dcr
Massachusetts

Resource Management Plan
New Salem 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 at www.mass.gov/dcr. Contact us at mass.parks@mass.gov.

New Salem State Forest

1. Property Overview

Characteristic	Value
Date Established	1936
Location	New Salem
Ecoregions	Lower Worcester Plateau, Worcester Plateau
Watershed	Chicopee, Millers
DCR Region	Central
DCR District	Central Highlands
DCR Complex	Erving
Management Forestry Districts	Eastern Connecticut Valley, Mid-State
Fire Control District	Franklin
Size (acres)	126.6
Boundary Length (miles)	3.6
Elevation - Minimum (feet)	536.2
Elevation - Maximum (feet)	1,293.5
Environmental Justice (acres)	0.0
Estimated Annual Attendance (2023)	500
Interpretive Programs (# programs, 2023)	0
Interpretive Programs (# attendees, 2023)	0

2. Landscape Designations

Designation	Acres
Parkland	0.0
Reserve	0.0
Woodland	126.6
No Designation	0.0

3. Regulatory Designations

Designation	Acres
Outstanding Resource Waters - Quabbin Reservoir	88.8
Priority Habitat (MESA)	2.8

4. Long-Term Agreements

Agreement	Expiration Year
None Identified	N/A

5. Concessions

Concession Type
None

6. Partners & Friends

Group(s)
None Identified

7. Features of Interest

Feature
Lake Rohunta access
Protected open space

8. Natural Resources

Resource	Value
Tree Canopy (acres)	126.4
Rivers and Streams (miles)	0.0
Open Water (acres)	0.1
Wetlands (acres)	2.0
Certified Vernal Pools (#)	1
Potential Vernal Pools (#)	1
State-Listed Species (# Regulatory)	1
State-Listed Species (# Non-Regulatory)	1
Federally Listed Species (#)	0
Aquatic Invasive Plants (# known species)	0
Terrestrial Invasive Plants (# known species)	1

9. Forest Management (Since 2012)

Management Objective	Acres
N/A	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	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	Moderately paced

11. Natural Hazards

Hazard Type	Acres
Flood (1.0%-chance)	Data unavailable
Flood (0.2%-chance)	Data unavailable
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	#
Protected open space	2

15. Recreation Activities

Activity
Dog walking, on-leash
Hunting
Snowshoeing
Wildlife viewing

16. Roads and Trails

Metric	Value
Roads - Unpaved (miles)	0.1
Roads - Paved (miles)	0.1
Forest Roads - Unpaved (miles)	0.3
Forest Roads - Paved (miles)	0.0
Trails - Unpaved (miles)	0.0
Trails - Paved (miles)	0.0
Trails - Unauthorized (miles)	0.0
Trail Density (miles/acre)	0.002
Area of Impact (acres)	27.7

17. Parking

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

INTRODUCTION

New Salem State Forest (New Salem or the Forest) is located in the Town of New Salem (the Town), approximately 15 miles southeast of Greenfield. It is situated just north of Quabbin Reservoir and is largely within the Quabbin Watershed. The Forest may be accessed via Routes 202 and 122, the Town's major transportation routes. Nearby DCR Division of State Parks and Recreation properties include Wendell State Forest (0.3 miles), Shutesbury State Forest (0.7 miles), and Petersham State Forest (2.0 miles). Approximately 88% of the Town is forested, and approximately 67% of its land is permanently protected (Rhodes and Gage 2021). Residential development is decentralized, and accounts for only 7% of the Town's land cover (Rhodes and Gage 2021). A similar pattern of land use (i.e., primarily forested with limited residential development) abuts the Forest. The Forest is composed of two isolated tracts (See Figure 1. Land Stewardship Zoning Map, page 19); they are:

- **West Street Tract**. This tract is located along the Wendell-New Salem town line, on Poor Farm Hill, within the Worcester Plateau Ecoregion. West Street, a paved public road, subdivides the tract. An approximately 14-acre parcel of Quabbin Reservoir Watershed land, which is administered by DCR's Division of Water Supply Protection (DWSP), is located along the tract's northern boundary and an additional 113 acres of watershed land are located tangentially to the northwest of the tract. There are no recreation facilities or infrastructure at this tract.
- **Blackinton Road Tract**. This tract is located in northeast New Salem, within the Lower Worcester Plateau Ecoregion, and has approximately 400 feet of frontage on Blackinton Road. On the opposite side of the road is Quabbin Reservoir Watershed Land. Michael Lane, a 30-foot-wide gravel road passes through the Forest's west side and provides access to residential lots north of the Forest. A low north-south oriented ridge through the center of the tract is a watershed boundary, sending water westward to the Chicopee Watershed and eastward to the Millers Watershed. Lake Rohunta, an impoundment along the Millers River, forms the tract's eastern boundary. There are no recreation facilities or infrastructure at this tract.

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 New Salem State Forest. Groups and individuals, including peoples known as the Nipmuc, Pennacook, and Wabanaki (Dawnland Confederacy), are recorded in available documentation (Native Land Digital 2023) as having relationships to this place over seasons and generations. The area's freshwater "ponds and fertile lowlands were probably capable of supporting a substantial" population of Indigenous peoples (Massachusetts Historical Commission (MHC) 1982). The Town was originally granted as the township of New Salem in 1734 from Salem and was incorporated as the Town of New Salem in 1775 (MHC 1982). The land that became New Salem State Forest was acquired years in advance of the Forest's formal establishment. In December 1923, the New England Box Company sold "several parcels of land situate in the towns of Orange, Warwick, Wendell, Shutesbury, and New Salem, containing approximately five hundred and fifty acres" to the Commonwealth (Book 675, Page 343). Three of these parcels, the Pierce Lot (i.e., West Street Tract) and the Bangs and Shumway lots (i.e., the Blackinton Road Tract), comprise today's Forest. The name "New Salem State Forest" does not appear until the 1936 annual report of the Commissioner of Conservation (Massachusetts Department of Conservation 1936). At that time, the Forest was 70 acres in size, indicating that it did not consist of both of the current tracts. A 1957 inventory of outdoor public recreation areas in Massachusetts also

identified the Forest as 70 acres in size (Massachusetts Department of Natural Resources 1957). A 1961 topographic map shows the Forest in its current configuration (United States Geological Survey 1961).

Although the specific reason(s) for the establishment of New Salem State Forest went undocumented, general reasons for the establishment of Massachusetts State Forests are well known. The Massachusetts State Forest system was established in the early 1900s "for timber cultivation within the Commonwealth," with the State Forester having the authority to "reforest and develop such lands…to increase the public benefit and enjoyment therefrom and to protect and conserve water supplies of the Commonwealth" (Massachusetts General Court (MGC) 1914). In 1924, Chapter 284 of the Acts of 1924 authorized the Commissioner of Conservation "to lay out, construct, and maintain trails or paths through or over lands in state forests" (MGC 1924). The following year, the Legislature authorized the regulated "hunting and trapping of certain birds and animals" on public lands in the Commonwealth (MGC 1925). The establishment of the Forest in 1936 was likely for these purposes, the societal priorities of the day. Prior to adoption of this RMP, New Salem State Forest was managed under a regional Guidelines for Operations and Land Stewardship plan (i.e., GOALS plan) covering the Northeastern Connecticut Valley Region (Department of Environmental Management 1997). Adjacent DWSP lands are managed under a variety of watershed-specific plans (e.g., DCR 2018a, 2018b, 2023a) and regulations.

Nearly 90 years after its establishment, New Salem continues to be managed for forestry purposes, water supply protection, and hunting opportunities. It also provides a number of additional public benefits of importance today, such as forest resiliency, carbon sequestration and storage, and providing habitat for non-game wildlife. Due to its small tract sizes and lack of recreation infrastructure, the Forest is primarily used for off-trail passive recreation.

PARK IDENTITY

New Salem State Forest provides permanently protected forested open space mostly within the Quabbin Valley. It protects natural resources while providing limited opportunities for dispersed passive recreation. All future activities and improvements should be consistent with New Salem's identity as a Woodland with an emphasis on resource protection and minimal recreation infrastructure.

DEFINING RESOURCES AND VALUES

The Forest is defined by the presence of forest and absence of recreational development. Its values include:

- Easily accessed permanently protected open space that provides a variety of societal benefits.
- Its undeveloped character, without recreation facilities and with limited trails.
- Frontage on Lake Rohunta (Blackinton Road Tract).

STATEMENTS OF SIGNIFICANCE

Statements of Significance describe the importance or distinctiveness of a place and its resources (National Park Service (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. When developing significance statements, the following criteria are considered:

- 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 New Salem 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 more ecosystem services such as forest resiliency, water quality, diverse wildlife habitats, carbon sequestration and storage, and safety.
- 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.
- The state forests were partly created to lessen the Commonwealth's dependency on out of state lumber and to support industry in Massachusetts. Early forest management strategies were driven by productivity and economics. As the science and societal stewardship values evolved, increased consideration was given to the environmental impacts of a site-specific forest management project. In some cases, other objectives, such as improving wildlife habitat or to maintain maintaining forest health resilience might be the primary reason for a particular project.
- Although 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.

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 New Salem State Forest is:

> Managing our State Forests for diversity and resilience leads to a healthier environment.

VISITOR EXPERIENCE

New Salem State Forest provides limited visitor experiences, including the following:

- **Virtual Experience**. Potential visitors will find little information about New Salem 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 Erving State Forest web page does not list New Salem as one of its "related parks."

- **Entering the Park**. The Forest may be accessed via West Street (for the West Street Tract) or Blackinton Road (for the Blackinton Road Track). Although there are DCR boundary markers and marking on trees, there are no Identification Signs at either tract. Visitors may turn off the paved public roads onto gravel forest roads and park along the road shoulder. There are no formal parking areas.
- **Off-trail Passive Recreation**. Unlike most DCR properties, there is no trail system or trail-based passive recreation. Visitors participate in off-trail recreation activities, such as hunting and wildlife viewing.

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 23).

Natural Resources

Threats

- One terrestrial invasive plant, glossy buckthorn, is known from the Forest. This limited information on the presence or distribution of invasive plants in the Forest prevents determining if any sensitive natural resources are being impacted by invasive plants.
- There is occasional OHV use in the Blackinton Road tract, which negatively impacts soils and vegetation.
- Two aquatic invasive plants, Carolina fanwort and variable water-milfoil, are present in Lake Rohunta (Assessment Unit #MA35070), along the eastern boundary of the Blackinton Road tract (Massachusetts Department of Environmental Protection (MassDEP) 2023a). These invasive species may negatively impact both the ecological integrity and biodiversity of the lake.

Opportunities

- Wetlands along the shore of Lake Rohunta have been identified as Priority Habitat for a waterbird listed as Endangered under the Massachusetts Endangered Species Act (MESA). Limiting recreational access (e.g., trails) to the shore, and avoiding the use of percussive/noise producing equipment within Priority Habitat between August 15 and March 15, will help minimize disturbance to the bird and alteration of its habitat (Schluter 2024).
- In addition to Priority Habitat in the Forest (i.e., Regulatory Habitat), there is also Non-Regulatory habitat for one MESA-protected species. 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 MESA (321 CMR 10.00). Requesting a pre-filing consultation with NHESP for "all works, projects, or activities" in the Forest (e.g., trail construction, preparation of a Forest Cutting Plan), regardless of location in or out of Priority Habitat, will ensure continued protection of this habitat and compliance with the MESA.

- The Forest's potential vernal pool may provide breeding habitat for the Forest's amphibians. Surveying and certifying this pool, as appropriate, may help better protect these animal populations.
- The West Street and Blackinton Road tracts both directly abut DWSP property. Intra-agency discussions between DWSP and State Parks could determine if it is appropriate to transfer control of specific tracts both to and from DWSP to ensure optimal resource protection.

Cultural Resources

Threats

- Erosion associated with natural weather events and human recreation activities (e.g., hiking, mountain biking, OHV use) has the potential to damage archaeological resources at both tracts.
- Current digitized and spatially referenced flood maps from the Federal Emergency Management Agency (FEMA) do not cover New Salem State Forest. This limits DCR's ability to identify potential threats from flood events to cultural resources in the Forest.

Opportunities

- The West Street Tract is situated on Poor Farm Hill, within 900 feet of the location of the New Salem Poor Farm (MACRIS ID NSA.F). An opportunity exists to conduct an archaeological reconnaissance survey to identify associated resources within the Forest.
- The Forest is located approximately 10 miles southeast of the Turners Falls Sacred Ceremonial Hill Site, a "highly significant Native American "prayer hill" containing stone features" (Matthews 2008). This property has been determined to be eligible for listing on the National Register (Matthews 2008). The "site is considered by Tribal authorities to be part of a ceremonial district" (Shutesbury Historical Commission (SHC) 2021). Although the boundaries of the district "are presently undetermined," its approximate boundary is "a 16-mile radius around the Turners Falls Site" (SHC 2021). Because of the Forest's location within this potential district, there is a possibility that Indigenous peoples ceremonial stone features occur within the Forest.
- An opportunity exists to conduct archaeological reconnaissance surveys in the Blackinton Road Tract to identify ancient Indigenous peoples land use and occupation along the banks of the upper Millers River.
- An opportunity exists to partner with the Town of New Salem, tribal partners, and DCR's Division of Water Supply Protection to interpret the history of the larger Quabbin area.

Recreation

Threats

- There is limited official information available on New Salem State Forest. DCR's webpage does not include information on the Forest, making it difficult for potential visitors to become aware of the property and its recreational opportunities.

- MassDEP has identified several water quality impairments in Lake Rohunta adjacent to the Forest (MassDEP 2023a), resulting in the lake being classified as not suitable habitat for sustaining a native, naturally diverse community of aquatic flora and fauna (MassDEP 2023b). Because MassDEP updates its Integrated List of Waters on a regular basis, readers are directed to refer to the most recent version of that document for current information.
- A Public Health Fish Consumption Advisory has been issued for Lake Rohunta due to the presence of mercury in fish tissue (Massachusetts Department of Public Health (DPH) 2023). Signs informing the public of this health advisory are absent from access points to the lake at the Blackinton Road Tract.
- There is limited official information available on New Salem State Forest. DCR's webpage does not include information on the Forest, making it difficult for potential visitors to become aware of the property and its recreational opportunities.
- Much of the dog walking that occurs within the Forest is off leash, in violation of DCR regulations.
- Current digitized and spatially referenced flood maps from FEMA do not cover New Salem State Forest. This limits DCR's ability to identify potential threats from flood events to cultural resources in the Forest.

Opportunities

- Adding a New Salem 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.

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 (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" (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

Because the Forest's state-listed bird lives in an aquatic environment, it may be susceptible to the anticipated impacts of climate change.

Climate change may cause 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, the Forest's vernal pool and its associated wildlife may be negatively impacted.

Cultural Resources—General Impacts

Climate change may negatively affect cultural resources, their preservation, and maintenance (EEA 2022a; 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

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

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 New Salem State Forest was designated Woodland. Identification of Land Stewardship Zones within New Salem 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 19 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 New Salem have been designated Zone 1.

- No sections of the Forest 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 New Salem have been designated Zone 2.

- All areas of the Forest.

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

- No sections of the Forest have been designated Zone 3.

Significant Feature Overlay

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

- There are no Significant Feature Overlays associated with this Forest.

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/.

Because authorized trails are located within State-Listed Species Habitat on this property, managers should consult an additional GIS-based tool, the NHESP 2022 Guidance Codes for DCR Trail Maintenance Map. (https://mass-eoeea.maps.arcgis.com/home/item.html?id=cb252e8df40d408c81fe8fcf690e14f6) This tool allows users to select specific trail segments and identify restrictions and regulatory review associated with performing 10 common trail maintenance activities on these segments. Because site-specific rare species information is confidential under Massachusetts law (M.G.L. c. 66, §17D), access to this tool is restricted.

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 20.)

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

Six priority management recommendations were developed for the Forest. They are presented in the Table 19, page 23. 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 23) 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.

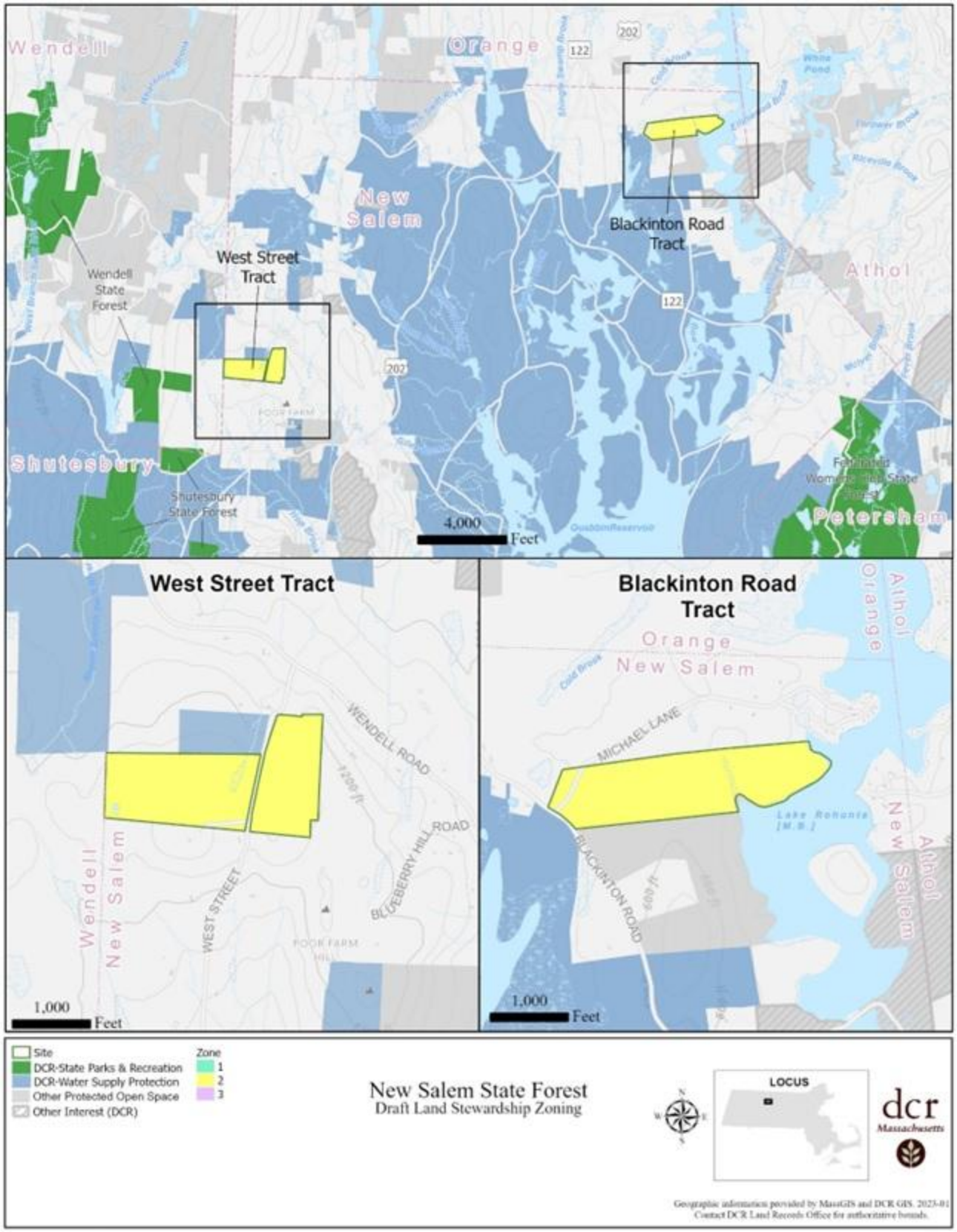

Figure 1. Land Stewardship Zoning Map.

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 NHESP for potential impacts to rare species and their habitats.	N/A
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.	Yes
Natural Resources	4. Aquatic areas adjacent to beaches, boat ramps and launches, roads, and hiking trails are free of eroded sediments.	N/A
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 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.)	N/A
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.	Yes
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.	Yes
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.	N/A
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.	Unknown
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.	N/A
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.)	No
Recreation	6. There is a high level of compliance with dog leash regulations and policies. (As assessed by property manager.)	No
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 2023a); DPH fish consumption advisories; and/or water quality testing at waterfront areas.	No
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.	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. 132, §§ 40–46).	N/A

Table 19. Priority Recommendations for New Salem 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 pool, in accordance with DCR (n.d.) and MassWildlife (2009), as warranted.	Office of Natural Resources (Lead), Volunteers
Cultural Resources	Work with Indigenous partners, Town of New Salem, DCR Forestry, and DWSP protection staff to inventory, document, conserve, and interpret Indigenous peoples' resources and Indigenous peoples' history within the Forest.	Division of Water Supply Protection, Management Forestry, Office of Cultural Resources (Lead), Partner
Cultural Resources	Conduct an archaeological reconnaissance survey (950 CMR 70) in cooperation with municipal, tribal, and non-profit partners. Complete appropriate Massachusetts Historical Commission archaeological site forms for identified archaeological resources.	Contractor, Office of Cultural Resources (Lead)
Recreation	Post Department of Public Health Fish Consumption Advisory Posters (https://www.mass.gov/doc/fish-consumption-advisory-poster-for-marine-and-fresh-water-bodies-0/download) at fishing access locations along Lake Rohunta at the Blackinton Road Tract.	Park Operations
Recreation	Install an Identification Sign at each tract.	Park Operations
Recreation	Establish a DCR web page for New Salem State Forest.	Interpretive Services, Regional Staff (Lead), State Parks Operations, Web Content Creator

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