



# MASSACHUSETTS WATER RESOURCES AUTHORITY

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Submitted via email at [guidelines@mass.gov](mailto:guidelines@mass.gov)  
Subject: Proposed Climate-Oriented Forest Management Guidelines

To Whom It May Concern,

The Massachusetts Water Resources Authority (MWRA) appreciates the opportunity to comment on the development of EOEEA's Climate-Oriented Forest Management Guidelines. These guidelines aim to provide science-based guidance on managing state lands and incentives for private landowners to maximize carbon storage, sequestration and overall climate resilience. While the request for comments was framed by three thoughtful questions, MWRA's comments are broader and are provided herein.

MWRA provides drinking water from the Quabbin and Wachusett Reservoirs in central Massachusetts, with source waters located in the Quabbin, Wachusett and Ware River watersheds. For many decades the Department of Conservation and Recreation (DCR) and its predecessor agencies have maintained an active land acquisition and forestry management program within the lands owned for watershed protection around MWRA's source waters. MWRA views these programs as essential parts of MWRA's watershed and source water quality protection, and have resulted in an increase in the amount of protected (undeveloped) land. MWRA supports the goal to make our forests more resilient to climate change and maximize carbon storage and sequestration. The current watershed forest management program is critical to watershed protection as demonstrated in the following sections and should be allowed to continue without change.

The watershed forestry program is not a production harvest program, rather it is designed and operated for the specific purpose of maintaining a resilient forest to protect MWRA's source water quality. MWRA is one of the few water systems nationwide with water sources that consistently deliver high enough quality water and are sufficiently well protected naturally such that EPA and MassDEP regulations allow MWRA to only provide disinfection of the water. This avoids the use of chemically enhanced filtration with its energy intensive processes and associated carbon footprint.

The watershed forestry program is designed to promote long-term protection of water quality and forest resilience to disease or natural disaster. When the Quabbin Reservoir was constructed in the 1930s, the vast majority of the watershed was in open fields, with the pre-existing forest having been cleared for farm use or damaged in the 1938 hurricane. Thus, almost all of the current forested

lands are of a relatively uniform age, with large stands of single species. The goal of the program is to slowly, over many decades, move the forest toward a multi-species, uneven-aged forest that is less likely to be damaged by invasive species or a natural disaster such as a hurricane, thereby reducing the risk to water quality.

MWRA relies on the protective attributes of the forest as a critical component of its watershed protection efforts, and is judged annually by state and federal regulators on the ability of its protection efforts to reliably ensure high quality source water. The on-going land acquisition programs at each watershed have added to the overall protected forest, avoiding loss of forest cover for development or private lands commercial forestry, and allowing some fields cleared for other purposes to return to forest. Since 1985 MWRA has invested over \$143 million in watershed land acquisition to protect and preserve nearly 28,000 acres.<sup>1</sup>

DCR's forestry program is well documented in its most recent (2017) Land Management Plan which is updated periodically with an opportunity during that process for public input<sup>2</sup>. The entire watershed forestry program was the subject of an intensive independent scientific review in 2012 by the Science and Technical Advisory Council (STAC<sup>3</sup>) with extensive public comment opportunities.

The STAC report,<sup>4</sup> published in 2012, clearly laid out the scientific basis for active management of the watershed forest as prudent and required to ensure water quality. The report concluded that deferring or eliminating the forestry management programs exposes the water system to decades of increased risk from catastrophic disturbance from a hurricane or other natural disaster. Such risk only increased with the effects of climate change, resulting in unacceptable water quality, failure to meet drinking water quality standards, and the cost and energy and greenhouse gas expenses of building and operating a more intensive water treatment plant. Upon completion of the STAC report, DCR produced a companion report<sup>5</sup> demonstrating how it was implementing

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1 **DCR Watershed Land Acquisition**, Division of Water Supply Protection, Department of Conservation and Recreation, retrieved October 11, 2023 from <https://www.mass.gov/info-details/dcr-watershed-land-acquisition#watershed-land-acquisition->

2 **Land Management Plan**, Division of Water Supply Protection, Department of Conservation and Recreation, 2017 [www.mass.gov/doc/2017-dcr-division-of-water-supply-protection-2017-land-management-plan/download](http://www.mass.gov/doc/2017-dcr-division-of-water-supply-protection-2017-land-management-plan/download)

3 The STAC was originally chartered in the 1990s by DCR as the Quabbin Science and Technical Advisory Committee, and was later tasked in 2010 to assist in overseeing forestry programs by the Secretary of EEA. It includes forest, wildlife, and natural resource researchers and managers from several University of Massachusetts Amherst departments, Harvard Forest, the USDA Forest Service, Mount Holyoke College, Amherst College, the Institute of Ecosystem Studies, US Geological Survey, Massachusetts Audubon Society, the New England Small Farms Institute, the MA Natural Heritage and Endangered Species Program, Hampshire College, and several state agencies.

4 **Review of the Massachusetts DWSP Watershed Forestry Program**, DWSP Science and Technical Advisory Committee, November 2012, [www.mass.gov/files/documents/2017/10/02/review-of-mass-dwsp-watershed-forestry-program.pdf](http://www.mass.gov/files/documents/2017/10/02/review-of-mass-dwsp-watershed-forestry-program.pdf)

5 **From Here Forward: Changes to the Department Of Conservation & Recreation, Division of Water Supply Protection's Watershed Forest Management Program**, Department of Conservation and Recreation August 2013, [www.mass.gov/files/documents/2017/10/02/changes.pdf](http://www.mass.gov/files/documents/2017/10/02/changes.pdf)

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each of the STAC report's recommendations, and then incorporated those actions into the current Land Management Plan.

The detailed inventory of current conditions within the Land Management Plan, based on decades of intensive surveys, indicates that a large majority of forested acreage at all the watersheds can be dated to late 19th century farm abandonment, to the hurricane of 1938, or to plantations created just after the original land takings at each watershed. The current forestry program aims to regenerate approximately one percent of the manageable forest on each watershed annually, for deliberate and steady progress at a rate within the range of long-term natural disturbance patterns. The plan also places sections of the watershed protection forest in reserves or otherwise protected categories to remain unmanaged. All together, these areas with restricted management total as much as 20-25% of Division of Water Supply Protection (DWSP) holdings.

The regeneration activities are carefully designed and implemented, on appropriately located parcels within the watershed. DCR's current practice calls for typical average openings of around one acre, which retain trees within their interior for both habitat and seed sources. These are not large scale clear cutting of commercial harvest operations. DCR's standards for forestry cutting practices are substantially stricter than typical commercial scale operations. Individual trees to be removed are marked, access paths and loading zones are delineated, and intensive ecological and erosion control measures are mandated. The regeneration activity unleashed by opening forest floor to sunlight sparks rapid growth of new trees, well suited to the particular soil and slope conditions.

The DCR Land Management Plan echoes a question answered by a number of scientific studies from around the world: Is there a "best" forest for watershed protection?

"A protection forest has been defined by the Society of American Foresters as 'an area, wholly or partly covered with trees, managed primarily to regulate stream flow, maintain water quality, minimize erosion, stabilize drifting sand, conserve ecosystems, or provide other benefits via protection' (SAF, 2008). Given the full suite of potential disturbances likely to influence DWSP watershed forests, a prudent and conservative approach to maintaining water quality is to deliberately create and maintain a protection forest that is both resistant and resilient in the face of a range of such disturbances. A forest that is diverse in age structure limits the impacts of age-specific disturbances" (DCR Land Management Plan, 2017).

An appropriate protective forestry program:

- creates and maintains a watershed protection forest, resistant to and resilient from disturbance;
- monitors, maintains, and enhances overall forest health;
- encourages diversity of native species, while favoring those that are long-lived and adapted to site conditions;
- creates and maintains diversity of forest structure; and
- maintains the ability of the forest to establish abundant, diverse regeneration.

DCR's watershed forestry program is responsive to each of these criteria.

These conclusions and recommendations are well supported in the scientific literature. The Water Research Foundation and EPA conducted an extensive review of the implications of the type of catastrophic vegetative change that could occur from a hurricane or wildfire, and concluded that species and age class diversity increased resilience, reduced risk, and promoted recovery after damaging events.<sup>6</sup> The report indicated that active forestry management practices that promote diversity can be effective both in reducing risk and in managing the effects of any disturbance after an event. In addition to the demonstrated water quality benefits of an active forestry management program, many of the forestry management techniques used provide carbon sequestration benefits. Recognized adaptation strategies for forest carbon management include reducing carbon losses from natural disturbances, restoring with diverse species adapted to future conditions, increasing harvest frequency or intensity to reduce risk of tree mortality, and altering forest composition or structure to maximize carbon stocks, among others.<sup>7</sup>

Scientists and natural resource policy experts at the Environment and Natural Resources Program at the Kennedy School of Government at Harvard reached similar conclusions about the need for regeneration within the Quabbin watershed forest in their 1984 report<sup>8</sup>. They recommended a gradual addition to forest reserves as portions of the forest were restructured to near-natural conditions by active management.

The watershed managers for New York City, the largest of the unfiltered water supply systems in the United States, in their forest management plan focused on the long-term water quality benefits of optimization of forest cover resiliency. Their 2011 plan indicates that “the benefits of forest cover are maximized when forests are managed to promote long-term continuity of forest cover. Management to enhance the likelihood of continuous forest cover involves promoting vigorous tree growth and diversity in all aspects of forest composition, e.g., species, forest structure, natural community type, and development stage, to maximize resilience to disturbance. The most effective way to establish and maintain diversity and vigorous tree growth in the Northeast is through active forest management.”<sup>9</sup> This diversity can also increase the carbon stores available in a forest.

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6 *Utility Guidance for Mitigating Catastrophic Vegetative Change in Watersheds*, Water Research Foundation and EPA, 2009. [www.waterrf.org/research/projects/utility-guidance-mitigating-catastrophic-vegetation-change-watersheds](http://www.waterrf.org/research/projects/utility-guidance-mitigating-catastrophic-vegetation-change-watersheds)

7 *Forest Management for Carbon Sequestration and Climate Adaptation*, Todd A Ontl, Maria K Janowiak, Christopher W Swanston, Jad Daley, Stephen Handler, Meredith Cornett, Steve Hagenbuch, Cathy Handrick, Liza McCarthy, Nancy Patch, *Journal of Forestry*, Volume 118, Issue 1, January 2020, Pages 86-101

8 *Managing the Greenwealth: The Forests of Quabbin*, Charles H.W. Foster and David R. Foster, Center for Science and International Affairs, Kennedy School of Government, October 1984. [harvardforest1.fas.harvard.edu/sites/harvardforest.fas.harvard.edu/files/publications/pdfs/Foster\\_Greenwealth\\_1994.pdf](http://harvardforest1.fas.harvard.edu/sites/harvardforest.fas.harvard.edu/files/publications/pdfs/Foster_Greenwealth_1994.pdf)

9 *New York City Watershed Forest Management Plan*, NYC Department of Environmental Protection, November 2011. [www.nyc.gov/assets/dep/downloads/pdf/watershed-protection/opportunities-on-city-lands/dep\\_forest\\_management\\_plan\\_2011.pdf](http://www.nyc.gov/assets/dep/downloads/pdf/watershed-protection/opportunities-on-city-lands/dep_forest_management_plan_2011.pdf)

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For both New York City and MWRA, maintaining a healthy, resilient diverse forest is a key attribute of overall watershed protection program and integral to avoiding the need for filtration. Without a forest management plan focused on water quality, EPA could require MWRA to filter its drinking water, costing hundreds of millions of dollars and increasing energy use. MWRA would expend significant capital costs to construct a filtration plant, as well as millions per year in operating costs. Filtration is also energy intensive. A new plant would require substantially more electricity and fuel than is currently used by the Carrol Water Treatment Plant, resulting in additional carbon emissions. It is critical that DCR's forest management program continues to prioritize water quality benefits to avoid such a costly and carbon intensive process.

The forestry program and overall forest management approach contained within DCR's 2017 Land Management Plan satisfies MWRA's interest in assuring that DCR's forest management programs are building a resilient forest and protecting reservoir water quality in both the short term and the longer term and should be allowed to continue without change. These programs have resulted in an increase in protected (undeveloped) land and are an integral part of the overall watershed protection efforts necessary to continue to allow MWRA to maintain its filtration avoidance determination from MassDEP and the US EPA. This determination avoids not only the potential for a capital expense of hundreds of millions of dollars, but also a substantial increased use of energy, and production of greenhouse gasses associated with a filtration plant. Additionally, a diverse and resilient forest allows for greater carbon storage.

If clarification is needed on any of these comments, MWRA would be happy to provide additional detail or respond to any questions. Feel free to contact Stephen Estes-Smargiassi at [smargiassi@mwra.com](mailto:smargiassi@mwra.com).

Sincerely,

A handwritten signature in blue ink, appearing to read 'D. Coppes', with a stylized flourish at the end.

David W. Coppes, P.E.  
Chief Operating Officer

Cc: Fred Laskey, Executive Director  
Matthew Romero, MWRA Advisory Board Executive Director  
Colleen Rizzi, Director of Environmental and Regulatory Affairs