dcr
Massachusetts

Resource Management Plan
Westminster 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 (DCR), 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 people 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@mass.gov.

Westminster State Forest

https://www.mass.gov/locations/wachusett-mountain-state-reservation

1. Property Overview

Characteristic	Value
Date Established	1924
Location	Gardner, Westminster
Ecoregion	Worcester Plateau
Watershed	Chicopee, Millers, Nashua
DCR Region	Central
DCR District	Central Highlands
DCR Complex	Wachusett
Management Forestry District	Mid-State
Fire Control District	North Worcester
Size (acres)	424.5
Boundary Length (miles)	8.7
Elevation - Minimum (feet)	835.1
Elevation - Maximum (feet)	1,248.6
Environmental Justice (acres)	46.8
Estimated Annual Attendance (2023)	200
Interpretive Programs (# programs, 2023)	0
Interpretive Programs (# attendees, 2023)	0

2. Landscape Designations

Designation	Acres
Parkland	0.0
Reserve	0.0
Woodland	417.2
No Designation	7.3

3. Regulatory Designations

Designation	Acres
Outstanding Resource Waters -Mare Meadow Reservoir -Ware River intake	161.7
Priority Habitat (MESA)	20.7
Surface Water Supply Protection Zone A	52.7

4. Long-Term Agreements

Agreement	Expiration Year
None Identified	N/A

5. Concessions

Concession Type
None

6. Partners & Friends

Group(s)
Midstate Trail Association
Appalachian Mountain Club

7. Features of Interest

Feature
Baldwin Hill
Inland Atlantic White Cedar Swamp
Joslin Brook
Mid-State Trail

8. Natural Resources

Resource	Value
Tree Canopy (acres)	415.6
Rivers and Streams (miles)	1.1
Open Water (acres)	0.0
Wetlands (acres)	98.1
Certified Vernal Pools (#)	1
Potential Vernal Pools (#)	4
State-Listed Species (# Regulatory)	1
State-Listed Species (# Non-Regulatory)	0
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	0.0

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	294
Acres burned by wildfires in Fire Control District; 2019–2023	1169.6
Type of Wildland-Urban Interface	Intermix
Predicted rate of spread, based on Fire Behavior Fuel Model 13	Rapidly Spreading

11. Natural Hazards

Hazard Type	Acres
Flood (1.0%-chance)	0.3
Flood (0.2%-chance)	85.8
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	0
Historic - National Register Listed	0
Historic - National Historic Landmark	0

14. Recreation Resources

Resource	#
Trails System	1

15. Recreation Activities

Activity
Bicycling, mountain
Dog walking, on-leash
Hiking/walking
Hunting
Nature study/photography
Running/jogging
Skiing, cross country
Snowshoeing

16. Roads and Trails

Metric	Value
Roads - Unpaved (miles)	0.0
Roads - Paved (miles)	0.0
Forest Roads - Unpaved (miles)	1.9
Forest Roads - Paved (miles)	0.0
Trails - Unpaved (miles)	1.1
Trails - Paved (miles)	0.0
Trails - Unauthorized (miles)	0.6
Trail Density (miles/acre)	0.008
Area of Impact (acres)	198.6

17. Parking

Parking Resources	#
Lots	1
Parking Spaces - Total	2
Parking Spaces - Accessible (HP)	0
Parking Spaces - Other	2

INTRODUCTION

Westminster State Forest (Westminster or the Forest) is located in the Towns of Westminster and Gardener, approximately 24 miles north of Worcester. The Forest is composed of six noncontiguous tracts, three located north of Route 2 and three located south of Route 2. (See the Land Stewardship Zoning map, page 20 for the locations of these tracts.) They are:

- **Knower Road Tract.** This tract is accessed from Knower Road and provides a small parking area for visitors. It is bordered by residential property and contributes to Surface Water Protection for Ware River watershed and Mare Meadow Reservoir on nearby Fitchburg Water Supply Land.
- **Cedar Swamp Tracts.** These two associated tracts are accessed from Lake Drive West and are bordered by town land and residential property. The tracts are named after the of Red Spruce Swamp and Northern Atlantic White Cedar Swamp Natural Communities partially located within the Forest.
- **Baldwin Road Tract.** This tract straddles the Gardner/Westminster Town Line and is accessed through Oakmont Regional High School. It is bordered by High Ridge Wildlife Management Area (High Ridge WMA), a Pan Am Southern, LLC Railroad right-of-way (ROW), and land owned by the Town of Westminster and Ashburnham, including the Oakmont Regional High School (HS).
- **Old Gardner Road Tract.** This tract is accessed from Old Gardner Road or through the High Ridge WMA. It borders the High Ridge WMA, residential property, and Pan Am Southern, LLC Railroad (ROW).
- **Bragg Hill Road Tract.** This tract is accessed from the Town of Westminster's Bragg Hill Conservation Area, which has a small parking area on Bragg Hill Road. It is bordered by the conservation area, rural residential property, and vacant land. The Midstate Trail passes through this tract.

The Midstate Trail passes north-south through the Forest's Bragg Hill Road Tract. This 92-mile-long regional hiking trail runs from Rhode Island to New Hampshire and links to regional trails in adjacent states. Along its course it passes across Mount Wachusett and 10 other DCR-owned or managed properties, the closest of which to the Forest are Ashburnham State Forest and Leominster State Forest. The Midstate Trail Committee of the Appalachian Mountain Club's (AMC) Worcester Chapter maintains the treadway and provides trail information (Midstate Trail Committee n.d.).

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 Westminster State Forest. Groups and individuals, including peoples known as the Agawam, Wabanaki (Dawnland Confederacy), and Pennacook recorded in available documentation (Native Land Digital 2023) as having relationships to this place over seasons and generations. Following Indigenous people's dispossession, European settlement began in 1728–1734, when land that had been bequeathed to heirs of soldiers in King Phillip's War was divided and settlers laid out roads and homesteads along trails previously used by Indigenous peoples. The inhabitants relied primarily on agriculture into the early 1900s, and also began exploiting forest resources in the town through the establishment of four sawmills and multiple tanning yards in the later 1700s (Massachusetts Historical Commission (MHC) 1984). Westminster State Forest was established in 1924, when 141.45 acres was acquired by the Department of Conservation (DOC 1925). The Forest has both increased and decreased in size since then, reaching peak size of 540.8 acres in 1926. The following year it was reduced to 335.1 acres. The Forest grew again between 1936 and 1956, to 518.3 acres before another reduction in 1956, when five parcels, located

between Knower Road and South Street, were sold to the City of Fitchburg for watershed land. The Forest's size has remained consistent since that time. Westminster State Forest plays a vital role in resource protection within the Town of Westminster.

Each tract of Westminster State Forest provides visitors with a unique outdoors experience. Consisting of deciduous forest, evergreen forest, forested wetlands, and open wetlands, visitors have opportunities to see and experience various landscapes within the Forest. Although mainly undeveloped, the Forest provides opportunities for hiking, with some trails allowing for short easy hikes while others connect to trails on adjacent private and public lands not owned by DCR, such as the Mid-State Trail. The Baldwin Road Tract provides a scenic trail experience beginning with a small bridge over a stream and extending onto the slopes of Baldwin Hill.

PARK IDENTITY

Westminster State Forest is strongly identified with water protection in Westminster and the conservation of unique natural landscapes in Massachusetts, including Northern Atlantic White Cedar Swamp. All future activities and improvements should be consistent with the Forest's identity as a Woodland with an emphasis on resource protection and trails-based recreation.

DEFINING RESOURCES AND VALUES

Resources that define Westminster State Forest are related to its unique natural areas and recreational opportunities. They include:

- An approximately 1/4-mile segment of the 92-mile Midstate Trail navigates through a parcel of Westminster State Forest. The Midstate Trail connects visitors to other DCR properties and conservation lands in the area, including Ashburnham State Forest to the North and Leominster State Forest to the South.
- The Forest helps conserve two uncommon natural community types: Massachusetts' only known example of Northern Atlantic White Cedar Swamp and an example of Red Spruce Swamp. The former is considered Critically Imperiled, and the latter is considered Vulnerable in the Commonwealth (Swain 2020). Both are located on the Cedar Swamp Tracts and adjacent private lands.
- The Baldwin Road tract and Old Gardner Road tract border High Ridge WMA, helping to protect over 1,100 contiguous acres of conservation land.
- The Forest provides recreational amenities to, and enhances environmental quality and equity for, an Environmental Justice (EJ) community.

STATEMENTS OF SIGNIFICANCE

Statements of Significance describe the importance or distinctiveness of a place and its resources (National Park Service 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 Westminster State Forest. The sequence of these statements does not reflect their level of significance.

- Beyond the original intents of timber harvesting, pest control, and fire control, DCR forest management objectives have evolved to include carbon sequestration and storage, diverse wildlife habitats, forest resiliency, safety, and water quality.
- While not a motivation in establishing the state forests, foresters at the time recognized the importance of trees to a watershed. The long-term impact of the reforestation of Massachusetts led to improved water quality in the Commonwealth.
- Unique to Massachusetts, the reforestation lot program let landowners turn over land to the state for reforestation; within 10 years they could then buy back the land. Unclaimed lots ended up as part of the State Forest system resulting in a system with parcels of varying sizes all over the state.

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 Westminster State Forest is:

> Forest management treats land as a community of interacting and interdependent parts.

VISITOR EXPERIENCE

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

- **Virtual Experience.** Potential visitors will find little information about Westminster State Forest on DCR's web site. The "Find a Park" tool (https://www.mass.gov/info-details/find-a-park) identifies the Forest's location and lists Hiking/Walking as activities that visitors may enjoy here. There is no additional information to help potential visitors plan a trip. The Wachusett Mountain State Reservation web page does not list Westminster as being one of its "related parks."
- **Entering the Forest.** The Forest lacks a central gateway, with visitors entering Westminster State Forest tracts on foot, using official paths and unauthorized trails. DCR signage and kiosks are absent from all tracts. The Knower Road Tract provides access to two dirt surface, off-street parking spaces. The Baldwin Road tract can be accessed from Oakmont Regional HS, though the entry point is not easily visible.

- **Trail-based Passive Recreation**. Visitors seeking a hike through woodlands may access modest trail networks on three Forest tracts. Nearly three miles of official trails and forest roads provide visitors the opportunity for a light hike and park exploration. Hikers seeking an extended adventure through many conserved landscapes may access the Mid-State Trail at the Bragg Hill Road tract.

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 24).

Natural Resources

Threats

- Westminster State Forest has four potential vernal pools, but without a certified status may be lacking proper protection.
- Due to the Park's proximity to residential development, a state listed reptile may be threatened by collection, road mortality, and increased predation due to suburban development.
- Although the Forest's natural communities have not been systematically surveyed, two Priority Natural Communities have been identified, both are partially located on the Cedar Swamp Tracts. These communities, and existing and potential threats to their ecological integrity and continued persistence in the Forest are identified below:
    - Northern Atlantic White Cedar Swamp (S1 - Critically imperiled). The only known example of this community type in Massachusetts. Known threats include alterations in hydrology, selective cutting, and fire suppression (Swain 2020).
    - Red Spruce Swamp (S3 - Vulnerable). The Forest's only known example of this community type. Known threats include alterations in hydrology and climate change (Swain 2020).
- Sections of the Northern Atlantic White Cedar Swamp and Red Spruce Swamp community types extend outside the Cedar Swamp Tracts onto neighboring parcels currently not protected by conservation easement or organization.
- There is limited information on the presence or distribution of invasive plants in Westminster. Such information is needed to determine if any sensitive resources are being impacted by invasive plants.
- Several instances of potential boundary encroachments exist along the Forest's boundary and may be negatively impacting natural resources at the Forest.
- There is at least one unapproved geocache in the Forest. Inappropriately located geocaches may threaten sensitive natural resources.

Opportunities

- Some of the Forest's four potential vernal pools may "support rich communities of vertebrates and invertebrates" (Massachusetts Division of Fisheries and Wildlife (MassWildlife) 2009) and serve as important habitat components for other wildlife, including one of the Forest's state-listed species. Surveying and certifying these pools (DCR (n.d.) and MassWildlife (2009)), as appropriate, may help better protect these animals.
- Increasing awareness of the property as part of DCR and associated regulations, through posted signage and website, could better protect the state listed reptile from collection. Increasing awareness with nearby residents could help decrease road mortality on residential roads.
- Within the Forest are occurrences of two types of rare species habitat, Regulatory and Non-Regulatory. Regulatory habitat is based on verified records of state-listed species and has associated mapped Priority Habitat. Non-Regulatory habitat is based on the presence of suitable habitat for state-listed species; there is no associated mapped Priority Habitat. On state lands, both are protected under the Massachusetts Endangered Species Act (MESA; 321 CMR 10.00). Requesting pre-filing consultation with the Natural Heritage and Endangered Species Program (NHESP) for "all works, projects, or activities" in the Forest, regardless of location in or out of Priority Habitat, will ensure continued protection of this habitat and compliance with the MESA.
- Part of Westminster State Forest is located within the DCR Priority Watershed "selected Millers Basin Lakes." DCR construction projects within Priority Watersheds maximize Stormwater Control Measures, potentially beyond those necessary to meet regulatory criteria (VHB 2022). By maximizing treatment, DCR addresses existing impairments in the receiving waters and contributes to improving water quality in the Priority Watershed. Designers of future projects at Westminster should review the latest Massachusetts Department of Environmental Protection (MassDEP) 303d list to understand other impairments of the receiving water and to fine tune stormwater treatment to address these pollutants, in accordance with the DCR Stormwater Design Handbook (VHB 2022).
- There is an opportunity to enhance the Forest's ecological integrity and biodiversity through targeted removal of invasive plant species.
- There may be opportunities to improve forest resiliency through forest management, including the Northern Atlantic White Cedar Swamp which is known to be in decline.
- Acquiring adjacent vacant parcels or establishing access through formalized agreements with property owners could improve natural resource protection and/or provide park operations with better access to landlocked parcels.
- Approximately 7.3 acres of the Forest has no Landscape Designation (DCR 2012). Designation of these areas could help with management of associated natural resources.
- The Forest is located within the Quabbin-to-Cardigan Partnership'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

- Approximately <1% of the park is within the 1.0%-chance flood zone and 20% is within the 0.2%-chance flood zone. (These data are derived from the FEMA's paper Flood Insurance Rate Maps, or FIRMS, dating to 1979. Because of their age, FIRMS may only be used to portray zones of uncertainty and possible risks associated with flooding, not the absolute delineation of flood boundaries (MassGIS 1997).) Erosion associated with these events may impact known and unknown archaeological and cultural resources at Westminster.
- There is at least one unapproved geocache in the Forest. Inappropriately located geocaches may threaten sensitive cultural resources.

Opportunities

- An archaeological reconnaissance survey (950 CMR 70), including research into related ancient and historical period contexts, could help to identify, protect, and interpret archaeological sites in the Forest.
- The Forest is recognized for its scenic, natural, and historic qualities through inclusion in the Freedom's Way National Heritage Area, which offers opportunities for agency partnerships, grants, and potentially higher visibility for the Forest (Freedom's Way Heritage Association 2015).
- Approximately 7.3 acres of the Forest has no Landscape Designation (DCR 2012). Designation of these areas could help manage associated cultural resources and ensure management consistent with DCR properties statewide.
- These disparate properties should be integrated into planning and interpretative activities as part of the Wachusett Mountain complex because of their similar environmental settings and geographic proximity, especially within tribal homelands.

Recreation

Threats

- There is limited official information available on Westminster State Forest. DCR's web page does not include information on the Forest, making it difficult for potential visitors to become aware of the property and its recreational opportunities.
- Westminster State Forest lacks a Main Identification sign, a Welcome Wayside, kiosks, trail navigation signs, or any other official signage, aside from boundary markers.
- Temporary trail markers added by visitors to the Knower Road tract, including skis and homemade signs, do not follow DCR sign standards and confuse visitors about the management entity.
- The Forest lacks a central entrance or daily staff, due to the remote and scattered locations of tracts, making annual attendance estimates approximate.
- Westminster has portions of trail with poor drainage and possible social trails leading to private property.

Opportunities

- Adding a Westminster State Forest web page to DCR's web site would allow potential visitors to become aware of the Forest, its resources, and associated recreation opportunities.
- Installing trail counters at trailheads would provide more accurate estimates for property visitation and better inform future planning and interpretation efforts.
- Evaluating areas for additional signage, like kiosks and internal navigation signs, would improve visitor awareness of Westminster State Forest being a DCR property, DCR rules and regulations governing use of the property, and official trails.
- Removing the skis and homemade signs from the Forest and posting official trail blazes could better delineate official trails and improve awareness of the property as under DCR management.
- Continuing to identify adjacent vacant land parcels for acquisition or areas for conservation restrictions could provide visitors with improved trail access to landlocked parcels.
- Developing a trails plan and improving current trail conditions could improve visitor experience at the property.
- Improving access to the Baldwin Road Tract, in partnership with the town and school district, could help improve community awareness of the property and better facilitate recreation.
- Developing a relationship with Oakmont Regional High School for specific programing and activities at the Forest could establish a beneficial partnership for resource stewardship and facilitate experiential learning.
- Portions of the Forest are within and contiguous with an EJ tract. There may be opportunities to advance environmental justice and equity via DCR's Environmental Justice Strategy (see pages 79–88 in Massachusetts Executive Office of Energy and Environmental Affairs (EEA) 2024a in alignment with the EEA's EJ Policy (EEA 2021) and the Executive Order on Environmental Justice (No. 552) (Patrick 2014).

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 (IPCC 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 (EEA 2024b). 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" (MassWildlife 2015: 357). In addition, 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 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.

Natural Resources—Property-Specific Exposure and Impacts

Three of the Forest's streams have been identified as Coldwater Fisheries Resources by the Massachusetts Division of Fisheries and Wildlife. This includes Joslin Brook (Knower Road Tract) and Carlson and Lemerise Brooks (Old Gardner Road Tract). 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 (MassGIS 2021). The entire lengths of these streams are exposed to climate impacts.

The Massachusetts NHESP has identified Red Spruce Swamps, such as the one in the Cedar Swamp Tracts, as being sensitive to hydrologic changes and climate change (Swain 2020). Northern Atlantic White Cedar Swamps require a natural cycle of wet and dry periods for their survival and reproduction; any alteration to the natural hydroperiod threatens their persistence (Swain 2020). Changes in precipitation, or water levels, have the potential to impact these communities.

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 2024). 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 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. All of Westminster State Forest was designated Woodland. Identification of Land Stewardship Zones within Westminster was performed in the context of the Woodland Landscape Designation.

The following Land Stewardship Zoning is recommended to guide management and any future development. (See Figure 1. Land Stewardship Zoning Map, page 20, and the Land Stewardship Zoning layer on DCR's Stewardship Map: https://dcrsgis-mass-eoeea.hub.arcgis.com/.)

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 Westminster State Forest have been designated Zone 1.

- No areas identified as 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 Westminster State Forest have been designated Zone 2.

- Knower Road Tract. All areas not identified as Zone 3.
- Cedar Swamp Tracts. Entirety of both tracts. Note that a Sensitive Natural Community Overlay covers the entirety of both tracts.
- Baldwin Road Tract, Old Gardner Road Tract, and Bragg Hill Road Tract. Entirety of all three tracts.

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 Westminster State Forest are currently developed, appropriate for potential future development, or intensively used for recreation. They have been designated Zone 3.

- Roadside parking at the Knower Road Tract.

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. The following Significant Feature Overlays were developed for Westminster:

- **Sensitive Natural Community Overlay.** The Cedar Swamp Tracts include much of the only documented occurrence of the Northern Atlantic White Cedar Swamp natural community type in Massachusetts. This overlay is precautionary in nature, until the community can be assessed, and management guidance developed and implemented. In the absence of formal management guidance, all actions within this overlay area should be reviewed by DCR's Office of Natural Resources for potential impacts to this unique community.
- **Surface Water Supply Protection Zone A Overlay.** Land uses and activities within this overlay should be consistent with Massachusetts' Drinking Water Regulations to protect surface water supplies. Refer to 310 CMR 22.20B and 310 CMR 22.20C for specific guidance.

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 21.)

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

Eleven priority management recommendations were developed for this property. They are presented in Table 19, page 24. 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 24) into CAMIS as a separate work order, noting "*RMP" in the description field. Non-traditional work orders (e.g., volunteer trail work, posting of Massachusetts Department of Public Health (DPH) Fish Consumption Advisory posters, certification of vernal pools) should be closed out by the property manager, once the recommendation has been implemented.

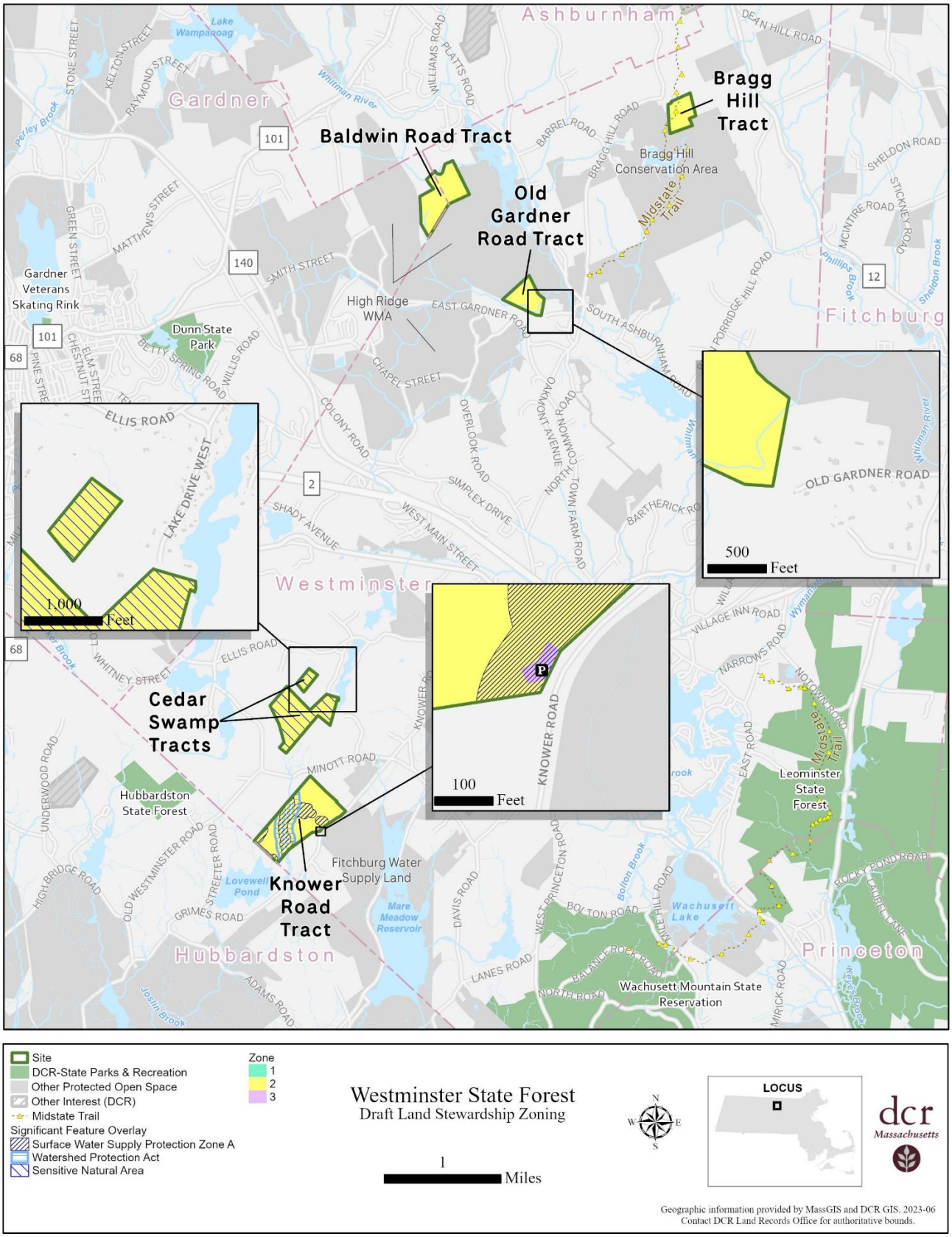

Figure 1. Land Stewardship Zoning Map.

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 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.	N/A
Natural Resources	6. The extent of native vegetation in campground and/or picnic sites is stable or increasing. (As assessed by property manager.)	N/A
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.	No
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
Natural Resources	10. Zone I wellhead protection areas are free of vehicle parking, chemical storage, or concentrated recreation.	N/A

Category	Metric	Status
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.	N/A
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.	N/A
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.	N/A
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.	No
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.	Yes
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

Category	Metric	Status
Recreation	2. Trail density is consistent with the park's Landscape Designation(s). (See Trails Guidelines and Best Practices Manual (DCR 2019a) 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.	Yes
Recreation	5. Recurring use by OHVs is restricted to authorized trails. (As assessed by property manager.)	Yes
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 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.	N/A
Sustainable Forest Management	1. Forestry activities are consistent with Landscape Designation and associated forestry guidelines.	N/A
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. 132, §§ 40–46).	N/A

Table 19. Priority Recommendations for Westminster 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	Survey, document, and submit documentation to certify potential vernal pools, in accordance with DCR (n.d.) and MassWildlife (2009), as warranted.	Office of Natural Resources (Lead), Volunteers
Natural Resources	Acquire adjacent parcels or conservation easements for resource conservation and to gain better access to the Forest parcels for resource protection.	Land Protection Program (Lead), Park Operations
Natural Resources	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)
Natural Resources	Apply Landscape Designations to those portions of the Park currently lacking such designations.	Management Forestry (Lead), GIS Program
Natural Resources	Resolve potential encroachment in accordance with draft Agency-wide guidance and Best Management Practices (DCR 2019b).	Management Forestry (Lead), Office of the General Counsel, Park Operations
Cultural Resources	Conduct a cultural resources and archaeological reconnaissance survey (950 CMR 70) to identify archaeologically sensitive areas, archaeological sites, and cultural landscape features. Complete appropriate Massachusetts Historical Commission archaeological site forms for identified archaeological resources.	Consultant, Office of Cultural Resources (Lead)
Recreation	As appropriate, promote EEA's Environmental Justice Policy goals at Westminster State Forest.	Land Protection Program (Co-Lead), Trails and Greenways Section (Co-Lead), Interpretive Services (Co-Lead), Partners

Category	Recommendation	Implementation
Recreation	Establish a DCR web page for Westminster State Forest.	Interpretive Services, Regional Staff (Lead), State Parks Operations, Web Content Creator
Recreation	Develop a sign plan for Westminster State Forest.	Park Operations, Interpretive Services (Lead)
Recreation	Establish a Forest gateway at the parking area on the Knower Road Tract with Identification Sign and Welcome Wayside.	Interpretive Services (Co-Lead), Park Operations (Co-Lead), Trails and Greenways Section, Landscape Architecture
Recreation	Identify opportunities to harden or reroute existing trails in areas where trail use has resulted in erosion.	Park Operations, Trails and Greenways Section (Lead)
Recreation	Remove skis and homemade signs from the Knower Road Tract.	Park Operations (Lead), Trails and Greenways Section

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