A Strategy for the Establishment and Protection of the Ecological Integrity of Forest Reserves in Massachusetts

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Forest Reserves are part of a holistic climate resilience and biodiversity conservation strategy that involves the protection of the full complement of habitat types and natural communities found in the Commonwealth. Resilient landscapes are composed of rich mosaics of interconnected terrestrial, aquatic, and wetland habitats and other compatible land uses.

Forest Reserves should be embedded within resilient landscapes containing a variety of habitats and land uses, and, over time, will support older forests with species assemblages and natural communities that may be lacking at more fragmented or human-impacted sites. The designation of Forest Reserves is intended to support the preservation of ecological processes and function as well as plant and animal interactions on the landscape.

The purpose of this document is to define Forest Reserves, outline the management approach and goals for Forest Reserves across state managed lands and to inform the Commonwealth's approach to supporting Forest Reserves on private and municipal conservation land.

What is a Forest Reserve?

Forest Reserves are formally designated landscapes where natural processes, including small and large-scale natural disturbances, such as wind and ice storms, determine changes in the long-term structure, composition, function, and dynamics of the forest ecosystem without deliberate human intervention, unless managers are confronted with a specific, unacceptable risk to human safety or forest health. It is acknowledged that certain ecosystem processes and disturbances historically occurring on the landscape, today require deliberate, facilitated management (i.e. prescribed fire, mowing) to permit these natural processes to occur. In Forest Reserves where high-value ecosystems are uniquely adapted to natural processes such as fire, these communities require active human intervention to facilitate these processes. Wildland fire management can support healthy forest ecosystems, improve habitat for rare and common species, and reduce the risk of catastrophic wildfire.

What are the goals of Forest Reserves?

Forest Reserves recognize the intrinsic value of forested ecosystems and support the preservation of ecological processes and functions that shape them, as well as plant and animal interactions on the landscape. This designation is a deliberate approach to:

1. increase the degree of natural complexity and amount of mature forest within forested landscapes statewide.
2. Provide an opportunity for unique older forest habitats to mature and develop over time with no intended intervention in ecological processes as part of a holistic, statewide, biodiversity conservation strategy.

3. Contribute to climate resilience through the maintenance of connected forest blocks and species movement corridors that provide a variety of important ecosystem processes, functions, and services.[i]
4. Contribute to carbon sequestration and storage as part of the Commonwealth's overall climate mitigation strategy.
5. Provide opportunities for low-impact outdoor recreation and other public enjoyment in uniquely undisturbed settings to serve a diverse public with wide-ranging recreational values.
6. Function as primarily passively managed reference sites that provide unique opportunities for ecological research, comparative studies of forest dynamics within different age classes and types of forest, and that enable long-term monitoring to evaluate how well Reserves are achieving their purpose as compared to other land management approaches. Long-term data monitoring may inform expansion or modification of Forest Reserves.

What Criteria will be used to identify Forest Reserves?

To identify and evaluate forests potential as Forest Reserves, the criteria below will be considered using the best available spatial data and analyses (GIS) and science, as well as by incorporating institutional knowledge and ecological field evaluations to ensure a well-informed selection process. While GIS data and models may be utilized to help identify potential sites across the state, field evaluations, ground truthing and documentation of existing conditions and stressors will fully assess and validate the suitability of individual sites for inclusion in the reserve portfolio.

Reserves may be a variety of sizes. Ideally, large Reserves are substantially larger than the largest natural disturbances to allow for refugia for disturbance sensitive species. Additionally, large reserves can accommodate a greater range of habitat conditions which enhances species diversity, provide more protection from outside anthropogenic disturbances, and allow for ecological process and function. Smaller Reserves can protect sensitive resources, such as those found on steep slopes and fragile soils and may serve as areas of refugia in a changing climate as well as "steppingstones" to facilitate movement of species that require undisturbed sites but can't travel long distances, such as many invertebrates and amphibians. In more developed areas of the state, smaller Reserves may help promote equitable access.

The most favorable lands for Reserve designation are those that exhibit a combination of the criteria below.

<u>Representativeness</u>

- *Representative of diverse forested landscapes across ecological settings (elevation, soils, landforms) at sites dispersed throughout Massachusetts*.
- *Captures redundancy in forest characteristics, such as composition, structure, and ecological services to ensure that multiple areas within a forested landscape can perform similar important ecological functions.*

<u>Landscape Context</u>

- *Proximal, connected to, or embedded within predominantly protected, resilient landscapes—in particular, proximal to other Forest Reserves –with a diversity of intact, interconnected natural communities that exhibit low levels of development or barriers to species migration, such as roads*.

- *Situated to protect and conserve ecological and evolutionary processes essential for ecosystem function, biodiversity, and the provision of ecosystem services.*
- *Situated where there is minimal recreational infrastructure and/or a low density of non-motorized trails that do not adversely impact critical resources.*
- *Large Reserves may be designated that exclude specific areas of high recreational impact, working landscapes, or non-forested cover types incompatible with Reserve designation.*

Ecological Composition and Condition

- *Exhibit high forest integrity, forest structural complexity and limited potential barriers (i.e. invasive/exotic species, heavy deer browse) to long-term ecosystem health and forest regeneration.*
- *Contain unique natural communities and may support specialized organisms associated with older forest conditions*.
- *Represent climate resilient landscapes and exhibit lower climate risks from major weather events, insects, and wildfire*.

Size and Shape

- *Accommodate Forest Reserves of a variety of sizes within the reserve portfolio*.
- *Reflect higher area-to-perimeter ratio to reduce "edge effect".* Parcel blocks with greater interior area are preferred to narrow or convoluted shapes of equal size as they provide more interior forest relative to their edges.

What Activities are Allowed in Reserves?

Forest Reserves will provide for the long-term passive management of select forested landscapes to allow natural processes to determine forest ecosystem changes to the greatest degree possible and to increase the degree of natural complexity and amount of mature forest within those landscapes. However, under specific circumstances, active forest management or assisted restoration may be needed in Forest Reserves to ensure that natural processes, such as fire, are allowed to persist without risk to forest health or human safety, and that ecosystem function, vital ecosystem services, and habitat values persist in face of certain problematic invasive species, and unforeseen circumstances that undermine forest ecological function.[ii]

Dispersed, low impact recreational activities such as hiking, hunting, fishing, trapping, wildlife observation, and outdoor education, are accommodated within Forest Reserves. Trails that meet agency policy and permitting requirements are appropriate but should be assessed to ensure that their number and location do not result in excessive fragmentation, erosion, or impacts to sensitive habitats based on the carrying capacity of the Reserve. OHV/ATV use will be restricted to existing, authorized trails only. The creation and implementation of new OHV/ATV trails will be prohibited in Forest Reserves.

The Forest Reserves Science Technical Advisory Committee (FRSTAC), a voluntary committee of subject matter experts, including conservation biologists, experts in forest health and ecology, climate change and adaptation, as well as watershed management, serves to advise EEA and its forest land management Division staff on specific management and major restoration activities within Reserves. This helps maintain important management flexibility to address stewardship needs, some already anticipated, and some that may emerge in coming decades, while ensuring a continued focus on passive management of Forest Reserves.

To better ensure that FRSTAC expertise is focused upon the most pressing concerns, the following management activities will remain the discretion of the agencies and do not necessitate consultation with FRSTAC. However, agencies may elect to confer with FRSTAC on a case-by-case basis:

1. Selective understory invasive plant control to protect native plants and wildlife habitats from displacement and prevent alteration of natural ecological processes.[iii]
2. The conversion or removal of non-native plantations as a short-term measure that supports long-term Forest Reserve goals, consistent with Climate Forestry Committee consensus that plantations should be restored to more compositionally diverse forests. The removal of a plantation helps restore a more biologically diverse ecosystem, allowing for the re-establishment of native flora and fauna that may have been displaced, promoting the ecological value of the Forest Reserve, and maintaining a more resilient ecosystem.
3. Creation of new non-motorized trails that adhere to agency policy, practices, and procedures.
4. Maintenance or repair of existing forest roads, trails, and administrative access points (e.g., access to other management units outside of the reserve boundaries) and any measures needed for protection from unauthorized and illegal uses such as off-road vehicles and mountain bikes which can cause severe soil erosion, increases in invasive plants, etc.
5. Legal, regulated hunting, fishing, and trapping.
6. Preservation of historic and cultural resources.
7. Activities that address public safety, such as the removal of hazardous trees, particularly within high-use areas and areas prone to wildfire near residential interfaces. These areas may increase as drought and shifts in forest composition increase with climate change.

Other management activities in Forest Reserves are subject to approval by Division and agency leadership, and will necessitate consultation with the Forest Reserve Science and Technical Advisory Committee:

1. Management to control emerging pathogens or forest pests that pose a regional or statewide threat to forests, including forests adjacent to and in the vicinity of Reserves.
2. Implementation of Natural Heritage and Endangered Species Program (NHESP) recommendations to restore, maintain or enhance habitat for rare and endangered species and exemplary natural or rare communities.
3. Adding new recreational access points consistent with low intensity use (e.g., small unpaved parking areas).
4. Restoration of water and wetland resources, including restoring hydrologic flow and aquatic connectivity, and remediation activities to manage erosion and maintain water quality.
5. The use of periodic low and moderate intensity prescribed fire to mimic fire's role as a natural process to sustain natural communities.[iv]
6. Implementation of new monitoring and research activities that inform Reserve management and actions needed on public and private forest lands to improve resiliency and adaptation to climate and other stressors. Engagement with the Forest Reserve Science & Technical Advisory

Committee is intended to leverage Committee expertise to enhance research activities. Consultation to establish protocols for certain non-destructive, low impact research and routine monitoring within a Forest Reserve is expected, with agency staff subsequently updating the Committee periodically as to ongoing research and monitoring activities.

7. Stabilization measures conducted in response to a major disturbance to prevent the further degradation of the health and functionality of the ecosystem following events such as wildfires, storms, and other significant events. This may include activities such as reforestation, restoration of water and wetland resources, or soil erosion prevention to accelerate the natural recovery of the ecosystem, allowing native plants and animals to re-establish, maintain soil integrity, and preserve water quality.

References

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[i] Ecosystem services include carbon storage and sequestration, supporting biodiversity, drinking water protection, and flood mitigation. These services are provided broadly by managed forests, forest reserves, and other natural lands.

[ii] Determining the appropriate response to wildfires, outbreaks of pests and pathogens, and occurrence of invasive species will be a critical component of Reserve planning.

[iii] The natural ecological processes that Reserves are intended to protect can be threatened by invasive plants. Strategic invasive plant management to protect high priority natural resources is important to the Commonwealth. Early detection and rapid response collects site-specific information and prioritizes intervention based on the severity of infestation and the invasiveness of the species. This can limit the damaging effects of new invasive species in the early stages of an establishment and infestation. Invasive plant management within Reserves will consider eradication, reduction, suppression, and/or spread prevention and will include follow-up monitoring to measure success.

[iv] Fire is a normal part of a healthy forest ecosystem, but is often suppressed to protect development that is in close proximity, or within, forests. More hazardous fire conditions may be created when fire-suppression programs allow dead organic material such as leaves, branches, and stems to accumulate, providing raw materials for an exceptionally severe fire that burns tree crowns and destroys the existing forest, rather than through the periodic consumption of materials by small fires burning along the forest floor. Changes in fire frequency can alter an

existing ecosystem, including invasion by fire-intolerant species and eventual loss of the original ecosystem. Understanding fire and plant dynamics, fuels, and fire behavior help to establish appropriate fire regimes (USDA Forestry Incentive Program).