

DCR-BOFF Forest Management Proposal

Project Name: Echo Lake Project

Property Name: Wachusett Mountain State
Reservation

Acres: 81.3

Forestry District: Mid State

Forester: Joelle Vautour with Amelia Zani/Jacob
Towsley

Date Proposed: October 2025

Town(s): Princeton

Landscape Designation: Parkland

Rec Complex/District: Wachusett

FOTL/F&P Supervisor: Morrissey/Marble

GENERAL PROJECT DESCRIPTION

Acres	Overstory Forest Type	Understory Forest Type	Stand Description
24.1	Overstory: Mixed Softwood Plantation	Understory: American beech, red maple, black birch, northern red oak, yellow birch	Stand 1. Failing mature Norway spruce plantation with occurrences of red pine and eastern larch plantings on former pastureland. Native overstory species include eastern white pine, northern red oak, and black cherry. No evidence of previous forest management.
8.4	Overstory: N/A	Understory: Grasses, forbs, poison ivy, eastern white pine	Stand 2. Grass and forb field, with small amounts of poletimber sized, open grown eastern white pine.
28.5	Overstory: Northern red oak	Understory: Black birch, red maple, American beech, eastern hemlock, yellow birch	Stand 3. Mixture of mature northern red oak, eastern white pine, red maple, black cherry, and white ash. Naturally regenerated on former pastureland. No evidence of previous forest management.
1.8	Overstory: Oak-Hardwoods	Understory: Eastern hemlock, eastern white pine, sugar maple, red maple, American beech	Stand 4. Mature hedgerow of small sawtimber sized northern red oak with occurrences of white ash, sugar maple, eastern white pine, black cherry, and red maple.
13.2	Overstory: N/A	Understory: Grasses, forbs	Stand 5. A field of grasses and mixed forbs.
5.3	Overstory: Northern Hardwoods	Understory: Grasses, ferns, blackberry	Stand 6. A young forest containing gray birch, black birch, white birch, yellow birch, black cherry, eastern white pine, red maple, sugar maple, white ash, and northern red oak.

Project Summary, Goals and Objectives:

The Echo Lake Project occurs on former agricultural lands on the lower slopes of the Wachusett Mountain State Reservation. A mature monocultural plantation, primarily consisting of Norway spruce, has been subject to increased mortality and damage from severe weather events that are common to this area. Resiliency to climate change is low due to the homogenous structure of the plantation. The main goal of this project is to mitigate mortality within the softwood plantation and adjacent forest stands to increase forest resiliency and recreational safety. This will be done by implementing uneven aged silvicultural practices to diversify species composition and increase stand structure. Fields within the project area will be managed to increase biodiversity habitat values for species of greatest conservation need as identified in the Massachusetts State Wildlife Action Plan (SWAP), particularly for songbirds.

MASSACHUSETTS FOREST ACTION PLAN GOALS

The goals listed below are sourced from *DCR (Department of Conservation and Recreation) Bureau of Forest Fire Control and Forestry. 2020. MASSACHUSETTS STATE FOREST ACTION PLAN 2020*

- **Increase resistance and resilience of trees and forests to mitigate and adapt to the effects of climate change**
- **Manage forest ecosystem health and biodiversity**
- **Enhance the connection between forests and people**

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- Cultivate and support partnerships with forestry and conservation Stakeholders
- Support the role and use of prescribed fire in the landscape

CLIMATE CHANGE ADAPTATION STRATEGIES AND APPROACHES

The strategies and approaches listed below are sourced from the Response to the Report of the Climate Change Committee, 2024 and the Report of the Climate Forestry Committee: Recommendations for Climate-Oriented Forest Management Guidelines, 2024.

- **1: Sustain fundamental ecological functions.**
 - **2: Reduce the impact of biological stressors.**
 - **5: Maintain and enhance species and structural diversity.**
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CLIMATE ADAPTATION

Action Type	Identified Issue	Action Description
Resilience	Homogenous, even aged overstory of mature species that lacks vegetative diversity and has a low adaptive capacity in the face of climate change.	Diversification of species composition and structure will create more resilient conditions by increasing the sites adaptive capacity in the face of climate change. Transition current conditions to an uneven aged heterogenous structure by mimicking natural disturbance patterns over time.

Adaptive Management Strategies: Per the Response to the Report of the Climate Forestry Committee: “Focus active management for resilience on areas...most at risk and in need of ecological restoration/climate resilience such as plantation monocultures”; Promote a diversity of tree species and age classes across the project area to increase resiliency to climate change, facilitate natural regeneration of native species, and enhance habitat opportunities as identified in the Massachusetts SWAP.

CLIMATE CHANGE CONSIDERATIONS

The Department of Conservation and Recreation, Division of State Parks and Recreation has determined that the decision to implement this project is consistent with EEA climate goals and guidelines and agency land management objectives.

Activities proposed	Carbon and climate change considerations
Full overstory removal, partial stand, variable retention harvesting in stands 1 and 3 will focus on increasing species diversity and structural complexity.	Variable retention (VR) is a regeneration technique based on natural disturbance ecology that retains important biodiversity components of the stand during the harvest to meet habitat objectives. The retained components include a diverse species mix of live and dead trees in a range of diameters with an emphasis on the larger sizes, cavity trees, and large snags and logs of different decay stages. These are in a patchwork pattern across the stand from single trees to large groups measured in acres. • This practice more closely aligns with natural disturbance patterns. • Promotion of a diversity of age classes, species composition and structural diversity enhances overall forest resiliency. • More carbon is left on the landscape for longer periods, in live trees, snags, and coarse woody material while regeneration develops.

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	• Improving conditions for a wide variety of local wildlife through the creation of temporary young forest habitat. • Maintenance of continuous forest corridors provides for wildlife habitat. • As part of a regeneration system this method can be used to help guide species diversity towards more future-adapted mixes. •
Full overstory removal, complete stand, plantation conversion to native species within stand 1, to convert the softwood plantation to a native forest ecosystem.	Long considered a critical practice on agency lands to improve biodiversity and forest resilience, the conversion of single-species conifer plantations to more diverse mixes of native species has recently been encouraged as a climate-smart practice by NIACS and other climate adaptation experts. Tree monocultures, intensively managed throughout the world to produce much of the wood we all use, are highly vulnerable to the kinds of pest and disease impacts that are likely to worsen as climate changes. Conversion of monoculture plantations aligns with many climate-smart forestry practices highlighted in the CFC report, including but not limited to: • Improving resistance to pests and pathogens. • Increasing resiliency by promoting diversity of plant species. • Providing age class/structural diversity. • Improving conditions for a wide variety of local wildlife through the creation of temporary young forest habitat. • Promoting future-adapted tree species in the regeneration mix.
Revegetation, tree planting in stands 1 and 3 to bolster species diversity and species migration patterns.	Healthy, climate-resilient forests should be capable of rapid self-replacement following disturbances. Agency forest managers identify many areas with too few seedlings and saplings in the understory to ensure such resilience. A variety of causes may account for this, including over-browsing by deer/moose and heavy invasive plant cover. Such sites are likely to suffer delayed carbon storage potential following harvesting or natural disturbances. Tree planting provides opportunities to: • improve regeneration numbers. • adjust the mix in favor of more climate adapted species or to meet other management goals. • reforest areas that have been converted to non-forest land cover. • improve carbon sequestration and storage. • establish tree cover where invasive vegetation might otherwise dominate the site.
Tree mowing & mulching within stands 2 and 6, in consultation with DCR Wildlife Biologist for suitability.	Mowing and mulching are used to perpetuate both non-forest (grasslands) and young sapling forest conditions within a given footprint on the landscape. This practice resets the development of a stand that has grown out of the sapling stage to provide critical habitat in the absence of localized natural disturbances such as flooding or fire. Is an important practice for maintaining young aspen stands that support species of greatest conservation need.

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	- Recommended as one type of climate-smart alternative for young forest habitat. Aligns with carbon objectives versus harvesting mature forests. Can be prohibitively costly to implement.
Habitat restoration and maintenance prescribed fires -- heath, shrubland, woodland, or grassland within stand 5, in consultation with DCR Wildlife Biologist.	Prescribed Fire is the planned use of fire in a particular place and time, under established conditions and safety requirements to accomplish resource management goals. - Prescribed fire improves habitat for a variety of wildlife and native plants and restores natural communities dependent on fire. - In fire-influenced natural communities, fragmentation of the landscape and the suppression of fires (prescribed or natural) leads to accumulation of volatile surface, mid-story, and canopy vegetation hazardous fuels. - Excessive fuel buildup negatively impacts the habitat quality of the natural community and may eventually lead to an unplanned, catastrophic wildfire. - Prescribed fires that reflect natural return intervals increase below-ground carbon storage and sequestration. The consequences of catastrophic wildfires include: - The release of large amounts of carbon. - Kills trees. - Causes severe soil, duff, and below ground vegetation impacts. - May alter soil chemistry. - Threaten firefighter safety, human communities, and property damage. - May volatilize and release soil carbon. - Cause severe smoke impacts within a large airshed.

SOILS AND TOPOGRAPHIC FEATURES

Acres	Soil Type	Drainage Characteristic
20.7	Paxton fine sandy loam, 3-8% slopes	Well drained
8.1	Peru fine sandy loam, 3-8% slopes	Moderately well drained
14.5	Berkshire-Marlow association, 15-45% slopes, extremely stony	Well drained
29.0	Peru-Marlow association, 3-15% slopes, extremely stony	Moderately well drained
9.1	Pillsbury-Peacham association, 0-8% slopes, extremely stony	Very poorly drained

Average Slope Percent:0-5%

General Aspect: Varied

Terrain Consistency: Variable

Terrain Position: Mid Slope

Description of Soils and Topographic Features: Much of the project area is underlain by well drained to moderately well drained glacial till soils. The Pillsbury-Peacham association underlies a stream and bordering vegetated wetlands in the northern portion of the project area. While the topography is generally on a south facing aspect, a small hill with a northwestern aspect also occurs.

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WETLAND FEATURES

	Present	Crossing	Work within Filter/Buffer
Wetlands:	Yes	Possible	Possible
Regulated Streams:	Yes	Possible	Possible
Non-Regulated Streams:	Yes	Possible	Possible
Vernal Pools:	No	N/A	N/A
Seeps:	Possible	Possible	Possible

Description of Wetland Features: There are two wetland systems within the project area and one to the east of the project area south of Westminster Road. The wetlands contain native tree species, shrubs, and ground vegetation consistent with wet soil conditions. Operability will be focused on stable soil conditions and planning efforts to avoid wetland resource crossings will be made. All BMP's will be applied and hazard tree mitigation will be implemented in resource areas in accordance with Chapter 132 regulations.

CULTURAL RESOURCES

	Present	At Risk	Work Within Buffer
Stone Walls:	Yes	No	N/A
Foundation / Cellar Hole:	Yes	No	N/A
Well:	Possible	N/A	N/A
Structures:	No	N/A	N/A
Cemetery:	No	N/A	N/A
Other: N/A			

Description of Cultural Resources: The foundation of an old summer cottage is present north of Westminster Road. Much of this area was former pasture lands and stone walls are present throughout the project area. All cultural features will be mapped during field work and collaboration with DCR Archaeology will be ongoing.

NATURAL HERITAGE / WILDLIFE-HABITAT MANAGEMENT / OTHER RESOURCES

Natural Heritage Polygon: No
Natural Heritage Restrictions: No
Restrictions on Harvest Description: Not applicable

Wildlife Specific Management: Yes
Targeted Species: SWAP songbirds
Goals: Management of stands 2, 5, and 6 will be for the benefit of habitat suitable for SWAP species, particularly songbirds.

Additional Habitat Management: N/A
Habitat Type: Click or tap here to enter text.
Goals: Click or tap here to enter text.

State Forest Action Plan: Yes
ACEC: No
BIO Map2: No
State Wildlife Action Plan: Yes
Public Water Supply: Yes
Current Resource Management Plan: No

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Additional Detail: Maintaining hard and soft mast species is important for providing a diversity of wildlife food sources into the future. Additionally, diversifying structure will create nesting and foraging habitat for a variety of migratory songbird and mammal species. Applying an uneven aged management approach will maintain young forest on the landscape. It may be beneficial to implement larger openings in adjacent stands in future projects to maintain and enhance habitat opportunities for SWAP species.

FOREST HEALTH / INVASIVE SPECIES

Forest Health Concern: Yes

Species Affected: American beech, white ash, eastern hemlock

Management Considerations: Beech leaf disease and beech bark disease are affecting American beech, hemlock is infested with hemlock woolly adelgid, and white ash is infested with emerald ash borer.

Management will focus on maintaining any healthy American beech, white ash, and eastern hemlock to maintain a genetic presence on the landscape. Prescribed silviculture is intended to increase species diversity and structural complexity, which will increase forest resiliency to future disease and pest outbreaks. High risk species within two tree lengths of any infrastructure will be assessed for potential future hazards and possibly removed to mitigate future hazard conditions.

Plant Invasive Species Present: Yes

Species Present: Autumn olive, burning bush, multiflora rose, Japanese knotweed

Management Considerations: A combination of mechanical and chemical control will likely occur. Species abundance and densities are currently low and avoidance to disturbance within those areas will be made.

Insect Invasive Species Present: Yes

Species Present: Emerald ash borer, hemlock woolly adelgid, beech leaf disease, beech bark disease

Management Considerations: See above

INFRASTRUCTURE / RECREATION/ AESTHETICS

Access Road: Forest road off Westminster Road

Ownership: DCR

Condition: Fair, has a solid base

Road Repair/Upgrade: Yes

Existing Landing: No

Landing Repair/Upgrade: Choose an item.

Project Access and Landing Site: Landings will be in the fields of stands 2, 5, and 6. Some road upgrades will be required to access stand 2.

Existing Skid Trail Network: No

Pre-Harvest Repair/Upgrade: Possible

Skid Trail Network Description: There are no pre-existing skid trails in the project area.

Shared Infrastructure: Yes

Road/Trail Names: Administration Road and Echo Lake Trail

Management Considerations: The project area surrounds a large portion of the Echo Lake Trail and abuts Administration Road, two heavily recreated sites at the property. Hazard tree mitigation, outreach, and education regarding the project, including trail closures, will be necessary.

Infrastructure Present

Infrastructure	Present	Condition
Official Trail	Yes	Poor
Illegal Trail	No	N/A
Existing Trail Head	Yes	Poor
Recreation Facility	No	None

Recreation and Aesthetic Concerns/Opportunities: An opportunity to restore or possibly re-route portions

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of the Echo Lake Trail that have eroded is possible and will be discussed with DCR Operations and DCR Trails staff.

SILVICULTURE

Acres	Silviculture Type	Silviculture Description
52.6	Individual Selection and Group Openings (Variable Retention Thinning)	Stands 1 and 3. Group openings up to 2 acres in size, mimicking natural disturbance, and optimizing growing conditions to achieve maximum species diversity. Individual tree selection will be implemented between group openings.
8.4	Mowing	Stand 2. Consultation with DCR's Wildlife Biologist regarding specific management actions will be sought. Previous discussions have determined that prescribed fire in this field is not suitable due to poison ivy presence and management as a pollinator/shrub habitat type would be beneficial. This will include harvesting the larger pine that have become established within the field to maximize habitat potential and implement a routine mowing regime.
1.8	Clearcut	Stand 4. All woody vegetation greater than 1" dbh will be harvested from this stand to increase the connectivity and habitat potentials between both sections of stand 5 that are adjacent.
13.2	Prescribed Fire and Mowing	Stand 5. Consultation with DCR's Wildlife Biologist as to deciding best management practices will be sought. Discussions have been made that prescribed fire could be a suitable management tool to increase grassland habitat potential within this stand. Additionally, it would be suitable to harvest the larger eastern white pine that have become established within the field. If prescribed fire is not feasible, management to assist in a routine mowing schedule will be pursued.
5.3	Mowing	Stand 6. Consultation with DCR's Wildlife Biologist as to deciding best management practices will be sought. Previous discussions include cutting the young forest to allow to regrow.

General Comments on Silviculture Proposed: Management of stands 2, 5, and 6 will require ongoing discussions and collaboration with colleagues to optimize habitat benefits.

PERMIT REQUIREMENTS / OPPORTUNITIES

Restrictions	Description
Seasonal Restrictions: No	None.
Equipment Restrictions: Possible	Equipment restrictions are unknown at this time.
Recreation Restrictions: Possible	There will be an impact on recreation during active management. Collaboration with DCR Operations and DCR Trail staff will be required.
Green Docket: No	None.
In-kind Services: Yes	Some road improvements are likely to access the landing in stand 2.

Potential Local Economic Benefits: Local economic benefits include, timber harvesters, machine servicing (welders, hose manufacturers), fuel and trucking, local wood producers, mill owners and workers, contractors, builders, and natural resources professionals, among others. The sale of forest products within the community helps underserved and rural economies in many ways. Historically, firewood that is harvested in this region of Massachusetts remain local and is sold and processed by local businesses to sell to local homeowners. Road and trail improvement services utilize local resources when hauling and/or the spreading of material is required.

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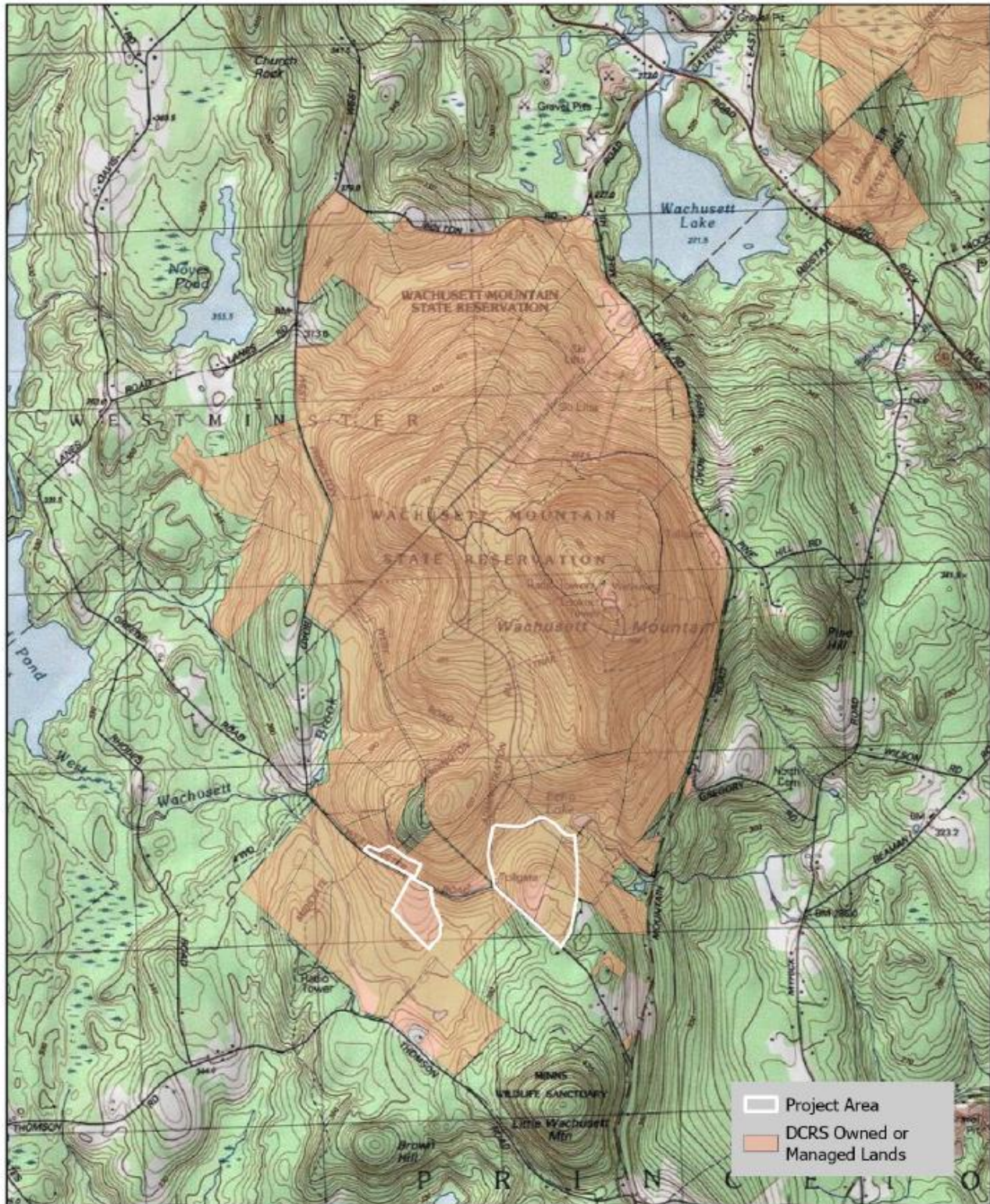
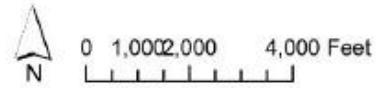
Attachments:

Locus Map

Project Map

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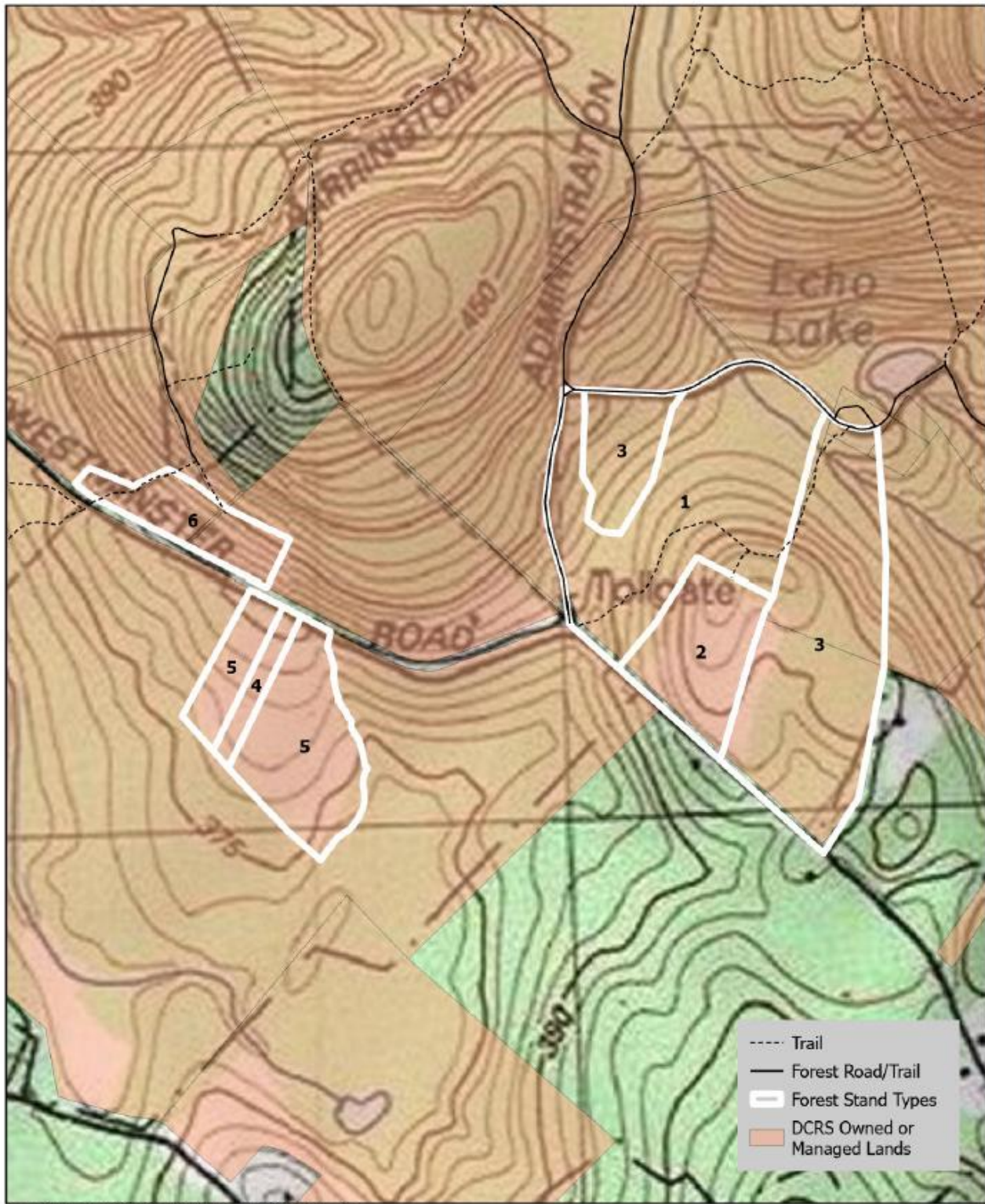
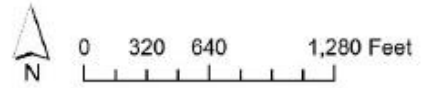
**Wachusett Mountain State Reservation
Echo Lake Project - Locus Map
February 2025**



Map Prepared By: Joelle Vautour, DCR Forester

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Wachusett Mountain State Reservation
Echo Lake Project - Project Map
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