dcr
Massachusetts

Resource Management Plan
Mount Grace State Forest

Adopted by the DCR Stewardship Council Month, 2025

Massachusetts Department of Conservation and Recreation
Division of Conservation and Resource Stewardship
Office of Cultural Resources

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Purpose

Resource Management Plans (RMPs) are foundational documents that identify a park, forest, or reservation's defining natural, cultural, and recreational resources and identify potential threats and opportunities to guide DCR's continued stewardship of the property and to inform future decisions about the property in a way that celebrates and preserves its identity.

RMPs are prepared for "all reservations, parks, and forests under the management of the department" (M.G.L. c. 21, § 2F). These plans "shall include guidelines for the operation and land stewardship of the aforementioned reservations, parks and forests, shall provide for the protection and stewardship of natural and cultural resources and shall ensure consistency between recreation, resource protection, and sustainable forest management." DCR finalizes RMPs following a public process and adoption by the DCR Stewardship Council. The contents of this RMP represent the best available information at the time of adoption by the Stewardship Council.

Mission and Core Principles

The Massachusetts Department of Conservation and Recreation, an agency of the Executive Office of Energy and Environmental Affairs, oversees 450,000 acres of parks and forests, beaches, bike trails, watersheds, dams, parkways, and over 100 National Register listed properties. The agency's mission is to protect, promote, and enhance our common wealth of natural, cultural, and recreational resources for the well-being of all.

DCR strives to be an exemplary leader in conservation and recreation. DCR's staff is passionate, dedicated, and continuously employs best practices, expertise, and a sense of place in carrying out the mission. The following core principles ground the agency in its work. For the benefit and well-being of all—people and the environment—DCR pledges to:

- Provide access to a diversity of outdoor recreational experiences and unique landscapes that is equitable, inclusive, and welcoming.
- Conserve lands, water, and forests by integrating science, research, and technical expertise into the management of our natural resources.
- Advance climate change mitigation and adaptation efforts by implementing sustainable practices and advancing resiliency across our infrastructure, assets, and resources.
- Support healthy communities by providing places for people to connect with nature and each other.
- Inspire generations of stewards by recognizing and honoring our legacy through partnerships, public engagement, and education.

Stewardship

DCR honors Indigenous peoples for their care, throughout many generations, of the land that DCR now stewards on behalf of the people of the Commonwealth. DCR embraces this legacy of stewardship, fostering a sense of shared responsibility by all people for protection of the waters, lands and living things for the enjoyment and appreciation of all.

To learn more about the DCR, its facilities, and programs please visit us www.mass.gov/dcr. Contact us at mass.parks@mas.gov.

Mount Grace State Forest

https://www.mass.gov/locations/mount-grace-state-forest

1. Property Overview

Characteristic	Value
Date Established	1921
Location	Warwick
Ecoregion	Worcester Plateau
Watershed	Connecticut, Millers
DCR Region	Central
DCR District	Central Highlands
DCR Complex	Erving
Management Forestry District	Mid-State
Fire Control District	North Worcester
Size (acres)	1,578.1
Boundary Length (miles)	15.3
Elevation - Minimum (feet)	520.8
Elevation - Maximum (feet)	1,617.0
Environmental Justice (acres)	0.0
Estimated Annual Attendance (2023)	15,000
Interpretive Programs (# programs, 2023)	0
Interpretive Programs (# attendees, 2023)	0

2. Landscape Designations

Designation	Acres
Parkland	84.7
Reserve	0.0
Woodland	1,489.2
No Designation	4.2

3. Regulatory Designations

Designation	Acres
None	N/A

4. Long-Term Agreements

Agreement	Expiration Year
None Identified	N/A

5. Concessions

Concession Type
None

6. Partners & Friends

Group(s)
Appalachian Mountain Club
Mount Grace Land Conservation Trust

7. Features of Interest

Feature
Bennetts Knob
Council Ring
Grace Brook
Kidder Brook
Little Mount Grace
Mirey Brook
Mount Grace
Mountain Brook
New England National Scenic Trail
Warwick Fire Tower

8. Natural Resources

Resource	Value
Tree Canopy (acres)	1,572.2
Rivers and Streams (miles)	6.5
Open Water (acres)	0.0
Wetlands (acres)	15.2
Certified Vernal Pools (#)	2
Potential Vernal Pools (#)	0
State-Listed Species (# Regulatory)	0
State-Listed Species (# Non-Regulatory)	1
Federally Listed Species (#)	0
Aquatic Invasive Plants (# known species)	0
Terrestrial Invasive Plants (# known species)	4

9. Forest Management (Since 2012)

Management Objective	Acres
None	N/A

10. History of Wildfires and Conditions Influencing Future Wildfires

Wildfire Attribute	Value or Characteristic
Number of wildfires on property; 2019–2023	0
Acres burned by wildfires on property; 2019–2023	0.0
Number of wildfires in Fire Control District; 2019–2023	220
Acres burned by wildfires in Fire Control District; 2019–2023	108.5
Type of Wildland-Urban Interface.	Intermix
Predicted rate of spread, based on Fire Behavior Fuel Model 13	Rapid

11. Natural Hazards

Hazard Type	Acres
Flood (1.0%-chance)	N/A
Flood (0.2%-chance)	N/A
Hurricane Inundation (Cat. 1)	N/A
Hurricane Inundation (Cat. 4)	N/A

12. Climate Change (By 2070)

Type of Change	Amount of Change
Increase in annual days over 90° F	>30
Change in annual maximum daily rainfall (inches)	>10
Massachusetts Coastal Flood Risk Model area of inundation (acres)	N/A

13. Cultural Resources

Resource Type	#
Archaeological	0
Historic - Total MACRIS Listed	7
Historic - National Register Listed	0
Historic - National Historic Landmark	0

14. Recreation Resources

Resource	#
New England National Scenic Trail	1
Oscar N. Ohlson Memorial Field	1
Trail Shelter	2
Trails System	1

15. Recreation Activities

Activity
Bicycling, mountain
Dog walking, off-leash area
Dog walking, on-leash
Hiking/Walking
Horseback riding
Hunting
Nature study/Photography
Orienteering
Scenic vista viewing
Skiing, cross country
Sledding/Tubing
Snowmobiling
Snowshoeing
Trapping
Wildlife viewing

16. Roads and Trails

Metric	Value
Roads - Unpaved (miles)	1.6
Roads - Paved (miles)	<0.1
Forest Roads - Unpaved (miles)	2.8
Forest Roads - Paved (miles)	0.0
Trails - Unpaved (miles)	10.8
Trails - Paved (miles)	0.0
Trails - Unauthorized (miles)	0.4
Trail Density (miles/acre)	0.009
Area of Impact (acres)	811.4

17. Parking

Parking Resources	#
Lots	2
Parking Spaces - Total	70
Parking Spaces - Accessible (HP)	0
Parking Spaces - Other	70

INTRODUCTION

Mount Grace State Forest (Mount Grace or the Forest) is located in the Town of Warwick (the Town), approximately 15 miles northeast of Greenfield and two miles south of the New Hampshire state line. The Forest is mainly surrounded by rural residential properties and undeveloped, privately-owned woodlands. Warwick Center, a residential, governmental, and commercial district is centered along Route 78 on the Forest's southeast border. To its west, the Forest shares an approximately 1,200-foot-long common border with the Flagg Road Tract of Warwick State Forest. An additional tract of Warwick State Forest, the Tully Brook Tract, is located approximately 1,500 feet east of the Forest. Mount Grace is bisected by Northfield Road to the west and Route 78 (Winchester Road) to the east. Three prominent peaks, Mount Grace (1,617 feet), Bennetts Knob (1,476 feet), and Little Mount Grace (1,226 feet) are located within the Forest.

The New England National Scenic Trail (NET), which incorporates the shorter Metacomet-Monadnock Trail (M&M Trail), passes generally east-west through the Forest. The NET, designated a National Scenic Trail in 2009, runs 235 miles as a north-south corridor in Massachusetts and Connecticut, with the M&M trail continuing the treadway into New Hampshire (New England Trail 2020). Along its course, the NET passes through 9 DCR-owned or managed properties, the closest to Mount Grace is Warwick State Forest, to both the west and east. In 2023, the National Park Service (NPS) designated the NET as a National Park.

The Forest is on land shaped by generations of Indigenous peoples and non-Indigenous inhabitants. Past and present Indigenous residents embody fluid, relational connections to the places and spaces now known as Mount Grace State Forest. Groups and individuals, including peoples known as the Wabanaki (Dawnland Confederacy), Pennacook, and N'dakina (Abenaki/Abenaquis), are recorded in available documentation (Native Land Digital 2023) as having relationships to this place over seasons and generations. Following Indigenous peoples' dispossession, the Massachusetts General Court (MGC) granted Euro-Americans the lands constituting present-day Warwick in 1690 and incorporated Warwick in 1763. By the early 20th century, Warwick was a sparsely populated, rural community with an emerging summer recreation economy (Massachusetts Historical Commission 1982: 1, 9).

Local and state trends in recreation aligned to make the creation of Mount Grace State Forest as much a recreational endeavor as a forestry endeavor. In the 1910s, Warwick residents began advocating for a reservation at Mount Grace because of its prominence as a local landmark. In 1911, the State Forester caused a fire tower to be installed on leased land at the summit, which may have raised awareness of the outstanding views available from the mountain (Ahlstrom 2020: 331, 333). The State Forest Commission (SFC) met with reservation supporters in January 1915, and in April 1915, the Massachusetts General Court (MGC) directed the SFC "to investigate the advisability of establishing a state park or forestry reserve at Mount Grace" (MGC 1915). The SFC reported back favorably in its January 1916 report, recommending that the mountain was appropriate for a state forest combining recreational and silvicultural objectives: "We believe that the mountain…will be of much benefit to the people of the community...and will be visited by large numbers because of its important scenic position…and that a State forest can be administered properly from a commercial standpoint and still afford every opportunity for recreation and pleasure..." (SFC 1916: 11–12). Because Mount Grace lands did not meet criteria for purchase by State Forest Commissioners (i.e., "wild or unproductive" land), special legislation was needed for the acquisition. After some delay, the MGC in 1920 authorized $50,000 for purchase of

up to 1,300 acres, with the stipulation that the property would be known as "Mount Grace State Forest" (MGC 1920). Recreational development began immediately after purchase with construction of shelters, including a stone hut at the summit (no longer extant) (Ahlstrom 2020: 333). Later, the Civilian Conservation Corps (CCC) from Warwick State Forest worked at Mount Grace on numerous projects. In 1935 and 1936, the CCC established snowshoe and downhill ski trails, with a large field and parking area for cars at the base. The field, now called Oscar N. Ohlson Memorial Field (Ohlson Field) after a former Mount Grace Supervisor, still contains two structures built by the CCC, the council ring and a shelter. The CCC also made improvements to the Gulf Brook Picnic Area; though no longer used as a picnic area, many remnants such as stone fireplaces are still visible (Berg 1999). The Forest was previously managed under a 1996 Department of Environmental Management (DEM) Guidelines for Operations and Lands Stewardship (GOALS) plan for the Northeastern Connecticut Valley Region (DEM 1997).

Mount Grace rewards visitors with outstanding natural and cultural resources. The Forest consists mainly of mixed hardwoods and conifers, providing a well shaded trail experience for visitors. Small streams at lower elevations, including Mountain Brook and Mirey Brook, add to the tranquil ambience of the Forest. Hikers on the New England National Scenic Trail can take advantage of a shelter at Mount Grace to rest on their long journey. Visitors wanting a challenging hike may choose from a few routes to ascend Mount Grace. During the winter, cross country skiers can dust off the skis and take advantage of the winter snowpack at the Forest.

PARK IDENTITY

Mount Grace State Forest is strongly identified with its namesake feature, Mount Grace. The Forest is a recreation destination for hikers and other trail users. The cultural features at Mount Grace, including the Gulf Brook Picnic Area, council ring, and ski area remnants, illustrate Mount Grace's long-standing role in land protection and recreation within the Town of Warwick. All future activities and improvements should be consistent with the Forest's Landscape Designations as Woodland and Parkland with an emphasis on resource protection and trail-based recreation.

DEFINING RESOURCES AND VALUES

Resources and values that define the Forest are related to its namesake feature, Mount Grace, and the numerous recreational opportunities it affords. They include:

- Mount Grace is the namesake feature in the Forest and a prominent local landmark. At 1,617 ft, it is the highest point of the property and in the Town of Warwick. Several trails make their way up the mountain providing a steep challenge for visitors. At the summit is a clearing with the Warwick Fire Tower and a boulder with graffiti from CCC workers.
- Oscar N. Ohlson Memorial Field anchors the Forest entrance and invites visitors onto the property. Having once served as the base for the ski area, it now provides a well-manicured lawn for people to gather and play.
- A section of the 235-mile New England National Scenic Trail passes through Mount Grace, taking hikers over Little Mount Grace and Mount Grace. A shelter on the trail provides travelers an opportunity to rest and extra comfort from the elements.

- The Civilian Conservation Corps made large contributions towards infrastructure and increasing recreation at Mount Grace. Many CCC built resources and remnants remain visible to visitors, such as those associated within the ski area and the Gulf Brook Picnic Area.
- Mount Grace is one of two DCR state forests, the other being Warwick, that account for 49% of forestland in the Town. These forests protect the Town's natural and cultural resources and provide a variety of recreational opportunities to residents (Warwick Open Space Committee and Warwick Town Forest Committee 2020).

STATEMENTS OF SIGNIFICANCE

Statements of Significance describe the importance or distinctiveness of a place and its resources (NPS 1998). These statements reflect current scholarly inquiry and interpretation and go beyond a simple listing of resources to include contextual information that makes the facts more meaningful. Significance statements cover the following categories of information:

- The property's significance at the time of its establishment.
- How the property, or society's understanding of the property, has changed since its acquisition that makes it significant or unique within the state park system today.
- The property's role in recreation and its importance to the community it supports, particularly regarding activities that are unique to that property.

For park planning, these statements focus management actions on the preservation and enjoyment of those attributes that most directly contribute to the importance of the place. For interpretive planning, they comprise the information upon which the interpretive themes and overall program are built.

The following Statements of Significance have been identified for Mount Grace State Forest. The sequence of these statements does not reflect their level of significance.

- The Massachusetts State Forest system was founded on the principles of scientific forest management. These practices contrasted with ongoing unmanaged destructive practices throughout the country. This effort focused on the long-term cultivation of forests to achieve a sustainable harvest. Foresters worked to maximize production and provide a sustained yield over time, aiming for long-term stewardship over short-term profits.
- While the Commonwealth did hope to sell timber from the property, the goals of Mount Grace were different from other state forests. The property was meant to provide physical and mental refreshment for visitors whose spending provided another source of income for rural areas (Ahlstrom 2020: 329). This site in particular was recognized for its scenic beauty.
- Though the majority of State Forests had forestry as their primary focus, Mount Grace balanced it with recreation. The State Forest Commission acknowledged that "a State forest can be administered properly from a commercial standpoint and still afford every opportunity for recreation and pleasure." The development of recreational features began immediately after the creation of the State Forest (Ahlstrom 2020: 333).
- The acquisition of Mount Grace helped firmly establish scenic preservation as a legitimate and lasting state policy and outdoor recreation. To acquire the site, special legislative permission was required. The cost ended up being ten times what was previously authorized for state forest acquisition.

UNIFYING THEME

The Unifying Theme is a statement that ties a property's stories together and shapes the overall interpretive message that DCR wants to share with visitors in their experience at the property. The theme provides an overarching conclusion for visitors to contemplate (Ham 2013) and answers the question "so what?" The theme guides all interpretation for the park, both personal (i.e., formal and informal interactions with visitors) and non-personal (e.g., exhibits, signage, brochures).

The Unifying Theme for Mount Grace State Forest is:

> The pleasure we derive from the contemplation of these beautiful gifts of nature provides physical and mental refreshment.

VISITOR EXPERIENCE

Mount Grace State Forest provides a variety of visitor experiences, including the following:

- **Virtual Experience.** Potential visitors will find information about Mount Grace State Forest on DCR's web site. The Forest has its own web page that provides potential visitors information needed to plan a visit. (https://www.mass.gov/locations/mount-grace-state-forest)
- **Entering the Park.** Mount Grace's headquarters area along Winchester Road serves as the Forest's main gateway. Visitors enter the Forest from Winchester Road, greeted by an identification sign. A large parking area allows for an abundance of visitors to enjoy the Forest. A small kiosk and initial directional signage helps visitors begin their journey at Mount Grace. Hikers may enter the Forest along the NET, and from trails that cross or border public roads on the west side of the Forest; there is no formal parking at these locations.
- **Picnicking.** Though lacking picnic tables, a large grassy area (Oscar N. Ohlson Memorial Field) near the Forest's parking lot provides ample space to lay down a blanket for a family picnic. An Adirondack shelter, built by the CCC, with picnic table provides a sheltered space along the edge of the field. With enough room to play field games, visitors can enjoy a relaxing lunch before venturing into the forest.
- **Hunting.** Mount Grace, and the adjacent Warwick State Forest are open to all legal hunting.
- **Trail-based Passive Recreation**. Visitors seeking trails-based recreational opportunities may access an extensive trails network. Over 13 miles of official trails wind through woodlands, providing visitors opportunities for light hikes and horseback rides around Mount Grace or more challenging hikes up Mount Grace. In the winter, visitors may cross-country ski, or snowshoe along many of these trails. Visitors may extend their travels along trails that connect to adjacent permanently protected open space, such as Warwick State Forest.
- **Trail-based Active Recreation**. In the winter, under appropriate snow conditions, visitors may operate snow vehicles (i.e., snowmobiles) on designated forest roads and trails within the Forest. Trail 2, a main corridor of the Snowmobile Association of Massachusetts' trail network passes through the southern end of the Forest.

THREATS AND OPPORTUNITIES

The following information identifies potential threats to the park's natural and cultural resources and identifies opportunities to enhance their protection and stewardship. Although recreation is not

considered a resource under statute (M.G.L. c. 21, § 2F), it is included below because recreation is an important part of the park-going experience, helps define a park's values, and is a key part of assessing the consistency of activities taking place in the Commonwealth's forests, parks, and reservations.

Threats and opportunities identified below are used to inform the development of management recommendations. Potential recommendations must meet prioritization criteria to be included in the Priority Recommendations table (Table 19, page 25).

Natural Resources

Threats

- Under Title 5 of the State Environmental Code (310 CMR 15.000), privies, such as the one near the Mount Grace summit, are considered a non-conforming septic system and a potential threat to groundwater.
- There is limited information on the presence or distribution of invasive plants in Mount Grace. Such information is needed to determine if any sensitive resources are being impacted by invasive plants.
- The power line running to the top of the tower is experiencing vegetation encroachment.
- Red pine scale, an invasive exotic insect, is present in the Forest and poses a significant threat to red pine trees at Mount Grace, which are fairly limited across the property.
- There are at least 16 unapproved geocaches in the Forest. Inappropriately located geocaches may threaten sensitive natural resources.
- Some geocachers report bushwacking and walking around in circles off trail to find geocaches, leading to increased vegetation trampling.
- Several instances of potential boundary encroachments exist along the Forest's boundary and may be negatively impacting natural resources at the Forest.
- Some Forest boundaries in state OpenSpace GIS data may not accurately represent the boundaries of Mount Grace, potentially resulting in encroachments.
- When the Commonwealth acquired land for a fire tower in 1919 (Book 650, Page 2), the deed included "… a right to maintain a line of telephone from the tower on the above described parcel of land hereby conveyed in a southerly direction over my lands to the public highway" and "a right of way over my property to the above described parcel of land for all forest fire purposes." Potentially limiting DCR's use of the access road for all other purposes (e.g. other types of natural resource protection). Additionally, a 2021 deed (Book 7782, page 156) for a private parcel through which the fire tower road passes lacks mention of the Commonwealth's Right-of-Way over the property.

Opportunities

- There is an opportunity to protect the Forest's biological health and aesthetic qualities through targeted removal of invasive plant species.
- implementing forest management activities to promote increased structural complexity and species diversity, would help create more resilient forest conditions.
- Application of DCR's draft Agency-wide guidance and Best Management Practices (DCR 2019a) to potential encroachments would identify and resolve encroachments, if any, and ensure public access to public land.

- Completing deed research and field surveys to confirm the boundary for Mount Grace and updating the OpenSpace GIS data will better protect natural resources at the Forest.
- Clarifying the status of the Commonwealth's Right-of-Way access on private property through deed research could help determine access limitations. Once complete, there may be opportunities to ensure (or expand) DCR's access to the Right-of-Way for additional purposes through acquisitions or agreement.
- Approximately 4.2 acres of the Forest has no Landscape Designation (DCR 2012). Assigning Landscape Designations to these portions of the Forest could help with management of associated natural resources and ensure management consistent with other DCR properties statewide.
- The Forest is located within the Quabbin to Cardigan Initiative's (Q2C) project area. This initiative is a public-private collaborative effort to conserve the Monadnock Highlands of north-central Massachusetts and western New Hampshire. The Forest's location within the project area offers opportunities to participate in organizational partnerships, grants, and land acquisitions in support of DCR's and Q2C's mutual conservation and recreation goals (Q2C 2023).

Cultural Resources

Threats

- Erosion due to natural weather events and human recreational activities (hiking, mountain biking, geocaching, snowmobiles). Vandalism & unmanaged maintenance/new construction at Ohlson Field and Gulf Brook CCC areas.
- Gulf Brook Picnic Area CCC built resources have been negatively affected by previous storms and fallen trees.
- Vegetation growing in cellar holes poses a threat to the integrity of these archaeological resources.
- The CCC Adirondack shelter is a unique resource in need of maintenance, including roof repair.
- The boulder, with graffiti carved by CCC workers, at the summit of Mount Grace had a commemorative plaque that is no longer present and was most likely stolen.
- A lack of knowledge concerning prehistoric and historical archaeological resources in the Forest impedes their effective management and protection.
- There are at least 16 unapproved geocaches in the Forest. Inappropriately located geocaches may threaten sensitive cultural resources.
- Current digitized and spatially referenced flood maps from the Federal Emergency Management Agency (FEMA) do not cover Mount Grace State Forest. This limits DCR's ability to identify potential threats from flood events to cultural resources in the Forest.

Opportunities

- Vegetation management could help stabilize features such as cellar holes and stone walls.
- Zylpha Smith cellar hole could provide a point of interpretation for an intriguing piece of local history.
- Opportunity to improve interpretation of CCC work, especially at Ohlson Field, Gulf Brook Picnic Area, and skiing history at Mount Grace, from CCC development to later tow rope in 1950s (remnants of this mechanism still exist).

- Assessing the cultural resources at the Gulf Brook Picnic Area could help determine maintenance needed to stabilize these resources.
- Ohlson Field provides an opportunity to host interpretive events with a large, open gathering space.
- Researching and creating a replacement commemorative plaque for the boulder at summit of Mount Grace could help provide context for the importance of the boulder.
- Continue to maintain the Adirondack shelter at Ohlson Field as a cultural resource.
- There is an opportunity to improve management, protection, and interpretation of significant cultural resources in the Forest through completion of a Forest-wide cultural resources reconnaissance survey in partnership with municipal, tribal, and regional entities.
- Approximately 4.2 acres of the Forest has no Landscape Designation (DCR 2012). Assigning Landscape Designations to these portions of the Forest could help with management of associated cultural resources and ensure management consistent with other DCR properties statewide.

Recreation

Threats

- The Forest lacks daily staff or pay and display machines, making visitation and use counts approximate and unclear.
- The welcome wayside displays an outdated park system map and lacks a map for Mount Grace.
- Unauthorized OHV use negatively impacts visitor experience for trail users at Mount Grace and contributes to trail erosion.
- Unauthorized dumping and camping detract from park aesthetics and overall visitor experience.
- Current digitized and spatially referenced flood maps from FEMA do not cover Mount Grace State Forest. This limits DCR's ability to prepare for flood emergency operations and to identify potential threats from flood events to recreational resources in the Forest.

Opportunities

- Installing trail and/or car counters at the Forest's main access points would provide better estimates of trail usage and property visitation.
- Updating the welcome wayside with information and a map for Mount Grace will help orient and inform visitors at Mount Grace.
- Increasing internal navigation signs and trail markers will help orient visitors in the park and improve their trail experience.
- Working with the Town's Highway Department and the Massachusetts Department of Transportation (MassDOT) to install Trail Crossing would improve visitor's experience crossing roads that divide the Forest.
- Adding a portable toilet and picnic tables would encourage more visitation by families and help make Mount Grace a destination for tourists.
- There are opportunities to add Universal Accessibility through addition of a universally accessible trail and picnic tables.

- Increasing patrols by Environmental Police Officers and staff presence may reduce unauthorized activities, like dumping, camping, and OHV use, and improve visitor experience.
- Formalizing partnerships with the Town of Warwick and Mount Grace Land Conservation Trust could improve opportunities for special events and recreation in the Forest.

CLIMATE CHANGE

Climate change impacts nearly every aspect of DCR's properties, from ecosystem health, to infrastructure, to recreation. (See DCR 2024 for an overview of these impacts.) The Department is actively working to mitigate and adapt to current and future impacts through such actions as forest management; decarbonizing DCR's buildings, vehicles, and power equipment; protecting wetlands; and using nature-based solutions to minimize stormwater impacts. Information on these, and other, efforts is incorporated into RMPs as available and appropriate.

Any discussion of climate change requires a shared understanding of terminology. Because of this, this RMP section adopts commonly accepted terms to the greatest extent possible. In general, climate-related technical terms used in this RMP are as defined in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2021). Exceptions to this are the terms Adaptation, Risk, and Sensitivity, which are used as defined in DCR's Climate Change Vulnerability Assessment (CCVA; Weston and Sampson 2022).

DCR manages its forests to provide a range of ecosystem services such as recreation, clean water, wood commodities, and wildlife habitat (DCR 2020). For ecosystems under its management, DCR carefully considers both their vulnerability to climate change and their ability to mitigate the effects of climate change by storing carbon in ecosystems and harvested wood products. Several approaches are used to monitor DCR forests and to design forest management strategies to adapt to climate change and provide ecosystem services. (See Swanston et al. (2016) for information on adaptation strategies and approaches associated with DCR's forest management.) Established in 1957, DCR's Continuous Forest Inventory (CFI) system uses a network of more than 2,000 permanent plots on which repeated measurements are taken on an ongoing basis. The CFI measures the status, size, and health of over 100,000 trees; other vegetation; down woody material; and the forest floor. (See DCR 2022 for additional information on the CFI system.) This information helps DCR understand at a strategic scale the current character, condition, and trends of forest ecosystems under its care. DCR also uses operational inventory to help plan specific treatments and evaluate their outcomes. Using these different scales of information, remotely sensed data, and local and regional external expertise, DCR plans projects that help its stands, forests, and other lands adapt to climate change and mitigate greenhouse gas emissions. The conservation and science-based management of forest lands are an essential element to ensuring crucial carbon storage and advancing climate change resilience (Massachusetts Executive Office of Energy and Environmental Affairs (EEA) 2024). For additional information on the relationship between DCR's forest management practices and climate change, please see pages 77–85 in Massachusetts Forest Action Plan 2020 (DCR 2020) and Managing Our Forests…For Carbon Benefits (DCR 2023).

The Department is actively assessing and addressing the vulnerability of its properties and facilities to the impacts of climate change. In 2022, DCR conducted a Climate Change Vulnerability Assessment (Weston and Sampson 2022). Findings from this CCVA are being used by DCR to enhance park operations and maintenance, inform resilient investment, and provide a framework for hazard mitigation and

climate adaptation for natural resources, cultural resources, recreational activities, buildings, facilities, and other infrastructure. Property-specific climate change information from the CCVA is included in the Climate Change (by 2070) table (Table 12) at the beginning of this RMP. An overview of the impacts of climate change on DCR facilities and operations is presented in the DCR Climate Impacts Story Map (DCR 2024).

Climate Exposure and Impacts

A summary of the ways in which the Commonwealth's natural, cultural, and recreational resources may be impacted by climate change is provided below. During the preparation of Resource Management Plans some resources may be identified as having particularly high exposure and/or sensitivity to the anticipated hazards or consequences of climate change. When this occurs, these resources and the projected impacts to them are described. In some instances, the potential impacts of climate change on a given resource are not well understood. When this occurs, only exposure is discussed.

Natural Resources—General Impacts

Climate change affects temperature, precipitation, and atmospheric and ocean chemistry, which in turn directly and indirectly affect the natural environment, including the plants, animals, and natural communities of DCR's forests, parks, and reservations.

Climate is known to influence the presence, absence, distribution, reproductive success, and survival of both native and non-native plants (Finch et al. 2021). Native northern and boreal species, including balsam fir, red spruce, and black spruce may fare worse under future conditions, but other species may benefit from the projected changes in climate (Janowiak et al. 2018). Some non-native invasive species will be affected by climate change while others will remain unaffected, and some non-invasive non-native species are likely to become invasive (Finch et al. 2021). In general, elevated temperature and CO_2 enrichment associated with climate change increases the performance of non-native plants more strongly than the performance of native plants (Liu et al. 2017). Climate change may result in the presence of new non-native invasive plants on a property, and changes to the distribution and/or abundance of invasives already present on a property.

Exposure to a changing climate affects wildlife in a variety of ways. For animals that live in or near aquatic environments, "changes in habitat and hydrological regimes are expected to shift their abundance and distribution" (Isaak et al. 2018: 89). Impacts to terrestrial animals are expected to be highly variable (Halofsky et al. 2018) but may be considered to fall into the following four categories: 1. habitat loss and fragmentation; 2. physiological sensitivities (i.e., innate characteristics that influence the ability to cope with changing temperature and precipitation conditions); 3. alterations in the timing of species' life cycles; and 4. indirect effects (e.g., disruption of ecological relationships) (Friggens et al. 2018). Although all Northeast wildlife are exposed to hazards associated with climate change, some groups, "including montane birds, salamanders, cold-adapted fish, and freshwater mussels, could be particularly affected by changing temperatures, precipitation, sea and lake level, and ocean processes" (Massachusetts Division of Fisheries and Wildlife (MassWildlife) 2015: 357).

Natural Resources—Property-Specific Exposure and Impacts

It is the position of the Massachusetts Natural Heritage and Endangered Species Program that state-listed species and Priority Natural Communities are likely to be highly sensitive to the anticipated impacts

of climate change and that all state-listed species will be negatively affected by hydrologic changes, changes in water, soil, and air temperature, and changes in forest composition.

Three of the Forest's streams have been identified as Coldwater Fisheries Resources by the MassWildlife. This includes Grace Brook, Kidder Brook, and Mountain Brook. Such streams provide important habitat for coldwater species, which are typically more sensitive than other species to alterations in stream flow, water quality, and temperature (Massachusetts Bureau of Geographic Information (MassGIS) 2021). The entire lengths of these streams within the Forest are exposed to climate impacts.

Climate change may cause some vernal pools to dry earlier in the season than they have historically, potentially interfering with amphibian life cycles (Cartwright et al. 2022). Because of this, some of the Forest's pools and associated wildlife may be negatively impacted.

Cultural Resources—General Impacts

Climate change may negatively affect cultural resources, their preservation, and maintenance (EEA 2022; International Council on Monuments and Sites (ICOMOS) Climate Change and Cultural Heritage Working Group 2019; Rockman et al. 2016: 3, 18; United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Center 2007). In Massachusetts, cultural resources may be exposed to the following natural phenomena that are correlated with adverse impacts: higher annual average temperature (especially in winter), increased numbers of freeze-thaw cycles, increased precipitation intensity, higher relative humidity, higher wind speeds, an increase in severe storm events, increased numbers and severity of wildfires, more severe seasonal droughts, increase in number and severity of inland flood events, increased coastal flooding and erosion, increased probability of landslides, changes in groundwater levels, shifts in native and invasive species distribution, performance, and phenology; and changes in oceanic and atmospheric chemistry (Rockman at al. 2016; Commonwealth of Massachusetts 2023: 5.1-31–5.1-61).

The phenomena listed above may produce a variety of adverse impacts to Massachusetts' cultural resources. Sensitivity and potential impacts vary based on resource category (i.e., archaeological sites, cultural landscapes, ethnographic landscapes and sites, and buildings and structures). Resource-specific factors such as location, design, materials, condition, etc. will also influence sensitivity and consequent impacts. All categories of cultural resources may be subject to complete or partial destruction through wildfire, inland flooding, sea level rise, storm surge, or landslides. Additionally, these resource categories may be subject to other types of impacts, as follows. Archaeological sites may have site stratigraphy disrupted by changes in hydrography, may suffer accelerated decomposition of artifacts and features, and may be impacted inadvertently during disaster response. Cultural landscapes may lose plantings due to a variety of stressors (e.g., drought or flood, pests, soil salinity), may be infiltrated by invasives, may be eroded by surface runoff, may experience more rapid deterioration of hardscaping and site furnishings, and may be damaged by high wind or heavy snow events. Ethnographic landscapes, traditional cultural places, and associated communities (including Indigenous peoples) may suffer both tangible and intangible impacts such as loss or diminishment of natural species used for food, ceremony, or medicine; alterations in timing of hunts, etc.; increased difficulty of vulnerable subgroups (e.g., the elderly) to perform outdoor tasks; and a loss of cultural knowledge associated with resources and practices. Buildings and structures may be damaged or destroyed by high wind or heavy snow events, suffer accelerated deterioration through a variety of mechanisms (e.g., elevated humidity, chemical reactions, destructive pests and organisms), may be destabilized by hydrological changes, or be damaged

by inadequate gutters or drainage systems (ICOMOS Climate Change and Cultural Heritage Working Group 2019: 73–89; Rockman et al. 2016: 20–24). (See Rockman et al. 2016: 19–24 for a detailed assessment of the potential impacts of climate change on cultural resources.)

Cultural Resources—Property-Specific Exposure and Impacts

No cultural resources with known elevated exposure or sensitivity to potential consequences of climate change were identified at this property.

Recreation—General Impacts

Outdoor recreation and park visitation are dependent on weather and climate and will be affected by a warming climate (Wilkins and Horne 2024). Higher temperatures positively affect participation in most outdoor activities, except snow-based activities (Wilkins and Horne 2024). "Winter is warming substantially faster than other seasons, and winter warming is especially pronounced in the...Northeastern United States" (Wilkins and Horne 2024: 15). Exposure to this climate change phenomenon is projected to significantly reduce the length of winter recreation seasons for downhill skiing, cross-country skiing, and snowmobiling, decreasing recreational opportunities and causing substantial economic impacts (Wobus et al. 2017). Whitewater rafting, primitive area use, and hunting are also projected to be negatively impacted by exposure changing weather patterns associated with climate change (Askew and Bowker 2018). Although "coldwater fishing habitat is expected to decline under a warming climate, which will likely result in fewer fishing days," overall fishing participation in the Northeast is projected to rise "due to the more favorable temperatures" (Wilkins and Horne 2024: 11). Horseback riding on trails, boating, swimming, and visiting interpretive sites are also expected to see higher participation in the Northeast under climate change (Askew and Bowker 2018). Temperature preferences of campers indicate that the "number of ideal days" for camping will also increase (Wilkins and Horne 2024: 13). Participation in biking is also projected to increase, especially in the winter and shoulder months (Wilkins and Horne 2024: 13). Climate change may also impact outdoor recreation through increased impacts to recreation infrastructure (e.g., flooding impacts), and increased exposure to disease vectors (e.g., mosquitoes and ticks), longer pollen seasons, and heat-related illnesses (O'Toole et al. 2019).

Recreation—Property-Specific Exposure and Impacts

Recreation activities at the Forest likely to be negatively impacted by exposure to weather changes resulting from climate change include hunting and snow-dependent sports (i.e., cross-country skiing, snowmobiling, and snowshoeing).

APPLIED LAND STEWARDSHIP ZONING

DCR assesses the appropriate uses and stewardship of its properties at two spatial scales: the landscape level and the property level.

Landscape Designation

In 2012, DCR engaged in a comprehensive system-wide assessment of lands managed by its Division of State Parks and Recreation, designating them as Reserve, Woodland, or Parkland. (See Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines (DCR 2012) for

details.) Multiple Landscape Designations may apply to individual properties with diverse resources and levels of development. Most of Mount Grace State Forest was designated Woodland, with a small portion designated as Parkland. Identification of Land Stewardship Zones within Mount Grace was performed in the context of these Landscape Designations.

The following Land Stewardship Zoning is recommended to guide management and any future development. (See Figure 1. Land Stewardship Zoning Map, page 21.)

Zone 1

Zone 1 areas have highly sensitive ecological and/or cultural resources that require additional management approaches and practices to protect and preserve these special features and their values (DCR 2012). The following areas of Mount Grace have been designated Zone 1.

- No areas within the park have been designated Zone 1.

Zone 2

Zone 2 areas provide for a balance between resource stewardship and recreational opportunities that can be appropriately sustained. They include stable yet important cultural and natural resources. These areas provide a buffer for sensitive resources, recharge areas for surface and groundwaters, and large areas where existing public recreation activities can be managed at sustainable levels (DCR 2012). The following areas of Mount Grace have been designated Zone 2.

- All areas not identified as Zone 3.

Zone 3

Zone 3 areas include altered landscapes in active use and areas suitable for future administrative, maintenance, and recreation areas (DCR 2012). The following areas of Mount Grace are currently developed, appropriate for potential future development, or intensively used for recreation. They have been designated Zone 3.

- The Forest Headquarters area, including three-bay garage, headquarters building, public parking area, Oscar N. Ohlson Memorial Field, shelter, and cleared areas to existing tree line.
- Winchester Road Parking Area and Trailhead.
- Mount Grace Summit, including the existing developed and cleared areas at the fire tower and communications building.

Significant Feature Overlay

Significant Feature Overlays provide precise management guidance in order to maintain or preserve recognized resources features regardless of the zone in which they occur.

- There are no Significant Feature Overlays associated with the Mount Grace.

DCR Stewardship Map Tool

This RMP should be viewed in conjunction with DCR's Stewardship Map, a GIS-based tool that allows users to view a property's natural, cultural, and recreational resources. The Stewardship Map tool is dynamic, and information continues to be updated after adoption of an RMP. Guidance for using the

tool, as well as Best Management Practices for resource stewardship, are located on the Stewardship Map site: https://dcrsgis-mass-eoeea.hub.arcgis.com/.

CONSISTENCY REVIEW

Resource Management Plans "shall ensure consistency between recreation, resource protection, and sustainable forest management" (M.G.L. c. 21, § 2F). For planning purposes, an activity is considered consistent with resource protection if it has no significant, long-term, adverse impact on resources. To this end, a series of indicators were developed to evaluate the impacts of recreation and forest management on natural and cultural resources.

Many activities with the potential to negatively affect resources are already subject to agency and/or regulatory review (e.g., forest management activities, projects within Priority Habitat). For these activities, compliance with state regulations, regulatory authority guidance, DCR policies and processes, and Best Management Practices (BMPs) is considered an indicator of consistency between park use and resource protection. New indicators were generated for activities not subject to agency or regulatory review, and are based on available data, information readily identifiable via aerial imagery or site visits, assessments by DCR subject matter experts, or the property manager's knowledge of park conditions and use. (See Table 18, page 22.)

Indicators are applied during the RMP planning process in order to ensure a standardized assessment of consistency across all properties in the DCR system. Inconsistencies identified via the application of indicators are used to inform the development of management recommendations.

The status of indicators (Yes, No, Unknown, and N/A) were accurate at the time this RMP was prepared and were used for planning purposes. However, they represent a snapshot in time and may not reflect future conditions. In addition, the status of indicators will change as recommendations get implemented.

MANAGEMENT RECOMMENDATIONS

Eight priority management recommendations were developed for this property. They are presented in Table 19, page 25. All recommendations are of equal importance.

Priority management recommendations derive from Threats, Opportunities, and Consistency Assessment information presented in this RMP. For a recommendation to be considered a priority and listed in the table, it must meet one or more of the criteria listed below. Maintenance and management needs not meeting one or more of these criteria are not included in the table but are identified in the Threats and Opportunities sections.

The following types of recommendations are considered priority:

- Natural resource stewardship and restoration activities consistent with park identity and intended to improve ecological function and connectivity.
- Cultural resource management activities consistent with park identity and intended to prevent the loss of integrity of significant cultural resources.
- Improvements consistent with park identity that are needed to support intended park activities.
- Actions required for regulatory compliance or compliance with legal agreements.
- Activities that prevent or ameliorate threats to the health and safety of park visitors and employees.

- Activities that address inconsistencies among recreation, resource protection, and sustainable forest management, as identified through use of the Consistency Assessment checklist.

Progress toward implementing priority recommendations is tracked through the use of DCR's Capital Asset Management Information System (CAMIS). The property manager should enter each recommendation listed in Table 19 (page 25) into CAMIS as a separate work order, noting "*RMP" in the description field. Non-traditional work orders (e.g., volunteer trail work, posting of DPH Fish Consumption Advisory posters, certification of vernal pools) should be closed out by the property manager, once the recommendation has been implemented.

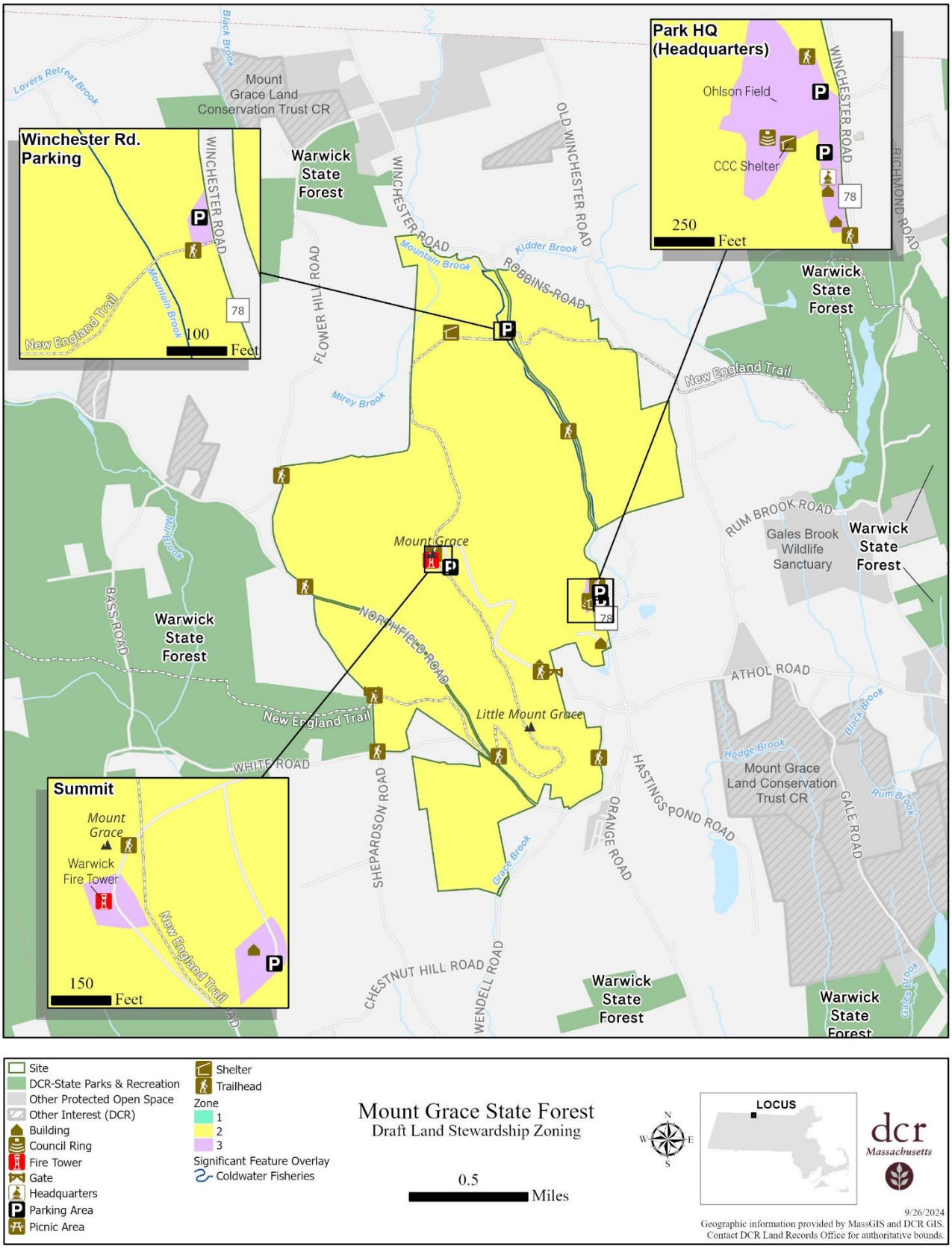

Figure 1. Land Stewardship Zoning Map.

Table 18. Consistency Assessment. This assessment represents a snapshot in time and may not reflect future conditions.

Category	Metric	Status
Landscape Designation	1. All development and uses of the park since 2012, or currently planned for the park, are consistent with its Landscape Designation(s).	Yes
Natural Resources	1. All projects (normal maintenance activities, special projects, volunteer projects) conducted within Priority Habitat were reviewed and approved through DCR's internal review process and by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) for potential impacts to rare species and their habitats.	Yes
Natural Resources	2. All projects conducted within areas subject to state and/or federal wetlands or waterways regulations were reviewed and approved through DCR's internal review process; reviewed and approved through the appropriate, local, state, and/or federal review process; and were carried out in accordance with the terms of a valid permit.	Yes
Natural Resources	3. Sensitive resource areas, such as steep slopes, riverbanks, streambanks, pond and lakeshores, wetlands, and dunes are free of desire paths and other user-created trails.	No
Natural Resources	4. Aquatic areas adjacent to beaches, boat ramps and launches, roads, and hiking trails are free of eroded sediments.	Yes
Natural Resources	5. The extent of exposed soil in campground and/or picnic sites is stable or decreasing.	Yes
Natural Resources	6. The extent of native vegetation in campground and/or picnic sites is stable or increasing. (As assessed by property manager.)	Yes
Natural Resources	7. Area of trail impacts in Reserves is less than 50% of total area. (See Naughton (2021) for information on primary area of trail impacts.)	N/A
Natural Resources	8. Congregations of breeding, migratory, or wintering wildlife are protected from disturbance by temporary (e.g., seasonal) restrictions on recreational access.	N/A
Natural Resources	9. Geocaches, letterboxes, orienteering control locations, and other discovery destinations are located outside sensitive natural resource areas and their locations have been reviewed and approved by park personnel. (As assessed by property manager.)	No

Category	Metric	Status
Natural Resources	10. Zone I wellhead protection areas are free of vehicle parking, chemical storage, or concentrated recreation.	Yes
Natural Resources	11. All boat ramps and launches have cleaning stations and/or educational signs and materials on preventing the spread of aquatic invasive organisms. (As assessed by property manager.)	N/A
Natural Resources	12. For each barrier beach there is a current, approved Barrier Beach Management Plan and all beach-related activities are conducted in accordance with this plan.	N/A
Cultural Resources	1. All maintenance activities and projects with the potential to cause sub-surface disturbance are being reviewed by the DCR archaeologist for potential impacts to archaeological resources.	Uknown
Cultural Resources	2. All maintenance activities and projects affecting historic properties (buildings, structures, and landscapes over 50-years-old) are being reviewed by the Office of Cultural Resources to avoid adverse impacts.	Yes
Cultural Resources	3. Historic buildings, structures, and landscapes are being used, maintained, and repaired in a manner that preserves their cultural integrity and conveys their historic significance to park visitors.	No
Cultural Resources	4. Recreational activities such as hiking, biking, and boating are not eroding cultural properties such as archaeological sites or historic landscapes through creation of desire lines, rutting in the landscape, damage to historic built features, or excessive scouring (erosion) of coastal and shoreline areas.	Unknown
Cultural Resources	5. Geocaches, letterboxes, and other discovery destinations are located away from sensitive cultural resources, and their locations have been reviewed and approved by park personnel.	No
Cultural Resources	6. Historic buildings, structures, landscapes, archaeological sites, and concentrations of historic resources are located outside of areas predicted to be subject to flooding, storm surge, or sea-level rise.	No

Category	Metric	Status
Recreation	1. Types of recreation, levels of recreational use, and types and extent of recreation infrastructure are consistent with the park's identity statement.	Yes
Recreation	2. Trail density is consistent with the park's Landscape Designation(s). (See Trails Guidelines and Best Practices Manual (DCR 2019b) for density thresholds.)	Yes
Recreation	3. All authorized trail construction was performed in accordance with an approved Trail Proposal Form.	Yes
Recreation	4. Over 90% of the park's official trails network is classified as being in Fair or better condition.	No
Recreation	5. Recurring use by OHVs is restricted to authorized trails. (As assessed by property manager.)	No
Recreation	6. There is a high level of compliance with dog leash regulations and policies. (As assessed by property manager.)	Unknown
Recreation	7. Athletic fields are free of recreation-caused impacts (e.g., bare spots) to turf. (As assessed by property manager.)	N/A
Recreation	8. Water-based recreation is consistent with "Uses Attained" designation as identified by the Massachusetts Department of Environmental Protection (MassDEP) in its most current integrated list of waters (e.g., MassDEP 2023); DPH fish consumption advisories; and/or water quality testing at waterfront areas.	Yes
Recreation	9. Recreation facilities are located outside of areas subject to flooding, storm surge, or sea-level rise.	Unknown
Sustainable Forest Management	1. Forestry activities are consistent with Landscape Designation and associated forestry guidelines.	Yes
Sustainable Forest Management	2. Forestry activities are consistent with current Forest Resource Management Plan.	N/A
Sustainable Forest Management	3. Tree cutting is performed in accordance with an approved cutting plan, if required under the Massachusetts Forest Cutting Practices Act (M.G.L. c.Ch. 132, §§ Sections 40–46).	N/A

Table 19. Priority Recommendations for Mount Grace State Forest. All recommendations are of equal importance. When multiple agency parties are responsible for implementing a recommendation, the lead party, or parties, are identified parenthetically in the Implementation column. Property managers should enter these recommendations as work orders in CAMIS to ensure their tracking and implementation.

Category	Recommendation	Implementation
Natural Resources	Replace the existing privy near Mount Grace summit with a conforming on-site sewage disposal system, as permitted by the Warwick Health Department and other regulators, as appropriate.	Office of Natural Resources, Park Operations (Co-Lead), Partner, Trails and Greenways Section (Co-Lead)
Natural Resources	Apply Landscape Designations to those portions of the Forest currently lacking such designations.	Management Forestry (Lead), GIS Program
Natural Resources	Resolve potential encroachments in accordance with draft Agency-wide guidance and Best Management Practices (DCR 2019a).	Management Forestry (Lead), Office of the General Counsel, Park Operations
Cultural Resources	Conduct an archaeological reconnaissance survey (950 CMR 70) in cooperation with municipal, tribal and non-profit partners, including the Town of Warwick. Complete appropriate Massachusetts Historical Commission archaeological site forms for identified archaeological resources.	Consultant, Office of Cultural Resources (Lead), Partners
Cultural Resources	Research plaque missing from boulder at the summit of Mount Grace. If sufficient archival materials exist, recreate the plaque and install the replacement on the boulder	Interpretive Services, Office of Cultural Resources (Lead), Park Operations
Cultural Resources	Manage vegetation in cellar holes and stone walls in accordance with DCR's Best Management Practices for Archaeological Features (DCR n.d.a.) and Best Management Practices: Stone walls (DCR n.d.b.).	Park Operations, Management Forestry
Recreation	Coordinate with the Warwick Highway Department and MassDOT, as appropriate, to install Trail Crossing signs where the New England National Scenic Trail crosses Northfield Road and Winchester Road (Route 78) and at other trail crossings of concern.	Facilities Engineering, Park Operations, Trails and Greenways Program (Lead)

Category	Recommendation	Implementation
Recreation	Work with the geocaching community to ensure that caches located in sensitive natural and cultural resources are relocated out of those areas and that locations of any new geocaches are placed outside of sensitive areas and with the approval of the property manager.	Office of Cultural Resources, Office of Natural Resources, Park Operations (Lead)

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