (EEA)
100 Cambridge Street, Suite 1020
Boston, MA 02114
VIA Email: guidelines@mass.gov

Re: **Comments on Forests as Climate Solutions – Climate-Oriented Forest Management Guidelines**

Dear Undersecretary Cooper and EEA staff:

Mass Audubon applauds the Commonwealth for undertaking the Forests as a Climate Solutions initiative and offers the following comments. This initiative is important in addressing the twin crises of biodiversity loss and climate change, and retaining the many other important values associated with Massachusetts' forests.

Introduction

Forests cover nearly 57% of Massachusetts and provide myriad ecosystem services including biodiversity; carbon sequestration and storage; water filtration, infiltration, flood control, and water supply; recreation; cooling and shade; scenic beauty; and overall support of our quality of life and community character. They are key to addressing the twin crises of biodiversity loss and climate change. Forests are dynamic ecosystems that change over time including through natural disturbances or management efforts to mimic natural disturbance. We define 'forest loss' as conversion from a forested system to some other land use such as development.

The landscape of Massachusetts has been shaped by hundreds of years of human land-use decisions. The fact that we still have so much forest reflects their resiliency, but they are not as resilient as they could be or need to be. Forests face many threats including loss and fragmentation from development, climate impacts, invasive pests and diseases, and deer overpopulation. In many instances, these threats reinforce and exacerbate each other. For example, climate change creates conditions favorable to forest pests and diseases; development reduces the integrity of remaining forest patches and creates edges where invasive plants take hold; and excessive deer browsing reduces biodiversity and tree regeneration while favoring certain invasive plants. Increasingly intense storm events and more frequent droughts also are altering disturbance regimes including blowdowns, ice damage, and fire risk.

In the face of these threats and risks, we need to protect and manage our forests, both public and private, to retain as much forest cover as possible and sustain all of the critical functions they provide. Sufficiently addressing these challenges will require management strategies that promote both young forests (which support many of our Commonwealth's listed species) and mature forestlands (which store greater amounts of carbon) as part of a healthy forest mosaic across the landscape.

When developing climate-smart and wildlife-friendly forest management policies, we can and must actively care for our forests in ways that increase resilience, sustain high-quality wildlife habitat, sequester and store more carbon, and provide the many other benefits on which we rely.

Mass Audubon advocates for the right solutions in the right locations at the right times, based on strategic, landscape-level planning that recognizes forests as dynamic systems — without a singular optimal state — and allows for flexibility as climate change and forest health threats continue to intensify. Forest policy should identify areas that are in suitable condition for long-term carbon accumulation with little management (reserves) and areas where climate-smart forest management techniques can be applied to promote adaptation and provide habitat for declining species. These decisions should be based on an assessment of vulnerabilities and opportunities, rather than landownership type, to address ongoing challenges to sustaining forest ecosystem benefits. Massachusetts also needs to increase the pace of land conservation and reduce the rate of loss due to all forms of development, including through adoption of new and expanded land protection funding mechanisms, and policy incentives which reward landowners for keeping their land in forested condition, and discourage development of high value forests and other natural ecosystems.

Question Responses

1. What role should humans play in optimizing carbon storage and sequestration in forests? To advance other objectives such as clean water, habitat for rare species, or wood products?

Forests currently sequester approximately 7% of Massachusetts' annual carbon emissions. This capacity needs to be increased while also retaining high levels of stored carbon and all of the other functions forests provide. While our forests face many risks and uncertainties about the future capacity to store carbon and provide other functions, there are also many risks and uncertainties in the transition to clean energy systems to reach the Net Zero emissions goal in the Clean Energy and Climate Plan. Just as we need to be flexible and nimble in addressing the risks and challenges of clean energy deployment across all sectors, we need flexibility in approaches to supporting the role of forests.

Mass Audubon believes in the deep interconnection between humans and forests. Forests are intrinsically valuable and innately interconnected with sustaining healthy societies. Our intertwined legacies cannot and should not be undone — caring for our forests and responding to past and ongoing forest threats is essential. We feel it is important to consider that given the scope and scale of past and ongoing human impacts, unimpeded nature would take millennia to recover from past land use and adapt to the impacts of climate change. Through carefully designed forest stewardship practices, we can deepen our community's connection with nature and increase the resilience of our conserved and working forests while optimizing both carbon storage and habitat quality. This stewardship needs to be undertaken with respect for and understanding of forests' natural ability to regenerate and develop late successional characteristics, while focusing intervention where necessary to reduce the threats and stresses humans are imposing on forests due to past land use, climate change, introduced pests and diseases, and extirpation of the apex predators wolves and mountain lions leading to overabundance of white-tailed deer.

The Commonwealth should adopt an informed approach to how and where active and passive management is planned. The establishment of forest reserves (see definition of forest reserves in question 2, below) should identify forested areas in relatively good condition -- diverse, large, forested areas with low threats (species composition, invasives, etc.). Management policies for public lands should be transparent and provide opportunities for meaningful input from the public, while relying on the best available current information and science. Management guidelines, especially for reserves,

need to maintain flexibility in responding to new and emerging threats such as novel forest pests and pathogens. The planning process should also recognize the need to mimic natural disturbance, at the appropriate scales of space and time, to maintain habitat for disturbance-dependent species, sustain water quality, provide local wood products, and help forests (particularly high vulnerability forests) adapt to climate change. When designating reserves, consider the places where active management is needed and do not locate reserves there.

The DCR Landscape Designations and guidelines provide a good model for an inclusive, transparent process that defines where active vs. passive management will be the primary practices, while retaining necessary flexibility at specific locations over time. We recommend that there be a similar statewide plan developed with public input for MassWildlife's lands, so that the public can understand the scientific rationale between locations selected for active habitat management vs. more passive forest reserve areas.

Beyond the state lands, we are pleased to see that the Commonwealth is framing the Forests as Climate Solutions initiative to include other lands as well. State-owned lands can and should provide management models for municipal and private lands. Protection of biodiversity and other functions requires coordination across parcel boundaries and landowners. Policies and programs flowing from the initiative should encourage and support cross-property collaboration and cooperation. New and expanded programs are also needed to help private landowners keep their land in forest use and to conduct good stewardship of those lands.

2. What is your definition or concept of forest reserves? What, if any, is the role of human intervention in maintaining reserve conditions?

The DCR Landscape Designations¹ defined forest reserves as areas *“where the dominant ecosystem service objectives will be biodiversity maintenance, nutrient cycling and soil formation, and long-term carbon sequestration. Reserves are areas that users often value for spiritual reasons and that may provide elements of a wilderness recreational experience. There will be no commercial harvesting of timber in Reserves. Forest management will generally consist of letting natural processes take their course, although under specific circumstances, more active management might be permitted.”* This approach focuses on passive management, with some flexibility to address stresses and threats like invasive species and pests.

We recommend building on this definition, incorporating more recent science. Ontl et al. 2020 designates the establishment of “forest reserves in high carbon area” as a potential forest carbon management approach for land managers interested in promoting forest carbon². Through a related body of work Mass Audubon, the Northern Institute of Applied Climate Science, The Nature Conservancy, the New England Forestry Foundation, and others have collectively worked to define key climate-smart management practices, including forest reserves. The process was conducted over the course of 18 months, and included a series of meetings that considered carbon modeling as well as input from New England landowners, foresters, academics, loggers, land trusts, state and federal agency staff, and regional planners. The resulting practice definition for forest reserves, which Mass Audubon supports, is as follows:

¹ <https://www.mass.gov/doc/landscape-designations/download>

² Ontl et al. 2020. *Forest Management for Carbon Sequestration and Climate Adaptation*. Journal of Forestry 118(1): 86-101, doi.org/10.1093/jofore/fvz062

Intentional passive management (with exceptions for invasive removals or novel outbreaks of forest pests and pathogens) to maintain ecological, carbon, and other benefits. Reserves can be established on all or a portion of a forest. This practice is not appropriate everywhere and may be most appropriate on sites with high carbon density and low vulnerability to climate change impacts (carbon), or unique or sensitive sites (which may include locations that contain at-risk species), sensitive ecosystems (e.g., vernal pools or riparian areas), or potential climate refugia (adaptation). Maintaining these areas preserves that adaptive capacity of these systems and may support landscape-level adaptation.

Mass Audubon supports the designation of Forest Reserves on state lands as well as municipal and private lands. Cooperation and coordination across abutting land ownerships should be encouraged, both for forest reserves and more generally to support good forest stewardship. Natural resources and the risks they face cross property and jurisdictional boundaries, and this needs to be recognized and partnerships supported to enable concerted approaches to forest management.

3. According to the Massachusetts Climate Change Assessment (2022) degraded forest health is expected due to warming temperatures, changing precipitation, increasing pest occurrence, and more frequent and intense storms. What types of forest vulnerability do you think require effort to preserve, protect, fortify and/or enhance our state forest lands? What management practices or approaches do you suggest to make the forests of Massachusetts more resilient to the conditions projected by the Climate Change Assessment?

Priorities for addressing forest vulnerability include reducing the rate of loss and fragmentation of forests due to development, increasing the pace of permanent land conservation, managing the state lands well both for their own values and as models for other landowners, and providing programs and incentives for municipalities and private landowners to support forest conservation and stewardship.

Specific forest management goals to address current conditions and risks to forests include:

- Increase species diversity
- Increase age class diversity
- Reduce invasives
- Maintain white-tailed deer density at appropriate levels
- Monitor forest condition and these new and emerging threats

The need to address white-tailed deer overpopulation and the impacts this is having on forest health and regeneration should be elevated as a priority. We recommend that MassWildlife lead a concerted effort to monitor deer densities statewide and develop and apply appropriate methods to meet density goals, in partnership with municipalities, nonprofits, and private landowners.

Mass Audubon supports the implementation of the Massachusetts Resilient Lands Initiative. This initiative calls for the adoption of a Forest Resilience Program (also referred to as the Forest Climate Resilience Program). Mass Audubon has been piloting a number of initiatives to inform a potential Forest Climate Resilience Program in partnership with the above-mentioned process for developing climate-smart management practices. These practices are designed to balance carbon and adaptation goals for forests while supporting the provisioning of other ecosystem services. Identification of what practices to implement, in appropriate locations, should involve a strategic consideration of vulnerability as it relates to climate and forest health threats in the near and mid-term. The below table lists and defines these practices.

Combined Climate-Smart Practices List

These 14 forest management practices come from two sets of meetings of landowners, foresters, academics, loggers, land trusts, state and federal agency staff, and regional planners in New England in 2020-2021. These two efforts had a primary focus on carbon or adaptation, even though by definition climate-smart practices have both carbon benefits (across varying time frames) and help forests adapt to climate change. This list is current as of January 2022.

A = Practices from the Massachusetts Forest Climate Resilience Program pilot, designed to help forests adapt to climate change. Practice development was led by Massachusetts Audubon and the Northern Institute of Applied Science, along with many stakeholders.

C = Practices from the Natural Climate Solutions Accelerator grant project in Massachusetts and Vermont, designed to increase forest carbon stock within 20 years. Practice development was led by The Nature Conservancy and the Northern Institute of Applied Science, along with many stakeholders.

Management Practice	C	A	Short Description
Keeping the Forests We Have			
Avoid forest loss	C	A	Reduce or eliminate the conversion of forest to non-forest use since forestlands contain more carbon than most other land use types and keeping land in natural forest cover maintains the ability of landscapes to adapt to changing conditions.
Respond to disturbance		A	Respond to a major disturbance to the forest by using one or more of the above practices to aid in post-disturbance recovery where ecosystem services and forest condition have been highly degraded.
Growing New Forests and Trees			
Reforest	C	A	Through seeding, stocking, or natural reforestation, create forest with a diversity of tree species in an area that used to be but is not currently forest. Use climate-informed species that are suitable to the location. Expected to be used with invasive species control and deer protection when needed.
Green developed areas	C	A	Plant trees in urban and residential areas to add carbon stock as trees grow, and provide many local benefits to air quality, stormwater management, and human health and well-being. Use climate-informed species that are suitable to the location. Expected to be used with invasive species control and deer protection when needed.
Plant trees to increase forest stocking	C	A	Enrichment or supplemental planting in forests to support climate adaptation. Use climate-informed species that are suitable to the location. Combine with invasive species control and deer protection when needed.
Intentional Passive Management			
Establish forest reserves	C	A	Intentional passive management (with exceptions for invasive removals or novel outbreaks of forest pests and pathogens) to maintain ecological, carbon, and other benefits. Reserves can be established on all or a portion of a forest. This practice is not appropriate everywhere, and may be most appropriate on sites with high carbon density and low vulnerability to climate change impacts (carbon), or unique or sensitive sites, which may include locations that contain at-risk species, sensitive ecosystems (e.g., vernal pools or riparian areas), or potential climate refugia (adaptation).

			Maintaining these areas preserves that adaptive capacity of these systems and may support landscape-level adaptation.
Increase time between harvests	C		Wait longer between harvests to grow larger trees that are more likely to be used in long-lived wood products. For example, this may take the form of delaying a harvest in your current 10-year management plan until the next 10-year plan.
Reduce Stressors			
Climate-informed forest access and forestry operations		A	Reduce impacts to hydrology, soils, and nutrient cycling associated with shorter winters, extreme precipitation events, and other climate changes, by following best management practices updated for dealing with these conditions.
Remove invasive vegetation	C	A	Remove heavy infestations of invasive plants that compete with regeneration or reduce growth of existing trees, either pre- or post-harvest, or both. May include the use of herbicides and/or mechanical cutting of invasive plants, and treatment over several years. Control of competing vegetation may be needed to maintain ecosystem functions as well as facilitate regeneration of forests along desired trajectories.
Protect seedlings and saplings from deer browse	C	A	Reduce over-browsing and protect regeneration from animal damage. Practices may include use of tree shelters or exclusion fencing. Protecting desired vegetation from browse help maintain ecosystem functions and facilitate regeneration of forests along desired trajectories.
Active management			
Create gaps to promote regeneration	C		Balance creation of gaps to promote regeneration with retention of existing carbon stocks when forests are undergoing harvests. For example, retain a minimum number of large-diameter live trees, snags (see NEFF's Exemplary Forestry standards), and live-but-dying trees (future snags), and limit gap creation to no more than 20% of the parcel.
Retain more carbon in a thinning	C		Limit the removal of trees in thinnings to retain large-diameter live trees, snags, and species diversity. For example, set aside between 25-50% of the stand as unharvested (retention) areas, and thin to partway between the A and B lines on a stocking chart, maintaining tree diameter.
Enhance adaptive capacity in forests (Resilience)		A	This practice is designed to improve the health and function of the current native forest vegetation in response to climate change. Silvicultural activities under this practice are designed to (1) reduce the impact from current and future stressors and disturbances, (2) diversify forest conditions to increase the capacity for adaptive responses, and (3) promote future-adapted regeneration of the current native plant community when forest regeneration (i.e., initiation of a new age cohort) is a desired outcome.
Facilitate forest transition to better match future conditions (Transition)		A	This practice is designed to facilitate transitions in forest communities toward assemblages that are expected to be better adapted to future conditions and support anticipatory adaptation where climate change is expected to exceed the capacity of the existing forest community to cope with climate change impacts and associated stressors (e.g., highly vulnerable or impacted systems).

Thank you for the opportunity to comment. Mass Audubon looks forward to continuing to provide input as the Forests for Climate Solutions initiative proceeds.

Regards,

A handwritten signature in black ink, appearing to read 'Michelle Manion', with a stylized, cursive script.

Michelle Manion
Vice President for Policy and Advocacy