dcr
Massachusetts

Resource Management Plan
Warwick 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

Maura T. Healey, Governor
Kimberley Driscoll, Lieutenant Governor
Rebecca L. Tepper, Secretary
Nicole LaChapelle, Commissioner

Purpose

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

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

Mission and Core Principles

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

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

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

Stewardship

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

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

Warwick State Forest

https://www.mass.gov/locations/erving-state-forest

1. Property Overview

Characteristic	Value
Date Established	1925
Location	Orange, Royalston, Warwick
Ecoregion	Worcester Plateau
Watershed	Connecticut, Millers
DCR Region	Central
DCR District	Central Highlands
DCR Complex	Erving
Management Forestry District	Mid-State
Fire Control District	North Worcester
Size (acres)	9,534.9
Boundary Length (miles)	81.3
Elevation - Minimum (feet)	542.2
Elevation - Maximum (feet)	1,386.4
Environmental Justice (acres)	<0.1
Estimated Annual Attendance (2023)	5,000
Interpretive Programs (# programs, 2023)	0
Interpretive Programs (# attendees, 2023)	0

2. Landscape Designations

Designation	Acres
Parkland	10.9
Reserve	3,164.4
Woodland	6,059.0
No Designation	300.7

3. Regulatory Designations

Designation	Acres
Priority Habitat (MESA)	557.3

4. Long-Term Agreements

Agreement	Expiration Year
None Identified	N/A

5. Concessions

Concession Type
None

6. Partners & Friends

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

7. Features of Interest

Feature
Chestnut Hill
Gales Pond
Kidder Brook
Mill Brook
Moss Brook
New England National Scenic Trail (NET)
Richard's Reservoir
Sheomet Lake
Stevens Swamp
Tully Brook

8. Natural Resources

Resource	Value
Tree Canopy (acres)	9,096.6
Rivers and Streams (miles)	32.6
Open Water (acres)	89.3
Wetlands (acres)	627.0
Certified Vernal Pools (#)	12
Potential Vernal Pools (#)	28
State-Listed Species (# Regulatory)	13
State-Listed Species (# Non-Regulatory)	4
Federally Listed Species (#)	1
Aquatic Invasive Plants (# known species)	0
Terrestrial Invasive Plants (# known species)	5

9. Forest Management (Since 2012)

Management Objective	Acres
Maintain and enhance species and structural diversity	80.0

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	108.9
Type of Wildland-Urban Interface	Intermix
Predicted rate of spread, based on Fire Behavior Fuel Model 13	Rapid

11. Natural Hazards

Hazard Type	Acres
Flood (1.0%-chance)	No Data
Flood (0.2%-chance)	No Data
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	#
Cartop Launch Site	1
New England National Scenic Trail	1
Trail System(s)	2

15. Recreation Activities

Activity
Bicycling, mountain
Fishing, fin fish
Hiking/Walking
Hunting
Canoeing/Kayaking
Horseback riding
Skiing, cross country
Snowmobiling
Snowshoeing
Trapping
Wildlife viewing

16. Roads and Trails

Metric	Value
Roads - Unpaved (miles)	9.4
Roads - Paved (miles)	6.9
Forest Roads - Unpaved (miles)	22.1
Forest Roads - Paved (miles)	0.1
Trails - Unpaved (miles)	15.3
Trails - Paved (miles)	<0.1
Trails - Unauthorized (miles)	4.5
Trail Density (miles/acre)	0.004
Area of Impact (acres)	2,709.2

17. Parking

Parking Resources	#
Lots	5
Parking Spaces - Total	20
Parking Spaces - Accessible (HP)	0
Parking Spaces - Other	20

INTRODUCTION

Warwick State Forest (Warwick or the Forest) is located primarily in the Town of Warwick (the Town), with small portions extending into the towns of Royalston and Orange. The Forest is situated I about four miles east of the Connecticut River and is less than 10 miles north of the Quabbin Reservoir. Warwick is a very large noncontiguous forest and comprised of the following tracts, as shown in Figure 1 (page 25):

- **Flagg Road Tract.** Named for a forest road that passes through much of this tract, Flagg Road Tract is located in along the Warwick-Northfield town line. This tract borders both Northfield and Erving State Forests to the west and touches Mount Grace State Forest to the east; it functions as an extension of these properties, which are connected via a network of hiking trails. The rest of the tract is bordered by undeveloped private woodlands and limited rural residential development. Wetlands (e.g., Bass Swamp, Stevens Swamp, Black Swamp) and flowing waters (e.g., Mill Brook, Moss Brook) are common throughout the tract. Much of this Tract, from the north side of Stevens Swamp to the tract's southern border, is designated Reserve. A portion of the New England Scenic Trail (NET) passes through the north end of this tract. The NET is a 235-mile-long trail that runs north from Guilford, Connecticut, through Massachusetts, ending at the border with New Hampshire, linking to smaller trails along the way. Along its course it passes through nine DCR-owned or managed properties, the closest of which to the Forest are Northfield State Forest and Mount Grace State Forest. The Appalachian Mountain Club (AMC) provides trail maintenance in Massachusetts, including in the Forest. See New England Trail (2020) for additional information. In 2023, the National Park Service (NPS) designated the NET a National Park.
- **Flower Hill Road Tract.** This tract is located north of the Flagg Road Tract, near the New Hampshire Border. Flower Hill Road passes north-south through this parcel. The tract is bordered by rural residential development, properties permanently protected through conservation restrictions, and undeveloped private woodlands. There is no formal trail system, or other recreation development.
- **Wendell Road Tract.** This tract is located in southwest Warwick, along Wendell Road. It is contiguous with Erving State Forest to the west and Orange State Forest to the southwest. This tract is designated as Reserve. The tract is mainly bordered by rural residential property, undeveloped private woodlands, and conservation lands. Moss Brook, Darling Brook, and Harris Swamp are located along the tract's northwest boundary. There is no formal trail system or other recreation development.
- **Orange Road Tracts.** These two tracts extend from Orange Road (Route 78) west to Wendell Road and are mainly bordered by undeveloped private woodlands and rural residential property. There is no formal trail system, or other recreation development.
- **Gales Pond Tract.** This tract is located on both sides of Gale Road and includes Gales Pond, an approximately 12-acre "artificial, warm water, eutrophic water body" (Warwick Open Space Committee and Warwick Town Forest Committee (WOSC and WTFC) 2020). This pond is recognized in Warwick for its ecological and scenic values (WOSC and WTFC 2020). Adjacent land uses include rural residential development, undeveloped unprotected woodlands, and permanently protected open space. Among the latter are Mount Grace Land Conservation Trust's (MGLCT) Arthur Iverson Conservation Area to the north, the Massachusetts Division of Fisheries and Wildlife's (MassWildlife) Warwick Wildlife Management Are to the south, the Massachusetts Audubon Society's (Mass Audubon) Gales Brook Wildlife Sanctuary to the southwest, and conservation restrictions to the

west, south, and east. Two brooks, Gales Brook and Hodges Brook, flow from north to south along the west side of the tract. There is no formal trail system, or other recreation development.

- **Tully Brook Tract.** This tract is located on the east side of Town, along the Warwick-Royalston town line, and extends from Tully Road in Orange, north to the New Hampshire Border. It is named for the brook that runs north to south throughout most of the tract. The tract is mainly bordered by rural residential property, undeveloped land, and permanently protected open space. Within this tract are two of the Forest's best-known features of interest, Richards Reservoir and Sheomet Lake. Richards Reservoir is an approximately 30-acre, warm-water impoundment commonly used for fishing (WOSC and WTFC 2020). Parking and a car-top boat launch are available near the Reservoir. Sheomet Lake is a 33-acre "enhanced pond considered to be stratified and mesotrophic" (WOSC and WTFC 2020). The Town considers the area surrounding Sheomet Lake to have high recreational value for fishing, blueberry picking, wildlife viewing, horseback riding, ice skating, and swimming (WOSC and WTFC 2020); the latter two activities are not authorized by DCR at the Forest and are discouraged. Parking is available adjacent to the lake. The NET passes through this tract, following the west and north shore of Richards Reservoir before exiting the Forest in Royalston. Most of the Forest's recreation is associated with these two water bodies and the NET.
- **Fish Brook Tract.** The Forest's smallest tract is located on the Royalston-Orange town line. This tract is bordered on the north and west by MassWildlife's Fish Brook Wildlife Management Area, on the south by residential development, and on the east by a mixture of rural residential development, unprotected woodlands, and MGLCT's Butterworth Ridge Conservation Area. There is no formal trail system, or other recreation development.

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 Warwick State Forest. Groups and individuals, including peoples known as the Wabanaki (Dawnland Confederacy), Pennacook, and N'dakina (Abenaki/Abenaquis), are recorded in available documentation (Native Land Digital 2023) as having relationships to this place over seasons and generations. Following Indigenous people's dispossession, the Massachusetts General Court (MGC) granted Euro-Americans the lands constituting present-day Warwick in 1690 and incorporated Warwick in 1763. By the early 20th century, Warwick was a sparsely populated, rural community with an emerging summer recreation economy (Massachusetts Historical Commission 1982: 1, 9). An 1830s map of Warwick shows dams in areas now part of Warwick State Forest, some of which may have visible remnants in the Forest (Blake 1830). The first 358 acres for Warwick State Forest were purchased in 1925 (Massachusetts Department of Conservation (1926). With many land acquisitions since then, the Forest's size now stands at just about 9,500 acres. The Civilian Conservation Corps (CCC) established two camps in Warwick. One camp, Camp S92, is known to have existed off of Richmond Road on the Tully Brook Tract from 1935 to 1938 (Berg 1999) The Warwick Prison Camp (the Camp) was established in the 1960s, on the site of the former CCC camp. The Camp opened in the 1960s and closed in the 1990s, due to pollution from the septic system (Charter 2022). The buildings have since been demolished but some infrastructure remains. The Forest was previously managed under a 1996 DEM Guidelines for Operations and Lands Stewardship (GOALS) plan for the Northeastern Connecticut Valley Region (DEM 1997).

Warwick State Forest rewards visitors with outstanding natural and recreational resources. The Forest protects numerous water bodies, including Sheomet Lake, Richards Reservoir, and Gales Pond. These

waterbodies provide rare species habitat for a high concentration of state-listed species, opportunities for recreational activities, and add to the aesthetics. The Sheomet Lake Dam is an interesting combination of stacked stone connecting to earthen mounds and bedrock. Numerous streams run through the property adding to the Forest's ecological diversity, ambience, and visitor experience.

PARK IDENTITY

Warwick State Forest is best known as being part of a broad, multi-partner conservation landscape and as public land with abundant recreational opportunities. Less well known are the Forest's outstanding conservation value, including large numbers of rare species and Priority Natural Communities, and its historic cultural uses. All future activities and improvements should be consistent with the Forest's designations as Woodland and Reserve, with an emphasis on protecting and promoting rare species and their habitats, management of cultural resources, and compatible trails-based and water-based recreation.

DEFINING RESOURCES AND VALUES

Resources that define the Forest are related to the protection of rare species and their habitats, land conservation, and recreational opportunities. They include:

- Contributions to landscape-scale resource protection.
    - Warwick's eight tracts are part of a broad conservation landscape. The Forest is contiguous with Northfield, Erving, Orange, and Mount Grace State Forests, MassWildlife's Fish Brook and Warwick Wildlife Management Areas, permanently protected open space owned and managed by Mass Audubon and MGLCT, and properties with conservation restrictions.
    - Two DCR state forests, Warwick and Mount Grace, account for 49% of forest land in the Town. These forests protect the Town's natural and cultural resources and provide a variety of recreational opportunities to residents (WOSC and WTFC 2020).
- Endangered or uncommon natural resources.
    - The Forest has a high number of state-listed species; 13 regulatory and an additional 3 non-regulatory. Ten of the regulatory species are associated with the Forest's wetlands, streams, or floodplains, and two of the non-regulatory species are also associated with wetlands. One of the regulatory species, a plant, is also listed as Endangered under the U.S. Endangered Species Act.
    - More than 500 acres of Priority Habitat.
    - Five priority natural communities are known from the Forest. All are palustrine (i.e., non-tidal freshwater) communities.
- Scattered throughout Warwick State Forest are cellar holes, concrete foundations, rock walls, and other cultural features, allowing visitors a glimpse into the Forest's land past use.
- Sheomet Lake provides visitors with a place to gather and a tranquil lake experience. The dam is a mix of natural and manmade features with the spillway providing soothing waterfall sounds. With picnic areas along the southern shore and a boat launch on the western shore, Lake Sheomet facilitates and contributes to numerous relaxing recreation activities.

- An extensive trail network that allows visitors to explore over 35 miles of forest roads and trails. Trails in Warwick are part of long-distance trail (NET) and local trail network connecting Warwick to Mount Grace and Erving State Forests, and trails on local municipal and non-profit lands.

STATEMENTS OF SIGNIFICANCE

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

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

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

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

- The Massachusetts State Forest system was founded on the principles of scientific forest management. These practices contrasted with ongoing un-managed destructive practices throughout the country. This effort focused on the long-term cultivation of forests to achieve a sustainable harvest. Foresters worked to maximize production and provide a sustained yield over time, aiming for long-term stewardship over short-term profits.
- Ten Priority Habitat areas are present throughout Warwick State Forest. These indicate land that is known to be the geographic extent of habitat for state-listed species. These species are either at risk, or may become at risk, of extinction.
- 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.
- Though foresters recognized that forest management could enhance recreational activities, when they created the state forests, recreation was a secondary motivation. State forests were viewed as opportunities to provide a "wilder" recreational experience in contrast to "planned," more landscaped parks. Prior to 1933, only three forests offered recreational facilities. Over time the focus on recreation grew to the point where it is the most visible function of the agency.
- 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.

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 Forest, both personal (i.e., formal and informal interactions with visitors) and non-personal (e.g., exhibits, signage, brochures).

The Unifying Theme for Warwick State Forest is:

> Perhaps surprisingly, resource management and conservation go hand in hand.

VISITOR EXPERIENCE

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

- **Virtual Experience.** Potential visitors will find little information about Warwick 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 Warwick as being one of its "related parks."
- **Entering the Forest.** The Forest lacks a formal gateway. Because it consists of eight tracts located throughout the Town, visitors may enter the Forest through many informal entrances along public roads. The Tully Brook Tract includes Sheomet Lake and Richards Reservoir, two of the Forest's most popular features. Because of this, it is often the main destination for visitors entering the Forest by vehicle. Sheomet Lake greets visitors with a simple sign and some internal navigation signage for this area. One small parking lot and scattered parking spaces provide visitors access to a picnic area and the shoreline of Sheomet Lake. Visitors access Richards Reservoir from Richmond Road for the purposes of wildlife viewing and fishing. Hikers may access the Tully Brook Tract from numerous trails, including the NET. The Flagg Road Tract may be accessed by hikers via connecting trails from Northfield, Erving, and Mount Grace State Forests, as well as many roadside trail crossings. Other areas of Warwick State Forest may be accessed at informal trailheads with little to no signs identifying the Forest.
- **Picnicking**. Visitors can take advantage of quiet, well shaded picnic areas spread along the southern shore of the Sheomet Lake that provide a secluded picnic experience.
- **Trail-based Passive Recreation.** Visitors seeking other recreational opportunities may access an extensive trails network. More than 37 miles of official trails and forest roads extend along streambanks, ponds, wetlands, and through woodlands, providing visitors the opportunity for a light hike or day-long exploration. Many of these trails are also used by equestrians. In the winter, visitors may cross-country ski, or snowshoe along these trails. Visitors may extend their travels along trails that connect to adjacent permanently protected open space, such as Mount Grace State Forest.
- **Trail-based Active Recreation**. In the winter, under appropriate snow conditions, visitors may operate snow vehicles (i.e., snowmobiles) on designated forest roads and trails within the Forest. Trail 2, a main corridor of the Snowmobile Association of Massachusetts' trail network extends east-west through the Great Hemlock Tract. Secondary trails extend through the Notch Mountain, Great Hemlock, and Orange Road Tracts.

- **Water-based Passive Recreation.** Sheomet Lake provides an opportunity for nonmotorized boating within the Forest. Richards Reservoir, Sheomet Lake, and Gales Pond all provide access to fishing resources. Richards Reservoir and Sheomet Lake are stocked with trout by MassWildlife.
- **Fishing**. MassWildlife stocks trout in Sheomet Pond and Richards Reservoir, in the Tully Brook Tract, providing anglers opportunities in these beautiful water bodies.
- **Hunting**. Warwick is open to all legal hunting, as are the four contiguous State Forests (Erving Mount Grace, Northfield, and Orange) that abut Warwick.

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 30).

Natural Resources

Threats

- The Massachusetts Department of Environmental Protection (MassDEP) has identified the West Branch of the Tully River (AU ID MA35-11) and Gales Pond (AU ID MA35024) as being impaired, resulting in these waters being classified as not suitable habitat for sustaining a native, naturally diverse community of aquatic flora and fauna (MassDEP 2023). 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.
- Visitors drive vehicles onto lakeshore at the southern end Sheomet Lake, potentially negatively impacting vegetation and increasing erosion into the lake.
- Nearly all of the Forest's state-listed species, including the Federally Endangered plant, are associated with the Forest's wetlands, brooks, or open water. Changes in hydrology have the potential to negatively impact these species.
- Although the Forest's natural communities have not been systematically surveyed, five priority natural communities have been identified. These communities, and existing and potential threats to their ecological integrity and continued persistence in the Forest are identified below:
  - Acidic Graminoid Fen (S3 – Vulnerable). The Forest's known example of this community type is located in the Wendell Road Tract, invasive exotic plants are present. This community type is vulnerable to nutrient enrichment, alterations to hydrology, and trampling (Swain 2020).
  - Acidic Shrub Fen (S3 – Vulnerable). The Forest's two known examples of this community type are located in the Flagg Road and Tulley Brook Tracts. This community type is vulnerable to nutrient enrichment, alterations to hydrology, and trampling (Swain 2020). Aerial imagery from 2021

reveals extensive trails (i.e., trampling) across the floating mat of the Tulley Brook Tract's Acidic Shrub Fen.

- Alluvial Hardwood Flats (S3 – Vulnerable). Two small patches of this community type are located along Gales Brook in the Gales Pond Tract; many non-native plants are present in both patches. This community type is vulnerable to invasive plants and plant succession (Swain 2020).
- Kettlehole Level Bog (S2 – Imperiled). A relatively small example of this community type is present in the Wendell Road Tract; it is considered to be in good condition, with good habitat and species diversity. In general, this community type is vulnerable to nutrient enrichment, alterations to hydrology, and trampling (Swain 2020).
- Level Bog (S3 – Vulnerable). A large example of this community type is present in Stevens Swamp (Flagg Road Tract), partially in Warwick State Forest and partially in Northfield State Forest. This community type is vulnerable to nutrient enrichment, alterations to hydrology, and trampling (Swain 2020). Aerial imagery from 2021 reveals extensive trails (i.e., trampling) across the floating mat of the Stevens Swamp's Level Bog.

- Red pine scale, an invasive exotic insect, is present in the Forest and poses a threat to the health of red pines.
- Emerald ash borer, a non-native invasive insect, poses a future threat to ash trees located within the Forest.
- The following five species of invasive plants have been identified in the Forest: Asiatic bittersweet, autumn olive, common buckthorn, glossy buckthorn, and Japanese knotweed (BSC 2017). Invasive species may negatively impact both ecological integrity and biodiversity of the Forest.
- There are at least 23 unapproved geocaches in the Forest. Inappropriately located geocaches may threaten sensitive natural resources.
- Extensive unauthorized Off Highway Vehicle (OHV) use in Warwick, including in areas designated as Reserve, may be negatively impacting natural resources through increased erosion into wetland areas, trail widening, and noise.
- Unauthorized swimming at Sheomet Lake may negatively impact vegetation in the Lake.
- Several instances of potential boundary encroachments exist along the Forest's boundary and may be negatively impacting natural resources at the Forest.
- Numerous areas of privately held lands are depicted as existing within the park boundary due to errors in the OpenSpace GIS data layer, some with insufficient survey data, potentially impeding efforts to protect natural resources at Warwick.

Opportunities

- Some of the Forest's 28 potential vernal pools may provide additional breeding habitat for the park's amphibians. Surveying and certifying these pools (MassWildlife 2009), as appropriate, may help better protect these animals.
- An opportunity exists to enhance the aquatic connectivity and climate resilience of the Forest's coldwater streams (i.e., streams where maximum summer water temperatures generally do not exceed 22° C). Six of the Forest's culverts could be replaced with structures consistent with the Massachusetts Stream Crossing Handbook (Massachusetts Department of Fish and Game 2018) and

the most current Climate Resilience Design Standards (e.g., Commonwealth of Massachusetts 2022). The University of Massachusetts' Critical Linkages Project has identified these six culverts (ID nos. 10035, 10064, 10066, 10070, 10076, and 24684) as being in the top 10% for restoration potential statewide. See http://www.umasscaps.org/applications/critical-linkages.html for additional information on this project.

- Continuing forest management strategies to encourage resiliency will help limit the impacts from threats like Red Pine Scale and Emerald Ash Borer.
- Increasing visitor awareness of the frailty of bog mats and asking them to stay off bogs and fens to help protect these sensitive resources may help reduce trampling.
- There is an opportunity to enhance the Forest's ecological integrity and biodiversity through targeted removal of invasive plant species.
- Professional land surveying is needed to accurately locate boundaries for several parcels in the Forest.
- Updating the Forest's boundaries in OpenSpace GIS will improve DCR management of the property and the public's understanding of the extent of the Forest.
- Installing gates at some access points, including the sandy area adjacent to the parking lot at Sheomet Lake, may deter unauthorized OHV use and improve resource protection for sensitive natural resources.
- Approximately 300.7 acres of the Forest has no Landscape Designation (DCR 2012). Assigning Landscape Designations to these portions of the Forest could help with management of associated natural resources and ensure management consistent with other DCR properties statewide.
- Land conservation opportunities exist that would help connect state forest land and conserve ecological integrity.
- The Forest is located within the Quabbin to Cardigan Initiative's (Q2C) project area. This initiative is a public-private collaborative effort to conserve the Monadnock Highlands of north-central Massachusetts and western New Hampshire. The Forest's location within the project area offers opportunities to participate in organizational partnerships, grants, and land acquisitions in support of DCR's and Q2C's mutual conservation and recreation goals (Q2C 2023).

Cultural Resources

Threats

- Current digitized and spatially referenced flood maps from the Federal Emergency Management Agency (FEMA) do not cover Warwick State Forest. This limits DCR's ability to identify potential threats from flood events to cultural resources in the Forest.
- A lack of knowledge concerning archaeological resources in the Forest threatens their effective management and protection.
- Construction and use of the previously mentioned unauthorized trails may disturb areas of the Forest that have potential archaeological resources.
- Unauthorized OHV use at Tully Brook Tract may be negatively impacting known and unkown cultural resouces in this area.

- Numerous old mill sites are discussed in the Massachusetts Heritage Landscape Inventory Program Warwick Reconnaissance Report from 2008 and shown on an 1830s map. The exact locations are not provided but some mill sites and associated dams may be located within Warwick State Forest boundaries. A lack of information on these cultural resources threatens their effective management and protection.
- There are at least 23 unapproved geocaches in the Forest. Inappropriately located geocaches may threaten sensitive cultural resources.

Opportunities

- There is an opportunity to improve management, protection, and interpretation of significant cultural resources in the Forest through completion of a Forest-wide cultural resources reconnaissance survey in partnership with municipal, tribal, and regional entities.
- Vegetation management could help stabilize features such as cellar holes and stone walls.
- The Warwick Open Space and Recreation Plan (WOSC and WTFC 2020) makes reference to historic dams associated with Rogers Reservoir, Sheomet Pond, Gales Pond, and other waterbodies within the Forest. These features have not been inventoried and are not listed in the Massachusetts Cultural Resources Inventory Sustem (MACRIS). An opportunity exists to inventory and document these features to better manage these historic resources.
- Approximately 300.7 acres of the Park has no Landscape Designation (DCR 2012). Assigning Landscape Designations to these portions of the Park could help with management of associated cultural resources and ensure management consistent with other DCR properties statewide.

Recreation

Threats

- There is limited official information available on Warwick 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.
- The Forest lacks a central entrance or daily staff, due to the remote and scattered locations of tracts, making annual attendance estimates approximate.
- The roads to access visitor parking and recreational resources around Sheomet Lake, including the picnic area and informal car-top boat launch, are severely degraded.
- During the preparation of this RMP it came to light that the Old Athol Road bridge over the west branch of Tully Brook, was not inventoried. An opportunity exists to enhance bridge maintenance by adding the bridge to the Massachusetts Department of Transportation (MassDOT) bridge database and conducting a conditions assessment.
- Current digitized and spatially referenced flood maps from FEMA do not cover Warwick State Forest. This limits DCR's ability to prepare for flood emergency operations and to identify potential threats from flood events to recreational resources in the Forest.
- Numerous historical dams may be present at Warwick that are not included in the Mass GIS Dam Hazard layer and potentially hold unknown threats.

- The informal cartop boat launch and access road on the west side Sheomet Lake has experienced erosion threatening boat access at the Lake.
- Visitors drive vehicles onto the lake shore at Sheomet Lake, near the parking area, potentially negatively impacting visitors utilizing the beach area for recreational activities.
- Gales Pond (AU ID MA35024) has been categorized by MassDEP in its most current integrated list of waters as "Not Supporting" fish consumption (MassDEP 2023). A Public Health Fish Consumption Advisory has been issued for the waterbody by the Massachusetts Department of Public Health (DPH 2023). Signs informing the public of this health advisory are absent from access points at fishing locations.
- Recreational use of Sheomet Lake predates DCR management and some activities continue despite being prohibited by DCR. Althought the shoreline of Sheomet Lake has not been designated a swimming area, unauthorized swimming occurs in violation of 302 CMR 12.06(3). Despite agency regulations to the contrary, the Town's Open Space and Recreation Plan classifies Sheomet Lake as having high recreational value for swimming (WOSC and WTFC 2020).
- The Town's Open Space and Recreation Plan identifies Sheomet Lake as having high recreational value for ice skating (WOSC and WTFC 2020). Under DCR regulations (302 CMR 12.04(14), skaters engaging in such "frozen water activities" do so at their own risk.
- There is unathorized OHV use within the Forest, including the Sheomet Lake area, potentially negatively impacting visitor experience through increased noise, negative interactions, and increased trail wear.
- Two year-round staff and nine seasonal staff manage the 9,534.9acres at Warwick and thousands more acres within the Erving Complex, making park operations and maintenance challenging. Additional seasonal aquatics positions at Erving State Forest (Erving) keep the waterfront area at Erving guarded during the summer, but do not contribute toward larger property maintenance or operations at Warwick, Erving, Northfield, and Mount Grace.

Opportunities

- Adding a Warwick 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.
- Developing and installing displays at Sheomet Lake that describe the Forest's natural landscape and historical context will contribute to interpretation of the area in the absence of interpretive staff.
- Locating and assessing conditions of historical dams could help protect recreational resources and surrounding communities.
- Adding a seasonal toilet near Sheomet Lake would encourage more families with small children to visit and help make Warwick State Forest a more appealling destination for residents and tourists.
- Improving road access and cartop launch site on Tully Brook Rd, on the northern shore of Sheomet Lake, will help maintain access to a recreational resource.
- Improving the access roads and bridges for parking around Sheomet Lake will ensure visitors can continue to use this recreational area.
- Developing a site plan for the recreational resources around Sheomet Lake would help a establish a plan for improving current resources and improving the visitor experience.

- Increasing patrols by Environmental Police Officers and other staff presence may reduce unauthorized activities, like dumping, camping, and OHV use, at Warwick.
- Installing gates at some access points may deter OHV traffic at Warwick potentially improving visitor experience.
- Formalizing partnerships with the Town of Warwick and MGLCT could improve opportunities for special events and recreation.

CLIMATE CHANGE

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

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

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

The Department is actively assessing and addressing the vulnerability of its properties and facilities to the impacts of climate change. In 2022, DCR conducted a Climate Change Vulnerability Assessment

(Weston and Sampson 2022). Findings from this CCVA are being used by DCR to enhance park operations and maintenance, inform resilient investment, and provide a framework for hazard mitigation and climate adaptation for natural resources, cultural resources, recreational activities, buildings, facilities, and other infrastructure. Property-specific climate change information from the CCVA is included in the Climate Change (by 2070) table (Table 12) at the beginning of this RMP. An overview of the impacts of climate change on DCR facilities and operations is presented in the DCR Climate Impacts Story Map (DCR 2024).

Climate Exposure and Impacts

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

Natural Resources—General Impacts

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

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

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

Natural Resources—Property-Specific Exposure and Impacts

Ten of the Forest's regulatory state-listed species and two non-regulatory state-listed species are associated with the Forest's wetlands, brooks, or open water. Changes in hydrology have the potential to negatively impact these species.

Four of the Forest's priority natural communities (Acidic Graminoid Fen, Acidic Shrub Fen, Kettlehole Level Bog, and Level Bog) are vulnerable to hydrologic alteration. Changes in precipitation, or the flow of water over dams, have the potential to impact these communities.

It is the position of the Massachusetts Natural Heritage and Endangered Species Program that state-listed species and Priority Natural Communities are likely to be highly sensitive to the anticipated impacts of climate change and that all state-listed species will be negatively affected by hydrologic changes, changes in water, soil, and air temperature, and changes in forest composition.

Responses of Massachusetts' invasive plants (i.e., those categorized as Invasive by the Massachusetts Invasive Plant Advisory Group (MIPAG) (n.d.)) to a changing climate are largely unknown. However, sufficient information exists to project the likely future trend of Oriental/Asiatic bittersweet. "Available data suggest that bittersweet is likely to benefit from the warming and increased precipitation that are predicted for the Northeast" (Rustad et al. 2012), resulting in expansion throughout New England. Areas where the forest canopy or forest floor has been disturbed are particularly susceptible (McNab and Loftis 2002). Because of this, it is anticipated that Oriental bittersweet will continue to expand within the Forest in response to climate change.

Five of the Forest's streams have been identified as Coldwater Fisheries Resources by the Massachusetts Division of Fisheries and Wildlife. This includes Moss Brook (Wendell Road and Flagg Road tracts), Mill Brook (Flagg Road tract), Kidder Brook and Tully Brook (Tully Brook Tract), and Fish Brook (Fish Brook 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 2022). The entire lengths of these streams within the Forest are exposed to climate impacts.

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

Cultural Resources—General Impacts

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

and changes in oceanic and atmospheric chemistry (Rockman at al. 2016; Commonwealth of Massachusetts 2023: 5.1-31–5.1-61).

The phenomena listed above may produce a variety of adverse impacts to Massachusetts' cultural resources. Sensitivity and potential impacts vary based on resource category (i.e., archaeological sites, cultural landscapes, ethnographic landscapes and sites, and buildings and structures). Resource-specific factors such as location, design, materials, condition, etc. will also influence sensitivity and consequent impacts. All categories of cultural resources may be subject to complete or partial destruction through wildfire, inland flooding, sea level rise, storm surge, or landslides. Additionally, these resource categories may be subject to other types of impacts, as follows. Archaeological sites may have site stratigraphy disrupted by changes in hydrography, may suffer accelerated decomposition of artifacts and features, and may be impacted inadvertently during disaster response. Cultural landscapes may lose plantings due to a variety of stressors (e.g., drought or flood, pests, soil salinity), may be infiltrated by invasives, may be eroded by surface runoff, may experience more rapid deterioration of hardscaping and site furnishings, and may be damaged by high wind or heavy snow events. Ethnographic landscapes, traditional cultural places, and associated communities (including Indigenous peoples) may suffer both tangible and intangible impacts such as loss or diminishment of natural species used for food, ceremony, or medicine; alterations in timing of hunts, etc.; increased difficulty of vulnerable subgroups (e.g., the elderly) to perform outdoor tasks; and a loss of cultural knowledge associated with resources and practices. Buildings and structures may be damaged or destroyed by high wind or heavy snow events, suffer accelerated deterioration through a variety of mechanisms (e.g., elevated humidity, chemical reactions, destructive pests and organisms), may be destabilized by hydrological changes, or be damaged by inadequate gutters or drainage systems (ICOMOS Climate Change and Cultural Heritage Working Group 2019: 73–89; Rockman et al. 2016: 20–24). (See Rockman et al. 2016: 19–24 for a detailed assessment of the potential impacts of climate change on cultural resources.)

Cultural Resources—Property-Specific Exposure and Impacts

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

Recreation—General Impacts

Outdoor recreation and park visitation are dependent on weather and climate and will be affected by a warming climate (Wilkins and Horne 2024). Higher temperatures positively affect participation in most outdoor activities, except snow-based activities (Wilkins and Horne 2024). "Winter is warming substantially faster than other seasons, and winter warming is especially pronounced in the...Northeastern United States" (Wilkins and Horne 2024: 15). Exposure to this climate change phenomenon is projected to significantly reduce the length of winter recreation seasons for downhill skiing, cross-country skiing, and snowmobiling, decreasing recreational opportunities and causing substantial economic impacts (Wobus et al. 2017). Whitewater rafting, primitive area use, and hunting are also projected to be negatively impacted by exposure changing weather patterns associated with climate change (Askew and Bowker 2018). Although "coldwater fishing habitat is expected to decline under a warming climate, which will likely result in fewer fishing days," overall fishing participation in the Northeast is projected to rise "due to the more favorable temperatures" (Wilkins and Horne 2024: 11). Horseback riding on trails, boating, swimming, and visiting interpretive sites are also expected to see higher participation in the Northeast under climate change (Askew and Bowker 2018). Temperature

preferences of campers indicate that the "number of ideal days" for camping will also increase (Wilkins and Horne 2024: 13). Participation in biking is also projected to increase, especially in the winter and shoulder months (Wilkins and Horne 2024: 13). Climate change may also impact outdoor recreation through increased impacts to recreation infrastructure (e.g., flooding impacts), and increased exposure to disease vectors (e.g., mosquitoes and ticks), longer pollen seasons, and heat-related illnesses (O'Toole et al. 2019).

Recreation—Property-Specific Exposure and Impacts

Recreation activities at the Forest likely to be negatively impacted by exposure to weather changes resulting from climate change include hunting and snow-dependent sports (i.e., cross-country skiing, snowmobiling, and snowshoeing). Other recreation activities may see increased participation, especially those associated with the waters of Sheomet Lake and Richards Reservoir. Fishing, canoeing, and other water-based activities may experience increased participation due the anticipated increase in temperature (i.e., more than 30 additional days with temperatures over 90° F; Table 12).

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 three landscape designations apply to Warwick State Forest. Identification of Land Stewardship Zones within Warwick was performed in the context of these designations.

The following Land Stewardship Zoning is recommended to guide management and any future development. (See Figures 1 and 2. Land Stewardship Zoning Maps, pages 25 and 26.)

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 Warwick have been designated Zone 1.

- Areas identified by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) as habitat for multiple state-listed species that are sensitive to trampling associated with dispersed recreation. Activities and projects in these areas, including trail-related activities, should consult with NHESP before project development.
- Known occurrences of the following priority natural community types, all of which have been identified by the NHESP as being sensitive to trampling:
    - Level Bog
    - Kettlehole Level Bog
    - Acidic Graminoid Fen

- Acidic Shrub Fen

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 Warwick have been designated Zone 2.

- All areas not identified as Zone 3 or Zone 1.

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

- The Parking area on Richmond Road, as defined by the existing tree line and including the entrance gate.
- The following dams, including their aprons, spillways, access roads, and other existing development needed to operate, maintain or repair:
  - Steven's Swamp Dam (MA03215); Flagg Road Tract.
  - Sheomet Lake Dam (MA00057); Tully Brook Tract.
  - Richards Reservoir Upper Dam (MA00056); Tully Brook Tract.
- Developed areas adjacent to Sheomet Lake, including the parking area, picnic area, and beach.
- Parking area on Flagg Road as defined by the existing tree line.
- Wendell Road as defined by the maintained grass area.

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 Warwick.

- **Surface Wellhead Protection Overlay.** This overlay includes the Zone I Wellhead Protection Area. Within this overlay, activities should be consistent with MassDEP Wellhead Protection Tips (MassDEP 1995) and MassDEP Guidance (MassDEP 2011). Geospatial data for this overlay are drawn from MassDEP Wellhead Protection Areas (Zone II, Zone I, IWPA) (MassGIS 2024).

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 27.)

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

Twenty priority management recommendations were developed for this property. They are presented in Table 19, page 30. 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 30) 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.

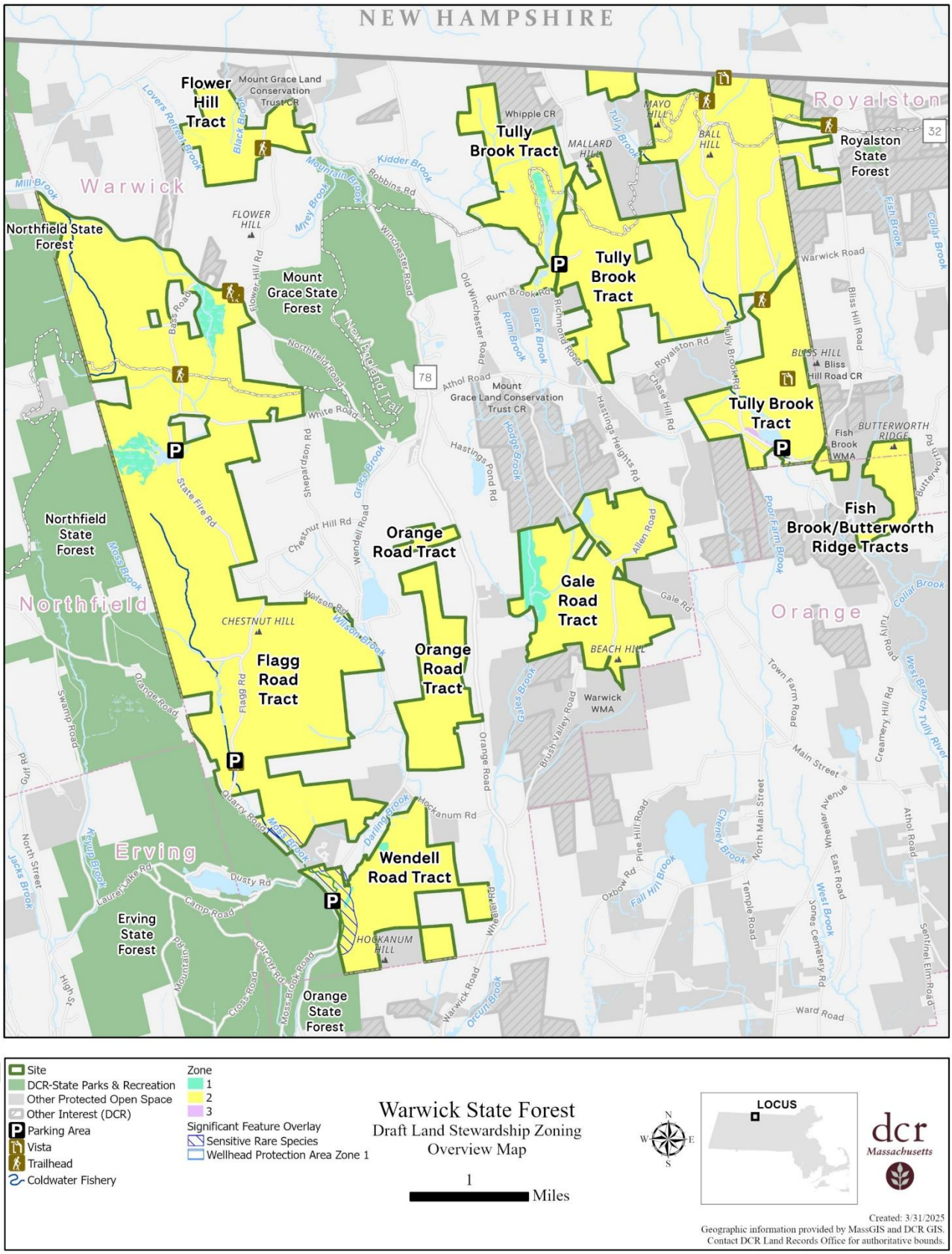

Figure 1. Land Stewardship Zoning Map.

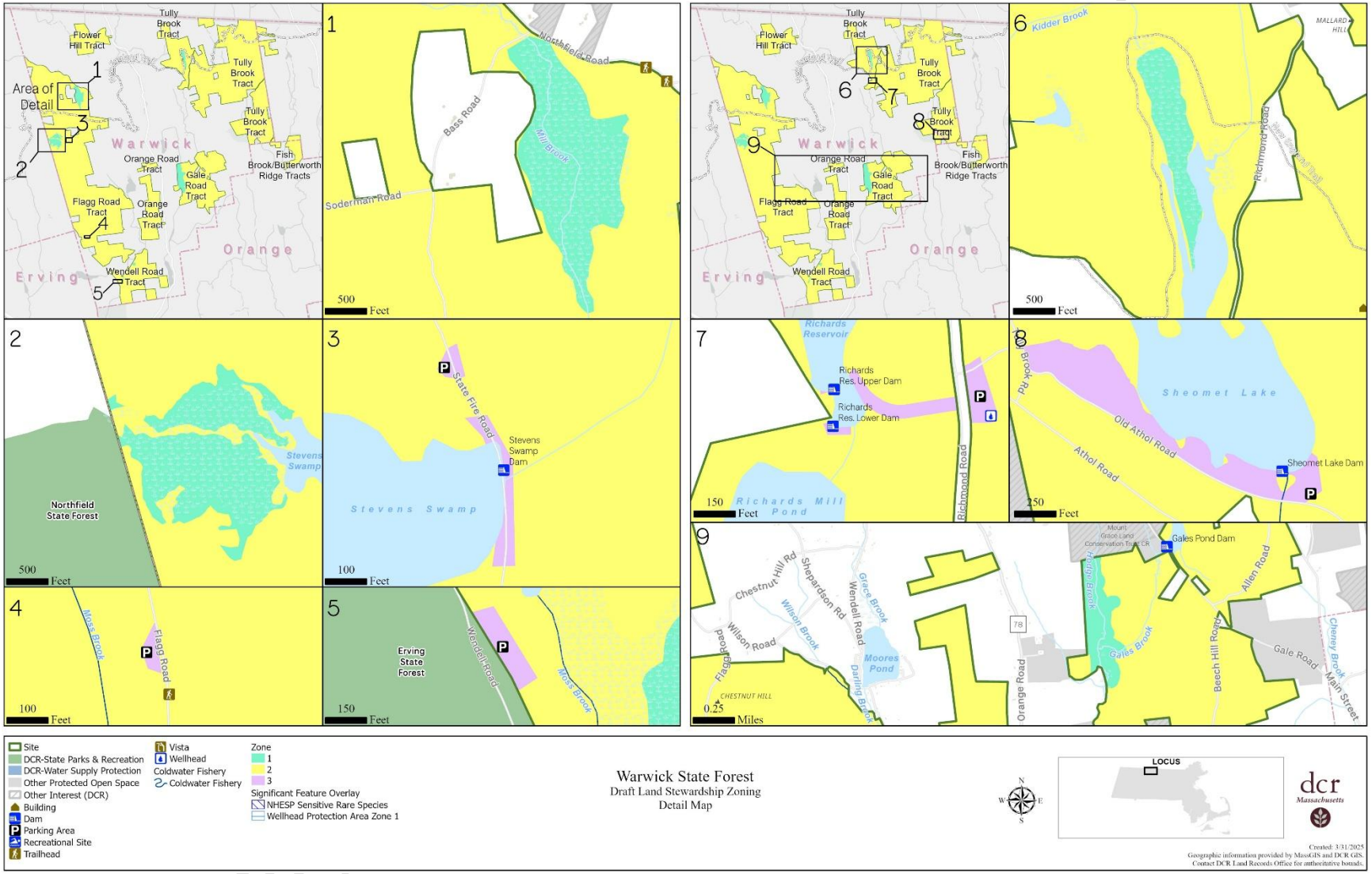

Figure 2. Land Stewardship Zoning Map (continued)

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.	No
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.	No
Natural Resources	5. The extent of exposed soil in campground and/or picnic sites is stable or decreasing.	No
Natural Resources	6. The extent of native vegetation in campground and/or picnic sites is stable or increasing. (As assessed by property manager.)	Yes
Natural Resources	7. Area of trail impacts in Reserves is less than 50% of total area. (See Naughton (2021) for information on primary area of trail impacts.)	Yes
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.	Yes

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.)	No
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.	Yes
Cultural Resources	3. Historic buildings, structures, and landscapes are being used, maintained, and repaired in a manner that preserves their cultural integrity and conveys their historic significance to park visitors.	Yes
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.	No

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.	No
Recreation	5. Recurring use by OHVs is restricted to authorized trails. (As assessed by property manager.)	No
Recreation	6. There is a high level of compliance with dog leash regulations and policies. (As assessed by property manager.)	Yes
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.	Unknown
Sustainable Forest Management	1. Forestry activities are consistent with Landscape Designation and associated forestry guidelines.	Yes
Sustainable Forest Management	2. Forestry activities are consistent with current Forest Resource Management Plan.	Yes
Sustainable Forest Management	3. Tree cutting is performed in accordance with an approved cutting plan, if required under the Massachusetts Forest Cutting Practices Act (M.G.L. c.Ch. 132, §§ Sections 40–46).	Yes

Table 19. Priority Recommendations for Warwick 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	Following appropriate review and permitting, implement the Invasive Plant Management Plan: Central Region (BSC Group 2017) for aquatic and terrestrial invasive plants. Maintain actions as needed. Emphasis should be placed on managing invasives in Priority Natural Communities.	Management Forestry, Office of Natural Resources (Lead), Park Operations
Natural Resources	Monitor the known population of Federally Endangered plant and survey for additional populations within the Forest.	Office of Natural Resources
Natural Resources	Regularly inspect and clean culverts; replace as needed following appropriate internal and regulatory reviews.	Park Operations
Natural Resources	Apply Landscape Designations to those portions of the Forest currently lacking such designations.	Management Forestry (Lead), GIS Program
Natural Resources	Survey, document, and submit documentation to certify potential vernal pools that are in NHESP habitat of MESA-protected vernal pool obligate species or in Woodland portions of the Forest, in accordance with MassWildlife (2009), as warranted.	Office of Natural Resources (Lead), Volunteers
Natural Resources	Post interpretive and/or regulatory signs at access points to bogs and fens informing visitors of the sensitive nature of these wetlands and requesting that they stay off these wetland mats.	Interpretive Services (Co-Lead), Office of Natural Resources (Co-Lead), Park Operations
Natural Resources	Resolve potential encroachments in accordance with draft Agency-wide guidance and Best Management Practices (DCR 2019b).	Management Forestry (Lead), Office of the General Counsel, Park Operations

Category	Recommendation	Implementation
Natural Resources	Assess the six culverts (ID nos. 10035, 10064, 10066, 10070, 10076, and 24684) with high restoration potential for replacement (as assessed by the Critical Linkages Project (see http://www.umasscaps.org/applications/critical-linkages.html) with structures consistent with the Massachusetts Stream Crossing Handbook (Massachusetts Department of Fish and Game 2018) and the most recent Climate Resilience Design Standards (e.g., Commonwealth of Massachusetts (2022), as applicable). Where viable, program funds for culvert replacement and replace culverts.	Design and Engineering (Co-Lead), Management Forestry, Office of Climate Resiliency, Office of Cultural Resources, Office of Natural Resources (Co-Lead), Trails and Greenways Program
Cultural Resources	Conduct an archaeological reconnaissance survey (950 CMR 70) in cooperation with municipal, tribal and non-profit partners, including the Town of Warwick. Complete appropriate Massachusetts Historical Commission archaeological site forms for identified archaeological resources.	Consultant, Office of Cultural Resources (Lead), Partners
Cultural Resources	Manage vegetation in cellar holes and stone walls in accordance with DCR's Best Management Practices for Archaeological Features (DCR n.d.a.) and Best Management Practices: Stone walls (DCR n.d.b.).	Park Operations, Management Forestry
Recreation	Post DCR standard "Danger, No Swimming" signs at Sheomet Lake and other locations experiencing unauthorized swimming.	Bureau of Pool & Waterfront Safety (Co-lead), Park Operations (Co-lead)

Category	Recommendation	Implementation
Recreation	Resolve trail-related threats and opportunities identified in this RMP, in accordance with Trails Guidelines and Best Practices (DCR 2019a, or update), through the following actions: • Maintain authorized trails, as identified in the DCR Trail Data Layer provided to the Natural Heritage and Endangered Species Program in 2021, and in accordance with the Recreational Trail Maintenance and Biodiversity Conservation 2021 update. • Evaluate trail segments for discontinuation or active closure, including those that are: unauthorized, unsafe, connecting to privately-owned property, located in environmentally or culturally sensitive areas, or otherwise inconsistent with DCR Trails Guidelines and Best Practices. Provide an updated trail data layer to the Natural Heritage and Endangered Species Program. • Establish new trails, as warranted, following regulatory review. Provide an updated trail data layer to the Natural Heritage and Endangered Species Program.	Management Forestry, Office of Cultural Resources, Office of Natural Resources, Park Operations (Co-Lead), Partners, Trails and Greenways Section (Co-Lead)
Recreation	Establish a DCR web page for the Forest.	Interpretive Services, Regional Staff (Lead), Park Operations, Web Content Creator
Recreation	Add the Old Athol Road bridge over the west fork of Tully Brook to the DCR and MassDOT bridge inventories and conduct a conditions assessment	Cultural Resources, Engineering (Lead)
Recreation	Survey questionable property boundaries, update Open Space GIS layer for Warwick State Forest, and create trail map.	GIS Program (Co-Lead), Management Forestry (Co-Lead), Office of External Affairs

Category	Recommendation	Implementation
Recreation	Develop a Site Plan for the recreational resources around Sheomet Lake to address the following issues: • Formalization of the existing gateway with Identification Sign, parking, kiosk, and Welcome Wayside. • Provision of picnic facilities. • Opportunities to add accessible recreational resources. • Road improvements. • Creation of a car-top boat launch. • Controlling vehicle access to the shore of Sheomet Lake.	Design & Project Management (Lead), Facilities Engineering, Interpretive Services, Park Operations, Universal Access Program
Recreation	Following field staff review of OHV use in the Forest, add barriers, such as gates, as appropriate, to deter OHV use.	Park Operations
Recreation	Increase the presence of Environmental Police Officers, DCR Rangers, and Forest operations staff, as appropriate and available, in areas with high OHV use.	Ranger Bureau (Co-Lead), Regional Staff (Co-Lead), Park Operations
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 the shore of Gales Pond and at the West Branch of the Tully River.	Park Operations
Recreation	Work with the geocaching community to ensure that caches located in sensitive natural and cultural resources are relocated out of those areas and that locations of any new geocaches are placed outside of sensitive areas and with the approval of the property manager.	Office of Cultural Resources, Office of Natural Resources, Park Operations (Lead)

REFERENCES

Askew, A. E., and J. M. Bowker. 2018. Impacts of Climate change on outdoor recreation participation: Outlook to 2060. Journal of Park and Recreation Administration 36: 97–120. https://www.srs.fs.usda.gov/pubs/ja/2018/ja_2018_bowker_001.pdf (PDF)

Berg, S. P. 1999. The Civilian Conservation Corps, shaping the forests and parks of Massachusetts. A statewide survey of Civilian Conservation Corps resources. Prepared for the Department of Environmental Management, Boston, MA, by Shary Page Berg, Landscape Preservation Planning and Design, Cambridge, MA. https://archives.lib.state.ma.us/handle/2452/835790

Blake, J. 1830. Plan of Warwick made by Jonathan Blake, Jr., dated 1830 [Map]. https://ark.digitalcommonwealth.org/ark:/50959/25152j189

BSC Group. 2017. Invasive Plant Management Plan: Central Region. Produced in association with: DCR Ecology & ACEC Program, June 2017.

Cartwright, J., T. L. Morelli, and E. H. Campbell Grant. 2022. Identifying climate-resistant vernal pools: Hydrologic refugia for amphibian reproduction under droughts and climate change. Ecohydrology 2022, 15, e2354. https://onlinelibrary.wiley.com/doi/epdf/10.1002/eco.2354 (PDF)

Charter, C. 2022. Aspiring journalist delves into history of Warwick Prison Camp. Greenfield Reporter. Greenfield, MA. https://www.recorder.com/Aspiring-journalist-delves-into-history-of-Warwick-Prison-Camp-47356680

Commonwealth of Massachusetts. 2022. Climate resilience design standards & guidance. Section 4 in Resilient Massachusetts Action Team (RMAT) Climate Resilience Design Standards and Guidance. Date: July 2022. https://eea-nescaum-dataservices-assets-prd.s3.amazonaws.com/cms/GUIDELINES/V1.2_SECTION_4.pdf (PDF)

Commonwealth of Massachusetts. 2023. ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan. ResilientMass Action Team, Boston, Massachusetts. https://www.mass.gov/doc/resilientmass-plan-2023/download (PDF)

Finch, D. M., J. L. Bitler, J. B. Runyon, C. J. Fettig, F. F. Kilkenny, S. Jose, S. J. Frankel, S. A. Cushman, R. C. Cobb, J. S. Dukes, J. A. Hicke, and S. K. Amelon. 2021. Effects of Climate Change on invasive species. Chapter 4 *in* T. M. Poland, T. Patel-Weynand, D. M. Finch, C. F. Miniat, D. C. Hayes, and V. M. Lopes (Editors) Invasive species in forests and rangelands of the United States: A comprehensive science synthesis for the United States forest sector. Springer. https://library.oapen.org/bitstream/handle/20.500.12657/46792/2021_Book_InvasiveSpeciesInForestsAndRan.pdf?sequence=1&isAllowed=y (PDF)

Ham, S. H. 2013. Interpretation: Making a difference on purpose. Fulcrum Publishing, Golden, CO.

Intergovernmental Panel on Climate Change. 2021. Annex VII: Glossary [Matthews, J.B.R., V. Möller, R. van Diemen, J.S. Fuglestvedt, V. Masson-Delmotte, C. Méndez, S. Semenov, A. Reisinger (eds.)]. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 2215–2256, doi:10.1017/9781009157896.022.
https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_AnnexVII.pdf (PDF)

International Council on Monuments and Sites (ICOMOS) Climate Change and Cultural Heritage Working Group. 2019. The Future of our Pasts: Engaging Cultural Heritage in Climate Action. ICOMOS, Paris, France.
https://civvih.icomos.org/wp-content/uploads/Future-of-Our-Pasts-Report-min.pdf (PDF)

Isaak, D. J., M. K. Young, C. Tait, D. Duffield, D. L. Horan, D. E. Nagel, and M. C. Groce. 2018. Effects of climate change on native fish and other aquatic species. Pages 89–111 *in* Halofsky, J. E., D. L. Peterson, J. J. Ho, N. J. Little, and L. A. Joyce (Eds.). Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-375. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Part 1. Pp. 1–197.
https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd578946.pdf (PDF)

Liu, Y., A. M. O. Odour, Z. Zhang, A. Manea, I. M. Tooth, M. R. Leishman, X. Xu, and M. Van Kleunen. 2017. Do invasive alien plants benefit more from global environmental change than native plants? Global Change Biology (2017), doi: 10.1111/gcb.13579.
https://www.researchgate.net/profile/Xingliang-Xu/publication/310902903_Do_invasive_alien_plants_benefit_more_from_global_environmental_change_than_native_plants/links/5a20bb30a6fdcccd30e032dc/Do-invasive-alien-plants-benefit-more-from-global-environmental-change-than-native-plants.pdf (PDF)

Massachusetts Bureau of Geographic Information (MassGIS). 2022. MA Wildlife Coldwater Fisheries Resources. September 2022.
https://www.mass.gov/info-details/massgis-data-ma-wildlife-coldwater-fisheries-resources

Massachusetts Bureau of Geographic Information (MassGIS). 2024. MassDEP Wellhead Protection Areas (Zone II, Zone I, IWPA). April 2024.
https://www.mass.gov/info-details/massgis-data-massdep-wellhead-protection-areas-zone-ii-zone-i-iwpa

Massachusetts Department of Conservation. 1926. Annual report of the Commissioner of Conservation and State Forester for the year ending November 30, 1925.
https://archives.lib.state.ma.us/handle/2452/786292

Massachusetts Department of Conservation and Recreation (DCR). n.d.a. Best Management Practices: Archaeological features.
https://www.mass.gov/media/1177476/download (PDF)

Massachusetts Department of Conservation and Recreation (DCR). n.d.b. Best Management Practices: Stone walls.
https://www.mass.gov/media/1388941/download (PDF)

Massachusetts Department of Conservation and Recreation (DCR). 2012. Landscape designations for DCR parks & forests: Selection criteria and management guidelines. March 2012. Boston, MA.
https://archives.lib.state.ma.us/handle/2452/200210

Massachusetts Department of Conservation and Recreation (DCR). 2014. Manual for continuous forest inventory field procedures. Bureau of Forestry, Division of State Parks and Recreation, February 2014.
https://archives.lib.state.ma.us/handle/2452/624791

Massachusetts Department of Conservation and Recreation (DCR). 2019a. Trails guidelines and best practices manual. Updated July 2019.
https://www.mass.gov/doc/dcr-trails-guidelines-and-best-practices-manual/download (PDF)

Massachusetts Department of Conservation and Recreation (DCR). 2019b. Agency-wide Guidance and Best Management Practices: Encroachment. Version 1.7 DRAFT 071019.

Massachusetts Department of Conservation and Recreation (DCR). 2020. Massachusetts State Forest Action Plan 2020. Executive Office of Energy & Environmental Affairs, Department of Conservation and Recreation, Massachusetts Bureau of Forest Fire Control and Forestry.
https://archives.lib.state.ma.us/handle/2452/840801

Massachusetts Department of Conservation and Recreation (DCR). 2022. Manual for Continuous Forest Inventory field procedures. Bureau of Forestry, Division of State Parks and Recreation. Rev. March 2022.

Massachusetts Department of Conservation and Recreation (DCR). 2023. Managing our forests…for carbon benefits.
https://www.mass.gov/info-details/managing-our-forests-for-carbon-benefits

Massachusetts Department of Conservation and Recreation (DCR). 2024. DCR Climate Impacts. Story Map series highlighting the expected impacts caused by climate change across the DCR's facilities and operations in Massachusetts.
https://storymaps.arcgis.com/collections/666258ae0e3543efa3612b9bf380bb30

Massachusetts Department of Environmental Protection (MassDEP). 1995. Wellhead protection tips for small public water supply systems.
https://www.mass.gov/files/documents/2016/08/op/welltips.pdf (PDF)

Massachusetts Department of Environmental Protection (MassDEP). 2011. Implementation of Zone I requirements. DWP Policy 94-03. Effective Date: 3/10/2008. Amended Date: 5/01/2011.
https://www.mass.gov/files/documents/2016/08/qs/9403a.pdf (PDF)

Massachusetts Department of Environmental Protection (MassDEP). 2023. Final Massachusetts integrated list of waters for the Clean Water Act 2022 Reporting Cycle. CN. 568.1. May 2023. Prepared by: Watershed Planning Program, Division of Watershed Management, Bureau of Water Resources. https://www.mass.gov/doc/final-massachusetts-integrated-list-of-waters-for-the-clean-water-act-2022-reporting-cycle/download (PDF)

Massachusetts Department of Fish and Game. 2018. Massachusetts stream crossing handbook. 2nd Edition, June 2012, reprinted May 2018. Department of Fish and Game, Division of Ecological Restoration.
https://www.mass.gov/doc/massachusetts-stream-crossing-handbook/download (PDF)

Massachusetts Division of Fisheries and Wildlife (MassWildlife). 2009. Guidelines for the certification of vernal pool habitat, March 2009.
https://www.mass.gov/doc/guidelines-for-the-certification-of-vernal-pool-habitat/download (PDF)

Massachusetts Division of Fisheries and Wildlife (MassWildlife). 2015. Massachusetts State Wildlife Action Plan 2015.
https://www.mass.gov/info-details/state-wildlife-action-plan-swap

Massachusetts Executive Office of Energy and Environmental Affairs (EEA). 2022. 2022 Massachusetts Climate Change Assessment, Volume II – Statewide Report. Executive Office of Energy and Environmental Affairs, Boston, MA.
https://www.mass.gov/doc/2022-massachusetts-climate-change-assessment-december-2022-volume-ii-statewide-report/download (PDF)

Massachusetts Executive Office of Energy and Environmental Affairs (EEA). 2024. Response to the report of the Climate Forestry Committee.
https://www.mass.gov/doc/forests-as-climate-solution-response-to-cfc-report/download (PDF)

Massachusetts Department of Public Health (DPH). 2023. Freshwater fish consumption advisory list
https://www.mass.gov/doc/public-health-freshwater-fish-consumption-advisories-2023-0/download (PDF)

Massachusetts Invasive Plant Advisory Group (MIPAG). n.d. Plants voted as: Invasive.
https://www.massnrc.org/mipag/invasive.htm

Massachusetts Historical Commission. 1982. MHC Reconnaissance Survey Town Report: Warwick. Massachusetts Historical Commission, Boston, MA.
https://www.sec.state.ma.us/mhc/mhcpdf/townreports/CT-Valley/wrw.pdf (PDF)

McNab, W. H., and D. L. Loftis. 2002. Probability of occurrence and habitat features for oriental bittersweet in an oak forest in the southern Appalachian Mountains, USA, Forest Ecology and Management 155(2002): 45–54.
https://www.srs.fs.usda.gov/pubs/ja/ja_mcnab006.pdf (PDF)

National Park Service (NPS). 1998. Planning for interpretation and visitor experience. Prepared by the Division of Interpretive Planning, Harpers Ferry Center, Harpers Ferry, WV. 1998.
https://www.nps.gov/subjects/hfc/upload/interp-visitor-exper.pdf (PDF)

Native Land Digital. 2023. Native Land Digital.
https://native-land.ca/

Naughton, M. 2021. Wildlife & recreation: Understanding and managing the effects of trail use on wildlife. Prepared for Vermont Fish and Wildlife and Vermont Forests, Parks, and Recreation. November 2021.
https://anr.vermont.gov/sites/anr/files/2023-01/wildlife_and_recreation_%20M_naughton_2021.pdf (PDF)

New England Trail. 2020. About the trail.
https://newenglandtrail.org/about-the-net/

O'Toole, D., L. A. Brandt, M. K. Janowiak, K. M. Schmitt, P. D. Shannon, P. R. Leopold, S.D. Handler, T. A. Ontl, and C. W. Swanston. 2019. Climate adaptation strategies and approaches for outdoor recreation. Sustainability 2019, 11, 7030.
https://www.mdpi.com/2071-1050/11/24/7030/pdf (PDF)

Quabbin-to-Cardigan Partnership. 2023. The Quabbin-to-Cardigan Partnership.
https://q2cpartnership.org/

Rustad, L., J. Campbell, J. S. Dukes, T. Huntington, K, F. Lambert, J. Mohan, and N. Rodenhouse. 2012. Changing climate, changing forests: The impacts of climate change on forests of the northeastern United States and eastern Canada. Gen. Tech. Rep. NRS-99. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.
https://www.fs.usda.gov/nrs/pubs/gtr/gtr_nrs99.pdf (PDF)

Swain, P. 2020. Classification of the natural communities of Massachusetts. Massachusetts Natural Heritage & Endangered Species Program. Massachusetts Division of Fisheries and Wildlife. Westborough, MA.
https://www.mass.gov/doc/classification-of-the-natural-communities-of-massachusetts/download (PDF)

Swanston, C. W., M. K. Janowiak, L. A. Brandt, P. R. Butler, S. D. Handler, P. D. Shannon, A. Derby Lewis, K. Hall, R. T. Fahey, L. Scott, A. Kerber, J. W. Miesbauer, L. Darling, L. Parker, and M. St. Pierre. 2016. Forest adaptation resources: Climate change tools and approaches for land managers, 2nd ed. Gen. Tech. Rep. NRS-GTR-87-2. U.S. Department of Agriculture, Forest Service, Northeast Research Station. Newtown Square, PA.
https://www.fs.usda.gov/nrs/pubs/gtr/gtr_nrs87-2.pdf (PDF)

United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Center. 2007. Climate Change and World Heritage. Report on predicting and managing the impacts of climate change on World Heritage and strategy to assist States parties to implement appropriate management responses. World Heritage Reports 22. UNESCO World Heritage Center, Paris, France.
https://whc.unesco.org/uploads/activities/documents/activity-474-1.pdf (PDF)

Warwick Open Space Committee and Warwick Town Forest Committee (WOSC and WTFC). 2020. Warwick Open Space and Recreation Plan 2020–2027.
https://frcog.org/wp-content/uploads/2021/07/Warwick_OSRP_Final_2020-2027.pdf (PDF)

Weston and Sampson. 2022. Climate change vulnerability assessment. September 2022. Report prepared for Massachusetts Department of Conservation and Recreation.

Wilkins, E. J., and L. Horne. 2024. Effects and perceptions of weather, climate, and climate change on outdoor recreation and nature-based tourism in the United States: A systematic review. PLOS Climate 3(4): e0000266.
https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000266 (PDF)

Wobus, C., E. E. Small, H. Hosterman, D. Mills, M. Rissing, R. Jones, M. Duckworth, R. Hall, J. Creason, and J. Martinich. 2017. Projected climate change impacts on skiing and snowmobiling in the United States. Global Environmental Change. 45(2017) 1–14.
https://www.sciencedirect.com/science/article/am/pii/S0959378016305556 (PDF)