Massachusetts Department of Conservation and Recreation
Bureau of Planning and Resource Protection
Resource Management Planning Program

RESOURCE MANAGEMENT PLAN

Harold Parker Planning Unit

Including Harold Parker State Forest and Boxford State Forest

March 2013

Cover Photo
Fishing at Harold Parker State Forest by Kindra Clineff

dcr
Massachusetts

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RESOURCE MANAGEMENT PLAN

2013

Deval L. Patrick, Governor
Timothy P. Murray, Lt. Governor
Richard K. Sullivan, Jr., Secretary
Edward M. Lambert, Jr., Commissioner
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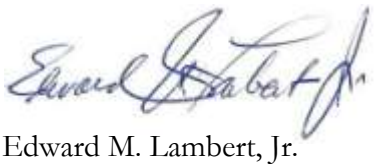
Resource Management Plans (RMPs) provide guidelines for management of properties under the stewardship of the Department of Conservation and Recreation (DCR). RMPs are working documents to assist with setting priorities, enabling the Department to adapt to changing fiscal, social and environmental conditions. The planning process provides a forum for communication and cooperation with park visitors, partners and surrounding communities to ensure transparency in the DCR's stewardship efforts.

The purpose of this RMP is to achieve a sustainable balance between the conservation of important natural and cultural resources, and the provision of quality outdoor recreational opportunities. Less than an hour drive north of Boston, the Harold Parker Planning Unit includes 3,295-acre Harold Parker and 1,045-acre Boxford state forests.

Harold Parker State Forest offers 93 family campsites and one group site tucked into the forest near two of the forest's 11 ponds. The day use area at Berry Pond, containing picnic, swimming and fishing facilities, has been closed due to state budgetary constraints. Fishing, canoeing and non-motorized boating are popular activities at Field and Stearns ponds.

Visitors can use approximately 67 miles of unpaved forest roads and trails for walking, hiking, mountain biking and horseback riding in the summer, and cross-country skiing and show shoeing in the winter. Interpretive programs offer the opportunity to learn about the rich cultural and natural history of the forests and the surrounding area. Boxford State Forest is primarily used for hiking, mountain biking, bird watching and hunting.

This RMP represents both a connection to the historic past and a guide to the future of Harold Parker and Boxford state forests. This RMP advances the DCR's efforts to prepare RMPs for every state forest, park and reservation across the Commonwealth.



Edward M. Lambert, Jr.
Commissioner

The Massachusetts Department of Conservation and Recreation (DCR), an agency of the Executive Office of Energy and Environmental Affairs, oversees 450,000 acres of parks and forests, beaches, bike trails, watersheds, dams and parkways. Led by Commissioner Edward M. Lambert Jr., 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. To learn more about the DCR, our facilities and our programs, please visit us at www.mass.gov/dcr. Contact us at mass.parks@state.ma.us.

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EXECUTIVE SUMMARY

INTRODUCTION

Resource Management Plans (RMPs) are "working" documents that consider the past, present and future of a forest, park or reservation. They include an inventory and assessment of environmental, cultural and recreation resources; identify unique characteristics and values; and develop clear management goals and objectives. RMPs provide a guide to the short and long-term management of properties under the stewardship of the Department of Conservation and Recreation (DCR). They are intended to be working documents for setting priorities, capital and operational budgeting, resource allocation, and enhancing communication and cooperation with park visitors and the surrounding communities.

The Department of Conservation and Recreation is directed by a legislative mandate (M.G.L. Chapter 21: Section 2F) to prepare management plans for "all reservations, parks, and forests under the management of the department." Although the mandate does not specify the format or content of these management plans, it does require the following:

> *"Said management 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."*

The legislative mandate also establishes two other requirements. First, that the Commissioner of the Department of Conservation and Recreation "shall seek and consider public input in the development of management plans, and shall make draft plans available for a public review and comment period through notice in the Environmental Monitor." Second, management plans must be reviewed and adopted by the Stewardship Council. The Stewardship Council is a 13-member citizen advisory board, appointed by the Governor, that works with the DCR to provide a safe, accessible, well-maintained and well-managed system of open spaces and recreation facilities that are managed and maintained on behalf of the public for the purposes of natural and cultural resource protection, sustainable recreation and education.

Within 30 days of adoption, the Commissioner "…shall file a copy of such management plans as adopted by the council" with the Secretary of State and the Joint Committee on the Environment, Natural Resources and Agriculture. Resource Management Plans, and the process developed to prepare these plans, exceed all legislative mandates.

This plan covers the Harold Parker Planning Unit, which includes Harold Parker and Boxford state forests, a Conservation Restriction held by the DCR on the Wunnegen Conservation Area in Boxford and an Agricultural Preservation Restriction on a property located in Andover. The two restrictions are included in this plan because of their physical proximity to Harold Parker and Boxford state forests.

MANAGEMENT PRINCIPLE AND GOALS

Harold Parker and Boxford state forests, the largest public recreation areas located in the densely populated northeastern Massachusetts, offer a variety of affordable opportunities for outdoor recreation on 4,635 acres of public land. Each year visitors enjoy camping, swimming, fishing, mountain biking, hiking, horseback riding, snowmobiling, skiing and hunting in the forests.

The State Forest Commission acquired approximately 800 acres in 1916 to establish Harold Parker State Forest. During the 1930s, much of the existing infrastructure in Harold Parker State Forest was constructed by state-funded unemployed crews and the federally-funded Civilian Conservation Corps (CCC), including roads, trails and recreation areas. These crews also continued reforestation efforts in Harold Parker State Forest. In 1933, Lawrence Fletcher, Secretary of the Federation of Bird Clubs of New England, sold 460 acres of land to the Department of Conservation forming Boxford State Forest.

The magnificent work of glaciers, natural processes and human disturbance have produced a landscape dotted with a variety of natural communities. This

unique variety of natural resources provides the residents of the region with access to nature and nature-based recreation.

The DCR is entrusted with the stewardship of Harold Parker and Boxford state forests. A thorough inventory and assessment of existing conditions and activities, in concert with substantive public input, is necessary to establish guidelines for future management of the forests. The following management principle and associated management goals are identified as a foundational structure for the Resource Management Plan, which will guide future management of these important facilities.

Management Principle

Through the creative use of limited state management resources, partnerships and volunteer stewardship, conserve important natural and cultural resources while providing diverse opportunities for public outdoor recreation that are compatible with resource conservation.

Management Goals

Maintain and enhance habitats for rare species, native plants and animals. Monitor, manage and protect vernal pool and wetland habitats for state-listed rare animals. Actively manage Harold Parker State Forest between Jenkins Road and Route 114 for age class and native species diversity, to enhance native wildlife habitat and increase resilience to forest pathogens and climatic change. Passively manage Boxford State Forest to encourage natural forest processes and inner forest habitat.

Protect and enhance the quality of water resources. Manage water resources to conserve and improve the habitats of native aquatic plants and animals, protect public drinking water supplies and ensure healthy and safe water-based recreation. Manage the forests to protect wetlands, vernal pools, streams, ponds and reservoirs from overuse and avoidable environmental degradation.

Preserve the distinct scenic and cultural resources of the forests. The forests' cultural resources represent a range of human endeavors from pre-contact Native American occupation and colonial homesteads to significant Civilian Conservation Corps (CCC) achievements. Preservation of these cultural resources and landscapes connects us to our past. Manage these resources to stabilize, restore and protect them from degradation.

Provide diverse opportunities for sustainable outdoor recreation. Provide the public with a variety of desired recreational experiences within a natural setting. Maintain a sustainable network of hiking, mountain biking, horseback riding and cross-country ski trails to provide connections among day use areas, the campground, abutting open spaces and the Bay Circuit Trail. Maintain forest roads for public safety, aesthetics and fire protection. Provide a trail system that connects important features, destinations, access points and neighboring communities. Avoid recreational impacts on sensitive natural and cultural resources. Renovate and maintain comfort stations to provide modern sanitary facilities for public use. Minimize maintenance costs and management requirements.

Interpret the natural and cultural resources of the forests. Effective park management largely depends on the support of well-informed visitors. Provide connections to the forests' significant natural and cultural resources through interpretive programs, materials and signage.

Work with partners and volunteers to achieve these management goals. Maintain and develop partnerships with other state agencies, adjacent municipalities, non-profit organizations, businesses and volunteers to provide quality outdoor recreational opportunities while conserving the important natural and cultural resources of the forests. With DCR oversight, partner with organizations and individual volunteers to implement this RMP for the long-term stewardship of the forests.

PRIORITY RECOMMENDATIONS

This RMP identifies 77 management recommendations; 30 are classified as high priorities. Resources are currently available to implement 15 of these high priority recommendations. It is anticipated that resources may be available within the next five years to implement an additional 15 high priority recommendations.

Number of Management Recommendations

Priority	Funding Currently Available	Funding May be Available in Near Future	Funding Not Available in Near Future
High	15	15	0
Medium	9	16	6
Low	2	10	4
Total	*26*	*41*	*10*

The following 27 recommendations focus on short-term activities to provide healthy habitat for native and state-listed species, improve existing recreation facilities and stabilize existing infrastructure to reduce future maintenance costs. These short-term activities, and the lead DCR unit responsible for their implementation, are identified in the Short Term Action Plan that accompanies this Executive Summary.

Short Term Action	DCR Lead Unit
Maintain and enhance habitats for rare species, native plants and animals.	
Manage Boxford State Forest as a forest reserve pursuant to the DCR guidelines for forest reserves (DCR, 2012). There will be no commercial timber harvesting or logging due to disturbance. Limited active forest management may occur to maintain rare species habitat, control invasive species, or to address threats to public safety.	Forestry
In the parkland sections of Harold Parker State Forest, allow pruning or tree removals to support recreational activities and address public safety hazards. Comply with the DCR guidelines for managing parklands (DCR, 2012). Do not permit commercial timber harvesting.	Forestry
Manage the woodlands portion of Harold Parker State Forest to protect and restore native forests by implementing sustainable forest management practices to maintain a diverse multi-aged, multi-species forest that will be resilient in the face of large natural disturbances. Assess the Home Fuelwood Program, proposing specific recommendations for Harold Parker State Forest.	Forestry
Create or enhance turtle nesting sites in Boxford State Forest to reduce the threats to female turtles traveling long distances to reach nesting sites.	Planning
Post signage, monitor and enforce the motorized off-highway vehicle (OHV) restriction using the Park Watch Program with law enforcement support to protect rare species and their habitats from OHV damage.	Ranger Services
Acquire properties adjacent to Boxford State Forest to further protect Blanding's turtles, vernal pool clusters and forest core habitat.	Planning
Protect and enhance the quality of water resources.	
Hydro-rake aquatic vegetation in Stearns Pond to maintain open water for boating and fishing. Do not hydro-rake along the shoreline, shallow coves and islands. Investigate the feasibility of reintroducing winter water draw downs to control pond vegetation.	Lakes and Ponds
Restore compacted and eroded areas around Frye Pond.	Lakes and Ponds
Install signs with instructions for checking and cleaning boats to reduce the potential of spreading invasive species at heavily used boat launch areas.	Lakes and Ponds
Preserve the distinct scenic and cultural resources of the forests.	
Avoid ground disturbing activities on undisturbed, level and well-drained areas around known archaeological sites, streams, ponds and wetlands, and monitor activities that are already occurring in these areas.	State Parks
Consult with the DCR Archaeologist when planning development or maintenance projects that involve ground disturbance on level and well-drained areas around known archaeological sites, streams, ponds and wetlands.	Cultural Resources
Prune and remove trees within 15 feet of the CCC picnic pavilion; open pond views through select thinning; and consult with the Office of Cultural Resources regarding best management practices for historic buildings.	State Parks
Preserve the CCC headquarters building, including window repairs, insulation and interior renovations. Prune hazardous tree limbs; simplify plantings in front of the building; and restore the timber fence. Install a new well for potable water. Correct any ACM, ADA, lead paint and building code compliance issues. Paint the storage building steel garage doors brown.	Engineering

Continued on next page.

Short Term Action	DCR Lead Unit
Preserve the distinct scenic and cultural resources of the forests.	
Develop a caretaker agreement with a local volunteer organization to maintain the Bald Hill historic agricultural landscape by mowing the fields one time per year; follow best management practices for cellar holes; install interpretive signage; and maintain the Russell family burial ground. Complete a conditions assessment of headstones, including repair recommendations and cost estimates.	Cultural Resources
Preserve and maintain the west ponds CCC landscapes. Preserve the remaining CCC features, including dams and spillways. Regularly clean debris from the water, shorelines and spillways. Preserve the dams as cultural resources.	Dam Maintenance
Provide diverse opportunities for sustainable outdoor recreation.	
Investigate options to re-open the Berry Pond day use area using the new DCR retained revenue model to provide swimming and picnic opportunities during hot summer months.	State Parks
Install a composting toilet and electricity at the Berry Pond CCC pavilion.	Engineering
Consider options for extending the camping season at Harold Parker State Forest from May 1st through the Columbus Day weekend using the new DCR retained revenue model.	State Parks
Replace campground comfort station #4 (near Frye Pond) to provide sanitary facilities that are ADA accessible with a dish washing station.	Engineering
Mitigate trail impacts on vernal pools, wetlands and streams by closing or relocating trails that negatively impact priority vernal pools and wetlands, and constructing boardwalks or bridges over flooded sections (see Trail Recommendations maps).	State Parks
Repair eroded areas along trails by relocating trails to gentler slopes or installing water bars to divert water flows away from the trails (see Trail Recommendations maps).	State Parks
Interpret the natural and cultural resources of the forests.	
Provide an entry sign at the Sharpners Pond Road entrance to Boxford State Forest with key forest rules, a trail map and Park Watch Program contact information.	State Parks
Convert the short-term seasonal Interpreter position to a long-term seasonal position (April-October) to provide spring and fall seasonal interpretive events and programs targeting school groups.	Ranger Services
During the hunting season, provide signs at the Jenkins Road, Middleton Road CCC pavilion, forest headquarters and Sharpners Pond Road public parking lots warning visitors to wear hunter orange and exercise caution during the hunting season. Provide information brochures online and at the forest headquarters describing the hunting season schedule and recommended safety precautions.	Ranger Services
Work with partners and volunteers to achieve these management goals.	
Work with the Bay Circuit Alliance, Essex County Greenbelt Association and the Town of Middleton to acquire additional land to permanently connect the Harold Parker and Boxford state forests using the Bay Circuit Trail and local connecting trails while protecting important Priority Habitat.	Planning
To encourage park use by low income minority families living in Lawrence, work with Groundwork Lawrence and the Appalachian Mountain Club to promote camping and trail use by Lawrence residents in Harold Parker State Forest.	State Parks
Work with the New England Mountain Bike Association to improve trail signage and develop loop trails in Harold Parker State Forest that connect to other conservation lands and neighborhood paths.	State Parks

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Berry Pond, DCR

SECTION 1. INTRODUCTION

1.1. MISSION OF THE DEPARTMENT OF CONSERVATION AND RECREATION

The Department of Conservation and Recreation (DCR) is responsible for the stewardship of approximately 450,000 acres of Massachusetts' forests, parks, reservations, greenways, historic sites and landscapes, seashores, lakes, ponds, reservoirs and watersheds. It is one of the largest state park systems in the country. The mission of the DCR is:

"To protect, promote and enhance our common wealth of natural, cultural and recreational resources for the well being of all."

In meeting today's responsibilities and planning for tomorrow, the DCR's focus is to:

- Protect our state's natural and cultural resources.
- Enhance outdoor recreation opportunities for our residents.
- Continue investment in current and new facilities and programs.
- Promote access to all programs and facilities.
- Expand public involvement in carrying out the DCR's mission.
- Establish first-rate management systems and practices.

The DCR was created pursuant to state legislation that in 2003 merged the former Metropolitan District Commission (MDC) and the former Department of Environmental Management (DEM). The DCR's Division of State Parks and Recreation manages over 300,000 acres of the state's forests, parks, beaches, mountains, ponds, rivers and trails. The Division has broad management responsibilities for the preservation, maintenance and enhancement of the natural, scenic, historic and aesthetic qualities within these areas.

The health and happiness of people across Massachusetts depend on the accessibility and quality of our green spaces, our natural and cultural resources, recreation facilities and great historic landscapes. The DCR continues to improve this vital connection between people and their environment.

1.2. INTRODUCTION TO RESOURCE MANAGEMENT PLANS

The Department of Conservation and Recreation is directed by a legislative mandate (M.G.L. Chapter 21: Section 2F) to prepare management plans for

every DCR reservation, park and forest; to provide management guidelines for the protection and stewardship of natural and cultural resources; and ensure consistency between recreation, resource protection and sustainable forest management. The legislative mandate also requires the incorporation of public review and input into the development of management plans, and review and adoption by the DCR Stewardship Council.

Resource Management Plans (RMPs) consider the past, present and future of a forest, park or reservation. Through an assessment of resources, clear management goals and objectives are developed, and short and long-term implementation action plans are identified for the management of properties under the stewardship of the DCR. RMPs are written to meet the information needs of a diverse audience: from the decision-makers directly involved in the operation and management of a property, to a variety of outside stakeholders. RMPs are intended to be working documents for setting priorities, budgeting and resource allocation, and establishing guidelines for balancing sustainable recreation with the stewardship of natural and cultural resources. Finally, RMPs are of value to users that are interested in learning more about specific properties, the challenges the DCR faces and how decisions affecting the properties are made.

DCR staff undertook a statewide survey in 2008–2009 to assess the level of existing resource and planning data available, and correlate that with operations and management considerations. This assessment was used to identify groupings of properties that should be included together in a single RMP, i.e., planning units. The statewide survey was also used to develop a strategic plan for the RMP program, including the identification of a sequence for preparing RMPs. The Harold Parker Planning Unit is ranked eighth out of the 80 planning units identified statewide.

1.3. THE PLANNING PROCESS

Resource Management Plans are developed by the DCR's Resource Management Planning Program through an iterative process of data gathering and analyses, public input, review and revision. Administrative, cultural (i.e., archaeological and historic), ecological, recreation, social and spatial (i.e., mapping) information is gathered. Sources of information include interviews with DCR staff, site visits, administrative files and reports, legal documents, map data and municipal and regional plans. An initial meeting is convened to provide the public with an opportunity to express their thoughts about the properties included in the RMP and to provide input into the plan's contents. The public meeting is announced in the Environmental Monitor and advertised in local media outlets.

The inventory and assessment of all available information on natural, cultural, recreation and operational resources is the foundation for the preparation of a draft RMP. The draft is distributed within the DCR for internal review, and is repeatedly reviewed and revised to produce a draft RMP for public review and comment.

Upon completion of the draft RMP, a second public meeting is convened to present an overview of the RMP's findings and recommendations. Once again, the public meeting is announced in the Environmental Monitor and advertised in local newspapers. After the second public meeting, the draft RMP is made available to the public via the DCR web page and local libraries. The meeting is followed by a 30-day public comment period. Comments made during the meeting and written comments received during the public comment period are used to further develop the draft RMP.

Once revised, a final draft RMP is submitted to the DCR Stewardship Council for review and adoption. The Stewardship Council is a 13-member citizen advisory board (appointed by the Governor) that works with the Department to provide a safe, accessible, well-maintained and well-managed system of open spaces and recreation facilities that are managed and maintained on behalf of the public for the purposes of natural and cultural resource protection, sustainable recreation and education.

Once adopted, the Commissioner of the Department of Conservation and Recreation files copies with the Secretary of State and the Joint Committee on Environment, Natural Resources and Agriculture of the Massachusetts General Court. The adopted RMP provides structure and guidance for the operation and management of properties included in the plan.

1.4. Public Participation in Developing this RMP

Notice of a public meeting and of the DCR's intent to prepare a Resource Management Plan for the Harold Parker Planning Unit appeared in the April 11, 2012 issue of the Environmental Monitor. Additional announcements were posted on the DCR web page and press releases were provided to the local newspapers. Announcements were also directly distributed to individuals, regional and local stakeholder organizations and local officials. An initial public meeting occurred on April 18, 2012 at the Stevens Memorial Library, North Andover. Approximately 35 people attended this initial meeting. Public input was received at the meeting, and through U.S. mail and e-mail received during a 30-day comment period after the meeting.

To promote greater citizen participation, the DCR created a trails plan for each forest. The DCR initiated the trails plan by hosting a public workshop to discuss current trail use, conditions and future needs. Notice of the workshop was posted on the DCR website, sent to local newspapers, interested individuals, stakeholder organizations and local officials. The trails workshop was held on June 13, 2012 at the Stevens Memorial Library, North Andover. Meeting notes for the trails workshop can be found on the DCR website.

A public meeting to present an overview of the draft RMP, held on December 5, 2012 at the Stevens Memorial Library, North Andover, was attended by 26 people. Notice of the meeting was published in the November 21, 2012 Environmental Monitor and posted on the DCR website. Meeting notices were sent to local newspapers, interested individuals, stakeholder organizations and local officials. The draft RMP was made available on the DCR website, at the North Andover Public Library and at the Harold Parker State Forest headquarters on December 6, 2012.

The public comment period on the draft RMP ran from December 6, 2012 to January 11, 2013. Eight sets of comments were received and incorporated into the final RMP (see Appendix B). This Resource Management Plan was presented to the DCR Stewardship Council on January 4, 2013 and adopted by the Council on March 1, 2013.

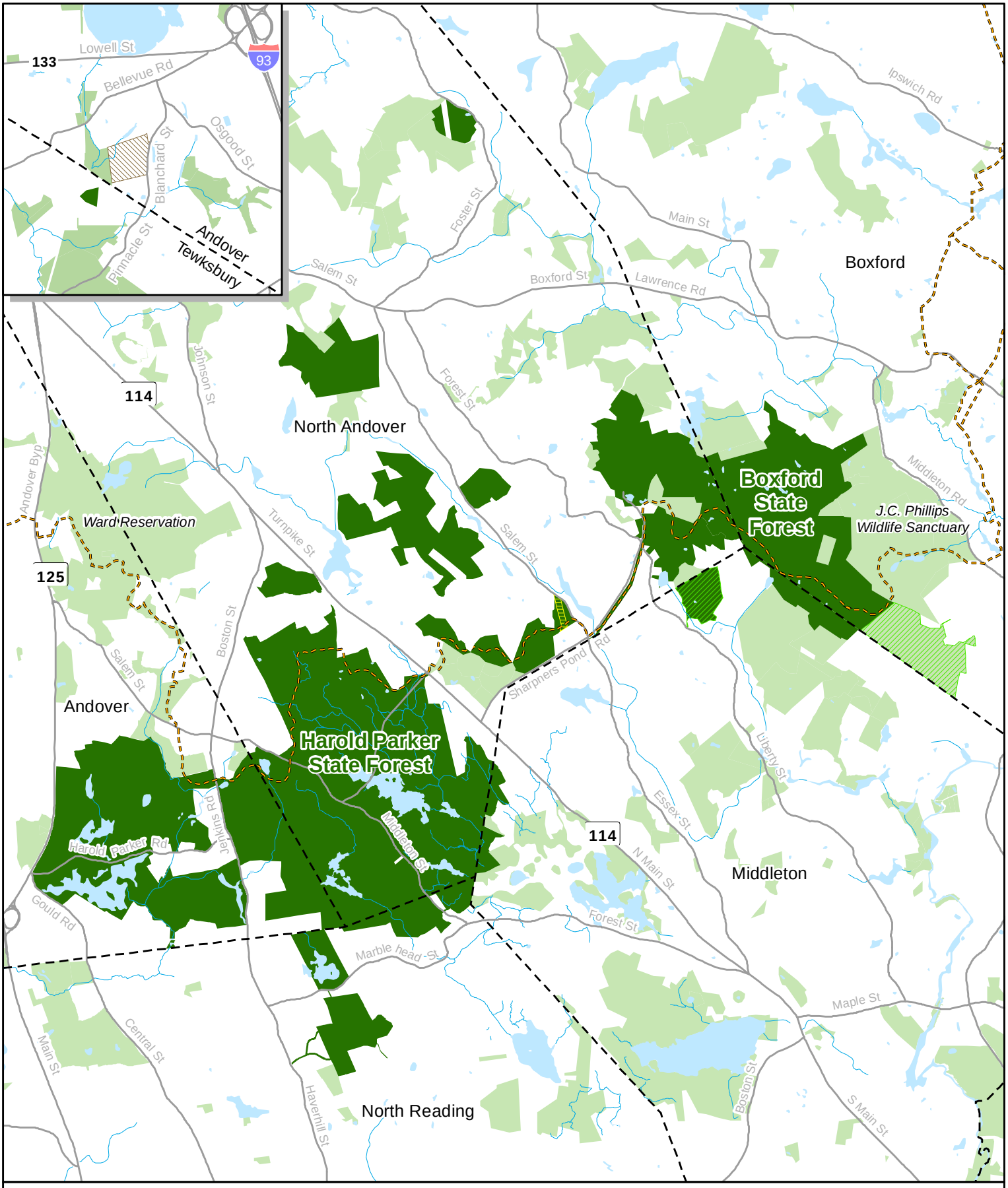
1.5. Properties Included in this RMP

This plan covers the Harold Parker Planning Unit, which includes Harold Parker and Boxford state forests, a Conservation Restriction (CR) held by the DCR on the town-owned Wunnegan Conservation Area in Boxford and an Agricultural Preservation Restriction (APR) on a reforestation lot located in Andover. A Conservation or Agricultural Preservation Restriction is a legal document that limits the uses of a property to protect specific open space values of that land. Locations of these properties are indicated on the Harold Parker Planning Unit map. Although these properties are not owned in fee by the DCR, they are included in the plan because of their physical proximity to Harold Parker and Boxford state forests, and the DCR's responsibilities for overseeing the stipulations of the restrictions.

1.6. Defining Characteristics

Harold Parker State Forest is located 20 miles north of Boston and five miles southeast of Lawrence. It is within a one hour drive for over three million people. The property offers 3,295 acres of park land primarily used for camping, freshwater swimming, hiking, horseback riding and fishing. Harold Parker State Forest is the largest public open space in Essex County. In the 1930s, the Civilian Conservation Corps (CCC) had two camps in the forest that built most of the roads, recreation areas, administrative facilities and dams, to create ponds in the forest.

Harold Parker State Forest is composed of a series of rolling hills, low-lying, swampy areas, rocky outcrops and ponds (see USGS Topographic map). Most of the property is forested by species of oak, hickory, maple, birch, white pine and hemlock. There is a wide variety of shrub, grass and flowering plants that exist on the more open and wet sites beneath the forest canopy. A special vegetative feature is the bog that encircles Bear Pond. This site contains a variety of rare plants, including dwarf mistletoe.



Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

Harold Parker State Forest is characterized by:

- 56 miles of trails and forest roads used by hikers, horseback riders, mountain bikers, cross-country skiers and hunters.
- Two natural and nine man-made ponds.
- 56 certified vernal pools.
- Cultural resources associated with Native American occupation, colonial industry and significant CCC achievements.
- 93 family and two group campsites.
- Two closed day use areas with swimming and picnic facilities.

Boxford State Forest offers 1,045 acres of park land primarily used for hiking, horseback riding and hunting. It is maintained by personnel based at Harold Parker State Forest. Several parcels of protected open space are adjacent to the forest. The 390-acre J. C. Phillips Wildlife Sanctuary lies along the eastern border of the forest. The Essex County Greenbelt Association owns approximately 532 acres of woodlots within or adjacent to the forest. The Town of Boxford owns 140 acres of conservation land south of the forest. The Town of Middleton owns 93 acres west of the forest. Totaling 2,200 acres, these conservation properties form a large expanse of backcountry offering visitors a natural forest experience. These properties are linked by a series of trails and forest roads.

Boxford State Forest is characterized by:

- 11 miles of trails and forest roads used by hikers, mountain bikers, horseback riders and hunters.
- Oak-conifer forest with 24 acres of swamp hardwoods.
- 100 acres of climax white pine-hemlock forest on the north side of Bald Hill.
- Portions of three ponds.
- 49 certified vernal pools.
- Archaeological resources associated with early colonial settlement.
- Remains of an anti-ballistic missile (ABM) radar site.

In 2002, the Town of Boxford purchased the 140-acre Wunnegan Conservation Area for $4.75 million to prevent the development of 34 house lots. The DEM contributed one million dollars toward the town's purchase in return for a Conservation Restriction (CR) on the land. The property abuts the southern border of Boxford State Forest, contains miles of hiking trails, breathtaking vistas and connections to the Bay Circuit Trail. The property provides habitat for a myriad of songbirds, woodpeckers, hawks and owls. It includes streams, wetlands, unusual rock outcrops, overlooks and 24 certified vernal pools, providing habitat for state-listed rare salamanders. The Conservation Restriction ensures that the property will remain in its natural condition with public access for passive recreational activities such as hiking, snow-shoeing, mountain biking, horseback riding and cross-country skiing on designated trails. The property may also be used for nature study, hunting, fishing and similar activities.

In 1986, the DEM exchanged title to an isolated 37-acre reforestation lot in Andover, west of I-93, for an interest in the former Moseley estate (now Maudslay State Park). The DEM retained an Agricultural Preservation Restriction (APR) on the property to ensure that the property be used for agricultural, farming or forest purposes.

1.7. Management Principle and Goals

The DCR is entrusted with the stewardship of Harold Parker and Boxford state forests. A thorough inventory and assessment of existing conditions and activities, in concert with substantive public input, is necessary to establish guidelines for future management of these forests. The resource management planning process has identified the following management principle and associated goals to guide future management of these important facilities, and provide a foundational structure for this management plan.

Management Principle

Through the creative use of limited state management resources, partnerships and volunteer stewardship, conserve important natural and cultural resources while providing diverse opportunities for public outdoor recreation that are compatible with resource conservation.

Management Goals

Maintain and enhance habitats for rare species, native plants and animals. Monitor, manage and protect vernal pool and wetland habitats for state-listed rare animals. Actively manage Harold Parker

State Forest between Jenkins Road and Route 114 for age class and native species diversity, to enhance native wildlife habitat and increase resilience to forest pathogens and climatic change. Passively manage Boxford State Forest to encourage natural forest processes and inner forest habitat.

Protect and enhance the quality of water resources. Manage water resources to conserve and improve the habitats of native aquatic plants and animals, protect public drinking water supplies and ensure healthy and safe water-based recreation. Manage the forests to protect wetlands, vernal pools, streams, ponds and reservoirs from overuse and avoidable environmental degradation.

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Interpret the natural and cultural resources of the forests. Effective park management largely depends on the support of well-informed visitors. Provide connections to the forests' significant natural and cultural resources through interpretive programs, materials and signage.

Work with partners and volunteers to achieve these management goals. Maintain and develop partnerships with other state agencies, adjacent municipalities, non-profit organizations, businesses and volunteers to provide quality outdoor recreational opportunities while conserving the important natural and cultural resources of the forests. With DCR oversight, partner with organizations and individual volunteers to implement this RMP for the long-term stewardship of the forests.

1.8. REGIONAL CONTEXT

Harold Parker and Boxford state forests are located in northeastern Massachusetts, within the towns of Andover, North Andover, Boxford, North Reading and Middleton. Approximately 30.4% of Harold Parker State Forest is in Andover, 61.8% in North Andover, 7.2% in North Reading and 0.6% in Middleton. Approximately 51.9% of Boxford State Forest is located in Boxford, 37.3% in North Andover and 10.8% in Middleton.

This region was settled around 1650 by English farmers. During the 1800s, much of the farmland was abandoned due to the movement west in search of better agricultural soils. During the mid-1800s, the manufacture of textiles, paper, furniture and shoes became the major industries in the region. Water powered woolen mills created urban centers in Lowell, Lawrence and Haverhill until the decline of these industries in the 1900s.

Construction of the interstate highway system after World War II accelerated the transformation of rural areas surrounding the forests into suburban bedroom communities. Computer hardware manufacturing and communications companies were attracted to the I-495 corridor. The population of the five abutting towns increased by 103.4% between 1950 and 1970 (see Table 1.1). The rate of population increase has slowed since 1970. The areas closest to the City of Lawrence and I-495 continue to be the most densely populated sections.

Table 1.1. Population of Towns Adjacent to Harold Parker and Boxford State Forests

	1950	1960	1970	1980	1990	2000	2010	Percent Change
Andover	12,437	17,134	23,695	26,370	29,151	31,247	33,201	**167%**
North Andover	8,485	10,908	16,284	20,129	22,792	27,202	28,352	**234%**
Boxford	926	2,010	4,032	5,374	6,266	7,921	7,965	**760%**
North Reading	4,402	8,331	11,264	11,455	12,002	13,837	14,892	**238%**
Middleton	2,916	3,718	4,044	4,135	4,921	7,444	8,987	**208%**
Five Town Total	*29,166*	*42,101*	*59,319*	*67,463*	*75,132*	*87,651*	*93,397*	**220%**
Percent Change between Decades	**-**	**+44.3%**	**+40.9%**	**+13.7%**	**+11.4%**	**+16.7%**	**+6.6%**	**-**

Source: United States Census Bureau.

The increase in population has translated into changes in land use in the abutting towns. There has been a significant increase in residential, commercial and industrial land use for each town, and a corresponding decrease in forested land. Large lot zoning for single family homes has resulted in the conversion of unprotected, privately-owned open space around the forests into residential use. These new residents are creating an additional demand for year-round recreational opportunities in the forests.

Management of the forests must take into account land uses and activities that occur on surrounding lands. The natural habitats and species found in the forests do not recognize the ownership boundaries established by people. In addition, land use decisions that occur outside the forests have an impact on the environment and activities that occur within the forests. The forests are home to a significant resident animal population and serve as a migration route for species that breed elsewhere in the region.

During the past three decades, the abutting towns, DCR, MassWildlife and several non-profit conservation organizations have been working together to identify and protect significant open spaces around the forests (see Harold Parker Planning Unit map). MassWildlife owns the 406-acre J.C. Phillips Wildlife Sanctuary adjacent to the east side of Boxford State Forest. The 695-acre Ward Reservation to the north of Harold Parker State Forest is managed by The Trustees of Reservations. Ten miles of trails in the Ward Reservation connect three hills, cross a quaking bog and are part of the regional Bay Circuit Trail.

The Andover Village Improvement Society (AVIS) owns or leases 1,100 acres of conservation land in Andover. The AVIS Skug River Reservation (35 acres) abuts Harold Parker State Forest and Town of Andover conservation land.

Thirty miles of trails in the AVIS reservations are open to the public for hiking, birding and cross-country skiing. Motor vehicles, hunting, fires and camping are prohibited on AVIS conservation lands. The Essex County Greenbelt Association owns 532 acres of land within and around Boxford State Forest, and scattered parcels in North Andover and Middleton.

The Bay Circuit Trail, first proposed in 1929 as an outer version of Boston's Emerald Necklace, spans 200 miles through 50 Massachusetts cities and towns. The trail links together conservation land, state parks, nature sanctuaries, national historic parks and other public open spaces. The trail connects Harold Parker and Boxford state forests with the J.C. Phillips Wildlife Sanctuary and Ward Reservation (see Harold Parker Planning Unit map).

To the south, in Middleton and North Reading, are lands managed for public water supply. The Emerson Brook Reservoir, abutting the Sudden Pond area of Harold Parker State Forest, flooded six acres of the forest to meet the public water supply needs of Danvers and Middleton. In Middleton and North Andover, the Boys Club of Lynn owns a parcel on Creighton Pond that is used for after school and summer camp programs for children 5-10 years of age.

Table 1.2. Physical, Ecological and Political Settings

Planning Unit: Harold Parker
Location: Towns of Andover, North Andover, Boxford, North Reading and Middleton
DCR Management Structure:
District: Middlesex Essex
Region: North
Division: State Parks and Recreation
Size:
Harold Parker State Forest: 3,294.7 acres
Boxford State Forest: 1,045.3 acres
Andover: 1,012.6 acres
North Andover: 2,379.6 acres
Boxford: 541.6 acres
North Reading: 249.3 acres
Middleton: 151.4 acres
Tewksbury: 5.5 acres
Ecoregion: Southern New England Coastal Plains and Hills
Watershed: Ipswich River
Legislative Districts:
Senate Districts: First Essex and Middlesex
Second Essex and Middlesex
House Districts: Fourth Essex
Eighteenth Essex
Twentieth Essex
DCR Conservation and Agricultural Preservation Restrictions:
Sawyer–Richardson Property, Boxford: 139.6 acres
Flint Reforestation Lot, Andover: 36.6 acres
Designations:
Priority Habitat – Natural Heritage Endangered Species Program
Certified Vernal Pools – Natural Heritage Endangered Species Program
Important Bird Area – Massachusetts Audubon Society
BioMap2 Core Habitat – Natural Heritage Endangered Species Program

1.9. HISTORY OF PROPERTY

Prior to European settlement, the land that now comprises Harold Parker and Boxford state forests was occupied seasonally by members of the Agawam tribe, who inhabited the area extending from Cape Ann to the Merrimack River, as far inland as North Andover and Middleton. From March to June, the Agawam typically began their annual subsistence cycle by moving to farming sites to sow crops of maize, squash and legumes. Summer camps located near the ocean along freshwater tributaries were used as a base for hunting and fishing. As summer ended, food gathering activities reached a climax as crops were harvested and wild nuts, berries, red meat and fish were collected. By fall, villages disbanded to form small hunting units in the interior forests to capture large mammals such as bear and deer. In December, the original villages reassembled and existed on small amounts of stored meat, grains and whatever fresh fish or meat could be obtained (MHC, 1985).

The Agawam camped in locations that were ideal for the above seasonal activities. The Agawam most likely chose summer campsites along major drainages such as the Parker, Merrimack and Ipswich rivers. The Agawam used sheltered winter campsites located along the periphery of interior freshwater ponds and wetlands. This life cycle continued until significant mortality occurred as a result of a plague introduced by European traders visiting the North Shore in 1616 to 1620. The plague reduced the local Agawam population to less than one tenth of its original size. Native American artifacts have been found in seven archaeological sites within the forests.

In 1638, Masconomet, sagamore or chief of the Agawam tribe, sold all of the tribal lands to John Winthrop for a sum of 20 pounds. As European

farmers began to settle the area, lands were cleared for predominantly agricultural use. The remaining tribal members were distributed on individual farms adjoining those of the English and integrated into the new settlements. Colonial settlers grew Indian corn, wheat, barley, rye, fruits and vegetables, as well as flax and hemp for home textile production. Animal husbandry was also an important activity. Much of the land located in the forests was used as pastureland. The English settlers raised cattle, horses, sheep, oxen, swine and fowl (MHC, 1985).

Unfortunately, the Native American conception of land ownership differed dramatically from that of the English colonists. Native Americans believed that transfer of title included the continued right of access, fishing and hunting. English colonists, on the other hand, gave exclusive rights to individual owners. Recognition of this irreconcilable difference resulted in the King Philip's War of 1675-76, which virtually eliminated most of the Native American population from the region (MHC, 1985).

Although dispersed farmsteads continued to characterize the area throughout the Colonial period, more concentrated village centers developed along the Shawsheen River (Andover Village), Merrimack River (Sutton Mills) and Fish Brook (Boxford). Small water-powered industries located in these village centers led to the development of urbanized centers north of the forests. The land that is now Harold Parker and Boxford state forests was cleared by the early settlers for use as agricultural and pasture land, orchards and wood products.

During the 1800s, most of the local economy was based on the manufacture of textiles, paper, furniture and shoes. The development of woolen mills along the Merrimack River created urban centers in Lowell, Lawrence and Haverhill. These mills remained active until their demise in the early 1900s. The urban centers relied heavily on timber for fuel, building materials, paper and furniture manufacturing.

Table 1.3. Significant Planning Unit Events

Year	Event
1500-1615	Area inhabited by the Agawam tribe.
1615-1616	Plague reduced the Agawam population to approximately 10% of its original size.
1630	Masconomet, chief of the Agawam tribe, greeted Governor John Winthrop.
1750s	Dispersed farmsteads established in the area.
1758	Jenkins family purchased 400-acre parcel on Jenkins Road, south of Salem Street.
Early 1800s	Farms abandoned for better soils in the central U.S.
1836-1840s	Blue soapstone quarry operated west of Jenkins Road.
1850s-1895	William Jenkins operated a sawmill on the Skug River, west of Jenkins Road.
c1800-1932	Four generations of the Towne family used half of Boxford State Forest as pastureland and woodlots.
1895	Harold Parker State Forest area cut over and ravaged by a forest fire leaving a "waste land."
1914-1916	Harold Parker served as the first Chairman of the State Forest Commission.
1916	State Forest Commission acquires 800 acres in Andover, North Andover and Reading, naming it Harold Parker State Forest in memory of its first Chairman.
1930-1933	Crews of 30 to 80 unemployed men hired by the state to repair forest roads, maintain forest plantations, plant trees and control gypsy moth and white pine weevil infestations at Harold Parker State Forest.
1933	Lawrence B. Fletcher, Secretary of the Federated of Bird Clubs of New England, donated 460 acres of land purchased from the Towne family to the Commonwealth, establishing Boxford State Forest.
1933-1935	CCC Camp S-5 operated west of Bradford Pond in Harold Parker State Forest.
1934-1941	CCC Camp S-76 was established on the east side of Frye Pond.
1941-1945	War transportation restrictions and shortages reduced maintenance and attendance.
1946	CCC camp buildings were sold for lumber salvage and timber harvesting accelerated in the state forests to supply lumber for post war construction.
1955	Three new comfort stations are constructed at Stearns Pond, Sudden Pond and Lorraine Park Campground.
1964	The Department of Natural Resources took 184 acres, including Bald Hill, to prevent private development adjacent to Boxford State Forest.
1969	U.S. Department of Defense abandoned construction of an anti-ballistic missile (ABM) radar facility in Boxford State Forest.
1985-1989	GOALS Plans completed for Harold Parker and Boxford state forests.

During the mid-1800s, many of the local farms were abandoned due to the poor agricultural soils and better soils in settlements to the west. Farming gave way to the manufacture of textile, paper, shoes and wood products in the region. Land that was left in forest cover was indiscriminately cut for white pine in the late 1800s and early 1900s. This cutting, combined with the effects of over-grazing and forest fires, left the area in a "waste land" condition.

In 1836, a blue soapstone quarry was founded in Harold Parker State Forest, west of Jenkins Road. This soft stone was used for a variety of purposes, including door and window moldings, large sinks and fireplace mantels. In the 1850s, William Jenkins built and operated a sawmill near the quarry on a branch of the Skug River. The sawmill operated until 1895 when much of the area was ravaged by forest fire.

Creation of Harold Parker State Forest

In 1914, the State Forest Commission was formed to acquire and restore unproductive waste lands to commercial forests. In 1916, the newly formed State Forest Commission purchased 800 acres of "waste land" in Andover and North Reading, creating the third state forest in Massachusetts. The Chairman of the State Forest Commission was Harold Parker, a civil engineer who had served as Chairman of the State Highway Commission. Harold Parker died suddenly in 1916 and the recently acquired "waste land" was named in his honor. A three-man crew was hired to immediately begin a reforestation program in the forest.

In 1920, the Department of Conservation was formed to reclaim land for timber production and protection of the water supply. The Department of Conservation continued the reforestation program in the state forests. In 1930, the legislature provided the Department of Conservation with additional funds to put unemployed men to work in state forests. Over the next three years, "emergency unemployment crews" of 30 to 80 men completed numerous forest improvement projects at Harold Parker State Forest, including road maintenance, extensive pest control, tree stand improvements and pine plantings. By 1938, Harold Parker State Forest contained 2,879 acres of previous "waste land."

During the Great Depression in the 1930s, the federal government created the Civilian Conservation Corps (CCC) to improve public forests. CCC Camp S-5, Company 110 operated southwest of Bradford Pond in Harold Parker State Forest between 1933 and 1935. The 200-man crew constructed five dams, four miles of roads and four bridges along the Skug River, creating Delano, Brackett, Collins, Field and Frye ponds. The crew also constructed a beach, picnic area and three parking lots at Field Pond.

CCC Camp S-76, Company 167 operated northeast of Frye Pond between 1934 and 1941 in Harold Parker State Forest. The 200-man crew constructed numerous park roads and parking lots, swimming and picnic areas at Berry and Stearns ponds, and camping areas at Berry Pond and Lorraine Park. The crew also constructed the forest headquarters buildings, picnic pavilions, bathhouses and comfort stations in the forest. The crew conducted extensive timber improvements, planted trees, controlled gypsy moth and pine weevil infestations and cleaned up after the hurricane of 1938. Most of the forest's original dams, roads, parking areas, recreation facilities, buildings and trails were built by the CCC crews.

Gas rationing during World War II caused a drastic drop in attendance at Harold Parker State Forest. At the same time, a lack of personnel and material resulted in the deterioration of facilities in the forest. This resulted in the closing of the Berry Pond and Lorraine Park recreation areas, with only Stearns Pond remaining open. In 1946, the CCC camp buildings were sold for lumber salvage.

Immediately after the war, the demand for outdoor recreation increased and existing facilities suddenly became inadequate. Each successive year attendance increased substantially. The park crew consisted of four men, upon the return of two former employees from the Army. By 1950, new comfort stations were built, roads were repaired and Lorraine Park was opened for camping. Aerial spraying of DDT virtually eliminated gypsy moth damage in the forest.

After World War II, formerly rural land in the region was rapidly subdivided and developed. Both increased demand for housing and construction of the interstate highway system transformed this region. Towns that were close to Route 128 grew significantly. Today, the fastest economic growth, which is in the technology, computer and

communications industries, is occurring predominantly around I-495.

Creation of Boxford State Forest

Four generations of the Towne family owned approximately half of the area that is now Boxford State Forest. The Townes used the land primarily as pastureland and woodlots. In 1933, Lawrence B. Fletcher, Secretary of the Federation of Bird Clubs of New England, bought 460 acres of land from the Towne family and transferred it to the Department of Conservation, creating Boxford State Forest. In 1936, the Department of Conservation purchased an additional 114 acres in North Andover, including an Atlantic white cedar swamp.

In 1963, a real estate company acquired Bald Hill, a prominent glacial drumlin, and adjacent land totaling 184 acres. A group of conservation-minded citizens, later to establish the Essex County Greenbelt Association, persuaded the state legislature to authorize the taking of this land by eminent domain. In 1964, the Department of Conservation acquired Bald Hill and the adjacent land, adding it to Boxford State Forest.

In 1968, the U.S. Department of Defense took approximately 150 acres of Boxford State Forest and an additional 150 acres of privately-owned land in North Andover (totaling 300 acres) for the purpose of developing an anti-ballistic missile (ABM) radar site. The Department of Defense stripped 23 acres of topsoil and vegetation, and excavated a very large hole for installation of a radar tower. After the project was cancelled in 1969, the excavation was filled with water and this man-made pond remains today.

ABM Radar Site after Suspension of Work, March 1970, J. Kitchens, III

After the nationwide ABM program was cancelled, the Department of Defense transferred back to the Department of Conservation land that had been previously taken, along with Sharpners Pond Road from Salem Street to Forest Street. Sharpners Pond Road connects the former ABM site with Route 114 in North Andover.

The Department of Defense left behind a badly scarred landscape, which has only partially recovered. Since the federal government never acquired title to the privately-owned land it had taken, it gave the land back to the original owners. In the late 1980s, the Department of Environmental Management acquired three of these properties (totaling 88 acres) to provide public access to Boxford State Forest from the end of Sharpners Pond Road.

1.10. LANDSCAPE DESIGNATIONS

As an overarching template for organizing its land management and forestry activities, the DCR has adopted a management structure that categorizes its parks, forests and reservations into three landscape designations: (1) forest reserves; (2) parklands; and (3) woodlands. The three landscape designations provide a balanced stewardship approach that reflects the many different values people hold for these public lands.

Forest reserves protect large contiguous bocks of high-value ecosystems. These are areas where the dominant ecosystem service objectives are biodiversity maintenance, nutrient cycling and soil formation, watershed protection and long-term carbon sequestration. There will be no commercial harvesting of timber in reserves. Forest management would generally consist of letting natural processes take their course, although in some cases, more active management might be permitted. For example, wildfire fuels management may be necessary for reserves located in Southeastern Massachusetts (DCR, 2012).

Parklands are areas where the primary ecosystem service objectives are provision of public recreational opportunities that depend on natural areas, preservation of ecologically significant areas and special places, and promotion of cultural values (aesthetic, historical, educational and tribal). Areas of forest reserves with existing high recreational values may be designated as parklands.

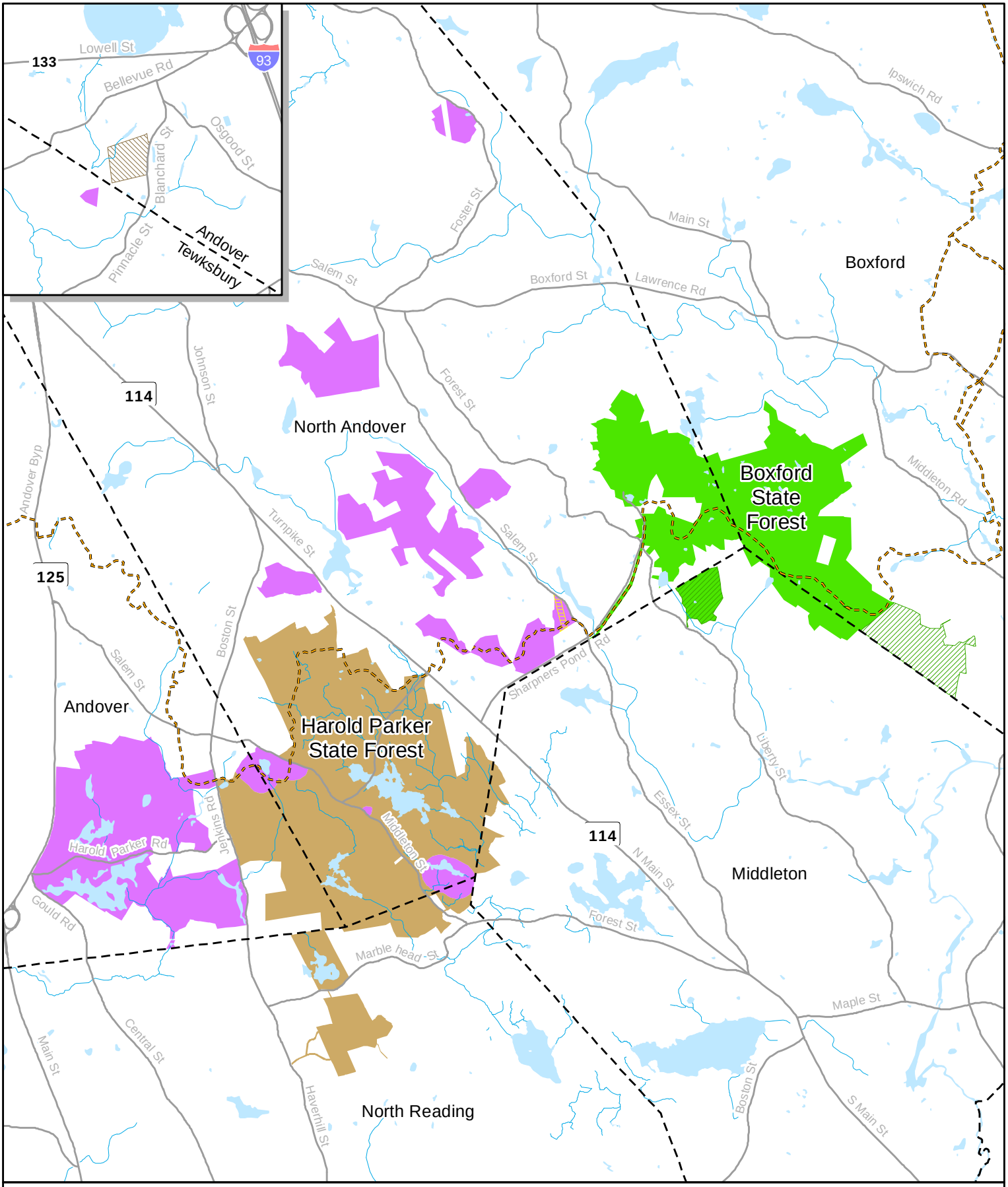
Woodlands demonstrate exemplary forest management practices for landowners and the general public, while supporting the range of ecosystem services that sustainably-managed forests offer, including a diversity of native species, forest age classes and compatible recreational opportunities. One role for woodlands would be demonstrating, to private and municipal landowners, and the general public, the practice of sustainable forestry through active forest management.

The DCR has recently designated Boxford State Forest as a reserve (see Landscape Designations map). Harold Parker State Forest west of Jenkins Road, the existing headquarters area, recreation facilities located at Berry and Sudden ponds, and several scattered properties located in North Andover have been designated as parkland.

The remainder of Harold Parker State Forest has been designated as woodlands. During the Landscape Designation process, GIS models were used to identify lands best suited for the woodlands designation. The most favorable lands for designation as woodlands are those areas suitable for wood production based on soils, vegetation, distance from roads and past management. Information about the Landscape Designation process can be found on the DCR website at: www.mass.gov/dcr/news/publicmeetings/forestryfvp.htm.

Reserve management allows natural processes to determine the long-term structure, composition, function and dynamics of the forest to the maximum extent possible. Equally important is monitoring and studying these conditions, then applying this knowledge to low impact forest management techniques within parklands and woodlands, and on privately managed forests.

The DCR has formed a Forest Reserves Science Advisory Committee, consisting of conservation biologists and forest ecologists, statisticians and wilderness policy experts, to review major restoration and management activities within reserves. This committee will deal with reserve management issues such as: invasive species, fire suppression, controlled burning, rare species habitat, long-term monitoring, and trail, road and facility location or relocation (DCR, 2012).



Harold Parker Planning Unit

Landscape Designations

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

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Lorraine Park Campground, DCR

SECTION 2. EXISTING CONDITIONS

Harold Parker and Boxford state forests provide residents of the region with access to nature and nature-based recreation. Facilities in the forests are readily accessible from the regional highway system. This chapter describes the present state of the natural, cultural and recreation resources of the forests. It also describes current interpretive services provided in the forests.

2.1. NATURAL RESOURCES

The natural resources of Harold Parker and Boxford state forests have been shaped over time by the forces of glaciers, climate and human disturbance. The result of this history is a landscape that provides a unique variety of natural communities and resources.

This section provides an overview of the varied natural resources of the forests. It constitutes an updated natural resource inventory of the forests based on existing information. No specific field studies were conducted as part of this RMP. Much of this information was originally compiled for the Harold Parker State Forest (DEM, 1985) and the Boxford State Forest (DEM, 1989) Guidelines for Operations and Land Stewardship (GOALS) Plans. The information was updated using recent inventories and assessments provided by the Natural Heritage and Endangered Species Program, the Massachusetts Audubon Society, and by Walter Kittredge, Irina Kadis and Don Lubin, botanists who conducted plant surveys for Harold Parker and Boxford state forests. The RMP uses all available information to evaluate current land management practices, and to present recommendations for future resource management and the provision of recreational opportunities in the forests.

Climate

The forests are located in a region with a variable climate. Total annual precipitation averages 52 inches. Winters are cold, with an average winter daily temperature of about 29ºF and summer days are warm, averaging about 72ºF. During the winter, the average daily high temperature is 35ºF and the average low temperature is 17ºF. During the summer, the average daily high temperature is 83ºF and the average low temperature is 63ºF.

There is a 50% chance of a first frost in mid-October and a similar probability of a final frost near the end of April. The length of the growing season may vary from 150 to 180 days. Prevailing winds are from the west to northwest, though precipitation is more

commonly associated with northeast and southeast winds. During the summer, the prevailing winds can bring hot, dry weather that is responsible for occasional summer droughts.

Massachusetts' climate is changing as a result of global warning. Average temperatures have increased by approximately 1.8ºF since 1970. These warming trends have been associated with other observed changes, including more frequent days with temperatures above 90ºF, reduced snowpack, and earlier snow melt and spring peak flows (Frumhoff et al., 2006, 2007; Hayhoe et al., 2006). By the end of the century, under the high emissions scenario of the Intergovernmental Panel on Climate Change (IPCC), Massachusetts is expected to experience a 5ºF to 10ºF increase in average temperature. Days with temperatures greater than 90ºF are predicted to increase from 5-20 days per year today, to 30-60 days each year by the end of the century. Winter precipitation, mostly in the form of heavy wet snow and rain, is expected to increase by 12 to 30 percent. The number of snow events is predicted to decrease from five each month to one to three each month (Hayhoe et al., 2006).

It is necessary to consider changing climate conditions while planning for the resources of the forests. The amount and kind of precipitation have effects on both growth and condition of vegetation, amounts of surface runoff, possible flooding and erosion, and vulnerability of existing infrastructure built based on historic weather patterns. Air temperatures and levels of precipitation also affect many recreational activities in the forests. Demand for swimming increases significantly during days with temperatures greater than 90ºF. Less snow will reduce opportunities for winter uses, such as cross-country skiing and snow shoeing (EEA, 2011).

Geology and Soils

Geology

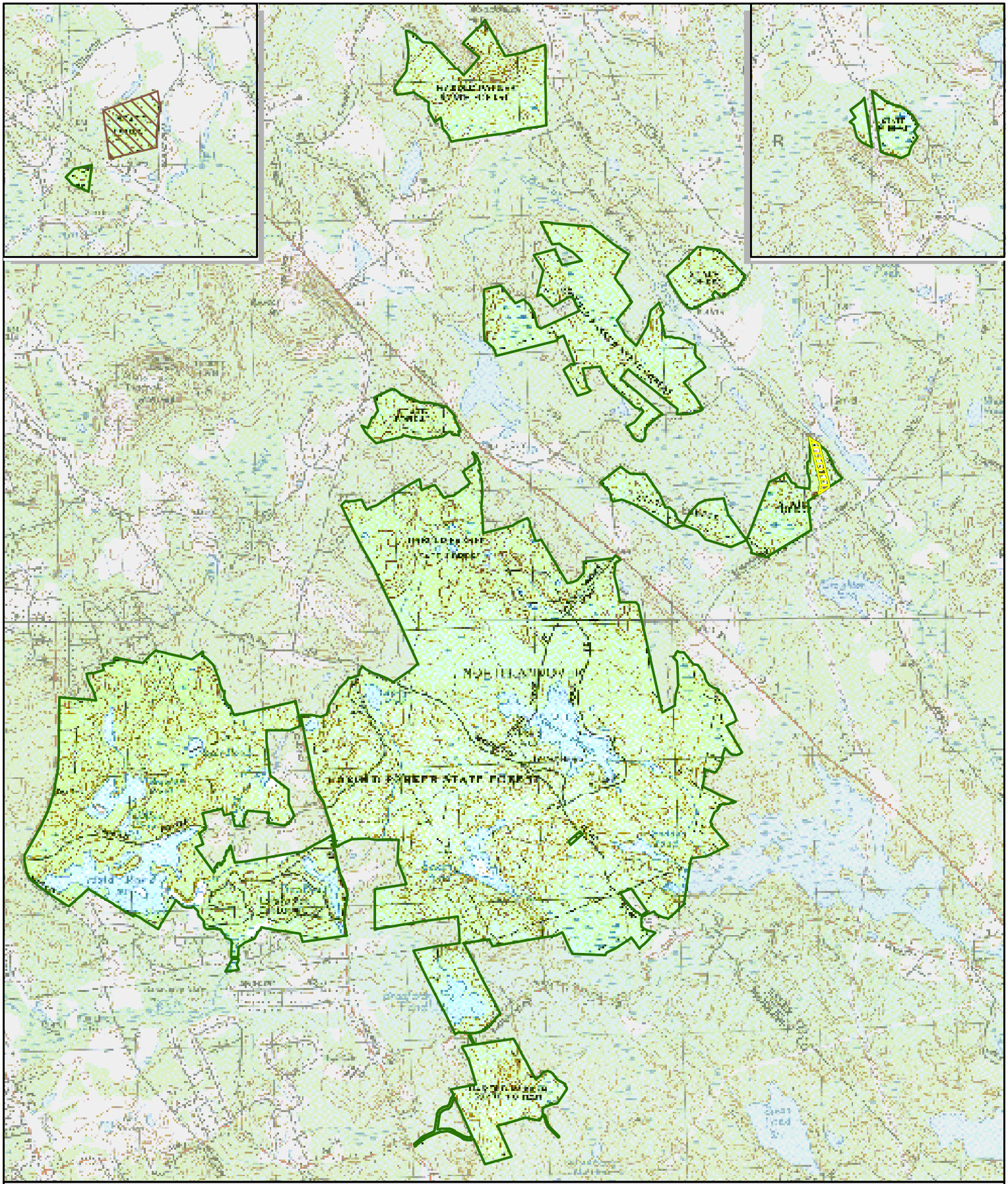
The underlying geology within the forests includes molten rock that crystallized as Andover granite about 450 to 412 million years ago. Andover granite is a light, commonly pink granite with muscovite and garnet. The Andover granite formed from the melting of deeply buried sedimentary rock. In the eastern section of the forests, Sharpners Pond diorite intruded these Andover granite formations about 430 million years ago. Sharpners Pond diorite, a dark igneous rock composed mainly of biotite mica and black hornblende, intrudes older Andover granite (Skehan, 2001). This geology creates an underlying bedrock that was further shaped in more recent times by glacial forces.

The most recent ice sheet, the Wisconsin glacier, deposited most of the glacial debris in eastern Massachusetts. By about 23,000 years ago, the Wisconsin glacier had advanced south across New England, slowing as it reached the more temperate climate of Nantucket Sound. Glacial debris deposited at the southern glacial margin created Martha's Vineyard and Nantucket. Movement of the Wisconsin glacier that covered northeastern Massachusetts as recently as 12,000 years ago created the rolling hills, low-lying swamps, rock outcrops and natural kettle hole ponds that occur throughout the forests.

As it progressed, the glacier wore away much of the land surface with the stones and debris it dragged along with it. The advancing ice created a dense, poorly sorted and often highly-compacted sediment deposit beneath the glacier, known as glacial till. Many areas in the forests contain till deposits over the bedrock that are generally composed of non-stratified, unsorted sediments ranging in size from clay to boulders (Skehan, 2001). Glacial till deposits are poorly drained and have low water yields from wells.

Towards of the end of the Glacial period, glacial melt water streams deposited primarily gravel and sand beyond the melting ice. These well-drained outwash deposits occur in a small portion of the forests, to the north of Salem and Stearns ponds, and west of Bald Hill.

When the glacier retreated from the area approximately 12,000 years ago, it did so haltingly. Glacial drumlins and kames were formed when advancing ice sheets pushed forward massive quantities of debris, which were then deposited as the glacier melted. The highest elevations in the forests are glacial drumlins formed by the Wisconsin glacier during a pause in its final retreat. These include the tops of Woodchuck (333 feet above mean sea level) and Bald hills (247 feet above mean sea level).



Harold Parker State Forest
Agricultural Preservation Restriction
Utility Easement

Harold Parker State Forest

USGS Topographic Quadrangles

0 0.5 1 Mile

1:36,500

dcr Massachusetts

DCR GIS Mar-13

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

Three natural kettle hole ponds are located within the forests. These are areas where huge ice blocks that were partially buried in glacial till were abandoned by the retreating glacier. When the ice block melted, it left a depression called a "kettle hole". In time, water filled these depressions to form deeper ponds such as Bear, Berry and Sharpners ponds.

The geology of an area determines the mineral composition of the soils that occur there. For example, most soils that are derived from glacial outwash are porous and allow fairly rapid percolation. This characteristic influences the hydrology and vegetation of an area. In turn, the hydrology and vegetation influences the organic component of the soil. A description of the soil types found at the forests follows in the next section.

Soils

A soil association is a unique part of the natural landscape composed of and named for its major soil types. The forests contain a wide variety of soil types, ranging from highly permeable sections of glacial outwash to large areas of poorly drained soils in wetlands that consist of large concentrations of decomposed organic materials. Although there are a variety of soils throughout the forests, there are four main soils associations present in the forests:

1. Charlton-Rock outcrop-Hollis association (approximately 56% of Harold Parker State Forest and 35% of Boxford State Forest);
2. Medisaprists muck-type organic wetland soils (approximately 13% of both forests);
3. Hinkley-Windsor-Sudbury association (approximately 15% of Harold Parker State Forest); and
4. Paxton-Woodbridge-Canton association (approximately 6% of Harold Parker State Forest and 48% of Boxford State Forest).

The Charlton-Rock outcrop-Hollis association is characterized by deep, extremely stony, fairly well-drained, fine sandy loam soils, which are formed in glacial till. The fine sandy loam Charlton and Hollis soils are found on the tops and sides of low hills, ridges and plains, and have stones on the surface. Rock outcrop areas are common in this association.

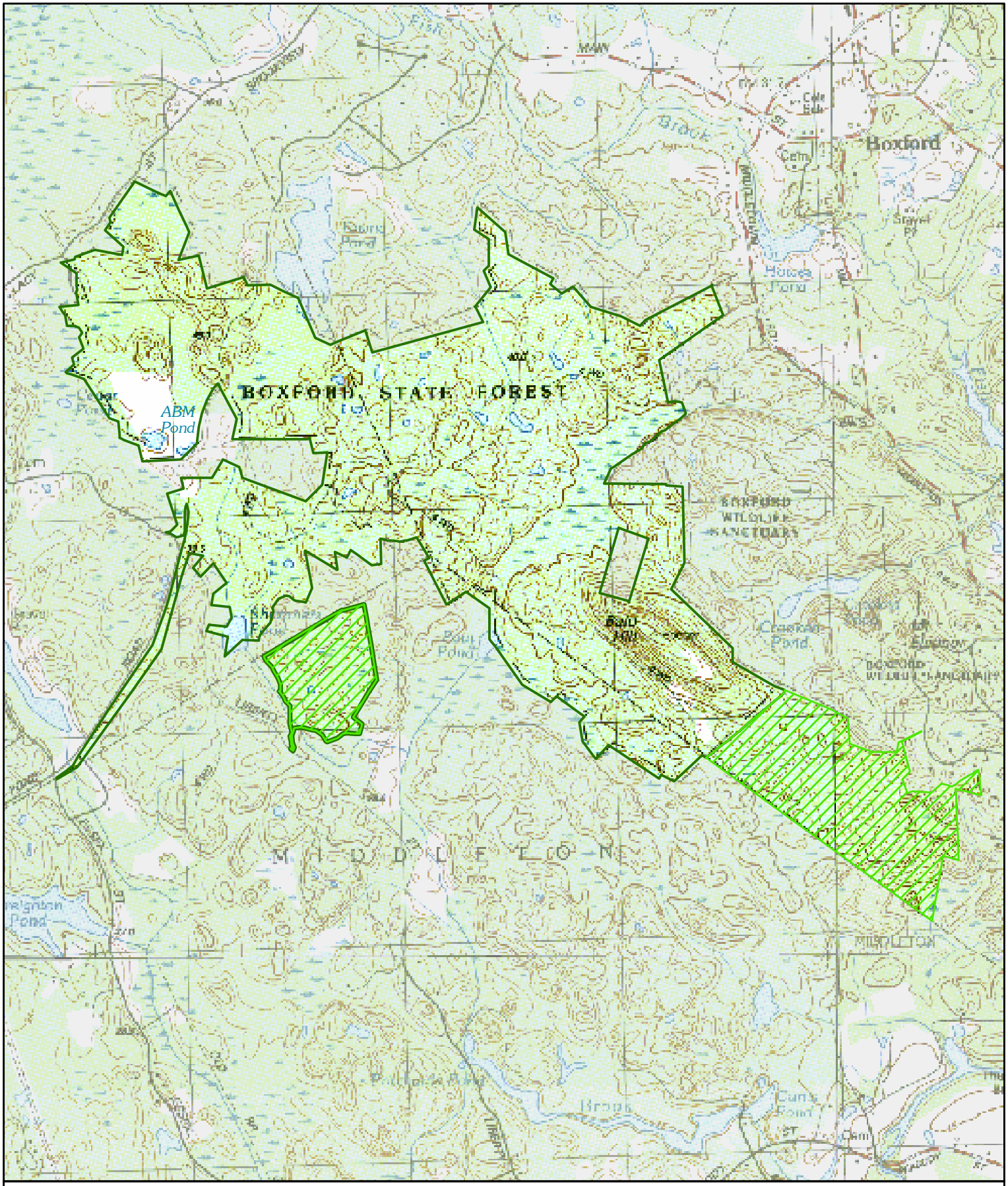
Medisaprists organic soils are found in wetlands located between the ridges and hills, and in pockets or depressions in the more level areas. The Medisaprists soils are very poorly drained wetland soils with a seasonal high water table at or near the surface most of the year (USDA, 2012).

The Hinkley-Windsor-Sudbury association is characterized by deep, fine sandy loam. Hinkley soils are well-drained and have sandy subsoil underlain by sand. They are found in kames, eskers and outwash plains. Windsor soils are also excessively drained and have sandy subsoil underlain by sand. These soils are common around Field Pond and in the Lorraine Park Campground (USDA, 2012).

The Paxton-Woodbridge-Canton association is a well-drained, very stony, fine sandy acidic loam found on hills and sloping uplands. Soils in the area of Bald Hill north have a low pH that changes the organic layer of the soil to fire-supporting peat; soils that have a more neutral pH are less prone to large fires. The summit of Bald Hill is covered with well-drained Paxton, which are typically found on the top of drumlins. Paxton soils have a high water holding capacity suitable for intensive agriculture or woodland production. Moderately drained Woodbridge soils can be found on the lower slopes of Bald Hill. Woodbridge soils are highly erodible with a seasonal high water table. Well-drained Canton soils occur at the base of gently sloping areas located north and west of Bald Hill. Canton soils are deep soils underlain by sandy till (USDA, 2012).

The limitations of the individual soil types within each association are useful in determining the types of recreational use and vegetation that each soil type can support. Some of the soil types in the forests have moderate to severe limitations for recreational development. Most of the soils in Harold Parker State Forest are suitable for forest production with pine species generally having better productivity than hardwood species. Present recreation facilities, such as the Lorraine Park Campground, headquarters facility, Stearns and Berry ponds day use areas, and the Sudden Pond group campsite, were properly located where there are few or no soil limitations.

There are several areas in the forests where the soils have become compacted and eroded due to heavy use. The Stearns Pond beach, Sudden Pond group area, Frye Pond beach, sides of Bald Hill and several trails have compacted or eroded soils.



Boxford State Forest

USGS Topographic Quadrangles

Boxford State Forest
Conservation Restriction

0 0.25 0.5 Mile

1:23,000

dcr Massachusetts

DCR GIS Mar-13

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

Water Resources

The forests lie within the northwestern area of the Ipswich River Watershed. This means that the general drainage pattern of the surface water in the forests is south to the Ipswich River.

Surface Water

There are three tributaries in or around the forests that flow south into the Ipswich River (see Water Resources maps). The Ipswich River flows roughly 45 miles from its headwaters in Burlington, through North Reading, Middleton and Boxford to its mouth in Ipswich. Fourteen communities draw their public water from the Ipswich River Watershed. Growing populations have diminished the recharge capacity of the river. Many communities now experience rationing of water during summer months. American Rivers, a national rivers protection organization, named the Ipswich River the third most endangered river in the country in 2003.

The Skug River flows from north to south through the Andover section of Harold Parker State Forest, eventually passing between the campground and Field Pond. The river is very small, slow moving and sandy-bottomed for most of its length through the forest. Emerson Brook flows south from Stearns and Sudden ponds into the Emerson Brook Reservoir located in Middleton. The Emerson Brook Reservoir provides public drinking water to Danvers and Middleton.

The west branch of Boston Brook flows south from a pond north of Route 114 in North Andover between several scattered forest parcels along Salem Road into Middleton. The east branch of Boston Brook flows south from Sharpners and Pout ponds, joining the west branch in Middleton.

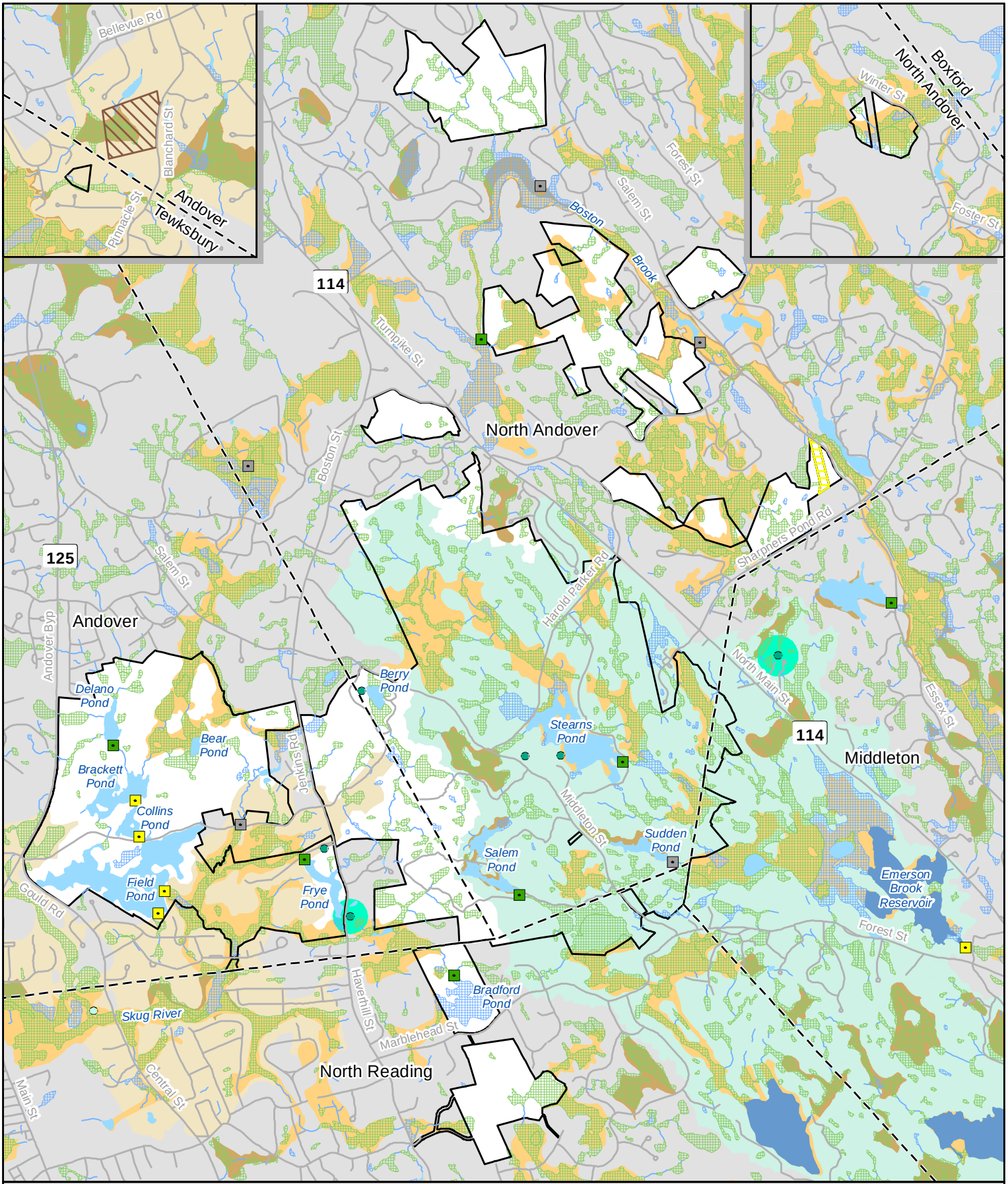
The forests have an abundance of ponds, streams and wetlands complementing the topography of low rolling hills. The Water Resources maps show the location of the ponds, wetlands and water courses in the forests. Nine of the twelve ponds are man-made or enhanced by man. Bear, Berry and Sharpners ponds are natural ponds. Table 2.1 provides information on the named ponds located within the forests. The man-made ponds located in Harold Parker State Forest were constructed by the CCC during the 1930s by damming brooks or red maple swamps. ABM Pond is a water-filled perimeter acquisition radar excavation, not a missile silo hole, created by the U.S. Army Corps of Engineers in 1969.

Table 2.1. Named Ponds and Their Recreational Uses

Pond Name	Size (acres)	Average Depth (feet)	Maximum Depth (feet)	Pond Origin	Recreational Uses		
					Swimming	Fishing	Boating
ABM	1.5	-	12	Man-made	NP	✓	NFA
Bear	2.5	-	-	Natural	NP	NFA	NFA
Berry	4.2	10	18	Natural	✓[3]	✓[6]	NFA
Brackett	18.6	-	-	Man-made	NP	✓	NFA
Bradford[1]	18.3	2	5	Man-made	NP	✓	NFA
Collins	6.8	-	-	Man-made	NP	✓	NFA
Delano	6.2	-	-	Man-made	NP	✓	NFA
Field	69.6	-	-	Man-made	NP	✓	✓
Frye	9	3	4	Man-made	✓[4]	✓	NFA
Salem	14.7	4	6	Man-made	NP	✓	NFA
Sharpners[2]	4.2	-	-	Natural	NP	NFA	NFA
Stearns	42.1	2.5	6	Man-made	NP[5]	✓	✓
Sudden	6.8	4	6	Man-made	NP	✓	NFA

1. The DEP considers all of Bradford Pond a deep marsh.
2. The DCR owns 70% of Sharpners Pond.
3. The public swimming area was closed in 2010, due to DCR staffing constraints.
4. An unguarded beach used by campers.
5. Beach was closed due to a lack of sanitary facilities and a leech infestation.
6. Stocked with trout by the Massachusetts Division of Fisheries and Wildlife.

✓ = FORMAL ACCESS available for recreational use.
NFA = Recreational use is permitted, but NO FORMAL ACCESS is available.
NP = Recreational use is NOT PERMITTED.



Community Groundwater Source
Non-Community Groundwater Source
Dam (Significant Hazard)
Dam (Low Hazard)
Dam (N/A)
Hydrologic Connection
Road
Town Boundary
Interim Wellhead Protection Area
DEP Approved Zone II

100-year Flood Zone
500-year Flood Zone
Deep Marsh
Shallow Marsh or Swamp
Open Water
Reservoir (with PWSID)
Outstanding Resource Waters
Harold Parker State Forest
Agricultural Preservation Restriction
Utility Easement

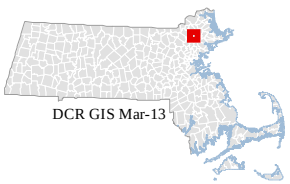
Harold Parker State Forest

Water Resources

0 0.5 1 Mile

1:36,500

dcr Massachusetts



Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

The dams for the Harold Parker State Forest ponds are made of poured concrete and earth with either concrete or stone spillways. The spillways have wooden gates to raise the water levels of the ponds. Until 1983, Field, Collins, Delano and Brackett ponds were managed as a fish hatchery for warm water fish (e.g., bass, pickerel, perch and bullhead) by the Massachusetts Division of Fisheries and Wildlife.

All of the forest ponds are open to fishing and boating (without internal combustion engines). Stearns, Berry and Frye ponds have swimming beaches. In 1991, the Stearns Pond swimming area was closed due to leeches in the water and a lack of sanitary facilities. Berry Pond was closed in 2009 due the lack of DCR staff to operate the day use area. The Frye Pond beach is open to campers staying in the campground, however it is not supervised by lifeguards.

Created in the 1930s by the CCC damming of a red maple swamp, Stearns Pond is a shallow 42-acre pond with numerous rocks and stumps. A 200-foot long swimming beach and picnic areas were constructed by the CCC along the west and south sides of the pond. A car top boat launch is located on the north shore adjacent to Harold Parker Road. The CCC bathhouse was destroyed by fire in 1985. The pond is fed by a combination of groundwater and surface water runoff from a 495-acre, largely forested watershed.

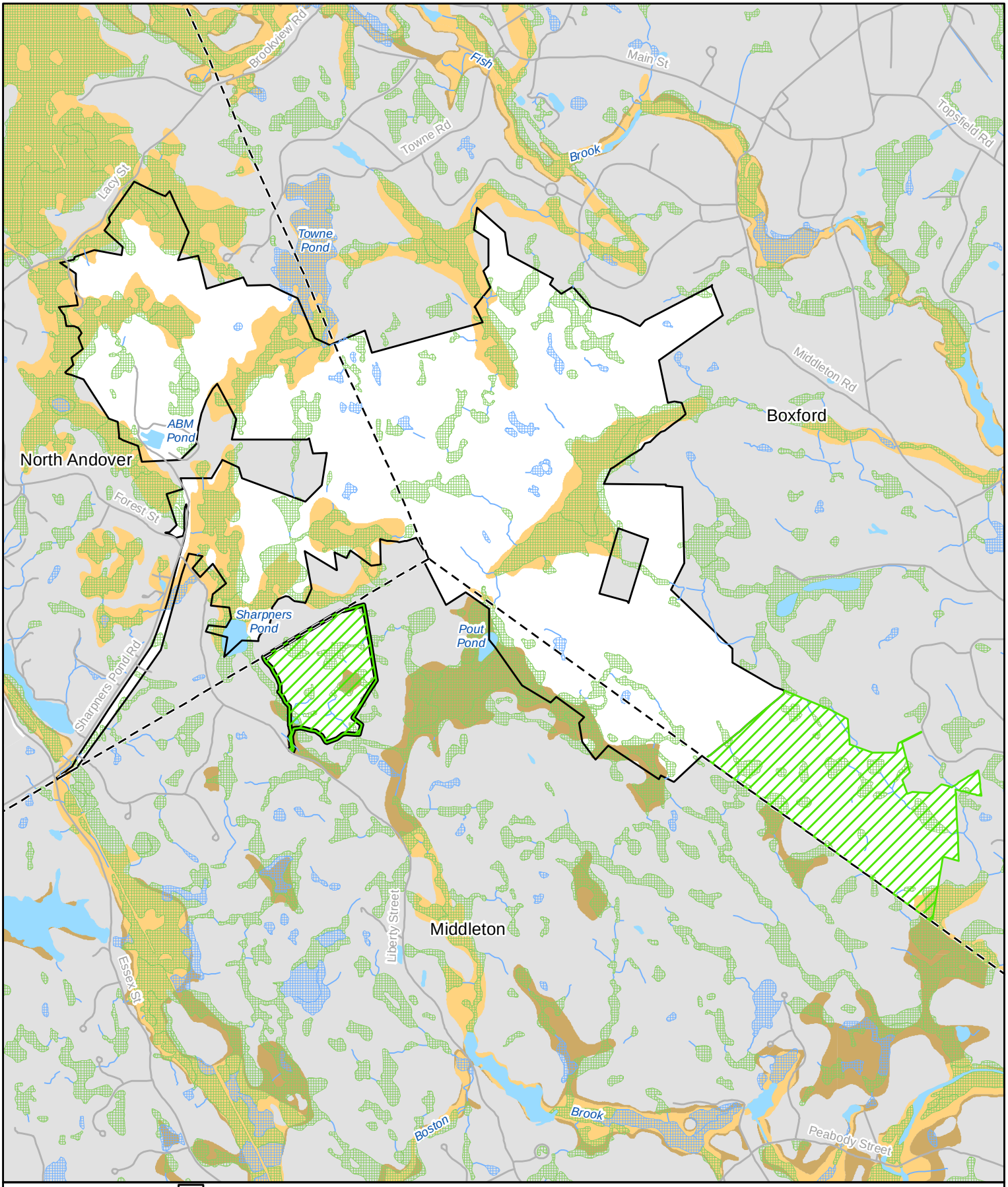
Water flows southeast out of Stearns Pond into Emerson Brook Reservoir. Sediments vary in depth from none in very rocky areas to less than one foot in other areas. High algae densities, iron, manganese and tannic acid reduce visibility in the pond to less than 2.5 feet. The majority of the pond is covered by floating leaf pondweed, fragrant water lily and bladderwort. These plants interfere with boating and fishing in the pond (Cortell and Associates Inc., 1989).

The DCR Lakes and Ponds Program has begun a five-year program of hydro-raking to maintain portions of Stearns Pond as open water to provide access for boating and fishing. A small portion of the pond will be targeted for hydro-raking each year (dependent on funding). Hydro-raking removes the plants, including root systems, from the water. A "no management" buffer area is proposed around the shoreline, islands and shallow coves. In 2012, a four-acre area is proposed in front of the Harold Parker Road public boat launch (Lycott Environmental Inc., 2012).

Berry Pond is a natural four-acre kettle hole pond that is stocked with trout (a cold water species) by the Massachusetts Division of Fisheries and Wildlife. It is filled by groundwater and has a single outlet. The pond's water level is influenced by seasonal and year-to-year fluctuations in the groundwater table. Sediments in Berry Pond are composed of a layer of organic material up to seven feet deep in the center of the pond. The pond is thermally stratified with the thermocline at approximately 10 feet. Oxygen concentrations decline with depth and generally anaerobic conditions are present at the bottom (Cortell and Associates Inc., 1989).

In 1996, the DEM completed improvements to the Berry Pond day use area to accommodate approximately 250 people. Site improvements included a restored 100-foot beach, new picnic area, restored CCC retaining walls and an ADA accessible perimeter trail. A new bathhouse, contact station and picnic pavilion were also built. A concession area was provided adjacent to the bathhouse to accommodate a vending vehicle.

Berry Pond contains sparse amounts of algae and native aquatic vegetation growth. The Berry Pond outlet has a low flow rate averaging 0.02 cubic feet per second during the peak swimming season (Cortell and Associates Inc., 1989). A dye test conducted at the beach indicated that the beach area has limited water circulation. The dye moved no more than 100 feet over a two hour period, indicating that flow augmentation should be considered for the swimming area (Cortell and Associates Inc., 1989).



Boxford State Forest

Water Resources

dcr Massachusetts

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

Berry Pond has a history of brown water color and low water clarity. The Secchi disk (an eight inch disk lowered into the water) transparency depth averages five feet. State regulations for swimming beaches require a minimum clarity of four feet. The pond is relatively acidic, with a pH ranging from 6.1 at the surface to 6.2 at a depth of 5.5 meters. Most healthy lakes maintain a pH between 6.5 and 8. The growth and health of many fish species is affected by long term exposure to water with a pH less than six. Total phosphorus levels were quite high, ranging from 0.10 mg/L at the surface to 0.16 mg/L at a depth of five meters. Total phosphorus levels above 0.02 mg/L generally indicate eutrophic conditions.

Frye Pond is long, narrow and very shallow. The pond covers nine acres and has an average depth of three feet with a maximum depth of four feet at the northern end of the pond. Frye Pond was created by the CCC by damming a stream and is surrounded on two sides by low hills. The bottom of Frye Pond contains up to three feet of organic mud with sand deposits under the mud. The area surrounding the pond includes 33 campsites, trails and a swimming beach. The swimming beach is composed of sand, which gets washed into the pond during spring runoff. Eroded areas along pond shores can serve as pathways for sediments to enter ponds. Phosphorus enrichment from these soil sediments can accelerate aquatic plant growth and degrade water quality.

The watershed draining into Frye Pond covers approximately one square mile. Two small unnamed tributaries flow into Frye Pond on the south and east sides of the pond. Frye Brook flows out of Frye Pond at the northern end of the pond where the dam is located. During dry summer months, there is no flow into the pond. The pond is not stocked for fishing, but past surveys by the Division of Fisheries and Wildlife have found largemouth bass, yellow perch, pumpkinseed, brown bullhead, redfin pickerel and American eel. Non-motorized boats and canoes are used on the pond.

Frye Pond is covered extensively with aquatic plants. Only a narrow strip in the middle of the pond has no plant cover. The plant growth is due to the shallowness of the pond, which allows light to reach the bottom sediments where many of the plants are rooted. Frye Pond water quality was sampled in 1983, 1986 and 1994. In general, dissolved oxygen has decreased since 1983, indicating that less oxygen is available in the water. However, the levels are still normal and acceptable. Pond water clarity was not measured because the shallowness of the pond allowed the Secchi disk to be seen even at the bottom of the deep hole.

Field Pond was created in 1934 when the CCC completed dams along the west branch of the Skug River. It is a shallow 70-acre pond with dense aquatic vegetation. It is a popular site for fishing, boating and hiking. A 2006 plant survey of the pond found a near continuous cover of invasive variable watermilfoil and Carolina fanwort. The pond was treated with herbicides in 2006 and 2008 to control these non-native invasive aquatic plants. Carolina fanwort appears to have been controlled by the herbicide treatments, but variable watermilfoil now covers most of the pond.

The watershed draining into Field Pond covers approximately 0.8 square miles, including sections of Route 125, Harold Parker Road and Gould Road. Water from the west branch of the Skug River, including Bear, Delano, Brackett and Collins ponds, flows into Field Pond. Field Pond empties into the Skug River from the dam located along the southeastern shore of the pond.

Herbicide treatments are an effective short-term management technique to control invasive aquatic plants, but it is not a permanent solution. After consulting with the Field Pond Watershed Association, the DCR decided to discontinue herbicide treatments until a long-term management plan is prepared for Field Pond.

The DCR monitors bacteria levels at its beaches in accordance with the minimum standards for bathing beaches contained in the State Sanitary Code (105 CMR 445.0). This code requires that water samples be obtained and analyzed at least once per week throughout the swimming season. During the swimming season, the DCR monitors enterococci bacteria at the forest's public beaches. When counts of these organisms exceed state standards, the swimming area is posted for elevated bacteria and swimming is discouraged. The area is still open for public use for sunbathing and picnicking.

Historically, bacteria levels at Harold Parker State Forest have been low. However, bacteria levels at Frye Pond exceeded state standards twice in 2009, three times in 2010, and once in 2011. Most of the

failures occurred after rain events associated with significant stormwater runoff into the ponds. During long spans between rain events there can be a build-up of bacteria on the roadways, parking areas and upstream development that drain towards the pond, which results in higher counts after major rain events.

The DCR has surveyed water quality at Stearns, Berry and Frye ponds (see Table 2.2). As indicated in the table below, nutrient levels were high in all three ponds with Berry Pond having the lowest phosphorus and nitrogen levels. Low nutrient levels indicate healthy ponds that are not likely to support prolific aquatic plant or algae growth. High dissolved oxygen levels support native fish populations, invertebrates and microorganisms that are dependent on high oxygen levels. The introduction of road salts into the forest ponds is a potential problem for ponds located along roadways, such as Field and Stearns ponds.

The UMass Acid Rain Monitoring Project has monitored the pH and alkalinity at Bear, Sharpners and Stearns ponds. From 1987 to 1992, the pH of Bear Pond rose from 6 to 6.3 (reflecting decreased acidity), while alkalinity increased slightly from 2.2 to 2.8 mg/L of $CaCO_3$, which increases the acid neutralizing capacity of the pond. From 1986 to 2002, the pH of Stearns Pond decreased slightly from 6.2 to 6.1 (reflecting increased acidity), while alkalinity increased from 4.9 to 5.5. From 1984 to 2001, the pH of Sharpners Pond decreased from 6.95 to 6.65, while alkalinity increased from 17.4 to 23 mg/L of $CaCO_3$.

Table 2.2. Water Quality Survey Results

	Stearns Pond	Berry Pond	Frye Pond	Manage-ment Target
Sample Year	1986	1995	1994	
Total Phosphorus (mg/L)	-	0.014*	0.044*	< 0.02
Ammonia Nitrogen (mg/L)	0.4	BDL	0.05*	< 0.3
Dissolved Oxygen (mg/L)	-	7.2-0.3**	6.8*	> 5
pH	6.05*	6.15*	6.0*	> 6
Total Alkalinity (mg/L)	12.6	5.9*	6.3*	> 20

Source: Cortell and Associates Inc. and DCR Lakes and Ponds Program. BDL = Below Detection Limits; * Average of multiple samples; ** 7.2 at surface, dropping to 0.3 in the bottom of the pond.

When acidic air pollutants fall to the ground, they lower the pH levels of ponds, rivers and soils, leading to a range of environmental problems. Acid deposition can make ponds and streams so acidic that survival becomes difficult for many species of fish and invertebrates. The results of the Acid Rain Monitoring Project and limited DCR testing indicate that the forest's ponds have an impaired ability to neutralize acid rain deposits. The ponds in the forests are naturally acidic due to acidic soils and the accumulation of organic matter. The inability to buffer increased acidity from acid rain with alkalinity (e.g., $CaCO_3$ from watershed soils) will cause cumulative adverse effects to the aquatic ecosystem.

Groundwater

The location of groundwater aquifers and yield to wells are related to the nature of the deposits that underlie the forests. Bedrock is a source of small, but generally reliable supplies of groundwater. Glacial till deposits (composed primarily of silt and clay) yield small amounts of water due to their low permeability. Larger quantities of groundwater may be obtained from glacial outwash deposits composed primarily of sand and gravel.

Six wells have been drilled in Harold Parker State Forest (see Table 2.3). The Field, Frye, Berry, Stearns and Sudden pond wells are not currently utilized. Municipal water is used at the campground

and Berry Pond day use area. Generally, the groundwater quality in this area is fair. Relatively high concentrations of iron, manganese and radioactive particles are common.

Table 2.3. Harold Parker State Forest Wells

Location	Depth (feet)	Output (gallons/minute)
Field Pond	298	24
Frye Pond	110	21
Headquarters	310	10
Stearns Pond	265	2
Sudden Pond	-	-
Berry Pond	425	10

Approximately four abandoned dug wells can be found in Boxford State Forest. These wells have been capped for the safety of visitors and to protect potential archaeological features.

Vernal Pools

Vernal pools are shallow depressions that temporarily fill with water during the spring and/or fall, and typically dry out during the late summer. Vernal pool habitat is essential to the life cycles of certain frog, salamander, fairy shrimp, snail and isopod species. These species have evolved breeding strategies that take advantage of the fishless, aquatic environment provided by vernal pools. Vernal pools often have little or no vegetation in them, but they are surrounded by trees, shrubs and herbaceous vegetation (Swain and Kearsley, 2001).

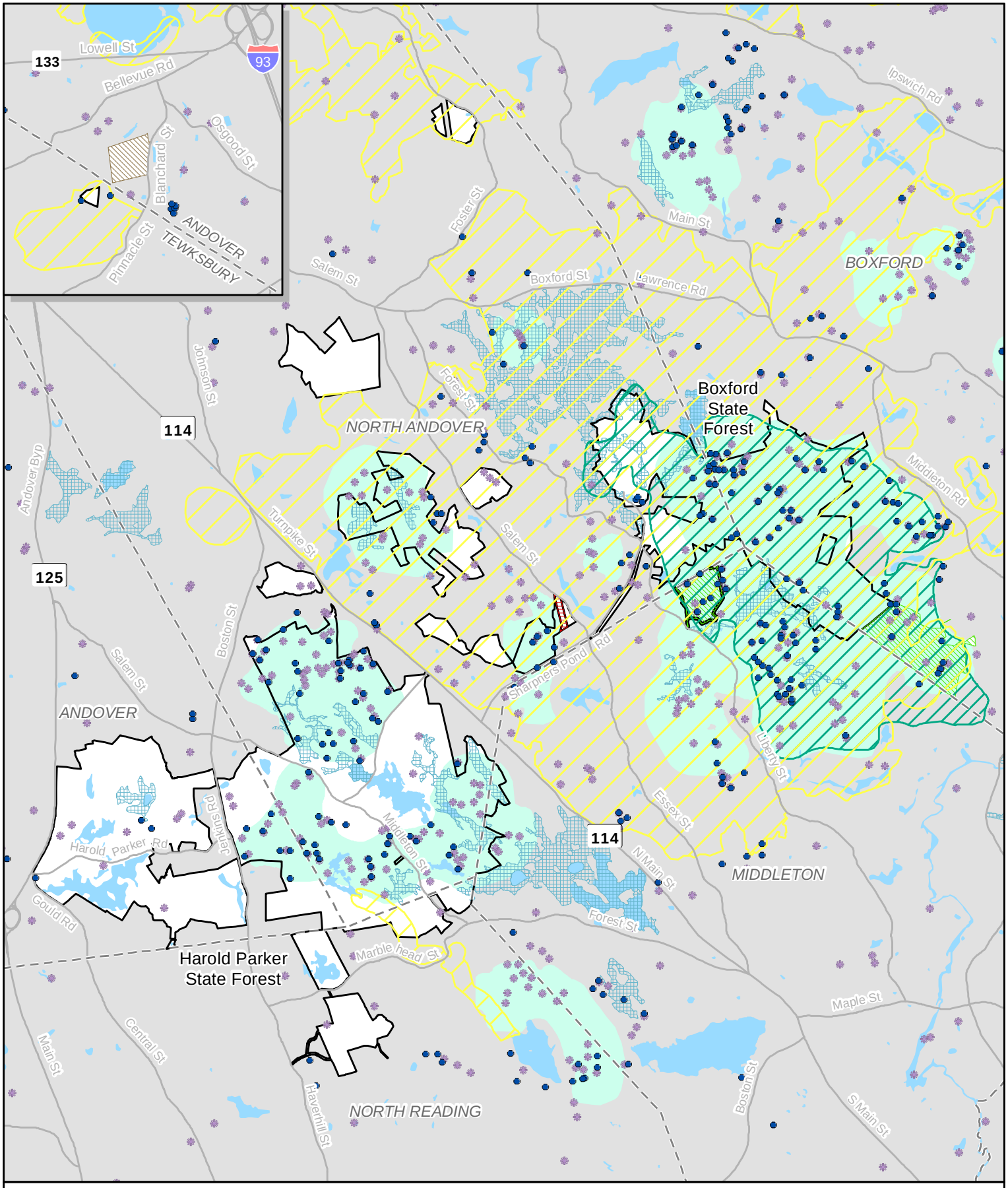
There are 105 NHESP certified vernal pools located within the forests, including 56 in Harold Parker State Forest and 49 in Boxford State Forest (see Priority Natural Resources map). Since the locations of the certified vernal pools were reported by multiple sources, many of the certified vernal pool locations may be 100 to 300 feet off. In addition, the NHESP has also conducted a survey of potential vernal pools in Massachusetts using color infrared aerial photography. This survey identified additional depressions within the forests that may also be vernal pools. Field surveys are needed to confirm the certified status of these potential vernal pools and the precise location of NHESP certified vernal pools.

Because vernal pool habitats are so dynamic over time, populations of vernal pool species have a greater likelihood of persistence in settings that allow individuals to move among multiple breeding pools. The persistence of populations of vernal pool-breeding species, such as the blue-spotted salamander, relies not only on the presence of the vernal pool itself, but also on adjacent upland forest habitat for foraging, overwintering and successful migration of individuals among pools. Individuals breeding at different pools interact over time and maintain the overall population as breeding success shifts among vernal pools with changing environmental conditions.

For this reason, the creators of BioMap2 used a GIS model to identify the top five percent of the most interconnected clusters of vernal pools statewide (DFG and TNC, 2010). Vernal pool cores were selected using an analysis that combined the locations of vernal pools in proximity to one another, and the quality and connectivity of the surrounding landscape and habitat between the pools (Compton et al., 2007).

The BioMap2 analysis identified four vernal pool clusters covering 1,254 acres in Harold Parker State Forest associated with Salem and Sudden ponds (see Priority Natural Resources map). The BioMap2 analysis also identified a large vernal pool cluster containing 948 acres in Boxford State Forest. Targeting clusters of vernal pools for additional protection measures, rather than individual pools, will maximize the resistance and resilience of vernal pool habitats and their resident species in the context of climate change.

Two state-listed species documented in the forests, the blue-spotted salamander and intricate fairy shrimp, depend on the use of vernal pools. Blue-spotted salamanders mate in early spring at vernal pools when adults migrate from woodland burrows to their natal pool. Fairy shrimp are small crustaceans that only live in vernal pools. In addition, the state-listed Blanding's turtle also utilizes vernal pools located in the forests. Blanding's turtles will travel considerable distances to reach vernal pools where they feed on amphibian egg masses, larval amphibians, crustaceans and other organisms throughout the spring (Kenney and Burne, 2009).



Certified Vernal Pool
Potential Vernal Pool
Priority Habitats of Rare Species
BioMap2 Forest Core
BioMap2 Vernal Pool Core
BioMap2 Wetland Core
Least Disturbed Wetlands
Road
Town Boundary
Open Water
DCR Property
Agricultural Preservation Restriction
Conservation Restriction
Utility Easement

Harold Parker Planning Unit

Priority Natural Resources

0 0.5 1 Mile

1:55,000

dcr Massachusetts

DCR GIS Mar-13

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

Vernal pools usually do not require ongoing management unless they are threatened by sedimentation from nearby eroding roads or trails, introduction of nutrients and chemicals into pools from runoff or direct contact, changing in shading of pools, non-native invasive plant species, direct disturbance by humans and dogs, and alteration of the natural hydrological regime (e.g., ditching, impoundments and culverts). Vernal pools do require buffering from forestry practices, building projects and recreational uses.

Wetland Communities

Marshes, swamps and other vegetated wetlands all play vital roles in the protection of public and private water supplies, control of sedimentation and erosion, prevention of pollution, protection of fisheries, provision of wildlife habitat and flood prevention. Using aerial photography, the Massachusetts Department of Environmental Protection's Wetland Conservancy Program identified vegetated wetlands within the forests (see Water Resources maps). As indicated by the following table, there are approximately 859 acres of vegetated wetlands within the forests.

Table 2.4. Vegetated Wetlands

Wetland Community	Harold Parker (acres)	Boxford (acres)
Deep Marsh	28.9	3.2
Shallow Marsh	30	8.2
Shrub Swamp	63.8	5.5
Wooded Swamp	478.8	240.6
Forest Total	*601.5*	*257.5*

Depressions in the forests collect moisture and decayed plant material forming poorly-drained "muck" soils that are characteristically found in wetlands. Several different types of wetlands occur throughout the forests. These include:

Deep marsh plant communities are open areas with standing water depths of between six inches and three feet or more during the growing season. Herbaceous emergent, floating, floating-leaved and submerged vegetation compose this wetland community. Typical deep marsh vegetation includes cattails, bulrushes, pickerelweed, purple loosestrife, giant bur-reed, common reed, wild rice, pondweeds and water lilies. These open areas provide food and resting areas for migratory birds. The largest deep marsh in the planning unit is located at the southern end of Harold Parker State Forest and is named Bradford Pond.

Shallow marsh plant communities have soils that are saturated or inundated by standing water up to six inches in depth throughout most of the growing season. Herbaceous emergent vegetation such as cattails, bulrushes, arrowheads and pond sedges characterize this community. Floating and floating-leaved vegetation are typically reduced and submerged vegetation is absent.

Shrub swamps are shrub dominated wetlands occurring on soils that are seasonally or temporarily flooded. Shrub swamps occur in depressions, at pond margins or along river banks. Typical swamp shrubs include: highbush blueberry, buttonbush, alder, willow, dogwood, viburnum, black-berried elder, sweet gale, leatherleaf, steeplebush, winterberry, shadbush and purple chokeberry.

Wooded swamps are forests intermittently or permanently covered with water that have a tree canopy. Trees that grow in these swamps are well adapted to soggy conditions. These swamps are located throughout the forests. The highly organic soils of swamps form a thick, black, nutrient-rich environment for the growth of water-tolerant trees such as red maple, swamp white oak and black tupelo. Wooded swamps frequently support highly diverse vegetation because of the many layers of vegetation present: trees, shrubs, saplings and herbaceous plants. Many upland animals depend on the abundance of food found in lowland swamps.

BioMap2 includes a statewide assessment of the most intact wetlands in Massachusetts (DFG and TNC, 2010). This analysis identified the least disturbed wetlands, wetland cores, those with the most intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support the broadest spectrum of wetland biodiversity in the context of climate change. The BioMap2 analysis identified eight wetland cores in the forests containing 256 acres (see Priority Natural Resources map).

Threats to wetlands in the forests include salt and sedimentation flowing into the wetlands, establishment of invasive species, alteration of wetlands by recreational activities, animal waste entering water supplies and changes in hydrology due to watershed changes outside the state forests.

Wetlands Protection Act Regulations (310 CMR 10.00) require that no one shall remove, fill, dredge or alter any wetland or riparian resource areas or buffer zones listed in these regulations without first filing a Notice of Intent (NOI) with the local Conservation Commission and obtaining an Order of Conditions under which the work will be performed to protect the specific interests of the Wetlands Protection Act.

Atlantic White Cedar Swamps

Five patches of inland Atlantic white cedar (AWC) swamp, totaling approximately 20 acres, have been documented in the western portion of Boxford State Forest. Ten additional patches of AWC swamp have been identified immediately north and west of Boxford State Forest. The NHESP considers inland AWC swamps to be imperiled (ranked S2) and are Priority Natural Communities for protection due to their distinct vegetation and limited distribution (NHESP, 2007*c*).

Boxford State Forest Atlantic White Cedar Swamp, P. Swain

Inland AWC swamps are forested wetland communities with a dense canopy dominated by Atlantic white cedar, a deciduous shrub layer, and an herb layer dominated by ferns and mosses. In Boxford State Forest, there are dense patches of maturing Atlantic white cedar (trees 6-12 inches in diameter forming the canopy) with red maple and yellow birch co-dominant in the canopy. The shrub layer includes sweet pepperbush and highbush blueberry (NHESP, 2007*c*).

Atlantic white cedar is the defining species of AWC swamps. AWC is an evergreen conifer tree in the cypress family with short branches and scale-like leaves. The trees grow up to 80 feet, have straight trunks, cinnamon-brown to gray peeling bark and a twisting grain.

Unique to AWC swamps are the larvae of one butterfly, Hessel's hairstreak, which feed exclusively on Atlantic white cedar. This small emerald-green butterfly lives high in the cedar canopy and is difficult to detect. The presence of Hessel's hairstreak, a state-listed rare butterfly species, has been documented within Boxford State Forest.

Atlantic white cedar has been cut extensively for posts and shingles for over three centuries. In a statewide survey funded by the NHESP in 1990, no "virgin" or uncut stands were found in Massachusetts (Motzkin, 1991). Selective cutting is detrimental to the persistence of AWC swamps, because hardwoods, such as red maple, tend to outcompete AWC unless sufficient sunlight can reach the forest floor. Atlantic white cedar regenerates well following disturbance events such as hurricanes and fires.

The greatest threats to AWC swamps are land clearing for agricultural, commercial or residential development, and interference with the hydrology. AWC swamps require a natural cycle of wet and dry periods for their survival and reproduction. Any alterations to the natural hydrology of this community threaten its persistence. Alterations in nearby uplands can alter water levels and flow in these swamps, affecting regeneration and survival of Atlantic white cedar trees (NHESP, 2007*c*).

The Wetlands Protection Act regulates activities within and adjacent to AWC swamps. Project proposals within 100 feet of wetland boundaries require review and official permission by the local Conservation Commission.

Vegetation

The plant communities that are present in the forests are a result of climate, soil, topography and natural and man-induced disturbances that have interacted over thousands of years following the last glacial period. These plant communities continue to change in a relatively predictable manner in their species composition and structure. Plant succession, or gradual changes in the composition of plant communities, proceeds from pioneer plant communities, which colonize bare rock or soil, through intermediate stages and eventually to a climax forest.

Natural and man-caused disturbances disrupt and alter plant succession. The forest stands in the subject properties are the result of past disturbances and are best understood in terms of the land use history and patterns of forest succession after disturbances. As previously described, the forests were originally cleared for agriculture and, after the farmland was abandoned, the landscape recovered with the growth of even aged forest stands. Pioneer hardwoods (e.g., grey birch, white birch, aspen and cherry) invaded the abandoned fields and white pine became established in the partial shade of these short-lived hardwoods. During the box boom era of the late 1800s and early 1900s, most white pine that reached sawlog size was harvested.

Also at this time, the occurrence of fires was both common and widespread. After these disturbances, even aged stands of predominantly hardwood interspersed with pine became established with mixed low quality oaks dominating upland sites and red maple dominating lower, wetter sites. More recent disturbances since state ownership have affected plant succession to a lesser and more localized scale. These disturbances include storm damage (e.g., wind, snow, ice and lightning), severe gypsy moth defoliation and other insects and disease problems, small forest fires, monoculture plantings of pines, and tree harvests along with other forestry management activities. Each forest stand is representative of a successional stage, which indicates the present plant community dynamics and future forest structure. Plant succession without disturbance eventually leads to a climax forest dominated by shade tolerant species. Changing climatic conditions, such as gradual global warning, will have long-term effects on forest composition.

Stands of white pine that appear throughout the forests occur commonly in old pastures where farm animals once grazed. Because of the distastefulness of its seedlings to feeding livestock, it gained a competitive advantage over grasses and most hardwood seedlings. On the top of Bald Hill, there is an old apple orchard and field. This field was both cultivated and used as pasture. Garden shrubs, groundcover and flowers grow near an old farmstead located on the southwestern side of Bald Hill.

Forest Types

Because of the diversity of landforms, soil types and microclimates, a variety of forest types occur in the subject properties. A 2003 forest type analysis identified four major forest types including: white-red pine, oak, swamp hardwoods and birch-maple (see Table 2.5).

Table 2.5. Forest Types

Forest Type	Harold Parker (acres)	Boxford (acres)
White-Red Pine	1,279	327
Oak	1,021	435
Swamp Hardwoods	84	24
Birch-Red Maple	15	15
Forest Total	*2,399*	*801*

The present forest types and their arrangement in even aged stands of approximately 50-80 years old is a reflection of the past treatment and plant succession which has occurred in the forests. The history of the forest management is discussed in the following section.

White-Red Pine Forest. This forest type is dominated by eastern white or red pines, although scattered northern red, white and black oaks are typically encountered. Along the north side of Bald Hill there are some outstanding natural stands of eastern white pine. Many of these trees have reached substantial size. These stands are interspersed with areas of mixed white pine and hemlock. These eastern white pine forests are similar to a later successional stage that existed before European settlement of the area.

In 1917, the State Forest Commission began a reforestation program in Harold Parker State Forest. Between 1917 and 1928, the state planted over 323,000 red, white, Austrian and scotch pine trees. With the help of state emergency unemployment crews and CCC crews, approximately 105,000 white and red pine, and spruce trees were planted in the forest between 1931 and 1938. The pine plantations are located on sites scattered throughout Harold Parker State Forest.

Oak Forest. This forest type is dominated by a mix of oak species composed of northern red, white, black and scarlet oak in association with white and red pine. The oak species dominate the canopy. Acorns provide an abundant food source for small mammals. The understory contains a mix of saplings

from the canopy species, sassafras and hop hornbeam. Shrubs in the understory include blueberries and huckleberry. The herbaceous layer is usually scattered and composed of wintergreen, spotted pipsissewa, sarsaparilla, ferns and poverty grass.

Swamp Hardwood Forest. Hardwood swamps are forests intermittently or permanently covered with water that have a tree canopy dominated by hardwoods. Trees that grow in these swamps, such as red maple, silver maple, swamp white oak, black and green ash, are well adapted to soggy conditions. The shrub layer is usually dense with sweet pepperbush, swamp azalea, high bush blueberry and winterberry. Ferns usually dominate the herbaceous layer.

Birch-Red Maple. Birch-red maple forests are pioneer forests found in abandoned fields. This forest type is dominated by a combination of yellow, grey, black or white birch and red maple. The shrub layer is dominated by tree species that are also found in the canopy.

Forest-Interior Habitat. Forest-interior habitat, identified in BioMap2 as forest core, is widely recognized as critically important for species sensitive to forest fragmentation. Forest-interior habitats are the areas least impacted by roads, private development and other fragmenting features. Many bird species that breed in Massachusetts are sensitive to forest fragmentation, including ovenbirds, scarlet tanagers and woodland warblers. BioMap2 identified 163 forest cores, representing just over 10% of Massachusetts' forests, that provide the highest quality forest-interior habitat across the state. BioMap2 identified most of Boxford State Forest as forest core habitat that is important for the long-term persistence of forest-interior species and ecological processes (see Priority Natural Resources map). Boxford State Forest and adjacent conservation lands harbor one of the richest forest communities remaining in eastern Massachusetts.

Rare Plant Species

The Massachusetts Endangered Species Act (MESA) protects rare plant and animal species listed as Endangered, Threatened or of Special Concern in the Massachusetts Natural Heritage and Endangered Species Program (NHESP) database. The NHESP has documented the presence of three state-listed rare plant species within Harold Parker State Forest. There have been no reports of federally-listed plant species in the forests. Any disruption or disturbance of a state-listed species or its habitat, as determined by the NHESP and defined in the MESA regulations, requires a permit.

A Rare Species Information Request Form must be submitted to the NHESP for all projects proposed in Priority Habitat for rare species (see Priority Natural Resources map). The NHESP will determine the rare species present and if a permit is required for the proposed activities.

Invasive Plant Species

Plants introduced into a new area often leave behind their natural control agents. This may give them a distinct advantage over native species in their new habitat. Most introduced species from gardens, meadows and agriculture are not harmful to native communities (Weatherbee et al., 1998). However, a few species have become serious threats to native plant communities. Within Harold Parker State Forest recent invaders include Oriental bittersweet, Norway maple, glossy buckthorn, European barberry and garlic mustard.

Boxford State Forest is generally free of invasive plants. Multiflora rose is established along a trail on the south side of Bald Hill. Louise's swallow-wort has also been observed on the west side of Bald Hill. A few glossy buckthorn plants are located along forest roads and some hilltops contain small patches of common barberry. Early detection and control before invasive species become well established is essential to control.

There are preferred methods of removal for each plant species that depend on their particular biology. If an invasive species issue arises in the forests, the problem should be evaluated by a DCR ecologist in consultation with the NHESP to determine the best method of removal. Removal of the target species by hand (i.e., pulling or cutting) is usually the least destructive method to the surrounding habitat. This method can be employed if the invasion is confined to a relatively small area. However, extensive areas of invasive species growth can overwhelm a natural community eliminating the hand removal option. In these cases, either employing biological agents, machinery or herbicides may be effective.

Forest Management

The plant communities present on the Harold Parker and Boxford state forests are a result of climate, soil, topography and natural and man-induced disturbances that have interacted over a long period of time.

Ecological Succession

These plant communities continue to change in a relatively predictable manner in their species composition and structure. Plant succession, or orderly replacement of one plant community over another through time, proceeds from pioneer plant communities, which colonize bare rock or soil, through intermediate stages of grass and shrub development, eventually to a relatively stable forest condition. However, all plant communities, including forests, are dynamic and are constantly undergoing change over time.

Natural and human-caused disturbances disrupt and alter plant succession. The forest stands at Harold Parker and Boxford state forests are the result of past disturbances. They are best understood in terms of the land use history and patterns of forest succession after disturbances. Most of the forests were originally cleared for agriculture and after their abandonment reverted to an even aged forest. Pioneer hardwoods (e.g., grey birch, white birch, aspen and cherry) populated these abandoned fields with white pine, becoming established in the partial shade of these short-lived hardwoods. When the pine became mature, it was harvested indiscriminately. Fire was common and widespread. Even aged stands of predominately hardwood, with some white pine mixed in, became established with mixed low quality oaks dominating the upland sites and red maple dominating the wetter sites.

More recent disturbances since state ownership have affected plant succession to a lesser and more localized scale. These disturbances include storm damage (e.g., wind, snow, ice and lightning), severe gypsy moth defoliation and other insect and disease problems, increased deer grazing, beaver activities, small forest fires, monoculture planting of pines and other forestry activities. Each forest stand is representative of a successional stage, which indicates the present community dynamics and future structure. Plant succession without disturbances would eventually lead to a stable forest community of mostly shade tolerant species sometimes referred to as a climax forest.

Silviculture practices can be used in the forest to guide plant succession, making possible the establishment and growth of long-lived species compatible to the site, while increasing the biodiversity. The density and composition of trees in both the overstory and understory can be controlled or manipulated through thinnings, improvement cuttings, or other management activities. It is possible to alter and enhance the wildlife, water resource, recreation, timber, ecological and aesthetic values of the forest resource by selectively removing trees of certain species to manipulate the forest structure and age. The information collected through remote sensing and stand analysis is vital in the understanding of the successional stages of the forest and the silvicultural treatments recommended to meet multiple use objectives.

History of Forest Management

Most of Harold Parker and Boxford state forests, as in much of southern New England, was cleared and maintained as farmland until the mid 1800s, when it was abandoned for richer lands to the west. Trees colonized these abandon lands and by the late 1800s and early 1900s indiscriminate harvesting occurred in much of the second growth forests. Harvesting at this time was driven by the large demand for wood in the box industry, as cardboard had not yet come into widespread use. Fire was widespread during this period, commonly started from the wood or coal burning trains.

The 1920s also saw a building boom that further increased the demand for timber. Further, in the early 1900s chestnut blight killed most of the chestnut trees, gypsy moth tree mortality became widespread in the area and a new disease, white pine blister rust, threatened to destroy the native white pine resource. It was during this period that most of Harold Parker State Forest (1915-1938) and Boxford State Forest (1931, 1938) were acquired under a statute that authorized the State Forest Commission to purchase “waste lands” at maximum price of $5.00 an acre. The State Forester was given control to “proceed to reforest and develop such lands….”

Prior to the Civilian Conservation Corps (CCC), there was only a small crew at Harold Parker State Forest and only about 25 acres were planted. In the

1930s, two CCC camps operated out of Harold Parker State Forest and allowed for expanded forest management. Access roads were built or improved for forestry purposes and fire protection, about a half million white and red pine trees were planted on 500 acres and timber stand improvement work was done on over 1,500 acres. The last CCC camp at Harold Parker State Forest disbanded in 1941. The small forest crew (two to four year-round personnel) continued forest management.

In the 1940s, fuelwood was cut in the more accessible areas of the forest as part of the Cut-a-Cord Program to encourage residents to use wood, instead of fuel oil, for heat during World War II and to remove undesirable trees. Fossil fuels were inexpensive then, keeping the demand low in the program. Small amounts of commercial saw timber were harvested in this period because the stands were young. In the 1960s, an expanding suburban population with more leisure time began to create a stronger emphasis on outdoor recreation and resulted in less emphasis on forestry work in forests such as Harold Parker and Boxford state forests.

The oil embargo of 1973 resulted in an increased demand for firewood or fuelwood as a source of energy. The Cut-a-Cord Program was reinstated that fall. Residents were allowed a daily permit to cut hardwood trees as fuelwood for home use. The program was used by Foresters to release potential crop trees; a practice that had not been done since the CCC period. Thousands of cords of low quality hardwoods were cut in Harold Parker State Forest and most accessible roadsides were treated prior to the end of the Cut-a-Cord Program in 1981.

The Home Fuelwood Program began in 1979. This program allowed residents who heated with wood to harvest designated blocks of a marked forest area. Contracts were awarded by competitive bid. The Home Fuelwood Program allowed participants to remove marked trees during the fall and granted extensions for the cutting into the winter, as compared to the one day Cut-a-Cord Program. As the only woodlands in Essex County, it is unlikely that the area designated as woodlands in Harold Parker State Forest will be able to meet the high level of past demand in the region for home fuelwood. The Home Fuelwood Program allowed forest management to occur in less accessible areas of the forests and more control over harvesting.

The Harold Parker and Boxford forests had grown and matured to the point that commercial timber harvests began in the 1960s. Between 1980 and 2010, approximately 230 acres of Boxford State Forest and approximately 525 acres of Harold Parker State Forest were treated with commercial timber sales. The objectives of the commercial forest management were to increase the overall forest diversity by regenerating the maturing forest and to enhance the vigor and health of the stands though thinning. Forestry activity, during this most recent active management period within state forests and parks, was intended to provide marketable forest products while enhancing the widest possible variety of native wildlife species. Protection and enhancement of water resources and improved recreational opportunities were also part of the goals of active forest management during this period.

Forest Inventory Systems

Three inventory systems are presently used to gather data on forest resources on lands under the jurisdiction of the DCR. These are the Continuous Forest Inventory (CFI) system, the remote sensing land cover classification system and the stand exam system.

The CFI system was developed in the late 1950s by the Division of Forests and Parks, with the assistance of the U.S. Forest Service, to provide information about the condition of forest volumes, growth, mortality, etc., within standard limits of error for large units of land.

The CFI system uses a series of systematically located 1/5 acre permanent plots, which are located on a 1/2 mile grid system. There are five CFI plots established in Boxford State Forest. These plots were re-inventoried in 1964, 1969, 1979, 2000 and 2011. The CFI plots were originally scheduled to be re-inventoried every five years, but were changed to every 10 years. In 2011, an annual system of measurement was started where only a portion of the plots which be re-measured and completed on a 10 year cycle. Re-measurement is dependent upon available funds and personnel.

At each CFI plot, tree information including diameter, height, forest product, vigor, pathological problems and quality is recorded. In addition, plot information such as forest type, size, stocking, previous disturbance, site, silviculture, operability

and reproduction is recorded. Historically, data from the CFI system has been used to plan allowable harvest guidelines for each forest management district. The CFI system is useful not only for planning purposes, but as a long range source of data for research, such as monitoring forest growth, health, determining effects of insects and disease, and human-caused problems such as pollution or climate change.

This system is useful in planning forest management and assessing forest conditions on a large scale, but is statistically inadequate to deal with small, individual tracts of land.

The remote sensing land cover classification system is GIS-based. It is designed to map out the land cover using photo interpretation of the state forest lands. Major and sub types of the forest or land cover, size class, stocking and past disturbances were delineated, within certain degrees of minimum accuracy. Being GIS-based, this information with other GIS data is very useful in general planning, but specific site actions are field checked because of limits of accuracy.

The stand exam system is a more intensive, detailed and site specific inventory than the CFI or land cover classification systems. It is used, primarily, to acquire information that is specific to each forest stand in order for land managers to prescribe site specific management objectives and goals, and make silvicultural treatment recommendations.

Foresters use the land cover classification sub type stand mapping as preliminary typing and do field sampling (stand exam) using the U.S. Forest Service "NED-2" software on handheld data collectors. For each forest stand type, sampling locations are randomly selected on a grid. Overstory tree plots, understory plots, ground cover plots and downed woody debris transects are used to collect data. The number of sampling plots varies depending on the acreage and diversity of the stand. Some examples of the types of data collected in an overstory plot would be tree species, diameter at breast height (DBH), height, crown class (dominant, co-dominant, intermediate or suppressed) and crown condition. Understory plot data would include species, DBH, origin of plant, percent cover or stem count.

Ground cover plot data includes shrub layer height, shrub layer types, mast types, species, percent cover or stem count. Information collected for a downed woody debris transect include what downed wood crosses the transect that is three inches or greater in diameter and three feet or longer in length, the specie, and if it is in a hard or soft condition. This data can be processed with the NED-2 software program to calculate plant species diversity, forest types or volumes. NED-2 can generate or compare management plans or goals concerning visual qualities, wildlife, water, wood production and ecological values. Vegetative tables can be produced for things such as fall color, tree size or stand condition. The program can also be used to predict future growth or conditions. This data can be incorporated into various databases and geographic information systems, and can be used to make computer generated stand visualizations or images. This field work can further refine the stand delineations of the land cover classification mapping.

From this information, and based on the guidelines for specific landscape zones in which the stand is located, site specific management recommendations and goals can be set.

Wildlife

The topography of the forests, featuring rolling hills with uplands, wetlands, swamps, streams and ponds, provide a diverse habitat for a wide variety of wildlife species. The ponds that occur within the forests provide a habitat for several species of fish and crustaceans. In addition, they provide stopovers for many migrating waterfowl. Deer and rabbit browse the sweet red maple seedlings on Bald Hill. Grouse, woodcock, flickers, prairie and blue-winged warblers, rose-breasted grosbeaks, fishers, deer, opossum and fox feed in low scrub transitional areas at the forest edge.

The red maple swamps harbor nesting red-shouldered hawks and barred owls. A stand of mixed pine on the northern side of Bald Hill was the only known northern goshawk nesting area in Essex County, but they have not been sighted nesting in the area for several years. Numerous brooks throughout the forests are waterways for beaver, mink and otter.

Conifer trees provide both food and cover for a variety of mammals. Conifers provide an abundant food source through their seeds, as well as critical

winter cover. Oak and hickory trees are also common through much of the forests. Acorns and hickory nuts are an important food source for numerous species including gray squirrel, southern flying squirrel, white-footed mouse, eastern chipmunk and white-tailed deer.

Since many mammals tend to be nocturnal (mostly active at night) or crepuscular (mostly active at dawn and dusk), they are not readily visible to the casual observer. Mammal species that are most regularly observed in the forests include red squirrel, gray squirrel, woodchuck, eastern chipmunk, white-tailed deer and coyote. These mammals are often observed because they are active during the day. However, species such as mink, fishers, moose, gray fox and red fox are more secretive and less likely to be encountered.

Numerous vernal pools, ponds and wetlands provide breeding and foraging habitat for both frogs and toads. Species that are known to currently inhabit the ponds within the forest include the green frog, bullfrog and pickerel frog. The forests also provide suitable habitat for Fowler's toad, eastern American toad, wood frog, gray tree frog and northern spring peeper. These species require standing water for breeding, but spend the majority of their lives in a terrestrial setting.

The ponds and wetlands attract a myriad of bird populations ranging from the great blue heron and Canadian goose to the black-capped chickadee. Over 200 species of birds are found in or in the vicinity of the forests including raptors, game birds, waterfowl and songbirds (see Appendix H). Many birds use the forests as breeding habitat or a migratory stopover to rest and refuel.

The ponds in the forests contain a variety of warm water fish species including bass, perch, pickerel and bullhead. The DFW stocks Berry Pond in the spring with trout, a coldwater species. Occasionally, the DFW stocks the larger ponds with smallmouth bass.

The breeding bird species found throughout the forests are those typical of white pine-oak forests and wetlands. From past studies, the most abundant species noted in the forests include perching songbird species such as eastern towhee, chipping sparrow and common yellow-throat warbler. The larger pine stands throughout the forests satisfy the nesting requirements of hawks and owls, such as red-tailed hawk, great horned owl and barred owl.

The varied habitats in the forests are an important migratory stopover for perching song birds and waterfowl. The ponds in the forest provide resting spots for a variety of ducks and geese flying from their wintering grounds to breeding locales in Canada. Forest succession has greatly impacted both species diversity and abundance, particularly in the grassland species as former agricultural fields become forests. Grassland birds and other wildlife species decline when open field habitat is replaced by forests.

The Department of Fish and Game stocks pheasant in Harold Parker State Forest. The pheasant are stocked in the "Harold Parker Wildlife Management Area," located between Jenkins Road and Route 114, just before and during the hunting season on a weekly basis. This is a "put and take" operation (birds are placed in the forest for hunters to take).

Beaver

The North American beaver (Castor Canadensis) is an important species because of the wetlands it creates by damming small streams. Early settlers harvested beaver almost to extinction for their waterproof pelts. The local beaver population has grown significantly after passage of a referendum in 1996 (M.G.L. Chapter 131: Section 80A), prohibiting the use of lethal traps for furbearing mammals. Licensed trappers are allowed to use live catch box or cage traps for beaver.

Openings created by beavers follow a predictable cycle of change. Beaver-created openings progress from newly flooded areas, to open water ponds, to open meadows containing scattered small trees and shrubs. Each of these stages provides habitat for a variety of wildlife. Frogs, turtles, waterfowl, great blue herons, swallows, otter, mink and moose regularly use the open water stage. Geese, grouse, woodcock, woodpeckers, common yellowthroats, yellow warblers, deer and moose use the open meadow stage. Through their damming activities, beavers have served a historically important role as a natural form of disturbance, creating young forest habitat required by many wildlife species.

Beaver also influence water quality, as dams trap sediments and open meadows slow seasonal runoff. During the open water stage, nutrients enter beaver

ponds, drop out of the water and accumulate in the organic matter at the bottom. When beavers abandon a pond and water levels drop, organic matter dries and decomposes, allowing grasses and forbs to colonize. In time, shrubs and trees reoccupy these meadows. Beavers are attracted back to the site by this abundant food supply. Beavers create a new dam and the cycle begins again.

Giardiasis or "beaver fever" is an intestinal illness caused by a microscopic parasite called Giardia lamblia. It is a fairly common cause of diarrheal illness caused by a protozoan that lives in the digestive tract of a variety of domestic and wild animal species, as well as humans. Campers and hikers can get Giardiasis by drinking contaminated water that is inhabited by beavers.

Beavers are strict vegetarians. They feed on a variety of aquatic plants and the shoots, twigs, leaves, roots and bark of woody plants. Trees and shrubs are felled by beavers to gain access to twigs, leaves and bark. Once stripped of leaves and bark, branches and logs are often used as construction material for dams or lodges. Beavers mate in the winter and females give birth to a single litter each spring, usually containing four, but sometimes up to nine kits. Young beavers will stay with their parents through two winters before dispersing up to four miles away the following spring to seek mates and establish new territories of their own (Jackson and Decker, 1993).

Beaver ponds are areas of still, deep water that provide access to food, protection from terrestrial predators and shelter in winter. Dams are impressive structures made of sticks and mud. Beaver dams range from two to ten feet in height and can extend more than 100 feet in length. Tipped off by the sound of escaping water, beavers will act quickly to plug any leak with mud, stones and sticks (Jackson and Decker, 1993).

Within ponds created by dams, beavers construct lodges out of sticks and mud. Lodges may be 15 to 40 feet across at the base and protrude three to six feet above water. Within each lodge, a single internal chamber is situated above the water line and is lined with dry plant material. Once the pond freezes over, beavers are confined to the pond until ice-out in the spring. Tree branches, stored on the bottom of the pond, provide winter food and are brought into the lodge to be eaten.

By damming streams, drainage ditches, dam outlet structures and culverts to form or enlarge existing ponds, beavers create wetlands that provide habitat for a diversity of plants, invertebrates and wildlife. However, the dams frequently flood trails, roads, septic systems and recreation areas. Beaver dams have flooded large areas near Bear, Bradford, Stearns and Sudden ponds in Harold Parker State Forest and Long Meadow and Sharpners Pond in Boxford State Forest. As a result, forest roads and trails are routinely flooded by beaver dams. Flow devices (e.g., beaver deceivers) are long-term and cost-effective solutions to beaver related flooding. In some instances, trapping and relocating the beavers is a logical short-term solution.

Rare Wildlife Species

The Blanding's turtle, blue-spotted salamander, intricate fairy shrimp and Hessel's hairstreak butterfly are state-listed species documented by the NHESP in the forests. If a project is proposed in Priority Habitat for rare species (see Priority Natural Resources map), a Rare Species Information Request Form must be submitted to the NHESP. The NHESP will determine the rare species present and if a permit is required for the proposed activities.

Blanding's Turtle. The Blanding's turtle is classified by the NHESP as a Threatened species. The Blanding's turtle is a six to nine inch turtle with a dark top shell covered with pale yellow flecking. Blanding's turtles have been observed in vernal pools, marshes, shrub wetlands and open uplands in the forests. The deeper parts of marshes and ponds are used for overwintering during their inactive season (November through March). Blanding's turtles often leave permanent wetlands and travel overland to vernal pools and shrub swamps, where they feed and mate.

Females will remain in wetlands or vernal pool habitat until they begin nesting. Females lay their eggs in well-drained upland forests or along forest or field edges. The majority of nesting occurs in June in open areas such as: dirt roads, electric transmission line right-of-ways, residential lawns, gravel pits and early successional fields. Female Blanding's turtles do not reach sexual maturity until they are 14-20 years of age (Congdon et al., 1993). Females may travel great distances, often more than one kilometer, to find appropriate nesting habitat (Grgurovic and Sievert, 2005). To protect potential

Blanding's turtle habitat, the NHESP has designated a large area east of Route 114 as Priority Habitat for rare species (see Priority Natural Resources map).

Blanding's turtles are omnivores, eating both plants and animals on land and in the water. Blanding's turtles are known to eat snails, crayfish, earthworms, insects, golden shiners, brown bullheads and other small vertebrates. Vernal pools are an important source of many of these prey animals. Blanding's turtles are also known to eat hornwort, duckweed, bulrush and sedge.

Blanding's turtles are particularly vulnerable because they travel very long distances during their active season, do not reproduce until late in life (14-20 years, and have low nest and juvenile survivorship. Roads are the primary cause of adult mortality. Blanding's turtles travel to multiple wetlands throughout a single year (typically three to six) and adult females travel to upland nesting habitats, crossing roads in the process. Habitat loss, degradation and fragmentation are driven by commercial and residential development. Other threats include illegal collection, predation by unnatural large populations of raccoons and skunks in suburban areas, agricultural practices and loss of nesting habitat through natural succession.

Blue-Spotted Salamander. The blue-spotted salamander, a state-listed species of Special Concern, lives in woody swamps and requires vernal pool habitat for breeding. As soon as the ground surface thaws, males migrate above ground to temporary ponds and females join them a few days later. Blue-spotted salamanders require moist, moderately shaded environments. Blue-spotted salamanders are secretive forest-dwelling animals that spend most of the year underground or in the leaf litter on the forest floor, usually within 500 meters of their breeding pool. As a result they are seldom observed outside of their breeding season.

The annual reproductive success of vernal pool breeders can be greatly affected by drought years when the pools dry up earlier than usual. Vernal pool dependent amphibians have evolved a breeding strategy in which an occasional season of reproductive failure is less detrimental to the population than heavy predation by fish every breeding season. Blue-spotted salamanders are particularly vulnerable during the early spring breeding season when they congregate in vernal pools during the first cold spring rains.

Intricate Fairy Shrimp. Intricate fairy shrimp, a state-listed species of Special Concern, has been documented in Boxford State Forest. It is a small, elongated crustacean that inhabits vernal pools. This species is typically found in deeper, less temporary vernal pools. Changes in hydrology that interfere with the length and timing of pool inundation can be threats to intricate fairy shrimp populations.

Hessel's Hairstreak. The NHESP has documented the presence of Hessel's hairstreak butterflies, a species of Special Concern, in Boxford State Forest. Hessel's hairstreak exclusively inhabits Atlantic white cedar swamps and bogs. Adult butterflies fly from the second week of May through the second week of June. Eggs are laid on branch tips of Atlantic white cedar. Larvae feed on new growth for about a month, pupating in July. Pupae diapause (i.e., go dormant) from July to the following May under the loose cedar bark. Hessel's hairstreak usually nectar on highbush blueberry or chokeberry within the cedar swamp, but may disperse into nearby fields, yards and roadsides to nectar at other flowers.

CCC Berry Pond Picnic Pavilion, DCR

2.2. CULTURAL RESOURCES

The land within the DCR's forests and parks is a storehouse of cultural resources; its historic buildings, structures, archaeological sites and landscapes are reminders of the important role these lands have played in this nation's history. Scattered across the landscape, this ensemble of buildings, structures and sites tell the story of our common

heritage. Their protection and preservation is an integral component of the DCR's mission.

The RMP development process has resulted in an improved body of knowledge on the cultural resources of Boxford and Harold Parker state forests. Data has been field verified and collected using a handheld GPS, recording spatial data (location) as well as condition, materials, threats and recommendations.

Cultural resources that are over 50 years old are considered potentially historic and evaluated for significance. The DCR uses the nationally accepted standards for evaluating historic significance, primarily the National Register of Historic Places. The DCR treats properties as historically significant if they meet the criteria for listing on the National Register, even if the property has not been formally nominated or listed. The OCR coordinates all regulatory compliance related to state and local laws protecting historic and archaeological resources located on DCR property.

This section describes the known and potential cultural resource areas in both forests, including pre-contact and post-contact archaeological resources and historic buildings, structures and landscapes. Section 5.3 provides specific recommendations for cultural resources that require additional research, documentation, stabilization or preservation. All cultural resources are to be managed in accordance with the DCR Cultural Resource Procedures provided in Appendix N.

Pre-Contact Archeological Sites

Seven pre-Contact sites are located within Harold Parker State Forest: 19-ES-229, 19-ES-228, 19-ES-772, 19-ES-773, 19-ES-763, 19-ES-775 and 19-ES-807 (see Table 2.6). One pre-Contact site, 19-ES-568, is located in Boxford State Forest (see Table 2.6).

Table 2.6. Pre-Contact Archaeological Sites

Site Name	MHC Site Number	Period(s) of Native American Occupation[a]
Harold Parker State Forest		
Hills Steatite Quarry	19-ES-228	Unknown
Jenkins or Hills	19-ES-229	Late Archaic and Woodland (5000-350 BP)
Boston Hill	19-ES-772	Late Archaic (5000-3400 BP)
Skug 1	19-ES-773	Middle Archaic, Late Archaic, Middle Woodland (7000-3400, 2000-1200 BP)
Skug 2	19-ES-763	Middle Archaic through Early Woodland (7000-2000 BP)
Skug 3	19-ES-775	Late Archaic (5000-3400 BP)
Boston Brook	19-ES-807	Woodland (2700-350 BP)
Boxford State Forest		
Middleton	19-ES-568	Early Archaic, Late Woodland (9000-7000, 1200-350 BP)

[a.] Years before present = BP.

In pre-Contact times, Frye Pond was a small stream named the Skug River, which meandered through a maze of wetlands and swampy areas across an uneven landscape rugged with bedrock and glacially deposited boulders. Due to the relatively rugged terrain, and the fact that the land has seen little farming, there are only seven pre-Contact sites within the 3,295 acres that comprise Harold Parker State Forest. The MHC files record site 19-ES-228 as the Hills steatite quarry, but makes no association with Native Americans. Bullen notes that the Hills site (Bullen's #68) was located on a sandy level terrace adjacent to the Skug River, before it was mined for sand and gravel, and states that a human burial was encountered by a steam shovel operator (Bullen 1949:61). It appears that 19-ES-228 and the Hills site (Bullen's #68) are one in the same. The reported presence of a human burial on the Skug River suggests other burials might be found within the forest.

Essex County is well documented in the archaeological record. It has long been a favorite collecting ground of artifact collectors and because of its proximity, it has also received attention from

the region's institutions (Johnson and Mahlstedt, 1982). The archaeological record of the county is biased toward the coast where estuaries punctuate barrier beaches, craggy shores and low-lying salt marshes. Because of the manner in which the archaeological data has been assembled, the nature of pre-Contact occupation is not fully known at this time.

Native American hunter gatherers were here during Paleo Indian times, probably as early as 12,000 years ago. Despite a continuously changing climate, which brought about changes in the natural resource bases, occupation continued through early historic times. Although the coastal zone exhibits the highest site frequencies and densities, the interior reaches (beyond the head of tide) of many of the area's more prominent rivers (Merrimack, Parker, Essex, Ipswich and Shawsheen) were also occupied at least by Early Archaic times (ca. 8,000-9,500 years ago).

The sheltered woodlands of the forest would have been vacated during the early to mid-spring when the anadromous fish entered the larger streams and rivers of the region. A small number of small fall/winter campsites may have been dispersed throughout Harold Parker State Forest, particularly along the banks of the Skug River before it was damned to create Frye Pond. If the Skug River was a spawning river, as a tributary of the Ipswich River, the forest may contain the remains of strategically placed fishing stations.

Harold Parker State Forest Historic Archaeological Sites

Historically, the area witnessed very limited activity with only a few scattered farmsteads in the vicinity. In the 1830s, at least two industrial sites, a gristmill and a soapstone quarry owned by William Jenkins, operated on the Skug River within the forest. They are located almost next to each other, separated by a stream that provided the waterpower to the mill about one-half mile west of Jenkins Road. At the time that Harold Parker State Forest was created it was considered to be an unattractive second-growth forest that had been cut over a number of times.

The principal historic activity that has left its mark on Harold Parker State Forest is the presence of the Civilian Conservation Corps (CCC) during the 1930s. Two CCC camps were located within Harold Parker State Forest. Camp S-5 Company 110 was located on Harold Parker Road, southwest of Brackett Pond, and worked primarily in the western portion of the forest. Camp S-76 Company 167 was located on the east side of Frye Pond, on the opposite side from the Lorraine Park Campground.

Frye Pond is one of nine ponds that were created by the CCC. The Lorraine Park Campground, a.k.a. Lorraine Park, was set out by the CCC between 1935 and 1937. Originally the campground included the loop road, contact station, several comfort stations, pavilions and campsites. In establishing a campsite, the CCC prepared the ground surface by making it as level as possible to accommodate a tent and fire pit. Today, all of the CCC campground buildings and structures have been removed and only the campground layout, with its loop road and campsites survive from that era.

CCC Camp at Brackett Pond

Archival records show a Civilian Conservation Corps camp adjacent to Harold Parker Road southwest of Brackett Pond. Such camps were meant to be temporary, with buildings dismantled after camps closed or moved on. Some camp elements remain – a stone well, entry stone pillar, loop road and building foundation depressions.

CCC Camp at Frye Pond

Archival plans show an extensive CCC camp at Frye Pond, but the camp was located in the same area as the current contact station and entrance road to Lorraine Park Campground. Modern development of the area has affected the archaeological site, but some elements remain – concrete steps, a flat clearing, loop road (CCC or 1960s?), depressions, vegetation (pines and arborvitae) and foundations. The area has been recorded on an MHC Area Form.

The location of this site at the entrance to the campground creates a valuable interpretive opportunity. Further research and interpretive planning could bring this area to life for visitors. Development of the entrance road and contact station, along with paved parking and RV dump stations, have likely impacted underground archaeological resources. The extent of the historic CCC campsite is also undetermined, making it difficult to develop a management plan for its protection.

CCC Dorm at Frye Pond, c. 1935, DCR

Jenkins Mill (Sawmill)

The Jenkins mill site is located west of Jenkins Road near the Bay Circuit Trail. The location is marked on the DCR trail map. The site consists of a dam and pond, the mill foundation with an intact wheel pit, stone walls and stone-lined waterways. The collection of intact, visible features along the stream bed, which displays a considerable drop in elevation, along with its location on a popular trail, make this site an excellent area to interpret early water-powered industry.

The Jenkins mill site is labeled on trail maps for Harold Parker State Forest, but little information is provided to explain the site to visitors. The remote area might also attract illegal uses, such as nighttime partying and mountain biking, as adjacent trails exhibit major erosion from mountain bike use. The structural condition of the dam in unknown, but its failure clearly has the potential to damage the intact Jenkins mill site.

Soapstone Quarry

The soapstone quarry is located near the Jenkins mill site along the Bay Circuit Trail west of Jenkins Road. Clearly marked on the DCR trail map, the site consists of a wide scatter of stone remnants with tool marks as well as some nearly finished pieces. Like the Jenkins mill site, this area has excellent interpretive potential.

The soapstone quarry is quite undefined, so it is hard to evaluate all of the threats to the site. Like many quarries in state forests, the site is threatened by overgrowth of vegetation. The larger, more finished stones are not easy to pilfer, but vandalism and looting are always possible at such sites.

Timothy Eaton Homestead

Located in the southernmost section of the forest, the Timothy Eaton homestead is a landscape of archaeological sites and surviving above ground features. In 1984, the site was documented as containing a cellar hole with stone foundation, a well, livestock enclosures, stone walls and remnants of a kitchen garden. The site has not been visited since that time, so additional fieldwork is needed. This remote cultural landscape could be vulnerable to vandalism, especially pot-hunting. Vegetation is also likely encroaching on the site, making the landscape less recognizable as a farmstead.

Robert Mason Homestead

The Robert Mason homestead is located along Middleton Road near the forest headquarters. Recorded in 1984 as a former homestead, the property does not readily express its history. Few features remain. Most notable is a large fieldstone and bronze marker, identifying the site as the "Site of the home of Robert Mason, A Revolutionary Soldier 1759-1821."

The extent of the homestead is unknown and further fieldwork needed to determine what remains from the historic land use. The marker is of unknown age, but the bronze plaque is well oxidized, indicating a long period of exposure. The plaque is readable, with no apparent damage and can be maintained as is.

Harold Parker State Forest Historic Buildings, Structures and Objects

Headquarters Building

The headquarters building is part of an area documented on an MHC Area Form in 1998. The area includes the headquarters and a storage building, both built by the Civilian Conservation Corps (CCC) in 1937-1938. Several newer storage

buildings are also located around the rear lot and parking area. The headquarters is significant as an original CCC-built park building and has been recorded on an MHC Inventory Form.

The headquarters building has undergone several changes over the years, some of which have altered its historic character. The small addition at the north of the building (unknown date) is compatible with the original wood frame construction of the headquarters. Since the 1998 inventory, however, the front shingles have been replaced with modern clapboard. The front of the headquarters has also been overplanted, obscuring the simple, utilitarian architecture of the building. Some plants may also be creating shade and moisture conditions against the building that contribute to rot. Stone curbing at the front of the building has also been removed (not considered to be historic).

CCC Headquarters Building, c. 1939, DCR

The headquarters building still retains its original wood sash windows, which are very drafty. For this significant CCC building, replacement windows should not be considered. Large mature trees are too close to the building, creating a hazard and an opportunity for debris and animals to collect on the building. The CCC storage building still has original shingles and loft doors, but the garage doors have been replaced with steel units that do not match the brown building.

Entrance Pillars

Two stone entrance pillars mark the beginning of Harold Parker Road at the intersection with Route 125. Built by the Civilian Conservation Corps (CCC), the square pillars are made of fieldstone and have pyramidal caps. There are original iron loops indicating that a chain was once used to close this entrance. The Route 125 entrance is a significant entrance for visitors from the I-93, Route 28 and Route 125 corridors, and the road is heavily used for through traffic. The pillars have been recorded on an MHC Inventory Form.

The stone pillars are in fair condition, but vegetation and newer alterations have changed the rustic character of the historic entrance. Trees are growing around the southern pillar, and new planting beds and split rail fence now flank the pillars. A yellow metal post, possibly a former highway sign, remains in front of the southern pillar. The iron rings are rusted and loose, and all of the stonework is in need of cleaning and re-pointing.

CCC Picnic Pavilion

The picnic pavilion on the east side of Berry Pond was built by the Civilian Conservation Corps (CCC) in 1935-1937. Constructed after the statewide CCC model, the structure has stone knee walls and corner pillars with heavy timber posts and roof framing. The pavilion is one of only 11 CCC pavilions left in the state, and the only example in the DCR's North Region. The structure is in good condition, but mature trees are dangerously close and organic debris is left to rot on the roof. Views toward Berry Pond from the pavilion are obscured. The pavilion has been recorded on an MHC Inventory Form.

CCC Dynamite Storage Shed

A small dynamite storage shed built by the Civilian Conservation Corps (CCC) is located off of Berry Pond Road along the Yellow Diamond Trail. The small wood-frame building is set on a poured concrete foundation and clad in corrugated metal. Concrete steps lead to a single door opening at the front of the building, but no door remains. A metal vent sits atop the side gabled roof. The shed is similar to those found at Sandisfield State Forest and Wendell State Forest, although those examples are in better condition.

The shed is in poor condition, with metal cladding pulling away from base of the wooden structure. The walls are pocked with bullet holes, and roof and walls are rusting heavily. Given the existence of better examples of this architectural type elsewhere in the DCR system, the Harold Parker State Forest dynamite storage shed is a lower priority for

preservation. Limited resources would prevent the DCR from going to extraordinary lengths to restore the structure. The site may also retain archaeological materials from the CCC use.

Collins Pond Fish Hatchery Building

The fish hatchery building is located on the downstream side of Collins Pond, adjacent to the north edge of Harold Parker Road. The building is a small concrete building with a wooden roof. It sits in a small body of water in front of Collins Pond dam and is highly visible from Harold Parker Road. The building includes intact metal chain link fish pens. Although the CCC established Collins Pond and other ponds for fishing, and stocked them with fish, the existing building is likely related to later fish hatchery use by the Massachusetts Division of Fish and Wildlife. Nonetheless, the building is a surviving example of the fish hatchery use, in a prominent location, making it suitable for interpretation.

The fish hatchery building appears to be in fair condition, although its location in standing water and lack of maintenance will cause it to deteriorate quickly. The building ruin provides an opportunity to interpret its fish hatchery function.

Historic Parkways

The historic parkways at Harold Parker State Forest are the roads built by the Civilian Conservation Corps (CCC) in the 1930s. Although both Harold Parker Road and Berry Pond Road were built by the CCC, they no longer retain distinctive CCC features due to road improvements and some private development along a portion of Harold Parker Road. Only the alignment and relationship to recreation features remain.

Berry Pond Road has been partially closed to vehicular traffic and the closure of the Berry Pond day use area has closed the remaining section of the roadway. There are a number of private homes along Harold Parker Road, compromising the naturalistic character of the roadway. “No parking” signs at some trailheads have forced parking onto Harold Parker Road, compromising driver and pedestrian safety, and eroding the road shoulder.

West Ponds Landscape

The West Ponds Landscape consists of four CCC-built ponds, dams, spillways and associated pond landscapes designed for recreation, specifically fishing. This area also includes CCC Camp S-5 which is recorded on an MHC Area Form.

The West Ponds Landscape is historically significant as one of the primary contributions by the CCC at Harold Parker State Forest. CCC plans indicate that the CCC planned for a range of other day use and camping facilities, but they were not realized. The CCC built dams, creating ponds which were stocked with fish. Later, the Massachusetts Department of Fish and Wildlife raised fish at Collins Pond hatchery until 1983. Fishing is one of the most popular activities at the ponds to this day. The transformation of the wetland areas into a series of ponds was both an engineering feat and a recreational advancement for the state forest.

Today the dams at all of the ponds are in poor condition, as documented by the DCR Dam Maintenance Program. Large holes in the concrete structures, inoperable gates and spillways clogged with debris have caused a major decline in the health of the ponds. Murky water, eroded shorelines and excessive trash and floating debris have compromised the integrity of the pond landscape created by the CCC in 1933-1938. While these dams may not present an imminent threat to people and property, their preservation is a priority for maintaining the character of the historic CCC landscape.

The preservation of the West Ponds Landscape as a historic recreation area should be a priority for the DCR. The challenge will be finding a cost-efficient balance between repairing the dams as infrastructure, versus making repairs to protect the historic pond landscape.

Berry Pond Landscape

The Berry Pond Landscape was documented on an MHC Inventory Form in 1998 and noted as one of the more extensive CCC landscapes at the park. Built 1935-1937, the Berry Pond Landscape includes the CCC picnic pavilion on the east side of the pond near Middleton Road, as well as the day use area on the west side of the pond. The day use area retains some characteristics of the CCC, including stone retaining walls and terraces, and views to the pond,

which is one of only two natural, spring-fed ponds at Harold Parker State Forest.

In 1996, the DCR undertook major improvements at Berry Pond, integrating the historic CCC terraces into a new design, including a new shade shelter, a new comfort station/warming building (replacing the historic CCC building) and improved visitor circulation. The area was meant to function as both a swimming area and a skating pond. However, staff limitations have closed the area in the summer and regulations related to skating on open ponds have ruled out the winter use. The day use area is closed to the public.

The day use area and swimming beach have been closed for several years. Changing water levels (mostly due to beaver activity and drought) are exposing and eroding the historic stonework. Views from the new building are growing in and the property is open to vandalism. Lack of use is the biggest threat to Berry Pond, the most significant CCC landscape at Harold Parker State Forest.

CCC Dams

There are seven dams at Harold Parker State Forest, all of which were created by the Civilian Conservation Corps (CCC) in the 1930s. All of the ponds at the state forest are man-made, except for Berry Pond and Bear Pond. The ponds and their associated recreational features are a hallmark of the CCC design. Although not all dams and ponds are culturally significant, those where active recreation still occurs are a high priority for preservation.

The dams that create the series of ponds in the western area of Harold Park State Forest are integral, character-defining features of the West Ponds Landscape. Their preservation is a priority for the ponds they create and the recreation areas they support.

In 1994, the Bureau of Engineering of the former Department of Environmental Management (predecessor to the DCR) issued a report indicating that the Field Pond, Collins Pond, Brackett Pond and Delano Pond drams presented "a significant hazard to the downstream public" and that repairs to the Collins Pond and Field Pond dams should be given priority (DEM, 1994). The Field Pond dam was repaired in 2007. No other repairs occurred. Dam repairs and maintenance should preserve the cultural significance of the dams.

Boxford State Forest Cultural Resources

Bald Hill Landscape

The Bald Hill Landscape is a remnant of Boxford's agricultural past. Old farm roads, fields, stone walls and cellar holes remain in this remote section of the state forest. There is also a small family cemetery (the Russell Cemetery, described below). The fields appear to be mown infrequently to preserve meadow, but narrow paths are cut through the meadow grasses, connecting adjacent trial systems and provide public access, if only on foot. One former house site includes a standing chimney and some mature sugar maples. The Bald Hill Landscape is significant as an intact former farm, but lack of maintenance is quickly affecting the area's ability to convey its own history. Its historical integrity is diminishing with time.

Boxford State Forest does not have a well developed system of park roads, so access by DCR staff is limited. The roads leading to the Bald Hill area are nearly impassable. Roads are overgrown, severely rutted and littered with large stones. The fields seem to be maintained occasionally, but DCR staff report no regular maintenance activities on site. The Russell Cemetery has also been apparently maintained by others (see below).

Russell Family Burial Ground

Near the Bald Hill area is a small family cemetery with a stone wall enclosure and three visible stones. The Russell family burial ground is typical of small family plots established in areas far removed from central churchyards, or in the periods before central burial grounds were established. The grave stones are tall granite monoliths, unusual for such a rural family plot. One marks the grave of a Revolutionary War soldier.

The Russell family burial ground is clearly maintained by someone other than the DCR. The area is clear, and a well worn path leads to the entrance. There is also evidence of inappropriate stone repairs, including some that appear to have been made using bath caulk. Stones are in need of professional conservation and stabilization, as they are large enough to pose a danger to visitors. Since DCR staff may not be able to regularly access the site for maintenance, the DCR should consider

creating a formal maintenance agreement with the anonymous partners.

Russell Homestead

The Russell homestead site features a large, dry laid fieldstone cellar hole, which has partially collapsed, filled with debris, and is overgrown with vegetation. It is notable because of its size and the clarity of the footprint of the former house. Bricks and other materials are scattered around the site and someone has carefully placed metal artifacts on top of the stone foundation stones. Someone has also placed a metal sign nearby entitled "Site of Russell-Hooper Farmhouse."

Like most of the DCR's historic cellar holes and homesteads, the Russell homestead is vulnerable to looting, vandalism, vegetation, erosion and other natural affects. DCR staff do not regularly inspect or monitor the site, but someone is mowing the fields nearby. These may be the same people who are placing the metal artifacts at the cellar hole. While the treatment of the site appears to be benign, the DCR's lack of oversight of the maintenance work occurring at the archaeological site could threaten the resource.

Anti-Ballistic Missile Radar Site

Excavated in 1969 for a planned anti-ballistic missile (ABM) perimeter acquisition radar (PAR) facility, this area is essentially two excavations and a backfill stockpile. The north excavation is filled with water, and the south excavation contains three certified vernal pools and a wetland. After the ABM Program was terminated and the site abandoned by the U.S. Army, the water-filled excavation quickly became a swimming spot. There are very few remaining cultural features, save for the topographical alterations most clearly exhibited in the elevated piles of excavate around the southern and eastern edges of the "ABM Pond" and the underwater hole. The site has virtually no integrity as a cultural landscape.

Trail Biking at Harold Parker, © Kindra Clineff

2.3. Recreation Resources

Located less than a 30-minute drive to two million people, Harold Parker and Boxford state forests offer a variety of outdoor recreational opportunities to the citizens of northeastern Massachusetts. From April to November, camping, swimming, hiking, fishing, boating, mountain biking, nature study, picnicking, horseback riding and pet walking are some of the most popular activities. Winter uses include cross-country skiing, snowshoeing, hunting and hiking. Visitation is highest in the summer months, lower during the fall and spring, and lowest in the winter months.

Harold Parker State Forest offers 85 family campsites and one group site tucked into the forest near Frye Pond. The day use area at Berry Pond, which includes picnic, swimming and fishing facilities, has been closed due to state budgetary constraints. Fishing, canoeing and non-motorized boating are popular activities at Field and Stearns ponds.

Visitors can use approximately 67 miles of forest roads and trails for walking, hiking, mountain biking, horseback riding, hunting, cross-country skiing and snow shoeing. Interpretive programs offer the opportunity to learn about the rich cultural and natural history of the forests and the surrounding area. Boxford State Forest is primarily used for hiking, mountain biking, bird watching and hunting.

Harold Parker Visitor Surveys

During the 2011 camping season, the DCR distributed a user survey to campers at the Lorraine Park Campground. A total of 179 completed surveys

were received by the DCR. The purpose of the visitor survey was to understand camper attitudes and satisfaction levels with their camping experience at Harold Parker State Forest.

As shown in Table 2.7, over 93% of the respondents felt that the park staff were friendly, courteous and knowledgeable. Respondents commented: "The staff was great;" and "Kept things clean and safe for all the campers, also gave great directions;" and "They were very diligent!"

Almost 87% of the respondents felt that the restrooms were clean, functional and accessible. Several repeat campers noted an improvement in bathroom cleanliness. A few campers noted the lack of soap and toilet paper in the bathrooms.

Eighty five percent of respondents felt the trails and beach facilities were clean, safe and well maintained. Others felt that some trails were not well maintained or marked. Several respondents preferred to swim at Berry Pond instead of Frye Pond. A number of respondents felt that Berry Pond should be re-opened.

Approximately 83% of the respondents were satisfied with park informational signs, brochures and maps. However, several felt that the trail maps were out of date and the print was too small to read. Others felt the driving directions on the DCR website were confusing and more directional signage was needed from the state highways. Over 78% of the respondents were satisfied with park interpretive programs. Several felt more nature and history activities were needed for youth staying in the campground.

Over 85% of the respondents were satisfied with the overall park experience. One commented that: "I've camped with my family all over the U.S. and Canada, and this is one of the best parks I've ever seen." Several campers were very disappointed that the Berry Pond picnic and swimming areas were closed to the public.

Table 2.7. 2011 DCR Camper Survey

Question	Expectations		
	Fell Short	Met	Exceeded
Quality of Park Staff? (friendly, courteous, knowledgeable)	6.3%	26.4%	67.3%
Quality of Restrooms? (clean, functional, accessible)	13.2%	37.4%	49.4%
Quality of Recreation Facilities? (trails, beach: clean, safe, well maintained)	15%	35.3%	49.7%
Quality of Park Information? (signs, brochures, maps)	17.1%	44.7%	38.2%
Quality of Programming? (nature, history, events, lessons)	21.6%	39.6%	38.8%
Overall Quality of the Park Experience?	14.8%	32%	53.2%

A number of campers felt the campground should be opened through the Columbus Day weekend, instead of closing after the Labor Day weekend. One camper commented that: "Fall camping is the best. No bugs, great temperature."

During the summer of 2008, the DCR distributed visitor surveys at the Berry Pond day use area before it was closed due to a shortage of operational funding. Respondents expressed a need for an outdoor rinsing area so that visitors were not standing in the bathroom sinks to rinse their feet. Several respondents also indicated that directional signs were needed between Route 125 and Berry Pond; "We drove around for an hour looking for the pond and found it by accident!"

During August and September of 2012, the DCR conducted an online survey of visitors to Boxford and Harold Parker state forests. The purpose of the survey was to understand visitor use patterns, attitudes and satisfaction levels. Notice of the survey was made available in the park, posted on the DCR, NEMBA and Friends of Harold Parker State Forest websites, and was sent directly to 262 organizations and individuals on the DCR Harold Parker Planning Unit RMP contact list. One survey was completed for Boxford State Forest and 63 were completed for Harold Parker State Forest.

The most common activities visitors reported participating in at Harold Parker State Forest during the last 12 months (see Table 2.8) were mountain biking (50.8%), hiking (31.7%), walking/jogging/running (31.7%), pavement biking (25.4%) and dog walking (22.2%). Since the survey was posted on the NEMBA website and was not distributed at the campground, the number of mountain bikers was over reported and the number of campers was under represented.

Table 2.8. Recreational Activity Participation at Harold Parker State Forest

Recreational Activity	Most Recent Visit		During Last 12 Months	
	n	%*	n	%*
Interpretive Programs	2	3.2	3	4.8
Nature Study	6	9.5	5	7.9
Hiking	16	25.4	20	31.7
Swimming	3	4.8	3	4.8
Fishing	4	6.3	5	7.9
Non-motorized Boating	2	3.2	4	6.3
Camping	1	1.6	4	6.3
Hunting	0	0	2	3.2
Walking/Jogging/Running	15	23.8	20	31.7
Family Gathering	6	9.5	10	15.9
Horseback Riding	6	9.5	4	6.3
Pavement Biking	12	19	16	25.4
Mountain Biking	29	46	32	50.8
Dog Walking	3	4.8	14	22.2
Winter Activities	2	3.2	18	0.2
Visit Historic Site	1	1.6	4	6.3
Playground	1	1.6	2	3.2
Picnicking	2	3.2	3	4.8
Geocaching	1	1.6	2	3.2
Park Passport Program	1	1.6	2	4.3

* Percents sum to more than 100% because individuals could participate in more than one activity during a visit.

Respondents to the DCR online survey felt the overall natural setting and the various components of the natural setting (ponds, vegetation, wildlife and birds) were important to their visit. Visitors liked the peace and quiet, the ponds, cleanliness, being in nature, the extensive variety of trails, friendly staff and users (see Table 2.9).

Respondents disliked the lack of trail maps and signage, closure of the Berry Pond swimming beach, limited trailhead parking options, trash barrels and sanitary facilities, and uneven trail maintenance. The need for more boardwalks over trail wet spots and sturdy bridges at least four feet wide for horses were identified. The need to control both aquatic (e.g., Field and Stearns ponds) and upland (e.g., Bald Hill) invasive species was also noted. Several hikers requested hiker only trails and better control over the proliferation of illegal trails. A number of users requested additional interpretive programs and a greater law enforcement presence.

Table 2.9. What Visitors Liked Most and Liked Least about Harold Parker State Forest

Liked Most (number)
Peace and Quiet (6)
Beautiful Ponds (9)
Being in Nature (8)
Extensive Trail Network (16)
Horseback Trails (5)
Variety of Mountain Bike Trails (29)
Friendly Informative Staff (3)
Proximity to Home (6)
Users Get Along Well (4)
Liked Least (number)
Trail Signage (10)
Berry Pond Closure (9)
Limited Trailhead Facilities (7)
Bridge and Trail Maintenance (6)
Invasive Plants (4)
Biker – Hiker Separation (4)
Illegal Trails (3)
Limited Interpretive Programs (3)
Limited Police/Ranger Presence (2)

Abutters noted: “I love the trails for horseback riding and have been riding my horse two to three times a week for the last twenty years;” and “We live adjacent to Harold Parker State Park on Field Pond. I am in the park every day. I love the ponds;” and “There is a variety of things to do. Good for all ages and capabilities. Park staff was helpful, informative and educated;” and “A great forest with historic sites and a variety of things to do.”

Most visitors praised the natural beauty of the forest: “I love being in this beautiful natural place far from the everyday stresses. The wide diversity of plant life and topography are interesting and lovely; also interesting birds and other animals.”

It was also noted: “There is a very harmonious atmosphere among all park users, hikers, bikers, dog walkers equestrians. Really a model of cooperation for all Massachusetts parks;” and “Fantastic trails always in great condition. Remote feeling, but sill accessible. Gorgeous and idyllic ponds.”

Mountain bikers noted: "The mountain bike trails are incredible. Lots of trails from easy to difficult;" and "DCR's work with NEMBA has show how effective a partnership with a concerned and motivated volunteer organization can be in creating truly excellent and sustainable recreational opportunities;" and "Bike trails are very long, high quality, and spread over a very large undisturbed area. Love the mountain bike trails and the scenery. It is absolutely beautiful!"

Other users liked: "Clean, safe, large, great trails, historic sites, wildlife, diverse activities;" and "We love the deep forest setting, also enjoy the playground for the kids. Large private campsites are a great plus."

Outdoor Recreation Trends

Between 2002 and 2008, the National Survey of Recreation and the Environment (NSRE) interviewed approximately 100,000 Americans in random telephone samplings to identify changes in the national market for outdoor recreation activities. The NSRE survey included approximately 1,350 surveys in Massachusetts (Green et al., 2008). As shown in Table 2.10, within the northeast region of Massachusetts, walking for pleasure (87.8%) was the most popular outdoor activity, followed by viewing or photographing natural scenery (72%), swimming in lakes and streams (62.4%), visiting nature centers and zoos (61.8%), and then day hiking (40.8%) and visiting a wilderness or primitive area (36.3%).

The NSRE also identified outdoor recreation participation trends between 1995 and 2008 for the state of Massachusetts. As shown in Table 2.11, day hiking showed significant gains in the percentage of people participating, followed by backpacking, camping and horseback riding. Small game hunting showed a decrease in participation (Green et al., 2008).

National participation in outdoor recreation ranged from a high of 64% among individuals ages 6 to 12, but gradually declines to a low of 38% among those over 45 years of age. For many Americans, getting outdoors is viewed as part of a healthy lifestyle. Fifty percent of outdoor participants considered outdoor activities as their main source of exercise. Females and some ethnic groups are under represented in the outdoor activities surveyed; only 43% of participants interviewed are female and 80% are white (Cordell, 2012).

Table 2.10. Northeast MA Participation in Outdoor Recreation Activities, 2002-2008

Activity	Percent Participating
Walk for pleasure	87.8
View natural scenery	72
Freshwater swimming	62.4
Visit nature centers, etc.	61.8
Day hiking	40.8
Visit a wilderness area	36.3
Mountain biking	31
Developed camping	27.8
Freshwater fishing	17.8
Canoeing	21.3
Primitive camping	15.7
Kayaking	11.2
Cross-country skiing	10.6
Snowshoeing	8.6
Hunting (any type)	5.1
Horseback trail riding	4.2

Source: National Survey of Recreation and the Environment (Green et al., 2008).

Over the past 40 years, the number of forest campers has grown nationally from 13 million in the 1960s to approximately 56 million in 2000. Over one quarter of the U.S. population participates in some form of camping. Developed forest camping has changed considerably over the past 40 years. Advances in equipment have made camping more comfortable today. The trend has moved toward expanded amenities and services, reflecting trends in American society toward personal comfort and convenience. Campers want more comfort when they get older. Comfort and convenience were most often associated with access to water, electricity, hot showers, clean bathrooms, and technologies such as satellite and cell phone reception (Cordell, 2012).

Due to cultural and social factors, Russian, Indian, Asian and Hispanic families living in surrounding urban communities use outdoor recreation sites for different reasons than suburban families. Many urban families have one day off from work per week and as a result, are primarily day use visitors. There is a strong emphasis on spending time with the extended family, resulting in larger sized groups (averaging 8 to 15 persons). These family gatherings are often an all day activity with several meals cooked onsite and much of the time spent playing with children (Cordell, 2012).

Table 2.11. Massachusetts Outdoor Recreation Participation Trends, 1995-2008

Activity	Percent Participating 1995	Percent Participating 2008	Change in Percent Participating
Day hiking	24.7	37.7	+ 13
Kayaking	0.7	11.6	+ 10.9
Bicycling	31.2	40.1	+ 8.9
Swimming in lakes, streams	53.3	58.5	+ 5.2
Backpacking	10.2	14.3	+ 4.1
Developed camping	20.4	24.1	+ 3.7
Horseback riding	1.7	5.2	+ 3.5
Canoeing	11.6	14.8	+ 3.2
Snowmobiling	3.5	6.2	+ 2.7
Visit nature centers, zoos, etc.	54.5	57.1	+ 2.6
Cross-country skiing	7.8	8	+ 0.2
Small game hunting	3.3	2.6	- 0.7

Source: National Survey of Recreation and the Environment (Green, et al., 2008).

Market Area Demographic Profile

Reserve America campsite reservation ZIP Code data was used to determine the geographic origins of campers at Harold Parker State Forest in 2011. Twenty-five percent of these 6,566 known park users originate from within 11 miles of the forest, 50% originate from within 17 miles, and 75% originate from within 88 miles (see Campground Market Area map). Residents living within these distances represent potential visitors to the forests.

More than two million potential visitors live within a 17 mile radius of the forests (see Table 2.12). Demographic information on these potential visitors was obtained from the 2010 U.S. Census and the 2006-2010 American Community Survey (ACS), conducted by the U.S. Census Bureau. Approximately 20.5% of these potential visitors are children under 18 years of age. Over 250,000 children live within 11 miles of the forests, and over 450,000 live within 17 miles. Seniors account for approximately 13% of the potential visitors. Approximately 147,000 seniors live within 11 miles of the forests, and over 280,000 live within 17 miles.

Table 2.12. Population Potentially Served by the Forests

	11 Miles	17 Miles
Total Population	1,074,988	2,190,968
# of Households	399,125	850,290
Children (<18)	250,702	450,128
Adults (18-64)	677,078	1,456,937
Seniors (>65)	147,208	283,903

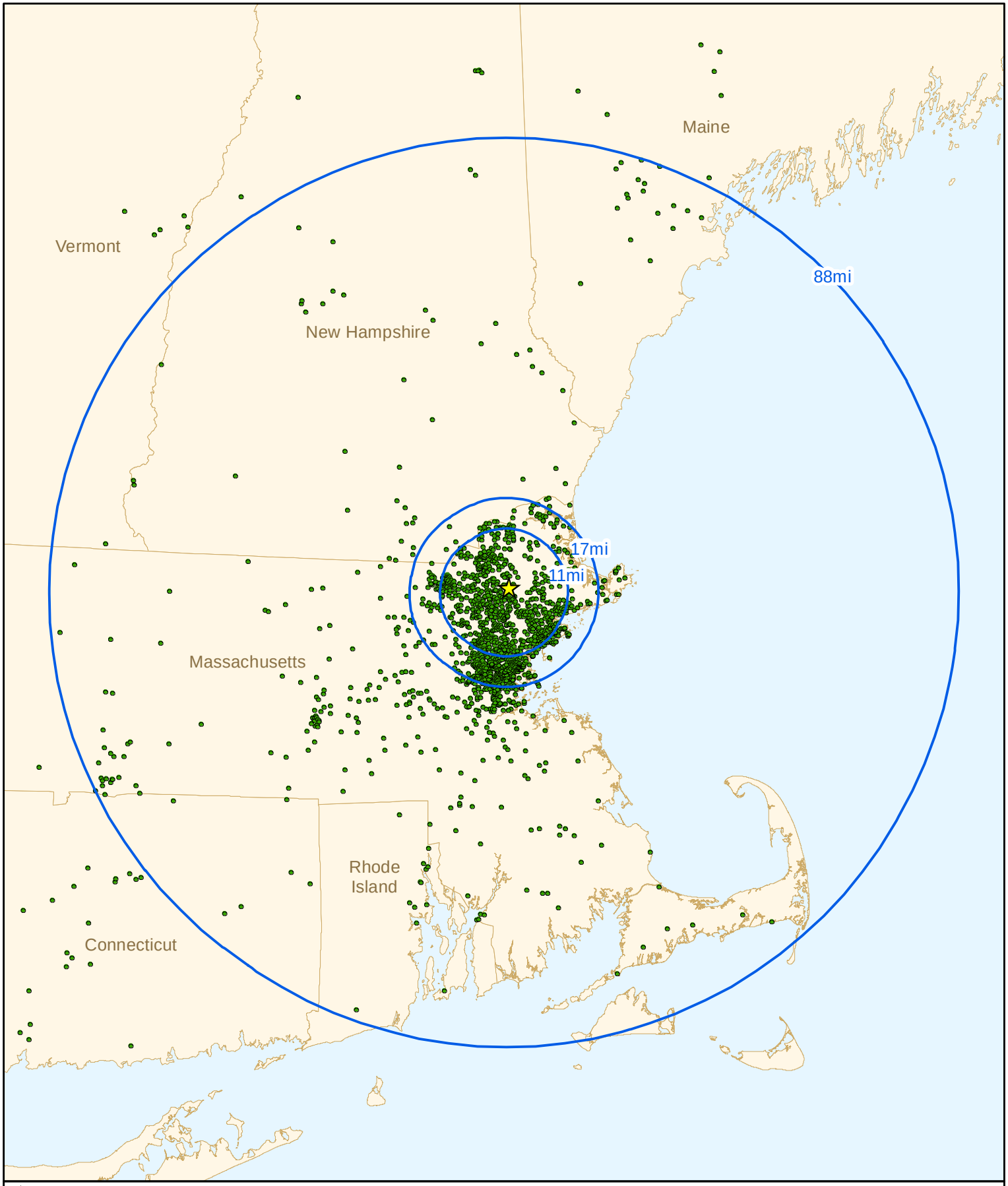
Source: 2010 U.S. Census.

As shown in Table 2.13, northeast Massachusetts residents between the ages of 16 and 34 have a high interest in backpacking (26.6%), mountain biking (20.7%), kayaking (18.7%), visiting a wilderness area (17.9%) and hunting (17.7%). People between the ages of 35 and 54 have a high interest in primitive camping (29.9%), cross-country skiing (29.6%), day hiking (29.25), developed camping (27.5%) and canoeing (26.1%). There is less involvement for people over 55 for most outdoor recreation activities. The highest participation rate is for walking for pleasure (14.7%), family gatherings (13.7%), picnicking (12.6%) and swimming in lakes and streams (10.9%).

Table 2.13. Northeast MA Outdoor Recreation Participation by Age

Activity	Number of Respondents	Age 16-34 %	Age 35-54 %	Age 55+ %
Walk for pleasure	229	13.7	21.6	14.7
Swimming in lakes, streams	185	15.8	23.4	10.9
Family gathering	157	16.1	20.2	13.7
Picnicking	130	11.9	25.6	12.6
Day hiking	99	16.6	29.2	4.2
Visit a wilderness area	91	17.9	25.7	6.5
Mountain biking	78	20.7	23.1	6.4
Canoeing	66	16.1	26.1	7.9
Developed camping	58	16.7	27.5	5.9
Freshwater fishing	46	17.4	24.3	8.4
Backpacking	42	26.6	22.3	1.2
Kayaking	38	18.7	23.9	7.4
Cross-country skiing	32	14.4	29.6	6
Primitive camping	31	17	29.9	3.1

Source: National Survey of Recreation and the Environment (Green et al., 2008).



Harold Parker Planning Unit

11mi, 17mi and 88mi Buffer, Representing 25%, 50% and 75% of Reservations at Harold Parker State Forest in 2011

State Boundary

Camping Reservation (2011), by ZIP Code of Origin*

1 Dot = 1 Reservation

Harold Parker State Forest

Campground Market Area

0 10 20 Miles

N W E S

dcr Massachusetts

* Based on 2011 ReserveAmerica data for Harold Parker State Forest. Reservations originating from ZIP Codes in CT, MA, ME, NH, NY, RI and VT (approximately 82% of all 2011 reservations) were used to create this map. Dots are placed at random within each ZIP Code. Outliers - reservations originating from beyond the scale of this map - are not displayed.

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

DCR GIS Mar-13

Many potential visitors come from households where English is not the primary language spoken (see Table 2.14). Within 11 miles of the forests, approximately 105,000 households have primary languages other than English. Within 17 miles, this increases to approximately 235,000 households or 27.6% of all households located within the primary market area for the forests.

Table 2.14. Primary Household Language of Potential Forest Visitors

Language	11 Miles	17 Miles
English	294,435	615,688
Spanish	45,889	82,063
Other European	38,900	97,610
All Asian	15,426	42,489
Other	4,475	12,440

Source: 2006-2010 American Community Survey.

Table 2.15. Household Income of Potential Forest Visitors

Income	11 Miles	17 Miles
Low (< $24,999)	19.1%	19.7%
Medium ($25,000 - $74,999)	35.1%	34.7%
High (> $75,000)	45.8%	45.6%

Source: 2006-2010 American Community Survey.

Within northeastern Massachusetts, households earning less than $25,000 per year have weak outdoor recreation participation rates, with freshwater fishing (10%), viewing natural scenery (5.8%), family gatherings (4.1%), freshwater swimming (3.9%) and picnicking (3.3%) being the activities with the most participation (see Table 2.16). Without public transportation to the forests, low income households without a car cannot access the forests.

Participation levels increase sharply for households earning $25,000-$75,000 (see Table 2.16). Approximately one third of this income group enjoys developed camping (33.6%), family gatherings (31.5%), picnicking (31.3%), day hiking (31.2%) and primitive camping (30.8%).

Participation rates decline for households who earn over $75,000 (see Table 2.16). Less than one quarter of this income group enjoys cross-country skiing (22%) with visiting a wilderness area (15.4%), freshwater swimming (14.8%) and canoeing (14.7%) having moderate participation rates (Green et al., 2008).

Table 2.16. Northeast MA Participation in Outdoor Recreation by Family Income

Activity	Number of Respondents	Low Income (less than $25,000)	Medium Income ($25,000-$75,000)	High Income (more than $75,000)
View natural scenery	210	5.8%	24%	13.5%
Freshwater swimming	185	3.9%	23.9%	14.8%
Visit nature centers, etc.	162	0.3%	29.2%	13.7%
Family gathering	157	4.1%	31.5%	11.2%
Picnicking	130	3.3%	31.3%	10.3%
Day hiking	99	0.5%	31.2%	12.2%
Visit a wilderness area	91	0.6%	26.4%	15.4%
Mountain biking	78	1.6%	28.7%	13.1%
Canoeing	66	0%	27.9%	14.7%
Developed camping	58	0.6%	33.6%	10.5%
Freshwater fishing	46	10%	14.9%	12.9%
Backpacking	42	0%	29.2%	13.9%
Kayaking	38	1.4%	29.4%	12.9%
Cross-country skiing	32	1.9%	15.2%	22%
Primitive camping	31	1.3%	30.8%	11.9%

Source: National Survey of Recreation and the Environment (Green et al., 2008).

Approximately 78.7% of potential forest visitors living within a 17-mile radius of the forests are white, 7.7% are Asian and 4.7% are black or African American (see Table 2.17). Approximately 12.3% of the population living within 17 miles from the forests is of Hispanic origin (see Table 2.17).

Table 2.17. Race and Ethnicity of Potential Forest Visitors

Race	11 Miles	17 Miles
White	80.2%	78.7%
Black or African American	4%	4.7%
Asian	6.2%	7.7%
Some Other Race	7.1%	6.2%
Two or More Races	2.5%	2.7%
Ethnicity (Any Race)		
Hispanic	13.7%	12.3%
Not Hispanic	86.3%	87.7%

Source: 2010 U.S. Census.

Environmental Justice Populations

It is the policy of the Executive Office of Energy and Environmental Affairs (EOEEA) that environmental justice shall be an integral consideration in the implementation of all EOEEA programs, including the provision of access to both active and passive open space. All EOEEA agencies, including the DCR, have been directed to identify and promote agency-sponsored projects, funding decisions and other actions to further environmental justice in the Commonwealth.

Environmental justice populations are those segments of the population that are least likely to gain access to state environmental resources. They are defined as neighborhoods whose annual median household income is equal to or less than 65% of the statewide median or whose population is 25% minority, foreign born or lacking English language proficiency.

The following map identifies environmental justice neighborhoods located within the primary market areas for the forests. Many of these environmental justice populations are located in densely populated, older urban neighborhoods (e.g., Lowell, Lawrence, Lynn, Malden, Everett, Chelsea, Somerville, Cambridge and Boston). An analysis of campground reservations at Harold Parker State Forest in 2011 indicates that residents from these environmental justice neighborhoods are camping at Harold Parker State Forest.

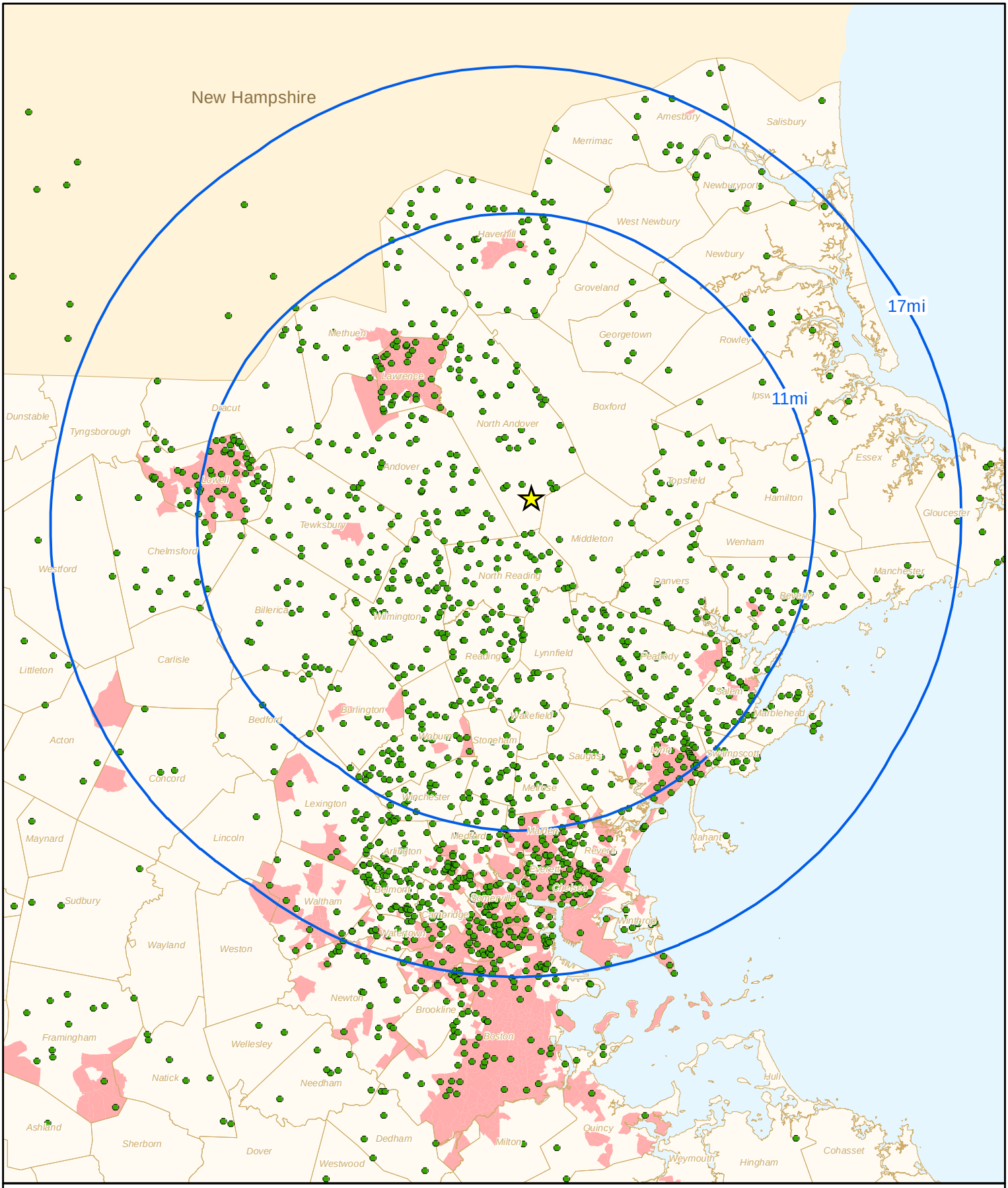
As shown in Table 2.16, in northeastern Massachusetts, households earning less than $25,000 per year have weak outdoor recreation participation rates, with freshwater fishing (10%), viewing natural scenery (5.8%), family gatherings (4.1%), freshwater swimming (3.9%) and picnicking (3.3%) being the activities with the most participation (Green et al., 2008). With the Berry Pond and Stearns Pond day use areas closed, Harold Parker State Forest no longer provides facilities for freshwater swimming and family gatherings that had been very popular among visitors from environmental justice neighborhoods located within its primary market area.

In northeastern Massachusetts, most participants in outdoor recreation activities are white. For blacks, about one-fourth participated in primitive camping (24.7%), 13% enjoy developed camping, 9.1% participated in day hiking and 8.2% enjoyed picnicking (see Table 2.18). Asians have the lowest outdoor recreation participation rate in the region, participating in canoeing (4.5%) and freshwater fishing (3.2%). Hispanics enjoy freshwater fishing (15.3%) and day hiking (7.3%; Green, et al., 2008).

Table 2.18. Northeast MA Outdoor Recreation Participation Distribution by Race/Ethnicity

Activity	Number of Respondents	White	Black or African American	Asian or Pacific Islander	Hispanic
Walk for pleasure	229	91.8%	2%	1.2%	4.9%
Freshwater swimming	185	94.7%	0.2%	1.5%	3.5%
Family gathering	157	89.9%	4.6%	0.5%	4.1%
Picnicking	130	88%	8.2%	0%	2.8%
Day hiking	99	83.5%	9.1%	0%	7.3%
Visit a wilderness area	91	97.5%	0.4%	1%	1%
Mountain biking	78	91.1%	2.3%	1.1%	5.5%
Canoeing	66	95.3%	0%	4.5%	0%
Developed camping	58	87%	13%	0%	0%
Freshwater fishing	46	81.5%	0%	3.2%	15.3%
Backpacking	42	97.8%	0%	0%	1.8%
Kayaking	38	99.5%	0%	0%	0%
Cross-country skiing	32	96.3%	0%	0%	6.2%
Primitive camping	31	72.3%	24.7%	0%	3%

Source: National Survey of Recreation and the Environment (Green et al., 2008).



Harold Parker Planning Unit

11mi and 17mi Buffer, Representing 25% and 50% of Reservations at Harold Parker State Forest in 2011

Environmental Justice Population (2000 Census Data)

Camping Reservation (2011), by ZIP Code of Origin*

1 Dot = 1 Reservation

Harold Parker State Forest

Campground Reservations and Massachusetts Environmental Justice Populations

0 2 4 Miles

dcr Massachusetts

* Based on 2011 ReserveAmerica data for Harold Parker State Forest. Reservations originating from ZIP Codes in CT, MA, ME, NH, NY, RI and VT (approximately 82% of all 2011 reservations) were used to create this map. Dots are placed at random within each ZIP Code. Outliers - reservations originating from beyond the scale of this map - are not displayed.

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

DCR GIS Mar-13

Local Recreation Demand

Construction of the interstate highway system after World War II accelerated the transformation of the five rural communities surrounding the forests into suburban bedroom communities. The population of the five abutting towns tripled between 1950 and 2000 (see Table 1.1). The rate of population increase has slowed since 2000 with the populations of these five towns increasing by 6.6% between 2000 and 2010 (see Table 1.1).

The increase in population has translated into changes in land use in the abutting towns. Data on land use from 1971 and 1991 show a significant increase in residential, commercial and industrial land use for each town, and a corresponding decrease in forested land. As a result, unprotected privately-owned open space is being converted into residential land and these new residents are creating an additional demand for recreation facilities in the forests. Major residential subdivisions were constructed immediately adjacent to both forests.

Town of Andover

The median age of Andover's population increased from 39.5 years in 2000 to 42.1 years in 2010. This followed the national trend where people are living longer, families are smaller and the general population is aging. As Andover's population ages, the demand for passive walking, picnicking and fishing facilities is likely to increase.

Currently, 39% (8,068 acres) of Andover is open space. Twenty-five percent (25%) of the town is considered permanently protected conservation and passive recreation land. The Andover Conservation Commission owns 2,257 acres, including several parcels along Jenkins Road adjacent to Harold Parker State Forest, which is open for passive recreation (Town of Andover, 2012).

The Andover Village Improvement Society (AVIS) offers 30 miles of trails that are open to the public on over 1,100 acres of AVIS reservations in Andover. AVIS is a non-profit land trust dedicated to acquiring and preserving land in its natural state. The 75-acre AVIS Skug River Reservation abuts Harold Parker State Forest buffering the northern edge of the forest from residential areas located on Salem Street and Jenkins Road. The Bay Circuit Trail connects Harold Parker State Forest to the Skug River Reservation.

The Andover Open Space and Recreation Plan calls for the extension of the existing trail system to connect schools and neighborhoods with abutting open space when new developments are planned. Existing forest trails provide connections to some of the Andover residential neighborhoods located adjacent to the forest (Town of Andover, 2012).

Town of North Andover

Between 2000 and 2010, the young adult (20 to 34 years) population of North Andover decreased by 14%, while the adult (45 to 59 years) population increased by 25.5%. Meanwhile, the elderly (65 years and over) population decreased by 36.5%. North Andover has seen a shift away from manufacturing jobs and toward high tech, service employment. Manufacturing employment has declined from 54% of the workforce in 1989 to 11.3% in 2010, changing North Andover from a blue collar to a white collar community. North Andover's 2010 median household income of $91,741 is 42.2% higher than the Massachusetts median household income.

In 2010, the town conducted an online open space survey to determine the community's open space priorities. Over 200 residents answered the survey and supported: preserving the rural character of the town (84%); protection of wetlands, rivers, ponds and other environmentally sensitive areas (87%); the preservation of meadows, farmland and forested areas (85%); and the purchase of land to preserve open space (64%; Town of North Andover, 2010).

Residents were also asked to rank various natural resources in the town that are important for maintaining the town's rural character. These resources were ranked as follows, from the most important to the least important:

1. Recreational trails
2. Aquifer protection
3. Forestland
4. Open pastures and farmland
5. Natural woodland views
6. Wetland protection
7. Historic buildings
8. Spacing of land between homes
9. Stone walls
10. Farm houses

In 2001, the Town of North Andover adopted the Community Preservation Act (CPA) with a three percent real estate surtax (after the first $100,000 in assessed valuation) to fund eligible historic preservation and open space projects. The Commonwealth of Massachusetts has matched the town's funds 100% (Town of North Andover, 2010). Since its inception, North Andover has spent $21 million on CPA projects.

Over half of Harold Parker and Boxford state forests (2,440 acres) are located in North Andover. The state forests are the largest protected open spaces in North Andover, representing roughly 12% of the town's total land area. About 600 acres of state forest land is located in six isolated parcels northeast of Route 114. Trails located in these six areas are important open space resources for area residents. The DCR has designated these areas as parklands.

The North Andover Trails Committee is working toward linking all North Andover neighborhoods, open spaces, neighborhood paths and recreation areas via an extensive trails network. North Andover has over 60 miles of hiking trails located on numerous public and private properties. These trails are available year-round for hiking, picnicking, nature walks, bird watching, and in the winter, cross-country skiing and snowshoeing (Town of North Andover, 2010). Trails on town-owned properties are maintained by the Friends of North Adams Trails (FONAT). The town has purchased and is installing trail information kiosks at ten trailhead facilities.

North Andover's landscape is noted for its glacial drumlins with panoramic views. In 2002, the town amended its Subdivision Rules and Regulations to require any natural slope exceeding 25% grade to remain in a natural condition.

Since 1995, 78 acres adjacent to the Woodchuck Hill section of Harold Parker State Forest were retained as town conservation land when four planned residential developments (PRDs) were approved by the town. The PDR conservation lands are owned and managed by the Town of North Andover. The North Andover Conservation Department is responsible for developing and maintaining trails located on the PRD properties. The FONAT volunteers maintain the trails within the adjacent state forest with the DCR performing all work that requires the use of power tools. The Eagle Scout Trail and Loop Connector trails were Eagle Scout projects constructed under the supervision of the town's Conservation Department.

Woodchuck Hill Parcels (FONAT)

Forest View Estates open space (71.5 acres) is located within a 94-lot residential subdivision west of Route 114. As part of the conditional approval by the North Andover Conservation Commission and Planning Board, trails were constructed throughout the open space parcels that connect directly to trails in Harold Parker State Forest (Town of North Andover, 2010).

The Cyr Recycling Center, an 88-acre parcel located in the southern end of the town, has been used by the DPW as a storage and leaf composting facility. Ten soccer and baseball fields are also located on this property. The Bay Circuit Trail traverses through this property, a link in the trail connection between Boxford and Harold Parker state forests in North Andover (Town of North Andover, 2010).

Town of Boxford

For most of its existence, Boxford was an agricultural community relying heavily on farming. The opening of Interstate 95 with three exits in

southeastern Boxford led to a shift from a rural community into a single-family bedroom community whose residents primarily work outside the town. Boxford's total population grew from 926 in 1950 to 7,921 in 2000. To preserve its rural character, the town began acquiring land for open space and the protection of agricultural and natural resources. Residential growth has leveled off since 2000 with the implementation of new zoning restrictions, lack of buildable lots and conservation of open spaces. Little commercial or industrial development exists in Boxford (Town of Boxford, 2008).

Boxford's rural character and strong school system attract young families. These families tend to stay through the children's education, downsizing to less expensive housing when the children leave home. This is reflected in large youth (30.1% under 20 years) and older adult (38.6% 40 to 59 years) populations with fewer young adults (11.7% 20 to 39 years old) and elderly (19.6% 60 years or over).

Boxford's labor force is employed predominantly in high tech, service jobs located in other communities. In 2010, 60.1% of Boxford's labor force was employed in management, business, science and arts occupations, compared to 42.8% statewide. Boxford's 2010 median household income of $143,045 was 121.7% higher than the Massachusetts median household income.

There are more than 3,500 acres of permanently protected land in Boxford. Over 100 miles of trails provide opportunities for hiking, birding, horseback riding, mountain biking, cross-country skiing and show shoeing. The town has also instituted a minimum two-acre residential lot size, pond overlay districts and bylaw set back distances from wetland resources. Swimming, fishing and boating facilities are provided for town residents at a town beach located on 60-acre Stiles Pond and a 66-acre state recreation area on Baldpate Pond. In 1997, the town approved a five million dollar bond for acquisition of conservation properties. In 2001, it adopted the CPA, providing additional funding for open space acquisition, historic preservation and affordable housing (Town of Boxford, 2008).

In a town-wide survey conducted in 2007, Boxford residents expressed an overwhelming appreciation of its rural character, woodlands and farms. Walking and nature hikes were reported as the recreational activities in which Boxford residents most frequently engaged (Town of Boxford, 2007). The Boxford Trails Association/Boxford Open Land Trust (BTA/BOLT) is a private non-profit organization created to permanently protect open space and wildlife habitat. Since its inception over 25 years ago, BTA/BOLT has helped permanently protect over 1,100 acres of open space and over 100 miles of trails in Boxford, including the Bay Circuit Trail. BTA/BOLT was also instrumental in the acquisition and development of trails within the 135-acre Wunnegen Conservation Area located adjacent to the southern boundary of Boxford State Forest. BTA/BOLT assists the town with ongoing monitoring and maintenance of the Wunnegan Conservation Area (BTA/BOLT, 2005).

Town of North Reading

Construction of the interstate highway system after World War II transformed North Reading from a rural town with a total population of 2,886 in 1940 into a suburban bedroom community of 11,264 by 1970. The growth rate has slowed in the past 40 years given small family sizes and decreasing availability of land readily suitable for development.

The median age of North Reading's population increased from 34.7 years in 1990 to 42 years in 2010, and the number of households with children under 18 years declined from 42.1% in 2000 to 37.2% in 2010. This followed the national trend where people are living longer, families are smaller and the general population is aging. As North Reading's population ages, the demand for passive walking, picnicking and fishing facilities is likely to increase.

North Reading operates a public well field adjacent to the Skug River (Central Street well field) placing Field Pond and most of the Harold Parker campground within a Zone II Wellhead Protection Area. North Reading has established an Aquifer Protection Zoning District along its entire northern boundary to protect recharge areas for the Town's public well fields. There are restrictions on uses associated with a high risk of groundwater contamination, earth removal, grading, impervious coverage and removal of vegetative cover within this district (Taintor and Associates Inc., 2007).

The North Reading Conservation Commission is responsible for the management and protection of 131 town conservation areas, containing 486 acres.

Two town conservation areas are located adjacent to the Skug River well field, one is located east of Bradford Pond and Ives Memorial Forest abuts the southwest corner of Harold Parker State Forest.

The North Reading Open Space and Recreation Plan calls for the creation of access points into Harold Parker State Forest from Marblehead Street, Haverhill Street and through Ives Memorial Forest. The plan also recommends the creation of a Northern Town Trail, connecting the forest trail system to residential neighborhoods, abutting open spaces and utility corridors (Taintor and Associates Inc., 2007).

Town of Middleton

Historically, Middleton was a farming community. Until the late 1980s, Middleton's rate of development was slower than in the surrounding towns. Since 1987, unprecedented development has been changing the character of Middleton. From 1991 to 1998, residential land use grew by 30%. Conversely, agricultural, forested and open land decreased by 7.7% during the same time period. Middleton's total population more than doubled from 4,135 in 1980 to 8,987 in 2010 (+117.3%). To preserve its rural character, the town created a 2,000-acre Conservancy Zoning District, a large Reservoir Protection District, and established procedures to protect wildlife corridors, the rural character of the town and the Ipswich River (Planners Collaborative Inc., 1999).

Middleton's population has been aging as the baby-boom generation progresses through the household reduction and retirement phases of life. Between 1990 and 2010, the population of 45 to 64 years olds grew by 141.6% and the population 65 and over grew by 93.9%. During the same period, youth 0 to 19 years grew by 72.7% and total occupied housing units grew by 59.1%.

Close to 25% of Middleton is designated as wetlands and 16% of its land area is held as Chapter 61 agricultural land. Until recently, the majority of development occurred in south Middleton. In 1895, the Town of Danvers purchased Middleton Pond in Middleton to supplement its main reservoir. The Danvers Water Department also owns land surrounding Emerson Reservoir, between route 114 and Forest Street, just south of Harold Parker State Forest. The Town of Danvers owns 10% of the total land in Middleton for its reservoirs and public water supply protection areas (Town of Middleton, 1998).

The Essex County Greenbelt Association and New England Forestry Foundation are also active protecting open space in north Middleton. Currently five percent of Middleton's land is held by land trusts. The town has proposed trails and paths connecting residential areas with each other and with points of interest such as ponds and hilltops. Utility corridors and the former Essex Railway right of way offer opportunities for hiking, equestrian and bicycle trails connecting to the forests. The Bay Circuit Alliance is working to locate land in north Middleton that would move the Bay Circuit Trail from Sharpeners Pond Road to forested properties connecting Boxford and Harold Parker state forests (Town of Middleton, 1998).

The former Essex Railway bed from Danvers to North Andover bisects Middleton and provides a five-mile corridor over flat terrain. Hikers and horseback riders use the old railroad bed for their trails. The Town of Middleton has recently formed a rails-to-trails committee to work with corridor land owners to develop a rail trail along the former Essex Railway corridor.

Day Use Areas

There are two day use areas located within Harold Parker State Forest. Due to operating budget limitations, the day use area located at Berry Pond has been closed since 2010. The Stearns Pond day use area was closed in 1988 after the CCC bathhouse was destroyed by fire.

Berry Pond

The day use area is set in a wooded area on the western bank of four-acre Berry Pond. The day use area was originally constructed by the CCC, including a swimming beach, comfort station, picnic pavilion and parking. During the 1970s the original CCC comfort station was destroyed by fire and the day use area was closed.

In 1996, the swimming and picnic facilities at Berry Pond were reconstructed to provide freshwater swimming in a region with a strong unmet demand for freshwater swimming. A new bathhouse, picnic pavilion and contact station were constructed. The beach area and CCC stone retaining walls were restored. Parking areas for 90 vehicles were

resurfaced. A new four-space ADA compliant parking area and an ADA accessible perimeter trail were also constructed as part of the project. A concession area was provided adjacent to the bathhouse to accommodate a vending truck. The completed day use area was heavily used by Russian, Asian and Hispanic families living in urban areas located within 15 miles of Harold Parker State Forest.

During the recent recession, the Berry Pond day use area was closed in 2010 due to state operating budget constraints. Swimming without lifeguards is not advisable since the pond is deep with a quick drop off from the shore. After Berry Pond was closed, fishermen, swimmers and hikers park on the shoulder of Middleton Road and walk into the day use area. Across the pond, along Middleton Road, there is a 40-space paved parking lot and CCC pavilion that provide access to trails in the area.

Stearns Pond

The Stearns Pond day use area contains an ample swimming beach (200 linear feet), large parking lot (140 spaces) and picnic sites on a knoll overlooking the pond. The day use area originally included a CCC bathhouse, a 1940s concession building and three 1950s comfort stations. This day use area was closed after the last remaining comfort station burned in 1988.

Stearns Pond is a large (42 acres), shallow stump pond with a leech population living in the pond sediments. Attempts to control the leech population by lowering the water level each winter have not been successful. The majority of the pond is covered by floating plants that interfere with boating, swimming and fishing in the pond.

Camping Area

The Lorraine Park Campground is located west of Jenkins Road adjacent to Frye Pond. The campground contains 85 family sites and one group campsite. Each site is supplied with a picnic table and fireplace with a campground comfort station and potable water source located nearby. The campground contains four comfort stations, a septic dump station for trailers, a contact station, nature center and recycle shed. There are no utility hookups at the sites. During the peak summer season, the campers are served by mobile concession trucks.

Traditionally, the campground was open May 1st through the Columbus Day weekend. However, given state budget limitations, the 2010 through 2012 campground seasons were shortened to Memorial Day weekend through the Labor Day weekend. There is a shallow beach along Frye Pond that is available to campers, but it is not staffed by lifeguards. There is also a new playground and small playfield available for use by campers.

Two of the four comfort stations are new ADA accessible buildings with dishwashing sinks. The two older comfort stations are not ADA accessible and do not provide dishwashing facilities. The older comfort stations contain extensive wood rot, non-compliant septic systems, failing electric and plumbing systems and leaky roofs.

The campground is run from the contact station located at the Jenkins Road entrance and is staffed 24 hours a day. Campers can register in advance by phone or online with Reserve America. Reservations may be made as early as six months prior to the date of arrival and as late as one day before arrival. Reservations are limited to 14 cumulative days in any one park between Memorial Day and Labor Day. There is a two-day minimum on most reservations.

During the 2011 camping season, 61.7% of the campsites were reserved during the entire camping season generating $65,988 in camping fees. Total campsite occupancy averaged 53.1% in June, 70.7% in July and 54.4% in August. Peak attendance occurred during the Memorial Day (75.3%), Fourth of July (100%) and Labor Day weekends (100%). During the 2009 camping season, the campground was open from May 1st through October 12th (Columbus Day weekend). In 2009, total campsite occupancy averaged 36.6% in May, 36.2% in September and 23.4% in October.

During the 2011 season, 50% of the campers lived within 17 miles of the campground and 75% lived within 88 miles (see Campground Market Area map). Campers came from as far away as Alaska, Nova Scotia, the Virgin Islands, Texas and the Marshall Islands during the 2011 season. During the past five years, the average stay declined slightly from 2.4 nights in 2006 to 2.3 nights in 2011.

Fishing and Hunting

Hunting and fishing are allowed in the forests. The National Survey of Recreation and the Environment found that 17.8% of the persons contacted in northeastern Massachusetts participated in freshwater fishing and 5.1% hunted (Green et al., 2008). A statewide survey conducted for the DCR in 2004 found that 22% of the Massachusetts households interviewed had fished and 4% hunted in a park during the past 12 months (The Insight Group, 2004).

The ponds in the forests are open for licensed fishing. Fisherman's landings are available at Stearns and Field ponds for small, open boats. Gasoline engines are prohibited from the ponds. Berry Pond is the only pond stocked with trout by the Department of Fish and Game. Most of the ponds are shallow and are limited to yellow perch, chain pickerel, pumpkinseed, eels, bluegill sunfish, largemouth bass, smallmouth bass and white perch.

Field Pond has become popular for fishing and boating. Currently, there is limited parking in pull offs along Harold Parker Road. The entrances to fire roads are often blocked by parked cars, making the roads inaccessible to emergency equipment. Parked cars and users along the heavily traveled and narrow road make for a dangerous situation. With the day use area closed at Berry Pond, unauthorized swimming and picnicking frequently occur at Field Pond.

Boxford State Forest and Harold Parker State Forest east of Jenkins Road are open for licensed hunting from mid-October until late February, except near the forest headquarters. On Sundays, hunting is not permitted in Massachusetts. No discharge of firearms, bow and arrows or other weapons is allowed at any other time of the year without a special permit. Target shooting is prohibited in the forests. Recreational users are advised to wear blaze orange during the hunting season.

The Division of Fisheries and Wildlife stock pheasant from mid-October through November in Harold Parker State Forest between Jenkins and Middleton Roads. The forests are also popular for deer hunting in late November and early December.

Trail Network

Trail users utilize an intricate network of forest roads and trails throughout the forests. The existing trail network is comprised of administrative access roads, unpaved forest roads and single lane natural trails (see Table 2.20). The trail systems at Harold Parker (56.3 miles) and Boxford (11 miles) state forests are extensive. The entire trail network has traditionally been utilized by all trail user groups, with the major users being hikers/walkers, nature watchers, mountain bikers, horseback riders and cross-country skiers.

Trail Inventory

In 2010-2011, DCR Foresters conducted an extensive GPS trail inventory of both forests. Every forest road and trail was walked, GPSed and assessed for width, surface and condition. Point features, such as bridges, drainage structures and historic features were also recorded and assessed for their physical characteristics and condition. The inventory also recorded all occurrences of trail damage including erosion, mud holes, ruts and braided trails. Intersecting trails, dead ends, connections to abutting properties and user-created trails, creating additional connections, were identified. Although trail signage and marking has been improved in recent years, there is still a lack of sufficient signage, particularly in Boxford State Forest.

Based on the recent DCR trail inventory, the condition of forest roads and trails within the forests is relatively worse than the statewide system (see Table 2.19). The inventory indicates that 12.5% of the forest roads and trails in Harold Parker State Forest are currently in good condition, 83.6% are in fair condition and only 3.9% are in poor condition. This compares favorably to the Boxford State Forest roads and trails of which only 2.6% are in good condition, 91.8% are in fair condition and 5.6% are in poor condition.

Table 2.19. Trail Conditions

Location	Good	Fair	Poor
Harold Parker	12.5%	83.6%	3.9%
Boxford	2.6%	91.8%	5.6%
DCR Statewide	44%	46%	9%

Table 2.20. Existing Forest Roads and Trails

Trail Type	Width	Boxford	Harold Parker
Paved Access Roads	> 15 ft	0 mi	8.2 mi
Unpaved Forest Roads	5-10 ft	5.3 mi	12.4 mi
Forest Trails	3-5 ft	5.7 mi	35.7 mi
Total	-	*11 mi*	*56.3 mi*

Harold Parker State Forest. Most of the trails in Harold Parker State Forest are in the main block of the forest to the west of Route 114. There are 8.2 miles of administrative access roads in the day use and camping areas. These are at least 15 feet wide, well-constructed and in good condition. Roads open to through vehicular traffic were not considered as part of the recreational trail network for the purposes of the trails inventory.

The trail system includes a 12.4-mile network of unpaved forest roads that provide access to the forest. Most of these were built by the CCC. These roads are at least eight feet wide, with sand and gravel surfaces, properly graded and well-drained with culverts and bridges where necessary. There are also 35.7 miles of footpaths that are generally three to five feet wide with good overhead clearance, a layer of leaf litter cover and good drainage.

While the general condition of the forest roads and trails is good, there are a few serious erosion or drainage problems. The most common deficiencies were flooded areas and mud holes that should be repaired to maintain trail function, minimize potential environmental impacts and provide a positive user experience. There are also stream crossings that need boardwalks or bridges, trails that should be re-routed away from vernal pools or wetlands and trails that need extensive clearing due to overgrowth and dead fall obstructing the treadway.

Boxford State Forest. There are 5.3 miles of unpaved forest roads and 5.7 miles of trails within Boxford State Forest. These roads and trails connect to trails within the J.C. Phillips Wildlife Sanctuary, Wunnegen Conservation Area and several properties owned by the Essex County Greenbelt Association. Most of the forest roads are former farming or logging roads that existed before the state purchased the property. Forest, Kimball and Bald Hill roads existed in colonial times.

During the 1930s, the CCC improved some of the forest roads and trails to provide access to forestry projects in the forest. The forest roads located between the Sharpners Pond Road and the ABM Pond were constructed by the Army Corps of Engineers in the late 1960s.

Many of the forest roads have not been maintained and are impassable to management, fire and emergency vehicles. Bald Hill Road has been flooded by beaver activity around Crooked Pond within the J.C. Phillips Wildlife Sanctuary, preventing emergency access to fire prone Bald Hill from Middleton Road in Boxford. Recently, the Bureau of Fire Control has cleared Thomas Road, a town-owned dirt road, to provide emergency access from Middleton to Bald Hill. The Essex County Greenbelt Association, Bay Circuit Alliance and Boxford Trails Association/Boxford Open Land Trust have maintained many of the foot trails within Boxford State Forest and adjacent properties.

While the general condition of the forest roads and trails is fair, there are a few serious erosion or drainage problems. Off-highway recreational vehicles are responsible for severe degradation of forest roads and trails on the south side of Bald Hill. Portions of roads and trails located in wet areas with poor drainage have ruts and ponding. Recent beaver activity has flooded several road and trail sections within the forest. There is also severe erosion on some of the trails that lead to the top of Bald Hill.

Unpaved Forest Roads

Unpaved forest roads provide access to remote parts of the forest for forest management, including fire suppression. Due to concern about forest fires, existing access roads were improved between 1917 and 1941 to access fires burning in remote sections of the forests. Forest roads also allow park staff, firefighters and emergency medical personnel to evacuate users who have become injured or lost in the forests. The forest roads have also become an important part of the forests' trail network. Forest roads are used by many recreational users, including hikers, equestrians and mountain bikers, as well as hunters and cross-country skiers in winter.

These unpaved forest roads are narrow (8-10 feet), gravel or natural surface roads suitable for travel only by high clearance and four-wheel drive vehicles. The only motor vehicles allowed on these

roads are DCR authorized forest management, wildlife management, fire safety and municipal emergency vehicles.

Unauthorized use of the forest roads causes damage to them and presents a safety hazard if the roads become impassable by emergency vehicles. This problem has decreased significantly since OHV use has been banned in the forests. Some primary forest roads have been improved and have remained in relatively good condition. However, other roads have not been maintained and the vegetation has not been cut back recently. The Bureau of Fire Control has instituted a program to reclaim worn and overgrown forest roads needed for emergency vehicle access.

Current Trail Uses

The experiences of observing, exploring and discovering nature can be enjoyed through various modes of travel from foot, to bike, horseback and ski. The following descriptions discuss some of the elements particular to each mode of travel in the forests.

Walking, Hiking and Snowshoeing. Experiencing the trails on foot is the slowest mode of travel. One can stroll leisurely or take a hike at a strenuous pace. Travel by foot is also the simplest, lowest cost and most versatile mode of trail use. Some walkers will look for wide, relatively flat loops of short to moderate distances that they can travel without too much effort and return to their trailhead without getting lost. Other hikers will want to find more challenging trails that offer steep and rocky sections and bring them to destinations with features or views.

Most pedestrian users will want an experience of one to eight miles, often with a destination in the middle, and generally loops are most desirable. This experience can be diminished by encountering damaged, eroded or wet trails, the presence of trash, and situations that make the user feel unsafe or uncomfortable. Due to its low impact nature, hiking can be located in most areas of the forests without causing significant damage to natural resources. However, no hiking should be allowed in the vicinity of vernal pools or sensitive cultural resources.

Nature Observation. Nature observation may occur throughout the forest, on hiking trails, dirt roads and paved roads. This use includes bird watching, mushroom hunting, butterfly watching and other organized and non-organized natural history exploration. Nature observation is often focused around ponds, wetlands and vernal pools where wildlife activity is concentrated. Nature observation is a valuable activity, but users should recognize that they may also be impacting the very resources they are appreciating.

Mountain Biking. Mountain biking is increasing in popularity. Mountain biking can add speed, distance, technical skill and physical challenge to the trail experience. Most users on mountain bikes like to connect with nature and experience diverse destinations. The mountain biking experience also includes some elements such as fun and technical challenges. The flow of the trail – its twists and turns, its ups and downs, its obstacles – all contribute to the mountain biking experience. The quality of the trail is integral to the quality of the experience.

Mountain bikers also desire varying distances, levels of challenge and technical difficultly. They may desire to increase their level of technical challenge as they develop. Mountain bikers may travel 5-15 miles during an outing. An adequate trail system should provide approximately 40 miles of trails of varying types, levels of difficulty and terrain. Single-track and loop trails are important to the mountain bike experience and loops of various difficulties are important to different riders. In the forests, the mountain biking experience is diminished by a lack of clear signage and marking, wet trails and negative encounters with off-leash dogs.

Mountain biking, as with all recreational trail uses, can cause trampling, soil compaction, erosion and sedimentation. The degree of impact is similar to that of hikers (Cessford, 2002). Heeled uses may create some difference in impacts when compared to "point" impacts created by hikers and horses. Any trail use on steep slopes that follow the fall-line have the greatest potential to contribute to soil erosion and sedimentation.

Due to its low impact nature, mountain biking can be accommodated in most areas of the forests without significantly impacting natural resources. It is a quiet activity that in most cases has minimal impact on breeding animals. However, it should be directed away from more sensitive habitats like

vernal pools. As with all recreational trail uses, fall-line trails on steep slopes should be evaluated for re-routing and structures such as boardwalks and bridges can be used to minimize or avoid impacts in wetland resource areas and buffers.

Trail Running. Trail running involves physical exercise and traveling longer distances within a natural context. The trail running experience is enhanced by the natural context of the trails and the ability to traverse diverse landscapes, reach destinations and tackle varied terrain. Runners generally cover three to seven miles in an outing and do not want to stop to figure out which way to go.

The trail running experience can be diminished by damaged, eroded, wet trails, confusing markings and the approach of off-leash dogs. Runners should be able to find a variety of well-marked running loops of three to six miles on easy to moderate trails, as well as some more challenging terrain.

Horseback Riding. Four horse stables abut Harold Parker State Forest. A number of homes surrounding both forests have horses. Parking adequate for trucks and horse trailers is available at the forest headquarters and on Berry Pond Road east of Jenkins Road. From these points, a variety of loops can be followed, from five miles to 20 miles along forest roads and trails.

Loops of different lengths are important for conditioning of horses and riders, and to provide varied riding experiences. The existing bridle trails predominantly follow sections of the dirt forest road network. The dirt roads tend to be approximately 8-10 feet in width and are composed of loosely sorted sand and gravel. Equestrian users can also use single-track trails that are only three to five feet wide, provided that the canopy is high enough. Individual and small group equestrian riding use is not restricted in the forest. Formal (or group) rides are required to obtain a Special Use Permit.

Horse riding can cause trampling, erosion, sedimentation, soil compaction and nutrient loading. Regular horse riding can produce a well-worn path that results in erosion where slopes are steep and soils are fine. Erosion can occur where horses trample pond bank vegetation while wading into ponds for watering.

There is a potential for user conflict between horseback riders and other trail users. Trail users should yield to a horse, step off the trail, talk to the rider and follow the rider's instructions.

Similar to hiking, horse riding is generally slow and methodical with the exception of long straight stretches of trail appropriate for trotting and cantering. Because horse riders use similar trail types as other passive users (narrow and wooded), impacts on these trails are often regularly observed through multiple uses. Horse riding is also a quiet activity that in most cases will not disturb or stress wildlife. Horse riding can be accommodated in most areas of the forest without impacting natural resources. It should be redirected away from sensitive natural resources such as pond shores, vernal pools and wetlands, as well as areas with a high potential for erosion such as steep slopes. Impacts from horses can be minimized or avoided by constructing boardwalks or bridges in the appropriate locations.

Dog Walking. Family pets, especially dogs, are an important part of today's society. Just like humans, dogs need to both exercise and socialize with other dogs to be healthy. As a result, many users to the forests desire to recreate with their dogs on trails and allow their dogs to socialize and recreate together.

While some dog owners prefer to keep their dog on a leash to both control and protect the dog, many dog owners desire to exercise their dogs off-leash. DCR regulations require that dogs in the forests be on-leash. The reasoning for this is that some dogs can be aggressive and can startle or frighten other users or dogs as they approach. Dogs off-leash will also tend to run both on and off trail, contributing to off trail impacts and potentially disturbing wildlife.

Cross-country Skiing. The skiing experience is enhanced by varied terrain and access to a variety of loop trails of different difficulties. The experience of cross-country skiing can be diminished by becoming lost or confused, rocky trail conditions, wet trails or sudden steep down hills. The forest roads and hiking trails serve as cross-country skiing and snowshoeing trails during winter months. There are no specifically designated or prohibited trails for cross-country skiing. Weather permitting, the trails are used throughout the winter.

Trail Etiquette. The trails and forest roads in Harold Parker and Boxford state forests are multi-use trails open to all allowed trail uses. The vast majority of

trail users are satisfied and have few complaints about their trail experience. However, conflicts among trail users do occur. If not addressed, conflicts can spoil individual experiences and polarize trail users.

As the number of trail users grows and diversity of trail activities increases, the potential for conflict grows as well. Trail conflicts need to be faced quickly and addressed with the participation of those affected. Trailhead signage, interpretive information and trail design are used to encourage proper trail etiquette.

When hikers or mountain bikers encounter horses on the trail, they should step off the trail on the downhill side and talk to the rider and the animal. If the horse seems anxious, they should consider removing their backpacks or helmets and dismounting their bikes. They should also talk in a calm voice as all of the animals pass by, paying special attention to the last horses; if there are new riders in the bunch, they are at the end of the line.

If hikers or mountain bikers approach horses from behind, it is critical that they announce themselves loudly, but calmly so as not to scare the animals. They should let the rider know that they would like to pass at the next safe location. They should not approach the horses quickly; it is dangerous for everyone.

Horse riders have a responsibility to manage their animals on the trail; it is not advised to bring "green" horses to high-traffic or multi-use trails until they are familiar. Also, it is important for riders to remember to keep an eye out for other trail users in front of them, behind them and joining them at trail junctions.

Trail users should do their utmost to let fellow trail users know that they are coming; a friendly greeting is a good method. Anticipate other trail users around corners. Bicyclists should yield to horses and other trail users. Bicyclists traveling downhill should yield to ones headed uphill.

Trailhead Parking

Seven trailhead parking areas containing 170 spaces are located throughout the forests (see Table 2.21). Visitors to Field and Collins ponds park along the shoulders of Harold Parker Road. These informal parking areas fill beyond capacity during summer weekends, creating a traffic hazard and compacting soils adjacent to ponds.

The unpaved parking area along Berry Pond Road east of Jenkins Road fills beyond capacity during peak weekends with some compacted areas. The New England Mountain Bike Association (NEMBA) is sponsoring a volunteer project to expand this parking area. The forest trail map located on the back side of the information kiosk is not visible from the parking lot.

Table 2.21. Trailhead Parking Facilities

Trailhead Parking Lots	Number of Spaces	Surface	Condition	Information Kiosk
West entrance on Harold Parker Road	14	Gravel	Fair	No
Field Pond along Harold Parker Road	12	Natural	Poor	No
Berry Pond Road east of Jenkins Road	40	Natural	Poor	Yes
Middleton Road south of Berry Pond	40	Asphalt	Good	No
Forest headquarters visitor parking	20 30	Asphalt Natural	Good Fair	Yes
Sharpners Pond Road (Boxford)	12	Asphalt	Fair	No
Liberty Street (Boxford)	2	Natural	Poor	No

Regional Trail Connections

The 220-mile Bay Circuit Trail connects Harold Parker and Boxford state forests with the J.C. Phillips Wildlife Sanctuary, Cyr Recycling Center, Skug River Reservation and other local conservation areas. The Bay Circuit Alliance has expressed an interest is relocating the Bay Circuit Trail from Sharpners Pond Road to a more natural, safer off-road corridor in Middleton. The Bay Circuit Alliance has proposed a trail connection in Middleton between Bald Hill within Boxford State Forest and the former Essex Railroad embankment. The Middleton Town Meeting has recently authorized the formation of the Middleton Rail Trail Committee to study the feasibility of creating a non-motorized trail along five miles of the former Essex Railway corridor. The former Essex Railway extended northwest from Salem to Lawrence through Middleton and North Andover. The Bay Circuit Trail runs along a short segment of the Essex Railway between Sharpners Pond Road and Salem Street in North Andover. These long distance trails provide opportunities to create long distance greenways that connect adjacent communities to the state forest trail systems.

Prohibited Recreational Uses

The man-made pond located at the former ABM site has been traditionally used for unauthorized swimming. Over the years, there have been several drownings and swimming accidents in the pond. The ABM Pond is now officially closed to swimming and posted.

In response to the growing number of concerns about off-highway vehicle (OHV) use in state forests, the DCR prohibited OHV use in Boxford and Harold Parker state forests. The use of recreational trail vehicles, which includes all terrain vehicles (ATVs), motorcycles, snowmobiles and four-wheeled vehicles, other than those necessary to maintain and protect the forests, are not allowed in either forest. Both forests contain a significant number of high quality wetlands and vernal pool clusters that can be negatively impacted by motorized vehicles.

In a report submitted to the Board of Environmental Management on October 17, 1995, it was recommended that OHVs be prohibited in the forests due to their incompatibility with the agency's statutory mandate to protect natural resources, minimize conflicting recreational uses and protect people from excessive noise (DEM, 1995). The report pointed to direct legal conflicts with the Massachusetts Endangered Species Act; problems with trail erosion; impacts to wetlands and wildlife habitat; conflicts between recreational user groups; and management problems with OHV users specifically related to illegally cut trails and trespassing on private and public lands abutting the forests. As a result of the report, the agency implemented a new OHV Policy that prohibited OHV riding in both forests.

OHVs can cause erosion and sedimentation, soil compaction, noise and motion impacts and pollution from exhaust. Direct impacts on vegetation include crushing of foliage, root systems and seedlings by wheels, and uprooting of small plant cover and disruption of root systems of larger plants by shear stress. Indirect impacts include undercutting of root systems as paths widen, creation of new erosion channels by runoff on land not used by the vehicles, burial of off-site areas by debris carried by runoff and reduction of biological capability of the soil by physical modifications, including stripping of the fertile top layer of the soil (Willshire, 1978).

Wednesday's Walk to Balanced Rock, DCR

2.4. Interpretive Services

Interpretation plays an important role in the creation of meaningful connections between park visitors and the natural and cultural resources at Harold Parker State Forest. Interpretive programs include a mix of educational programs and activities geared primarily towards children, catering to campers, day use visitors and residents from surrounding

communities. The DCR does not provide interpretive services at Boxford State Forest.

A short-term seasonal Interpreter provides interpretive services and programs at Harold Parker State Forest during the summer recreation season (May 1st through Labor Day weekend). Weekly hikes and special events have been provided off-season by a dedicated volunteer from the Harold Parker State Forest friends group with support from the year-round Regional Interpretive Coordinator assigned to the North Region.

Interpretive Facilities

The seasonal Interpreter works out of a small (160 square foot) shed located near the campground entrance. The Nature Center contains a desk, wall displays and storage space for interpretive materials. The Nature Center does not contain space for audio-visual presentations, permanent exhibits, indoor programs, meetings or special events. During wet weather, outdoor programs are cancelled. There is limited parking and no public restrooms at the Nature Center.

The Nature Center is open May 1st through Labor Day weekend when the seasonal Interpreter is not providing roving interpretation or running interpretive programs elsewhere in the forest. The seasonal Interpreter provides trail maps, distributes interpretive program schedules and provides discovery packs at the Nature Center. Discovery packs contain items to explore geology, insects and other facets of nature in the forest.

An outdoor amphitheater is located in the campground. The amphitheater is used for storytelling programs, live animal demonstrations, campfires and other special events.

Interpretive Programs

Interpretive programs led by the seasonal Interpreter focus on natural and cultural resources at Harold Parker State Forest. Most of the participants are camping families or residents of the surrounding communities. Each year, a variety of programs provided by the seasonal Interpreter are enjoyed by numerous visitors to the forest (see Table 2.22 and 2.23).

Table 2.22. Interpretive Services Provided in 2012

Month	Number of Programs	Number of Participants	Nature Center Attendance	Informal Interpretation	Total Attendance
May	24	194	269	771	1,234
June	31	272	303	888	1,463
July	33	562	307	1,179	2,048
August	32	519	444	1,301	2,264
September	8	300	92	285	677
Total	*128*	*1,847*	*1,415*	*4,424*	*7,686*

Special Events

Special events provide opportunities to involve campers, visitors and other organizations in exploring ecological communities and recreational opportunities available at Harold Parker State Forest. Table 2.24 provides a summary of the special events that were offered in 2012.

For the past three years the Fishing Festival has been held at Sudden Pond. Although this pond is quite beautiful, it is a poor fishery in terms of both the variety of species and size. The event used to be held at Berry Pond, which is stocked with trout and has public restroom facilities.

Informational Kiosks

Four informational kiosks are located within Harold Parker State Forest at the:

- Berry Pond day use area – one new kiosk with a trail map, park history and rules and regulations.
- Headquarters visitor parking lot – one kiosk providing information about the forest and a trail map.
- Berry Pond Road parking lot at the end of Jenkins Road – one kiosk with park information and a trail map.
- Campground entrance – one kiosk with park information and a small scale trail map.

There are no kiosks inside the campground to post forest rules, interpretive program or special event notices. There are no information kiosks in Boxford State Forest.

Table 2.23. 2012 Interpretive Programs

Program Title	Program Description
Senior Walk and CCC Talk	A slow paced walk around Frye Pond with the Interpreter describing the CCC program and its role developing Harold Parker State Forest.
Wednesday's Walk in the Woods	A year-round, community walk in the woods. Each week the Interpreter chooses a different trail and theme (e.g., oaks and acorns, glacial erratics and kettle hole ponds). At mid-point, the groups stop for a nature reading from "Daybreak: 52 Things Nature Teaches Us."
Gone Fishin'	Teaches the basics of freshwater fishing. The program starts with a class at the Nature Center and ends at Frye Pond. Equipment and bait are provided.
Hikin' Kids	An introduction to hiking for pre-kindergarten children. The children hike a short trail over a hill behind the Nature Center to Frye Pond. The program includes tree and plant identification and observation of animal signs (e.g., tracks and scat).
Let's Explore the Pond	Nets, containers, magnifiers and a fishing rod are used to discover what lives in and around a New England pond. Sometimes the Interpreter will read a story about one of the pond's inhabitants.
Healthy Heart Hike	A hike around Berry Pond from the CCC pavilion on Middleton Road.
Forest Bike Ride	A weekly two-hour bike tour on forest roads and trails making stops at several ponds and historic sites.
Soapstone Quarry Ramble	A weekly hike over a hilly trail stopping at mid-point to explore remains of the Jenkins Sawmill and soapstone quarry. Parking is not available on Jenkins Road at the Bay Circuit Trail crossing to this area. Program participants must walk from the Berry Pond parking lot, reducing time available for the historical part of the program.
You Can Canoe Too!	Instruction on the basics of canoe handling and water safety followed by a guided paddle around one of the forest's ponds.
Campers' Campfire	Held Saturday evenings at dusk in the campground amphitheater, the program begins with a welcoming, lighting of the campfire, show of animals or storytelling and then toasting of marshmallows and s'mores.

Table 2.24. 2012 Special Events

Event Title	Event Description
Movie Nights	Campground movie nights held on three consecutive Saturday evenings in July.
Lawrence Schools Camping Experience	Introduction to camping for 200 Lawrence students, including a talk about animals living in the forest, hike in the woods, cooking lunch over an open fire and a swim in Frye Pond.
Annual Fishing Festival	Held in September for the past 25 years, this program includes fishing instruction and contests. This event is co-sponsored by the Wildlife Angler Education Program.
Hunter Moon Hike	October night hike around Stearns Pond, including a campfire and hot chocolate.
Colonial Encampment	In August, the Wilmington Minutemen hold a colonial encampment in the campground field to demonstrate colonial dress, cooking, toys and musket firing.
Wicked Ride of the East	The North Shore Chapter of the New England Mountain Bike Association holds an annual mountain bike festival each fall featuring loops for different abilities, bike clinics and food.

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Friends of Harold Parker State Forest Collins Pond Clean-up, DCR

SECTION 3. MANAGEMENT RESOURCES AND PRACTICES

The operation and management of DCR properties often requires close coordination between multiple bureaus, offices and programs of the DCR, and is highly dependent upon fluctuating operating budgets. Each facility has its own management challenges, which are generally influenced by many factors, including seasonal or year-round visitor use numbers, staffing availability, condition of recreation facilities, the equipment available for property management and regulations which the agency must follow. Operational procedures at the forests have evolved over the past 95 years. The following section summarizes the current management and operation of Boxford and Harold Parker state forests.

3.1. MANAGEMENT STRUCTURE

The forests are part of a group of DCR facilities within the North Region, under management of the North Region Director. The North Region office and support staff is located at Lowell Heritage State Park. North Region staff provide support for various aspects of park management throughout the region including, but not limited to:

- Regional Management and Forest Health Foresters provide support for maintaining forest health, pruning hazardous vegetation, timber harvests and controlling insect pests and invasive plant species.
- District 5 Forest Fire Warden promotes fire safety and supervises the fire control staff that operate the fire tower, maintain forest fire access roads and fight wild fires.
- Regional Ranger provides support for public education and enforcement of DCR regulations. The Regional Ranger reports to the Director of Ranger Services, supervises District Rangers and trains seasonal Park Rangers. Park Rangers report to the Park Supervisors, but rely on the Bureau of Ranger Services for training and regulation enforcement guidance.

- Regional Interpreter provides support for visitor services, interpretive programs and special events, and training of seasonal Park Interpreters. Seasonal Park Interpreters report to the Park Supervisors, but rely on the Office of Interpretive Services for training and technical support.
- Regional Beach Manager coordinates water safety programs and trains seasonal lifeguards.
- Regional Maintenance Foreman coordinates facility maintenance from a statewide dispatch center using appropriate in-house staff or service contractors. The dispatch center provides plumbing, electrical, HVAC, overhead door, fencing, pool mechanical system, roofing and painting services.
- Regional Mechanic provides vehicle maintenance support.

The North Region is divided into three smaller management districts. Boxford and Harold Parker state forests are located within the Middlesex Essex District, under the management of the District Manager. Boxford and Harold Parker state forests have a full-time, year-round Recreation Facility Supervisor who reports to the District Manager.

Planning and Engineering

The Bureau of Planning and Resource Protection prepares master plans, resource management plans and trail system plans; develops and updates GIS data; provides technical assistance for the stewardship of archaeological and historic resources; identifies and acquires properties to be added to the DCR system; maintains an archive of park documents; and provides technical support on ecological resources and the monitoring of Conservation Restrictions. The Bureau also plans, designs and permits park building and landscape projects.

The Bureau of Engineering is responsible for the engineering and construction of parkways, utilities, dams, buildings and recreation facilities. The Bureau includes a Regional Engineer who oversees infrastructure maintenance and construction projects in the North Region.

Law Enforcement and Public Safety

Public safety, waterfront safety and emergency response services are provided by park staff with the support of state and local law enforcement departments. Swimming in undesignated areas, illegal dumping, illegal OHV use, illegal campfires/party spots and after hours use are the most common enforcement issues in both forests. Parking in restricted areas, alcohol violations, illicit sexual activity and campground noise violations occur on a regular basis at Harold Parker State Forest.

DCR staff are not law enforcement officers, but have limited authority to issue citations in the forests (e.g., parking tickets). The Massachusetts State Police has primary law enforcement authority on state-owned lands. Within the forests, the State Police respond to vehicle accidents, medical emergencies, intoxicated visitors, visitor evictions, search and rescue, domestic violence and burglary incidents.

The Massachusetts Environmental Police provide primary enforcement of off-highway vehicle, boating, hunting, trapping and fishing regulations. The Environmental Police will also respond to search and rescue, domestic violence, dumping, vehicle law violations and camping issues within state forests. Local police (i.e., Andover, North Andover, Boxford, Middleton and North Reading) provide additional law enforcement at Boxford and Harold Parker state forests within their respective jurisdictions.

DCR Rangers and lifeguards provide first aid services. Fire control and first aid services are also provided by DCR District 5 Forest Fire Control staff, with support from the local fire departments. DCR Rangers also provide search and rescue services, manage traffic and parking, administer the Park Watch Program and educate visitors about park rules and regulations. Approximately 90% of the visitors lost in the forests each year do not have a trail map when they get lost.

3.2. CURRENT STAFFING

The number and job titles of permanent year-round and temporary seasonal personnel that work at Boxford and Harold Parker state forests are presented in Table 3.1. As fiscal challenges require the DCR to make some tough staffing decisions, facilities such as Harold Parker State Forest that have a quiet winter season have been reducing their

year-round staff and increasing the seasonal staff during the peak summer season.

Table 3.1. 2012 Harold Parker State Forest Personnel

Job Title	Number
Year-round	
Recreation Facility Supervisor III	1
Forest and Parks Supervisor I	1
Long-term Seasonal (late April to September)	
Clerk II	1
Forest and Parks Supervisor I	2
Park Interpreter	1
Park Ranger	2
Laborer I	8
Short-term Seasonal (June to Labor Day)	
Summer Worker	1

In 1985, Boxford and Harold Parker state forests were staffed by six year-round state employees and supplemented by 18 seasonal employees during the summer season. During 2012, the forests were staffed by two year-round and 15 seasonal employees. This has the effect of reducing the full-time equivalent of 14 employees in 1985 to seven in 2012.

This shift from a reliance on full-time permanent employees to seasonal temporary employees impacts long term maintenance, which occurs in the off-season. It also represents a loss of institutional knowledge and memory, which becomes increasingly difficult to recreate. The information gathered in this RMP will help staunch the loss of knowledge and experience through recordation.

Volunteers

Volunteers contribute to the operation and maintenance of Boxford and Harold Parker state forests. They conduct interpretive programs, sponsor special events, pick up litter and under the guidance of DCR staff, maintain trails and historic features and construct wetland crossings and bridges. Some volunteers make one-time or short-term contributions while others make ongoing contributions to the management of park resources. One-time and short-term volunteers are typically associated with youth groups, corporations and special volunteer events (e.g., Park Serve Day).

Organized volunteer groups, such as the BTA/BOLT, Friends of Harold Parker State Forest, New England Mountain Bike Association and other park user groups also provide ongoing support for the maintenance and safe use of the forests.

The DCR has prepared a draft volunteer policy that sets forth the conditions under which organizations and individuals can engage in volunteer projects on DCR properties. Volunteers may perform a wide range of activities including: general clean-ups; providing park visitors with information about the facility; assisting DCR staff with education programs and events; removing invasive plant species; researching historical or scientific information; maintaining the park's recycling center; planting flowers, trees or shrubs; minor trimming or weeding with hand tools; maintaining trails; and organizing events to promote public awareness of park resources.

3.3. Current Operating Activities

DCR personnel perform a variety of activities related to the operation and maintenance of the forests (see Table 3.2). Recreation related activities include the operation and maintenance of the Lorraine Park Campground. During the peak camping season, the campground staff has three eight-hour shifts.

Buildings and grounds maintenance activities include: cleaning, painting, minor carpentry, electrical and plumbing tasks, mowing grass, removing leaves and branches, picking up litter, beach clean-up, emptying trash barrels and graffiti removal. The comfort stations are cleaned as needed when open to the public.

Visitor services related activities include: camper registration, ParksPass sales and processing, routine patrols, promoting awareness and enforcement of regulations. The trailhead parking lots are monitored periodically to assess conditions and user activity.

Administrative activities include: employee scheduling and supervision, report preparation, revenue processing, coordinating volunteer activities, coordinating special events and budget preparation.

Table 3.2. Current Management Activities

Activity	Summer (June-August)	Fall (Sept.-Nov.)	Winter (Dec.-Feb.)	Spring (March-May)
Litter and graffiti removal	As needed	As needed	As needed	As needed
Campground fee collection	Daily			
Water safety monitoring	Daily			
Camping administration	Daily			
Visitor guidance and information	Daily	Daily	Daily	Daily
Interpretive programs	Daily	As needed	As needed	As needed
Trash barrel pick-up	As needed	As needed	As needed	As needed
Empty dumpsters	As needed	As needed	As needed	As needed
Sweep and clean headquarters	As needed	As needed	As needed	As needed
Seasonal opening and closing of camp office and comfort stations		Annually		Annually
Routine patrols	Daily	Daily	Daily	Daily
Minor painting, carpentry, plumbing and electrical work	As needed	As needed	As needed	Daily
Picnic table, fence, guardrail and grill maintenance	As needed	As needed	As needed	As needed
Mowing, trimming and leaf removal	As needed	As needed		As needed
Weed flower beds and paved areas	Monthly	Monthly		Monthly
Mulching and fertilizing				Annually
Road pavement maintenance	As needed	As needed	As needed	As needed
Catch basin, drain, spillway and culvert maintenance		As needed		
Comfort station cleaning	As needed			
Parking lot maintenance	Daily	As needed	As needed	As needed
Snow removal		As needed	As needed	As needed
Campground maintenance	Daily	As needed	As needed	As needed

Daily operation and management efforts associated with the forests are influenced by several key laws including the Wetlands Protection Act (WPA; M.G.L. Chapter 131: Section 40) and its associated regulations (310 CMR 10.00); the Massachusetts Endangered Species Act (MESA; M.G.L. Chapter 131A) and its associated regulations (321 CMR 10.00); and the State Sanitary Code (105 CMR 410.00). A list of regulations applicable to the forests can be found in Appendix F.

Wetlands Protection Act Regulations (310 CMR 10.00) require that no one shall remove, fill, dredge or alter any wetland or riparian resource areas or buffer zones listed in the regulations without first filing a Notice of Intent (NOI) with the local Conservation Commission and obtaining an Order of Conditions under which the work will be performed to protect the specific interests of the Wetlands Protection Act. If work is only in a buffer zone, a Request for Determination of Applicability (RDA) may be filed, instead of a NOI.

If a project is proposed in Estimated Habitat or Priority Habitat in the latest Natural Heritage Atlas (see Priority Natural Resources map), a Rare Species Information Request Form must be submitted to the NHESP. The NHESP will determine the rare species present and if a permit is required for proposed activities.

The Bureau of Planning and Resource Protection's Ecology Program can provide advice, guidance and support to DCR staff and volunteer organizations planning work in areas potentially subject to the Wetlands Protection Act or in Estimated Habitat or Priority Habitat for rare species on DCR lands.

A DCR Waterfront Program Procedure Manual has been adopted to unify how waterfront properties operate (DCR, 2007). The manual covers topics from designating swimming areas, water quality standards, emergency response and preparedness, to management of designated swimming areas and lifeguard recruitment and testing guidelines. All lifeguard staff receives the same annual trainings

outlined in the Waterfront Program Procedure Manual.

3.4. A TYPICAL SUMMER DAY

No summer day is the same at Harold Parker State Forest, but general routines are followed to maintain the property. The following section provides a snap-shot of a typical summer day in Harold Parker State Forest. These summaries do not include work performed by outside contractors (i.e., dumpster collection).

8:00 a.m. - 4:00 p.m. Supervisors, Clerk, Laborers, and Summer Workers

- Check reservations
- Complete paperwork for revenue collection
- Prepare campground office for camper registration
- Clean campground comfort stations
- Trash pick-up and empty trash barrels
- Continued comfort station cleaning
- Report writing, staff scheduling and other office work
- Staff park and campground offices
- Public relations
- Coordinate Firewood Program, make available to visitors
- Rules and regulations oversight
- Painting and staining as needed
- Grass cutting at campground and day use area
- Trash collection in parking lots
- Close of business revenue count and bank deposit

3:30 p.m. - 11:30 p.m. Weekdays, (6:00 p.m. - 2:00 a.m. Weekends) Park Rangers

- Monitor and clean bathrooms as necessary
- Staff communications desk at campground office
- Monitor campground quiet time after 10:00 p.m.
- Respond to complaints

3.5. MAINTENANCE ACTIVITIES

Maintenance activities at Harold Parker State Forest vary on a seasonal basis, but involve both year-round employees and 11 seasonal maintenance employees (excluding seasonal Clerks, Rangers and interpretive staff). The year-round staff of two cover the park seven days a week from 7:30 a.m. until 4:00 p.m. These staff perform many skilled tasks such as carpentry, utility repair, forestry and road maintenance.

The biggest job in the fall is the winterization of buildings in the campground. This takes several weeks and includes putting up shutters, draining the pipes and noting repairs needed. Picnic tables and barrels are picked up and brought in for repairs and painting.

In the winter, major repairs to buildings and equipment that can be worked on inside are undertaken. Snow removal, hazard tree pruning and road maintenance are also performed during the winter season. In the spring, the campsites are cleaned and set up and the comfort stations are repaired and reopened.

From Memorial Day until Labor Day, park maintenance operations change dramatically. Instead of work projects and major repairs, routine maintenance becomes the focus. The summer maintenance routine includes camping area patrol, trash pick-up, toilet cleaning, campground and beach maintenance and vandalism repairs.

Trail Maintenance

Currently, trails are patrolled and maintained on an irregular basis. The Massachusetts Environmental Police is responsible for regulating recreational vehicles and is called on for emergency assistance. Maintenance involves removing fallen trees, pruning brush from the trails, grading dirt trails and maintaining cross culverts and wetland crossings. The maintenance staff works out of a maintenance complex made up of the forest headquarters, a nine-stall garage and two storage sheds.

The Friends of Harold Parker State Forest, New England Mountain Bike Association, Boy Scouts, Essex County Greenbelt Association, Boxford Trails Association and Student Conservation Association have provided invaluable assistance maintaining trails and wetland crossings in the forests.

Trail construction or maintenance activities that occur within a wetland resources area, riverfront area or wetland buffer, as defined by the Wetlands Protection Act (WPA), and have the potential to fill, dredge, remove or alter these wetland resource areas are regulated by the local Conservation Commission and the Massachusetts Department of Environmental Protection. Local Conservation Commission

approval is required before commencing trail construction or maintenance activities that will alter any wetland resource or buffer area within the forests.

Nearly all of Harold Parker and Boxford state forests located northeast of Route 114 are located in Priority Habitat for rare species (see Priority Natural Resources map). Trail corridor vegetative clearance, tread maintenance, simple drainage structures (e.g., drain dips and water bars), trail closures and simple wet area crossings (i.e., bog bridges, puncheons) that comply with the DCR guidelines for recreational trail maintenance and biodiversity conservation can be performed without prior NHESP review.

However, proposed moderate drainage structures (i.e., ditches, culverts and turnpikes), stream crossings, trail re-routes and new trails within Priority Habitat for rare species must be surveyed for the presence of vernal pools or breeding amphibians within 100 feet of the proposed trail work during the appropriate time of year. A report of the survey results must be submitted to the NHESP before work proceeds, regardless of whether vernal pools or breeding amphibians are found or not. If no vernal pools or breeding amphibians are found, then the trail work may proceed. If any vernal pools or breeding amphibians are found within 100 feet of the proposed trail project, the NHESP must review detailed, site specific plans before the trail work may proceed.

3.6. Forest Management

Management Approach

Many of the stands in both Harold Parker State Forest and Boxford State Forest have been treated with the shelterwood system for regeneration. Intermediate treatments, such as thinning, have been used to improve the vigor and health of various stands and improve wildlife habitat. Common trees in the area are northern red, white and black oaks, hickories, red maple, beech, eastern white pine and hemlock. Future forest management will follow the Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines (DCR, 2012).

Boxford State Forest has been designated as a reserve and will follow management guidelines set forth for reserves, which are available at: http://www.mass.gov/dcr/ld/mgmtguidelines.pdf. There will be no commercial timber harvesting, salvage or preemptive logging due to disturbance or threat. Limited active forest management may occur to maintain rare species habitat, control invasive species, or to address threats to public health or safety. Decisions about vegetation management activities will be made with information, review and advice from the Forest Reserve Science Advisory Committee. Tree cutting will be allowed to protect recreational assets or mitigate public safety hazards.

In areas designated as parkland within Harold Parker State Forest (see Landscape Designations map) there will be no commercial timber harvesting. Pruning and tree removal will be conducted to support recreational activities and address public safety hazards, such as trail and view shed maintenance, expansion of facilities within intensively used areas, clearing/maintaining power lines, protecting rare species habitat and controlling invasive species.

For the woodlands portion of Harold Parker State Forest, the overall goal is to protect and restore native forests by implementing excellent, sustainable forest management practices as model forestry for the general public. The DCR seeks to maintain a diverse multi-aged, multi-species forest that will be resilient in the face of large natural disturbances and climate change.

The decision tree for forest management in the areas designated as woodlands is based on three management choices:

1. Exclude or Defer: This is appropriate for areas containing sensitive ecological, historical or cultural resources. Physical limitations may also lead to this decision.
2. Manage for Diversity/Complexity: This is appropriate for areas categorized with high productivity and substantial diversity or the potential for these attributes. Uneven aged or multi-age silvicultural systems will be used to create or maintain vertical structure, multiple age classes, species diversity and large tree size elements.
3. Manage for Improvement: This is appropriate for areas with low productivity or damaged stands. These areas are less diverse in both structure and species. Thinning, to improve growth, vigor and health of remaining trees, and

even age silvicultural systems would be used in these areas. Plantations will be generally managed for improvement and may be converted to more natural native stands.

Water and soil resources are protected by meeting or exceeding the standards of the Massachusetts Forestry Best Management Practices Manual (Kittredge and Parker, 1999) and the DCR's Guidelines of Harvesting Near Vernal Pools. The Massachusetts Forest Cutting Practices Act (Chapter 132) requires the implementation of forestry best management practices to control environmental impacts during timber harvest operations. DCR Management Foresters are responsible for approving cutting plans and providing oversight during harvesting operations on DCR land to enforce adherence to the forestry best management practices.

To further protect the resource, all potential vernal pools will be treated the same as certified vernal pools. The Comprehensive Wildlife Conservation Strategy and the NHESP will be consulted concerning rare species and habitats. NHESP recommendations and Forestry Conservation Management Practices for Rare Species will be followed.

DCR Management Foresters conduct periodic surveys to identify, map and quantify impacts of non-native invasive species. The removal of invasives is a requirement of timber sale contractual operations. All harvesting machinery must be thoroughly cleaned prior to bringing the equipment on site to minimize the introduction of invasive plant seeds and parts. DCR Management Foresters inspect all equipment prior to unloading at job sites.

Woodland Multiple Use Objectives

The Bureau of Forestry and Forest Fire Control is committed to multiple use objectives for lands in the designated category of woodlands. The multiple use concept is applied to secure a sustained yield of ecosystem services, such as forest health, supporting the local economy with forest products, wildlife, water resources, and to provide various forms of dispersed outdoor recreation.

Massachusetts' supply of local forest products is decreasing as more forested land is developed. This fact highlights the importance of state forested lands as a resource base, and the necessity of management to provide sustained yields of forest products within a multiple use system.

Harold Parker State Forest provides an excellent opportunity to educate the public about the role of active forest management in providing an array of ecosystem services. The forest is easily accessible to a dense urban/suburban audience. The forest has many of the characteristics of a quality long-term active forest management program, including land suitable for: a variety of silvicultural treatment levels, wood production, restoration of late successional characteristics, or the creation of early successional habitat, and demonstration activities. It is in a watershed area that would benefit from active forest manipulation and has a legacy of forest management.

Impacts and Benefits of Harvesting

Effects on Vegetation

Although harvesting of forest products has an initial impact on the areas where it occurs, the results are generally beneficial. Natural succession is altered to provide for a variety of habitats, possible enhancement of wildlife carrying capacity, increase growth on remaining trees and to enhance biodiversity. The most positive benefit of harvesting is to enhance the diversity of species and tree age classes, creating a variety of habitat and ecosystem services on a sustainable basis.

Effects on Wildlife

Forest product harvesting creates changes in habitat and affects wildlife species populations. Altering the habitat can increase the diversity of wildlife species. By opening the canopy of the forest, more sunlight reaches the forest floor, allowing greater abundance of the low herbaceous cover. For some species, such as small mammals or insects, this means a greater food supply and more shelter.

The Bureau has standards for the retention of down wood called coarse woody debris (CWD), standing dead trees (snags), den or nest trees and large leave trees (legacy trees), which are designed to benefit a variety of wildlife species. Better mast producing trees are given more space to grow (released), enhancing their mast production and improving the food supply for some species of wildlife. "No cut" areas (refugia) are used to support plant and animal species that have a low tolerance to disturbance.

Effects on Water Quality and Quantity

The major cause of impaired water quality near an area that has been harvested is soil erosion. Soil erosion is likely to occur when the soil surface is disturbed. The actual cutting of trees has little effect on the soil surface. The skidding and hauling of forest products can disturb the soil, which has the potential to create erosion, particularly on sloping land. Most adverse effects result from poorly designed and maintained skid roads.

Carefully planned and maintained skid trails and log roads, using the guidelines of the Massachusetts Forestry Best Management Practices, minimize potential water quality problems. Leaving filter strips of vegetation between harvesting areas and water bodies or streams, as required by the Massachusetts Forest Cutting Practices Act (Chapter 132), prevents or minimizes the chance that eroding soil will enter the water. Filter strips maintain shade, which eliminates potential water temperature changes. Forwarding (carrying wood) instead of skidding (dragging the wood) also minimizes impacts. The Bureau policy of using bridges on stream crossings during harvest diminishes the chance of siltation.

Harvesting will often positively affect water yields from a watershed. Removing trees causes a reduction of crown interception and total evapotranspiration, resulting in increased runoff through the watershed. Properly planned forest product harvests that follow guidelines outlined by the Landscape Designations Management Guidelines and guidelines that are mandated by the Forest Cutting Practices Act should not result in adverse impacts on either water quantity or quality. It should be noted that any proposed timber harvesting operations will be preceded by focused public review and comment.

Effect on Recreational Uses

Forest management has little impact on most outdoor recreational uses that are permitted in areas designated as woodlands, although they may be curtailed temporarily for safety reasons during timber harvests. Harvesting can create improved access for horseback riders, mountain bikers, cross-country skiers, hikers, hunters and other dispersed recreational uses.

Forestry practices that can support recreational values within woodlands will be incorporated where feasible. During timber sale activities, existing trails will be protected. Where impacts are unavoidable, the DCR will include a plan for trail rehabilitation in the harvest plan. During timber sale activities, logging equipment will be used to control erosion, stabilize soils and close trails recommended for closure (see Harold Parker State Forest Trail Recommendations map).

All officially designated trails that interface with forest management will include a 50 foot wide corridor on each side of the forest road or trail and use these guidelines:

- Sustainable forest management, including salvage, is allowed within forest road and trail corridors.
- Forest management within the trail corridors will be designed to promote native diverse vegetation, large-diameter trees, multiple age classes and forest structures, forest health, a safe recreation experience and quality scenery.
- Slash as a result of forest management within 25 feet of interior forest roads and trails shall meet the Massachusetts Slash Law, and should result in a light and natural appearing forest ground cover.
- Skid trails should avoid crossing trails whenever possible and if crossings are necessary, they should cross perpendicular to the trail. Any impacts to a trail from such crossings shall be rehabilitated upon project completion.
- Management Foresters will coordinate with Park Supervisors, trail managers and trail user groups when vegetation management is planned.
- Management Foresters will coordinate with Park Supervisors, local emergency management officials and user groups to determine if unmapped forest roads and trails should have corridor management guidelines applied, have no special treatment or should be closed and restored.

Effect on Aesthetics

Harvesting of forest products has an impact on the aesthetics of the forest that can be either negative or positive, depending on the observer's perspective and length of time after harvest.

Most adverse visual impacts associated with forest management are short-term. The presence of slash, which is a by-product of harvesting, generates most

objections. Slash, with the policy banning biomass removal, cannot be economically or feasibly removed or chipped in place since such practices are too costly to justify the results. Also, the equipment which is necessary for treating slash would result in the destruction of established regeneration. The most economical and efficient method of treating slash is to lop it in place and move it back from heavily used roads and trails. Forest users should be informed that the presence of slash is temporary. It rapidly decays, provides cover for wildlife, protects emerging regeneration and is important in the recycling of nutrients back to the soil.

The Department's goal for heavy woody debris (HWD) of two cords per acre may impact visitors' impressions of the forest. Many people expect a city park appearance and are displeased with this more natural look of down wood in the forest. The openings that are created by harvests in the forest quickly re-vegetate and screen decaying slash.

Silvicultural activities can enhance aesthetics by "opening up" vistas and scenic views. They can create a cleaner, well-managed appearance and improve depth of perception into forested areas. Diversity of vegetation in understory growth created by openings in tree canopies can provide visual variety to observers.

3.7. INFRASTRUCTURE

Buildings and Structures

There are no buildings or structures located within Boxford State Forest. There are 17 buildings and structures at Harold Parker State Forest (see Table 3.3). Thirteen are in adequate or better condition, meeting all performance requirements. One is in fair condition, requiring extensive corrective maintenance and repairs. Two are in poor condition, failing to meet current performance standards and public health code requirements. One building has failed and is no longer needed for park functions.

Collins Pond Fish Hatchery

The former fish hatchery building has not been used since 1983 and is not needed for a park use. The poured concrete structure is in fair condition; however, the wooden floor and roof have failed. Given its visible location, remains of the building provide an opportunity to interpret its former fish hatchery use.

Lorraine Park Campground

The campground contains four small administrative buildings and four camper comfort stations (see Table 3.3). The administrative buildings are in excellent to good condition, requiring routine maintenance. The Nature Center is a small shed that does not contain restroom facilities, space for audio-visual presentations, permanent exhibits, indoor programs, meetings or special events. Comfort stations #1 and #3 are new masonry buildings in good condition. Comfort stations #2 and #4 are older wood frame buildings in poor condition. Built in 1963, Comfort stations #2 and #4 have failing roofs, extensive wood rot, faulty electrical and plumbing systems, crumbling ceramic tiles and do not meet current campground comfort station performance standards. Each year, the DCR is cited for public health code violations in comfort stations #2 and #4. Located near Frye Pond, restroom facilities in comfort station #4 are used by swimmers at the beach.

Headquarters Complex

Park maintenance staff work out of the headquarters complex with four buildings, including the forest headquarters, nine-bay garage and two storage sheds. The maintenance buildings are in adequate condition, requiring some corrective maintenance. The forest headquarters is a heated CCC building in fair condition without insulation and energy efficient windows. The headquarters building is not ADA accessible and has an unreliable well. The building may also contain lead paint and asbestos containing materials.

Berry Pond

The Berry Pond day use area contains a new masonry bathhouse, contact station and picnic pavilion constructed in 1996. The structures are in excellent to good condition, requiring routine maintenance. The bathhouse has two minor roof leaks and mold is growing inside the mothballed building. A CCC pavilion is located on the opposite side of Berry Pond. The CCC pavilion is in adequate condition, requiring corrective maintenance to control carpenter bee damage and to remove trees growing over the pavilion.

Table 3.3. Buildings and Structures in Harold Parker State Forest

Location/Building Name	Year Built	Building Condition[a]	Type[b]	Use Status
Collins Pond/Fish Hatchery Building	1939	Fail	CO	Vacant
Lorraine Park Campground				
Campground Office	1963	Good	WL	Seasonal
Nature Center	1996	Good	WL	Seasonal
Maintenance Storage Shed	2010	Excellent	WL	Seasonal
Golf Cart Storage Shed	1960s	Good	WL	Seasonal
Comfort Station #1	1995	Good	UM	Seasonal
Comfort Station #2	1963	Poor	WL	Seasonal
Comfort Station #3	1997	Good	UM	Seasonal
Comfort Station #4	1963	Poor	WL	Seasonal
Headquarters Complex				
Forest Headquarters	1938	Fair	WL	Year-round
Nine-Bay Garage and Storage	1938	Adequate	WL	Year-round
Small Storage Shed	1994	Adequate	WL	Year-round
Storage shed	1990	Adequate	WL	Year-round
Berry Pond				
Contact Station	1996	Excellent	UM	Vacant
Bathhouse	1996	Good	UM	Vacant
Picnic Pavilion	1996	Good	WC	Vacant
CCC Pavilion	1933	Adequate	WC	Year-round

[a.] Building condition code as used in the Massachusetts Capital Asset Management Information System (CAMIS). Excellent = Easily restorable to like new condition, minimal routine maintenance; Good = Routine maintenance required; Adequate = Some corrective and preventative maintenance required; Fair = Excessive corrective maintenance and repair required; Poor = Renovation needed; and Fail = Non-operational, replacement required.
[b.] Type refers to the construction materials. Possible materials include: CO = Concrete, poured at site; CP = Concrete, precast off-site; PL = Plastic (e.g., structures made from recycled plastic); PB = Pole barn without exterior walls; ME = Metal; UM = Unconsolidated masonry (i.e., brick, cement block, or stone and mortar); WC = Wood, commercial and industrial; WL = wood, light duty.

Paved Roads

The DCR owns Sharpners Pond Road, between Forest and Salem streets, within Boxford State Forest. The Town of North Andover maintains Sharpners Pond Road. Within Harold Parker State Forest, the DCR is responsible for the maintenance of Harold Parker Road from Route 114 to Middleton Road, and Middleton Road in North Andover. The Town of Andover is responsible for the maintenance of Harold Parker Road between Route 125 and Jenkins Road, and Jenkins Road (MassDOT, 2012).

Table 3.4. Road Pavement Conditions

Paved Roads	Length (miles)	Condition
Harold Parker	1.2	Fair
Middleton Road	1.8	Poor
Campground	2.6	2.0 - Good 0.6 - Fair
Berry Pond	1.1	Good
Stearns Pond	0.8	Good
Sudden Pond	0.6	Good
Total	*8.1*	-

Within Harold Parker State Forest, an 8.1 mile network of six paved roads provides vehicular access to different areas of the forest. The paved roads are comprised of three miles of parkways and 5.1 miles of local roads in day use and camping areas (see Table 3.4). The parkways include Harold Parker Road, providing access from Route 114, and Middleton Road, providing access from Andover and Middleton. The local roads provide access to Lorraine Park Campground, Berry Pond, Stearns Pond and Sudden Pond. Berry Pond Road is closed to vehicular traffic by a gate on either end. As a paved road with no vehicular traffic, it has become a busy and highly popular destination for dog walkers, family walks, parents with baby carriages and young children on bikes.

Approximately 4.5 miles of the paved roadways are in good condition, requiring routine maintenance, 1.8 miles are in fair condition, requiring surface improvements, and 1.8 miles are in poor condition, requiring base rehabilitation (see Table 3.4).

3.8. DAMS

Eight CCC-constructed dams are located within Harold Parker State Forest (see Table 3.5). There are no dams located within Boxford State Forest. A 50 year old fish hatchery system, including Field, Collins, Bracket and Delano ponds, has been classified as a significant hazard to the downstream public. Since Field Pond is located at the downstream end of the fish hatchery system, maintenance of the Field Pond dam is a public safety priority.

Table 3.5. Harold Parker State Forest Dams

Dam Name	Hydraulic Height of Dam (feet)	Dam Length (feet)	Normal Storage Volume (acre-feet)	Overall Dam Condition
Field Pond	8.5	600	170	Poor
Collins Pond	7	300	10.5	Unsafe
Brackett Pond	10	440	73	Poor
Delano Pond	6	100	19.5	Poor
Frye Pond	6.3	100	49.6	Fair
Stearns Pond	10	150	150	Satisfactory
Salem Pond	5	100	36	Satisfactory
Sudden Pond	4	70	6	Satisfactory

Field Pond Dam

The Field Pond dam is a 600-foot long earthen embankment, 15 feet high. The embankment was constructed with a concrete core wall through its interior. Discharge from the pond is over a concrete spillway 39 feet long with three feet of freeboard from its crest to top of the dam. The dam is served by a low level outlet which is located 35 feet south of the spillway. Flow through the outlet is carried through a 30-inch by 32-inch concrete culvert, which discharges into a concrete lined stilling basin at the toe of the dam. In 2007, the dam embankment was renovated.

In 2011, GZA GeoEnvironmental Inc. (GZA) completed an Inspection and Evaluation Report for the Field Pond dam (GZA, 2011*a*). The report found the dam to be a large, significant hazard dam in poor condition. GZA observed inadequate spillway capacity, erosion at the upstream slope water line, brush on the embankment, significant seepage on the downstream slope and an eroded footpath on top of the embankment.

Collins Pond Dam

The Collins Pond dam is a 300-foot long earthen embankment, 10 feet high. The upstream face of the dam is formed by a vertical concrete wall, which is one and a half feet thick and rises three feet above the earthen embankment. The dam runs parallel to Harold Parker Road, which is less than 100 feet downstream.

The dam is served by two discharge facilities. The principal spillway is located at the east abutment, while the emergency spillway is located at the west abutment. The principal spillway is 30.5 feet long and three feet high. The emergency spillway is set at the top of the concrete core wall. The dam is served by a low level outlet located between the two spillways. The outlet consists of a 27-inch diameter corrugated metal pipe controlled by a sluice gate on the upstream side of the dam.

GZA conducted a visual inspection of the Collins Pond dam in 2011 and found the dam to be in an unsafe condition (GZA, 2011*b*). The GZA inspection identified inadequate spillway capacity; erosion of the embankment from foot traffic; large tree and brush growth throughout; deteriorated spillway concrete retaining walls; seepage through the downstream face of the primary spillway; seepage and standing water at the toe of the left downstream slope; two large holes in the core wall where water can pass through the wall and flow over the earthen embankment; and an inoperable slide gate.

Brackett Pond Dam

The Brackett Pond dam consists of two earthen embankments separated by approximately 1,150 feet of natural ground. The east embankment is 140 feet long and contains an 18-inch thick concrete core wall. A concrete low level outlet structure located at the center of the embankment flows into Collins Pond. The outlet is controlled by a slide gate, operated from the crest of the dam. A 20-foot wide grass lined emergency spillway is located at the top of the embankment.

The western embankment is 300 feet long and 15 feet wide. The embankment contains a primary spillway, an auxiliary spillway and a concrete core

wall. Both spillways discharge into a natural stream channel that flows under Harold Parker Road into Field Pond.

In 2006, Weston & Sampson completed an Inspection and Evaluation Report for the dam (Weston & Sampson, 2006I). Weston & Sampson found the dam to be in poor condition with failing concrete walls, significant concrete spalling, heavy vegetation on the crest of both embankments and soil erosion exposing the core wall in many locations. Seepage was observed from the downstream toe of the western embankment.

Delano Pond Dam

The Delano Pond dam is a 100-foot long earthen embankment, 14.5 feet high. A one-foot thick concrete core wall in the western embankment ends at the spillway. The spillway consists of a four-foot wide by six-foot high reinforced concrete channel fitted with four-inch thick wooden stoplogs for the lower six feet of the channel. Discharge over the stoplogs flows into a four-foot wide, 30-foot long concrete channel.

In 2006, Weston & Sampson completed an Inspection and Evaluation Report for the dam (Weston & Sampson, 2006I). The report found the dam in poor condition with failing concrete walls, significant concrete spalling, vegetation on the embankment, soil erosion on top of the dam and seepage east of the spillway.

Frye Pond Dam

The Frye Pond dam is an earthen embankment approximately eight feet high and 100 feet long with a crest width of approximately 21 feet. The crest supports Lorraine Road that leads to the campground. A one-foot wide concrete wall fitted with stoplogs makes up the spillway.

Weston & Sampson inspected this dam in 2006 (Weston and Sampson, 2006*c*). The inspection found the dam in fair condition with a spalled and broken right training wall, overgrown downstream embankment and erosion at the downstream wing walls.

Stearns Pond Dam

The Stearns Pond dam is a 150-foot long earthen embankment about 15 feet high. Discharge from the pond is over a round-crested concrete spillway that is 25 feet long and two and a half feet below the top of the embankment. The dam is also drained by a low level outlet which is located 20 feet east of the spillway. The low level outlet discharges through an 18-inch diameter corrugated metal outlet pipe.

In 2006, Weston & Sampson completed an Inspection and Evaluation Report for the dam (Weston & Sampson, 2006*d*). The report found the dam to be in satisfactory condition with several minor deficiencies. The embankment slopes had low vegetation reemerging after it was cleared in 2005. The low level outlet pipe is corroded and the outlet discharge walls need repair.

Salem Pond Dam

The Salem Pond dam is an earthen embankment approximately 100 feet long and 10 feet high with a concrete core wall through its interior. A 15-foot wide concrete spillway is located five feet below the top of the embankment. The spillway is capable of passing 100% of the probable maximum flood. Wetland areas downstream provide a significant amount of floodwater storage. Wire mesh fencing has been erected in the pond to prevent beavers from damming the spillway inlet.

In 2006, Weston & Sampson completed an Inspection and Evaluation Report for the dam (Weston & Sampson, 2006*e*). The report found the dam to be in satisfactory condition. The embankment had low vegetation, as the area was cleared in 2005. There were small cracks in the training wall mortar.

Sudden Pond Dam

The Sudden Pond dam is a 70-foot long earthen embankment, five feet high. The grouted masonry spillway is approximately one-foot below the embankment crest. During moderate flood conditions, the dam would likely overtop. However, the downstream area contains a large wetland, which provides a significant amount of floodwater storage capacity (O'Brien & Gere Engineers, 1988).

3.9. General Budgeting Information

A variety of state operating, state capital, federal and private funds support the operation and maintenance of the forests.

Operating Budget

The annual state operating budget supports daily operations and maintenance, including staff salaries, utilities, supplies, equipment leases, administration and the maintenance of facilities, vehicles and equipment. Operational funding is an ongoing issue for the operation of the forests, as it is throughout the DCR. The agency's overall operating budget decreased by 30% from Fiscal Year 2009 to 2012.

Retained Revenues

The state operating budget specifies the maximum amount of park revenue from fees, licenses and rents charged by the DCR that may be retained by the agency in a given fiscal year. This amount changes yearly. In fiscal year 2012, these retained revenues were capped at $8,401,831. Revenues from camping reservations and donations for firewood at Harold Parker State Forest are deposited into the state's general fund. The DCR may then use up to (or "retain") $8,401,831 of these park revenues statewide for its operating expenses and improvements to its facilities. Retained revenues cannot be used to hire full-time agency personnel. During Fiscal Year 2012, $65,988 in camping fees were collected at Harold Parker State Forest.

Capital Budget

The capital budget supports projects (e.g., construction, repair) and items (i.e., equipment) with an expected lifespan of at least seven years. Capital projects and programs are identified and funded through a five-year capital plan. These plans identify proposed capital projects, their costs and the year in which they are to be funded. Table 5.7 contains a list of future capital projects identified for Boxford and Harold Parker state forests.

Capital expenditures include both stand alone capital projects and ongoing programs. The ongoing capital programs have annual budgets that are divided each year between the DCR's 350 facilities (e.g., Clean State Environmental Remediation @ $2,400,000/year, Lakes and Ponds @ $320,000/year, and Parkway Paving @ $1,500,000/year).

Recent capital projects at Harold Parker State Forest included vegetation control at Field Pond and comfort station repairs. A total of $680,739 of capital funds were spent at Harold Parker State Forest during fiscal years 2005 through 2012 (see Table 3.6). No capital funds were expended at Boxford State Forest during this period.

Table 3.6. Capital Expenditures during Fiscal Years 2005-2012

Capital Program	Amount Expended
Environmental Remediation	$5,444
Tree Services	$78,528
Small Repairs to Park Facilities	$241,041
Comfort Station Renovations	$167,592
Equipment Purchase	$54,305
Field Pond Vegetation Control	$27,500
Dam Inspections	$40,929
Dam Maintenance	$22,413
Road Maintenance	$14,058
Campground Modernization	$28,925
Total Capital Expenditures	*$680,739*

Federal Funding

During fiscal years 2011 and 2012, the DCR received a Recreation Trails Grant for trails projects statewide. A total of $27,675 of these federal grant funds were spent to improve the Bay Circuit Trail.

Conservation Trust Fund

The trust fund uses private donations to support special state park initiatives, above and beyond basic property maintenance. It is funded through charitable contributions to the DCR, including those donations placed into the "iron ranger" (i.e., a secure metal donation box) located at the forest headquarters. Conservation Trust Fund donations were used to renovate the campground water system and purchase equipment.

3.10. PARTNERSHIPS

The DCR Office of External Affairs and Partnerships works to enhance the agency's constituency of supporters and users by: working in partnership with park users and supporters to develop and sustain community-based stakeholder groups; facilitating external financial assistance for the planning, design and construction of capital projects; managing the DCR Partnerships Matching Funds Program to leverage private contributions to improve DCR facilities; and serving as a dedicated point of contact for individuals and non-profit, institutional and community-based organizations. The Office of External Affairs and Partnerships is responsible for identifying and coordinating private

and institutional giving and partnerships at the forests.

There are a number of existing partnerships that support the DCR's operational, interpretive and resource protection efforts at both forests.

Boxford Trails Association/Boxford Open Land Trust (BTA/BOLT)

The Boxford Trails Association was formed in 1978 to preserve and maintain trails for passive recreational use. A local land trust with a small staff and many dedicated volunteers, the BTA/BOLT is supported by the dues and contributions of over 600 families. Since its inception, the BTA/BOLT has helped permanently protect over 1,100 acres of open space and over 100 miles of trails in Boxford. The BTA/BOLT has organized Boy Scout and volunteer projects to install and maintain trails, and interpret historic features in Boxford State Forest.

Essex County Greenbelt Association (ECGA)

The ECGA was founded in 1961 to conserve farmland, wildlife habitats and scenic landscapes across Essex County. Its first project was protecting Bald Hill in Boxford State Forest from residential development. The ECGA has protected a total of 14,711 acres, including 532 acres abutting Boxford State Forest. Its trails are open to hikers, mountain bikers, horseback riders, birders and hunters.

Friends of North Andover Trails (FONAT)

The FONAT, operating under the North Andover Improvement Society, promotes the awareness of the town's 4,000 acres of protected open space and trails. The FONAT conducts Saturday morning trail projects to maintain town-owned trails. The FONAT can assist the DCR with trail development and maintenance projects in the state forests. The Town of North Andover has spent $21 million on Community Preservation Act (CPA) funded historic preservation and open space projects.

Bay Circuit Alliance (BCA)

The BCA was formed in 1992 to develop and maintain the Bay Circuit Trail (BCT), a 220-mile trail around metropolitan Boston from Plum Island to the Duxbury/Kingston shore. The Trustees of Reservations and the Appalachian Mountain Club have entered into an agreement with the BCA to provide staff and raise two million dollars to complete the BCT. The BCA plans to move the BCT off Sharpners Pond Road by developing a trail through Middleton. The BCA has proposed using the Essex Railroad right of way and a trail across the Richardson Farm property to connect Boxford and Harold Parker state forests. In the future, the BCA would like to construct and maintain back country camping facilities along the Bay Circuit Trail in Boxford and Harold Parker state forests.

New England Mountain Bike Association (NEMBA)

Formed 25 years ago, the NEMBA has 4,000 members throughout New England. There are approximately one million mountain bike users in Massachusetts. The NEMBA's mission is to promote recreational trail opportunities, care for public trail systems, provide resources to land management agencies and preserve open space. The NEMBA partners with the DCR to provide trail schools, trail care training, bicycle patrols, "No Child Left Inside" programs, charity rides for state parks and professional trail consulting.

For the past 12 years, the NEMBA has held the "Wicked Ride of the East" every October in Harold Parker State Forest. The Wicked Ride of the East includes a seven-mile easy route and 17-mile advanced route. Approximately 300-400 riders participate each year. Over the past 10 years, the NEMBA has completed numerous trail improvement and boardwalk projects in Harold Parker State Forest using funds raised by the Wicked Ride of the East. The NEMBA recently provided materials and labor to expand the Jenkins Road parking lot. The NEMBA also sponsors Thursday night group rides in Harold Parker State Forest.

The NEMBA would like to continue to complete two to three trail improvement projects per year using Wicked Ride of the East donations. The NEMBA would like to assist with the creation of trail loops that connect to other conservation lands and neighborhood paths in the area. The NEMBA can also assist with improving signage at parking lots and trail intersections.

Friends of Harold Parker State Forest

The Friends of Harold Parker State Forest is a volunteer group founded to promote and conserve

the natural, cultural and historic resources of Harold Parker State Forest. The Friends are dedicated to restoring and maintaining the forest and its trails for sustainable recreation, to educating themselves and others about the forest and to promoting a healthy habitat for native plants and wildlife.

Groundwork Lawrence

Since 2001, Groundwork Lawrence has provided open space improvement, healthy food and youth education and employment programs in Lawrence. Groundwork Lawrence and Mass Audubon operate a nature-based day camp in Lawrence. Groundwork Lawrence and the Appalachian Mountain Club (AMC) are developing a program to promote camping and trail use by Lawrence residents in Harold Parker State Forest. Groundwork Lawrence, in partnership with the AMC, is interested in sponsoring youth camping programs and trail service projects in Harold Parker State Forest.

Other Partnerships

The following organizations also support management activities at the forests:

- Numerous local organizations have partnered with the DCR in land conservation efforts or have protected land in close proximity to the forests including the: Andover Village Improvement Society, Town of Boxford, North Andover Conservation Commission, Town of North Reading, Middleton Trails Committee and The Trustees of Reservations.
- The Student Conservation Association, which sponsors summer youth conservation projects, recently rebuilt the Stearns Pond bridge and installed a boardwalk at Sudden Pond.
- The Massachusetts Audubon Society assists with monitoring and stewardship of native bird habitat as well as public education.
- The Department of Fish and Game manages the Pheasant Wildlife Management Area located within Harold Parker State Forest and stocks trout in Berry Pond.
- Local Boy and Girl Scout troops perform trail maintenance projects.
- The NHESP and local volunteers perform vernal pool and rare species surveys in the forests.

Russell Family Burial Ground, DCR

SECTION 4. LAND STEWARDSHIP ZONING

4.1. INTRODUCTION

The Department of Conservation and Recreation (DCR) has a broad and dynamic mission that encompasses protection of resources, providing the public with access to recreational opportunities and active forest management. This multi-faceted mission often results in complex management challenges. To help meet its mission, the DCR has developed a two-tier system for guiding the management of DCR parks, forests and reservations:

1) **Landscape Designations** are applied statewide to assess and guide management activities throughout the DCR system. All properties are designated as either reserves, parklands or woodlands as a means to establish primary ecosystem services provided by these properties, guide management decisions based upon these services and communicate the agency's landscape level management objectives to the public.

2) **Land Stewardship Zoning**, and the resource management planning process of which it is a part, addresses the agency's statutory responsibilities in M.G.L. Chapter 21: Section 2F to prepare management plans that: encompass all reservations, forest and parks; provide for the protection and stewardship of natural, cultural and recreational resources under the agency's management; and ensure consistency between recreation, resource protection and sustainable forest management. Land Stewardship Zoning is applied to DCR state forest and park properties on an individual basis through the resource management planning process, incorporating site specific information to guide management of specific areas within these properties.

These two systems, while applied at different levels (statewide scale vs. site specific scale) work in an integrated fashion to accommodate primary ecosystem services while recognizing and providing site specific resource protection.

The DCR is committed to protecting important natural and cultural resources while simultaneously providing for sustainable public access and recreation across all properties. The DCR is also committed to complying with all applicable state and federal regulations and policies, and meeting all state health and building codes – responsibilities that are central to the agency's mission and statutory charge.

Application of Landscape Designation and Land Stewardship Zoning to Harold Parker and Boxford

state forests is summarized below; for a more detailed description of Land Stewardship Zoning and Landscape Designations please see Appendix P.

4.2. LANDSCAPE DESIGNATIONS

As a result of a robust public process called Forest Futures Visioning, the DCR designated its lands as parklands, woodlands and reserves. The following designations were established for properties under the jurisdiction of the DCR:

Reserves provide backcountry recreation experiences and protect the least fragmented forested areas and diverse ecological settings. Successional processes will be monitored to assess and inform long-term forest stewardship.

Woodlands demonstrate exemplary forest management practices for landowners and the general public, while supporting the range of ecosystem services that sustainably-managed forests offer, including a diversity of native species, forest age classes and compatible recreation opportunities.

Parklands focus on providing public recreation opportunities while protecting resources of ecological and cultural significance.

Under the Landscape Designations process, the DCR designated Boxford State Forest as a reserve. Harold Parker State Forest west of Jenkins Road, the existing headquarters area, recreation facilities located at Berry and Sudden ponds, and several scattered properties located in North Andover have been designated as parkland (see Landscape Designations map). The remainder of Harold Parker State Forest has been designated as a woodland.

Specific management guidelines for reserves, parklands and woodlands are described in Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines (DCR, 2012).

4.3. LAND STEWARDSHIP ZONING

Land Stewardship Zoning Guidelines

The Land Stewardship Zoning Guidelines (see Appendix P) define three types of zones to ensure resource protection based upon site specific field data, and provides guidance for current and future management based upon resource sensitivities. Inventory and assessment of resources during the preparation of an RMP is factored into land use management and decision making, and provides guidance for stewardship of these resources.

The process results in zoning of areas and specific sites within DCR properties based on their sensitivity to recreation and management activities that are appropriate for each facility as recognized during the resource management planning process. In this way, the Land Stewardship Zoning system helps to "ensure that recreation and management activities do not degrade ecological, cultural, or experiential resources and values."

The three land stewardship zones provide a general continuum to categorize resources (relative to potential degradation from human activities) from undisturbed sites with highly sensitive resources, through stable/hardy resources, to sites that have been developed and consistently used for intensive recreation or park administration purposes.

The Land Stewardship Zoning system also includes Significant Feature Overlays that may be applied to highlight resource features that have been researched and assessed by professional resource specialists.

Zone 1

Management Objective

Protection of sensitive resources from management or other human activities that may adversely impact the resources.

General Description

This zone encompasses areas with highly sensitive ecological and cultural resources that require additional management approaches and practices to protect and preserve the special features and values identified in the RMP. Zone 1 areas are not suitable for future intensive development.

Examples

Examples identified as being highly sensitive to human activities include rare species habitat or natural communities, areas with concentrations of sensitive aquatic habitats, excessively steep slopes with erodible soils, archaeological sites or fragile cultural sites, where stewardship of these resources must be the primary consideration when assessing management and recreational activities in these areas.

Zone 2

Management Objective

Provide for a balance between the stewardship of natural and cultural resources and recreational opportunities which can be appropriately sustained.

General Description

This zone encompasses stable yet important natural and cultural resources. Zone 2 is a very important component to the DCR's management responsibilities, because the protected landscape within this zone provides a buffer for sensitive resources, recharge for surface and groundwater, and large areas where existing types of public recreation activities can be managed at sustainable levels.

Examples

Examples include areas of non-intensive use that contain diverse ecosystems, rare species habitat that is compatible with dispersed recreation and sustainable management practices, and cultural resources that are not highly sensitive to human activities.

Zone 3

Management Objective

Provide public access to safe and accessible recreational opportunities, as well as administrative and maintenance facilities that meet the needs of DCR visitors and staff.

General Description

This zone includes altered landscapes in active use and areas suitable for future administrative, maintenance and recreation areas. The resources in this zone can accommodate concentrated use and require regular maintenance by DCR staff.

Examples

Examples of areas of concentrated use include park headquarters and maintenance areas, parking lots, swimming pools and skating rinks, paved bikeways, swimming beaches, campgrounds, playgrounds and athletic fields, parkways, golf courses, picnic areas and pavilions, and concessions. Examples of future use areas include disturbed sites with no significant ecological or cultural values and not suitable for restoration identified through the RMP or in a Master Plan as being suitable for intensive recreation or park administration sites. Note: development would be preceded by detailed site assessments to ensure protection of natural and cultural resources.

Significant Feature Overlays

Management Objective

The purpose of the overlays is to provide precise management guidance in order to maintain or preserve the recognized resource features regardless of the zone in which they occur.

General Description

The three land stewardship zones may be supplemented with significant feature overlays that identify specific formally designated or recognized resources. These resource features have been recognized through research and assessment by professional resource specialists. Information on the significant features is brought into the resource management planning process via review of previous research projects and associated designations.

Examples

A natural or cultural resource, recognized through professional inventory/research, which cuts across more than one land stewardship zone, such as:

- National Register Historic District;
- Areas subject to public drinking water regulations;
- Priority Habitat for species that are not sensitive to human activities;
- Designated Areas of Critical Environmental Concern.

A natural or cultural resource, recognized through professional inventory/research, which is located in an area characterized by intensive visitor use. In these cases, the Significant Feature Overlay is used to highlight the potential conflict between resource stewardship and ongoing visitor use, and provide mitigation strategies. Examples include:

- A NHESP Priority Natural Community associated with a summit that is also a popular destination for hikers.
- A barrier beach that provides habitat for rare shorebirds, and is subject to CZM barrier beach

management guidelines and coastal wetlands regulations, but also supports thousands of visitors during the summer season.

- A significant cultural site such as Plymouth Rock that is subject to ongoing, intensive visitation.

4.4. Recommended Land Stewardship Zones

The development and application of these guidelines is the result of a step-by-step analysis of natural and cultural resources of Boxford and Harold Parker state forests in the context of compatible public recreation and public access. In a sense, they are the culmination of the resource management planning process, and are intended to help guide the long-term management of the forests. Please see the Recommended Land Stewardship Zoning maps.

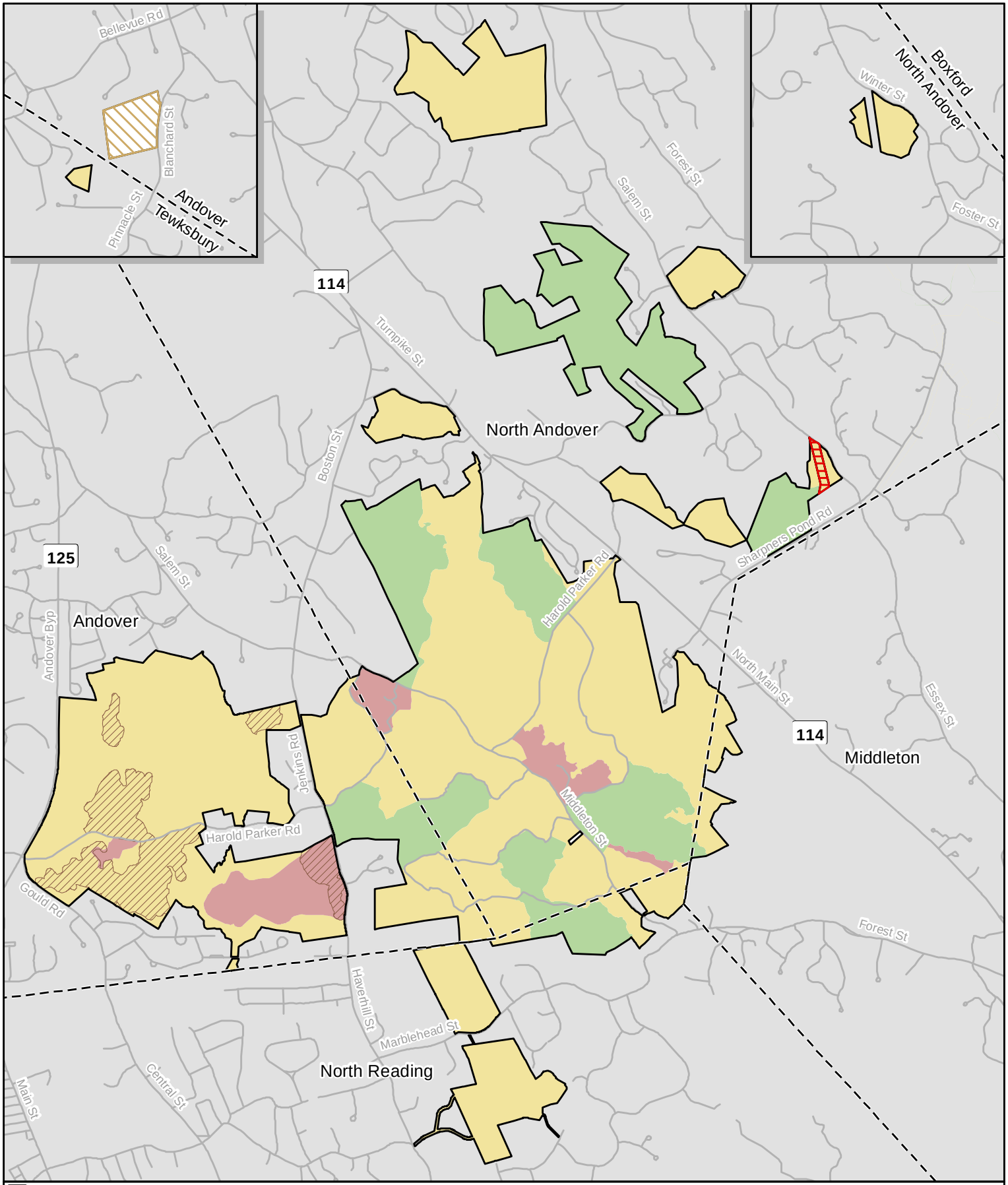
Zone 1. Highly sensitive natural resources including: fragile vernal pool clusters and associated undisturbed upland habitat; and sensitive rare species habitat.

Zone 2. Most of the forested habitat, including oak forests, white pine forests, red pine plantations, birch-red maple forests and swamp hardwood forests.

Zone 3. Portions of Harold Parker State Forest that support the most intensive levels of use, including existing and proposed swimming beaches, picnic areas, campgrounds, parking areas, maintenance and administrative areas.

Significant Feature Overlay. A significant feature overlay was identified for archaeological features.

Fragile prehistoric archaeological sites, CCC-constructed ponds located west of Jenkins Road, the Jenkins mill and soapstone quarry are included in this overlay. The sites included in this overlay should be managed to protect pre-historic and historic archaeological sites from avoidable damage. The archaeological sites should be stabilized to prevent loss and monitored for vandalism. The DCR's Office of Cultural Resources should be consulted to ensure survival of irreplaceable archaeological resources located within this overlay through best management practices.



Harold Parker State Forest
Agricultural Preservation Restriction
Utility Easement
Road
Town Boundary
Land Stewardship Zoning
Zone 1
Zone 2
Zone 3
Significant Feature Overlay

Harold Parker State Forest

Recommended Land Stewardship Zoning

N W E S

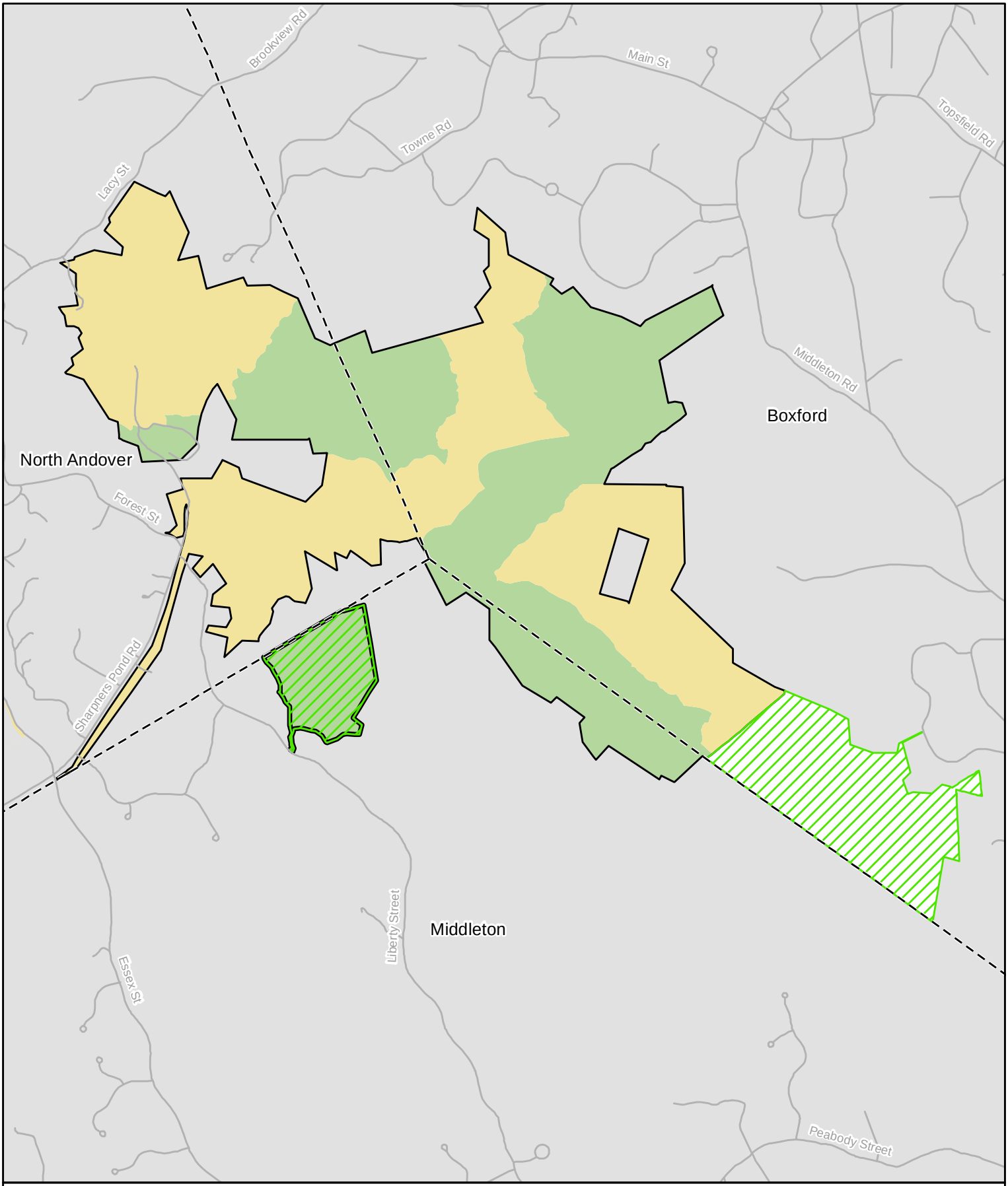
0 0.5 1 Mile

1:36,500

dcr Massachusetts

DCR GIS Mar-13

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.



Boxford State Forest
Conservation Restriction
Road
Town Boundary
Land Stewardship Zoning
Zone 1
Zone 2

Boxford State Forest

Recommended Land Stewardship Zoning

0 0.25 0.5 Mile 1:23,000

dcr Massachusetts

DCR GIS Mar-13

Geographic data supplied by the Office of Geographic Information (MassGIS) and DCR GIS.

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Blanding's Turtle, Tina Shaw/USFWS

SECTION 5. MANAGEMENT RECOMMENDATIONS

This chapter describes management recommendations to achieve a sustainable balance between the provision of quality outdoor recreation opportunities and the conservation of important natural and cultural resources at Harold Parker and Boxford state forests. The management recommendations that follow are organized by the six management goals adopted to guide future management of the forests. The recommendations related to each management goal are summarized and prioritized in a table.

Management recommendations were assigned one of three levels of priority ranking: high, medium or low. Recommendations were given a **high** priority if they meet any of the following criteria:

- Correct serious health or safety concerns.
- Protect state-listed rare species habitat from immediate threats.
- Prevent damage or deterioration of significant cultural resources.
- Required by legal responsibilities or regulatory compliance.

Recommendations were given a **medium** priority if they meet any of the following criteria:

- Provide stewardship for significant natural and cultural resources.
- Maintain essential park infrastructure.
- Improve or enhance a facility's recreational programming.
- Reduce facility operating costs.
- Leverage non-Commonwealth funds.

Recommendations that did not meet the above criteria were assigned a **low** priority.

Recommendations were also assigned one of three levels of funding availability: (1) funding is currently available; (2) funding is currently unavailable, but may become so in the near future; or (3) funding is currently unavailable, but may become so in more than five years.

Funding was determined to be **currently available** if the recommendation can be implemented using:

- Existing DCR staff and equipment.
- A volunteer organization agreed to use existing volunteer labor and funding.

- Capital funding scheduled by an existing DCR capital program (e.g., Lakes and Ponds, Dam Maintenance, Storm Water Services or Clean State Remediation Programs).
- Retained revenues scheduled for small deferred maintenance projects.
- Existing trust funds.

Funding was determined to be **currently unavailable**, but can become so in the near future if:

- The recommendation is scheduled in the DCR's approved five-year capital plan.
- The recommendation can be funded by an existing DCR capital program within the next five years.
- Existing DCR staff and equipment can perform the work within the next five years.
- A volunteer organization can sponsor the activity within the next five years.
- Projected retained revenues can be used to fund a deferred maintenance project within the next five years.

Recommendations that did not meet the above funding criteria were characterized as "funding is currently unavailable, but may become so in more than five years."

5.1. Maintain and Enhance Habitats for Rare Species, Native Plants and Animals

- Monitor, manage and protect vernal pool and wetland habitats for state-listed rare animals.
- Passively manage Boxford State Forest to encourage natural forest processes and inner forest habitat.
- Actively manage Harold Parker State Forest between Jenkins Road and Route 114 as a demonstration forest for age class and native species diversity, to enhance native wildlife habitat and increase resilience to forest pathogens and climatic change.
- Manage the parkland sections of Harold Parker State Forest to support recreational activities and address public safety hazards.

Table 5.1. Plant and Animal Habitat Recommendations

Recommendation	Priority	Fund[a]	Lead[b]
Manage Boxford State Forest as a forest reserve. There will be no commercial timber harvesting or logging due to disturbance. Limited active forest management may occur to maintain rare species habitat, control invasive species, or to address threats to public safety.	High	1	F
In the parkland sections of Harold Parker State Forest, allow pruning or tree removals to support recreational activities and address public safety hazards. Do not permit commercial timber harvesting.	High	1	F
Manage the woodlands portion of Harold Parker State Forest to protect and restore native forests by implementing sustainable forest management practices to maintain a diverse multi-aged, multi-species forest that will be resilient in the face of large natural disturbances. Assess the Home Fuelwood Program, proposing specific recommendations for Harold Parker State Forest.	High	1	F
Create or enhance turtle nesting sites in Boxford State Forest to reduce threats to female turtles traveling long distances to reach nesting sites.	High	1	P
Protect a state-listed plant living in a field south of the Jenkins Road parking lot by ensuring that vehicles do not park on it and by mowing the field outside of the growing season.	High	1	S
Post signage, monitor and enforce motorized the off-highway vehicle (OHV) restriction using the Park Watch Program with law enforcement support to protect rare species and their habitat from OHV damage.	High	1	R
During the growing season, **conduct surveys of Atlantic white cedar swamps** located in Boxford State Forest to identify their extents, plant species composition, condition and potential threats.	Medium	1	P
In late May, survey the Atlantic white cedar swamps located in Boxford State Forest for the presence of the **state-listed Hessel's hairstreak butterfly.**	Medium	1	P
Acquire properties adjacent to Boxford State Forest to further protect Blanding's turtles, vernal pool clusters and forest core habitat.	Medium	3	P
Develop a demonstration forest within Harold Parker State Forest's woodlands to expose the public to model active forest management.	Medium	2	F
DCR experts will evaluate proposed cutting plans to identify and protect sensitive natural and cultural resources prior to implementing any timber harvesting activities.	Medium	2	F
Do not pave forest roads located within sensitive turtle habitat to maintain natural cover.	Medium	1	S
Control invasive plant species to the greatest extent possible, to lessen adverse affects on priority vernal pool and forest core habitats.	Low	2	F/V
Conduct long-term biodiversity surveys and monitoring to monitor rare species and vernal pools, and track forest succession and health at Boxford State Forest in consultation with the NHESP and Forest Reserves Science Advisory Council.	Low	2	F/V
Install box culverts or culverts with natural bottom substrates at known sites of frequent Blanding's turtle crossings of paved public roads in consultation with the NHESP's Turtle Biologist.	Low	3	P/E

[a.] Availability of funding to implement recommendations: 1 = funding is currently available; 2 = funding is currently unavailable, but may become so in the near future; 3 = funding is currently unavailable, but may become so in more than five years.
[b.] The following codes identify the party responsible for implementing the recommendation: C = Contractor or consultant; E = Bureau of Engineering; F = Bureau of Forestry and Fire Control; L = Legal Services; O = Other; P = Bureau of Planning and Resource Protection; S = Division of State Parks and Recreation; R=Bureau of Ranger Services; T = State forest tenant; V = Volunteer or partner; W = Lakes and Ponds Program; X = Office of External Affairs and Partnerships.

5.2. PROTECT AND ENHANCE THE QUALITY OF WATER RESOURCES

- Conserve and improve the habitats of native aquatic plants and animals.
- Manage water resources to protect public drinking water supplies, and ensure healthy and safe water-based recreation.
- Manage the forests to protect wetlands, vernal pools, streams, ponds and reservoirs from overuse and avoidable environmental degradation.

Pond management should focus on keeping soil and natural vegetation around and within the ponds intact and free from disturbance. Natural shoreline vegetation is susceptible to damage from hiking, swimming, fishing, camping, horseback riding and boating. These activities can disturb aquatic animals, disrupt the seed bank and damage individual plants. In the submerged areas of the pond fringe, aquatic plants, hatchling animals and insect larvae can be disturbed by wading, swimming and fishing.

Table 5.2. Water Resource Recommendations

Recommendation	Priority	Fund[a]	Lead[b]
Hydro-rake aquatic vegetation in Stearns Pond to maintain open water for boating and fishing. Do not hydro rake along the shoreline, shallow coves and islands. Investigate the feasibility of reintroducing winter water draw downs to control pond vegetation.	High	1	W
Restore compacted and eroded areas around Frye Pond.	High	2	W
Install signs with instructions for checking and cleaning boats to reduce the potential of spreading invasive species at heavily used boat launch areas.	High	1	W
Monitor ponds for introduced invasive plant species, particularly aquatic species in ponds with boat access, and eliminate or control these species to the best extent feasible.	Medium	2	V/W
Introduce milfoil weevils to Field Pond to control the variable water milfoil infestation.	Medium	2	W
Dredge and add sand to the Frye Pond swimming beach to add depth and remove organic material from the swimming area.	Medium	3	W
In early spring, **visit certified and potential vernal pools** to determine their locations, presence of obligate species and potential threats. Focus on vernal pools most likely to be impacted by existing and proposed recreational and management activities. Use the survey to train DCR staff in the methodology for certifying vernal pools.	Medium	1	P

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5.3. PRESERVE THE DISTINCT SCENIC AND CULTURAL RESOURCES OF THE FORESTS

The forests' cultural resources represent a range of human endeavors from pre-Contact Native American occupation and colonial industries, to significant Civilian Conservation Corps (CCC) achievements. Preservation of these cultural resources and landscapes connects us to our past. Manage these resources to stabilize, restore and protect them from degradation.

The preservation of cultural resources can be accomplished through continued cooperation and teamwork. Good planning and early communication about proposed projects will ensure smooth project implementation. Beyond the dictates of legal compliance and resource protection, the cultural resources of both forests should be recognized for the opportunity that they are, and developed into public programming. Management practices at Harold Parker and Boxford state forests should incorporate the appropriate protection procedures to ensure that their cultural resources are not adversely affected by daily operations.

Cultural resources represent unique records of past events and behavior that are part of our communal heritage. Typically, prehistoric sites resulted from short-term sporadic occupation and under the best of circumstances, these sites are difficult to excavate and interpret properly. They are extremely fragile and easily damaged. Archaeological sites cannot be repaired or fixed and their loss is analogous to the extinction of a plant or animal species. Once these resources are gone, they are gone forever. Early consultation with the OCR concerning any proposed development, management and maintenance can ensure that projects are brought to their timely completion.

Table 5.3. Cultural Resource Recommendations

Recommendation	Priority	Fund[a]	Lead[b]
Archaeological Sites			
Avoid ground disturbing activities on undisturbed, level and well-drained areas around known archaeological sites, streams, ponds and wetlands, and monitor activities that are already occurring in these areas.	High	1	S
Consult with the DCR Archaeologist when planning development or maintenance projects that involve ground disturbance on level and well-drained areas around streams, ponds and wetlands.	High	1	P
Improve public access to the soapstone quarry. Consult with the Office of Cultural Resources regarding best management practices for historic quarries.	Medium	1	S
Prepare and submit MHC Inventory Forms for the Jenkins mill, soapstone quarry and the Russell family burial ground.	Medium	1	P
Conduct further archaeological research to determine the extent of the CCC camps at Collins and Frye ponds. Prepare a map of prominent, visible features.	Low	2	P
Assess the structural condition of the Jenkins mill dam; prepare repair recommendations and cost estimates.	Low	2	E

Continued on next page.

Table 5.3. Cultural Resource Recommendations (Continued)

Recommendation	Priority	Fund[a]	Lead[b]
Historic Buildings, Structures and Objects			
Preserve the CCC headquarters building, including window repairs, insulation and interior renovations. Prune hazardous tree limbs; simplify plantings in front of the building; and restore the timber fence. Install a new well for potable water. Correct any ACM, ADA, lead paint and building code compliance issues. Paint the storage building steel garage doors brown.	High	2	E
Prune and remove trees within 15 feet of the CCC picnic pavilion; open pond views through select thinning; and consult with the Office of Cultural Resources regarding best management practices for historic buildings.	High	1	S
Preserve stone walls throughout the forests, consulting with the Office of Cultural Resources regarding best management practices.	Medium	1	S/F
Development interpretive materials and programs for historic sites and buildings located in both forests.	Medium	1	P/S
Clean, repair and re-point stonework on the **CCC entrance pillars.** Restore the iron rings, remove the yellow highway post, prune vegetation, remove small trees and prune large trees at the eastern pillar.	Medium	2	S
Stabilize the Collins Pond fish hatchery ruin by securing or removing loose material. Remove the roof if it becomes unstable. Keep the fish pens and stonework intact.	Low	2	P
Historic Parkways and Landscapes			
Develop a caretaker agreement with a local volunteer organization to maintain the Bald Hill historic agricultural landscape by mowing the fields one time per year; follow best management practices for cellar holes; install interpretive signage; and maintain the Russell family burial ground. Complete a conditions assessment of headstones, including repair recommendations and cost estimates.	High	2	V/P
Preserve and maintain the west ponds CCC landscapes. Preserve the remaining CCC features, including dams and spillways. Regularly clean debris from the water, shorelines and spillways. Preserve the dams as cultural resources.	High	2	E
Restore and maintain the Berry Pond Landscape, including vista and vegetation management, beach replenishment and stone wall conservation.	Medium	2	S
Maintain Harold Parker and Berry Pond roads as historic parkways. Major road improvements should include restoration of some design elements of the historic parkways (e.g., rustic materials, low profile guiderails, stone headwalls and restored views).	Low	2	S

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[b.] The following codes identify the party responsible for implementing the recommendation: C = Contractor or consultant; E = Bureau of Engineering; F = Bureau of Forestry and Fire Control; L = Legal Services; O = Other; P = Bureau of Planning and Resource Protection; S = Division of State Parks and Recreation; R=Bureau of Ranger Services; T = State forest tenant; V = Volunteer or partner; W = Lakes and Ponds Program; X = Office of External Affairs and Partnerships.

5.4. PROVIDE DIVERSE OPPORTUNITIES FOR SUSTAINABLE OUTDOOR RECREATION

- Provide the public with a variety of desired recreational experiences within a natural setting.
- Maintain a sustainable network of hiking, mountain biking, horseback riding and cross-country ski trails to provide connections among day use areas, the campground, historic features, abutting open spaces and the Bay Circuit Trail.
- Maintain forest roads for public safety, aesthetics and fire protection.
- Avoid or mitigate recreational impacts on sensitive natural and cultural resources.
- Close trails that are redundant or eroded fall-line trails in poor condition.
- Reduce trail densities in forest core habitat, or in the vicinity of the most intact wetlands or vernal pool clusters.
- Provide and maintain sanitary facilities for public use.
- Minimize maintenance costs and management requirements.

Successful trail systems work seamlessly to highlight scenic features, protect sensitive resources, create valuable connections, discourage unwanted behaviors and provide a range of recreational experiences to users. The trail recommendations are based on an assessment of the condition and function of the existing trail network, the management of recreation trails within the context of natural and cultural resources under the stewardship of the DCR, and DCR trails guidelines (DCR, 2010). The trail planning process provides an opportunity for communication and cooperation with park visitors, local trails organizations and surrounding communities.

As part of the trails planning process, the DCR completed an inventory of the forest road and trail system in both forests. This inventory allowed the DCR to integrate natural and cultural resource information about Priority Habitat for rare species, vernal pools, wetland resource areas, soils and steep slopes into the trail recommendations.

Table 5.4. Sustainable Recreation Recommendations

Recommendation	Priority	Fund[a]	Lead[b]
Day Use Areas			
Investigate options to re-open the Berry Pond day use area using the new DCR retained revenue model to provide swimming and picnic opportunities during hot summer months.	High	2	S
Install a composting toilet and electricity at the **Berry Pond CCC pavilion.**	High	2	E
Open the Stearns Pond day use area for picnicking, boating and fishing. Construct a new comfort station, restore the picnic areas, install fireplace grills and remove some paving to create an open playfield.	Medium	3	P
Create a new fishing and boat launch area at Fields Pond with 40 parking spaces and an information kiosk. Restore parking turn out areas along Harold Parker Road to a natural condition.	Medium	3	P
Suction dredge Stearns Pond to improve boating, fishing and swimming opportunities. Use a long-reach excavator to remove rocks, stumps and sediments within 60 feet of the public beach. Restore the swimming beach.	Low	3	E

Continued on next page.

Table 5.4. Sustainable Recreation Recommendations (Continued)

Recommendation	Priority	Fund[a]	Lead[b]
Lorraine Park Campground			
Consider options for extending the camping season at Harold Parker State Forest from May 1st through Columbus Day weekend using the new DCR retained revenue model.	High	2	S
Replace campground comfort station #4 (near Frye Pond) to provide sanitary facilities that are ADA accessible with a dish washing station.	High	2	E
Place the campground electrical system underground and install 10 trailer electrical hook ups to improve system safety and reliability.	Medium	2	E
Replace campground comfort station #2 to provide modern sanitary facilities that are ADA accessible with a dish washing station. In the interim, make repairs to facilitate compliance with public health regulations.	Medium	3	E
Forest Roads and Trails			
Improve fire and emergency access to Bald Hill by clearing back brush, repairing or installing cross culverts, and re-grading Thomas Road.	High	2	F
Mitigate trail impacts on vernal pools, wetlands and streams by closing or relocating trails that negatively impact priority vernal pools and wetlands, and constructing boardwalks or bridges over flooded sections (see Trail Recommendations maps).	High	2	F
Repair eroded areas along trails by relocating trails to gentler slopes or installing water bars to divert water flows away from the trails (see Trail Recommendations maps).	High	2	F
Install trail intersection signs, reassurance markers and blazes along forest roads and trails.	Medium	2	V/S
Assess the trail systems to determine whether various classes of **power driven mobility devices** carrying people with mobility disabilities can reasonably be allowed.	Medium	2	P/S
Design and construct new trails in Harold Parker State Forest to create a system of beginner loop trails with improved connections between the headquarters area and existing trails serving Stearns, Berry, Sudden and Salem ponds (see Harold Parker Trail Recommendations map).	Medium	2	P/S
Public Roads			
Repave Middleton Street (from Andover to North Reading town lines). Clear back brush and remove hazardous trees. Install box culverts at major wetland turtle crossings, culvert beaver deceivers and raised trail crossings with signage and rumble strips.	Medium	2	E
Repave Harold Parker Road (Middleton Street to Route 114). Clear back brush and remove hazardous trees. Install box culverts at major wetland turtle crossings, culvert beaver deceivers and raised trail crossings with signage and rumble strips.	Low	3	E

[a.] Availability of funding to implement recommendations: 1 = funding is currently available; 2 = funding is currently unavailable, but may become so in the near future; 3 = funding is currently unavailable, but may become so in more than five years.
[b.] The following codes identify the party responsible for implementing the recommendation: C = Contractor or consultant; E = Bureau of Engineering; F = Bureau of Forestry and Fire Control; L = Legal Services; O = Other; P = Bureau of Planning and Resource Protection; S = Division of State Parks and Recreation; R=Bureau of Ranger Services; T = State forest tenant; V = Volunteer or partner; W = Lakes and Ponds Program; X = Office of External Affairs and Partnerships.

5.5. EXPAND INTERPRETIVE AND ENVIRONMENTAL EDUCATION PROGRAMS

Effective park management largely depends on the support of well-informed visitors. Provide connections to the forests' significant natural and cultural resources through interpretive programs, materials and signage.

Table 5.5. Interpretive and Environmental Education Program Recommendations

Recommendation	Priority	Fund[a]	Lead[b]
Provide an entry sign at the Sharpners Pond Road entrance to Boxford State Forest with key forest rules, a trail map and Park Watch Program contact information.	High	1	S
If Berry Pond is reopened as a recreation area, **equip the Berry Pond bathhouse warming room for improved visitor services and informal interpretation.** Install cabinets to store interpretive materials. Construct a partition with sound absorbing materials to separate the area from the public bathrooms.	High	2	S
Convert the short-term seasonal Interpreter position into a long-term seasonal position (April-October) to provide spring and fall seasonal interpretive events and programs targeting school groups.	High	2	S
During the hunting season, provide signs at the Jenkins Road, Middleton Road CCC pavilion, forest headquarters and Sharpners Pond Road public parking lots warning visitors to wear hunter orange and exercise caution during the hunting season. Provide information brochures online and at the forest headquarters describing the hunting season schedule and recommended safety precautions.	High	1	S
Install a trail map holder on the existing Jenkins Road parking lot kiosk and trim around the kiosk to make the forest trail map more visible to visitors.	Medium	1	S
Provide new information kiosks near campground comfort stations #2 and #4. The kiosks should include forest rules, an interpretive program schedule and special event notices.	Medium	2	S
Provide new interpretive kiosks at the existing Middleton Road CCC pavilion parking lot, and the proposed Field Pond and soapstone quarry parking lots. The kiosks should include a trail map of the forest, forest rules, description of nearby historic features and a brochure holder for trail maps.	Medium	2	S
Hold the annual Fishing Festival at Berry Pond to improve fishing opportunities and provide public restroom facilities during the event.	Medium	2	S
Provide pond discovery packs to increase knowledge of pond ecology.	Low	2	S
Provide a vernal pool interpretive program to increase public awareness of the importance and sensitivity of vernal pools.	Low	2	S
Develop a tri-fold brochure explaining the recreational history of the western pond area of Harold Parker State Forest.	Low	2	S
Develop a video presentation and display for the Berry Pond interpretive center describing CCC contributions to Harold Parker State Forest.	Low	3	S

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5.6. WORK WITH PARTNERS TO ACHIEVE MANAGEMENT GOALS

Maintain and develop partnerships with other state agencies, adjacent municipalities, non-profit organizations, businesses and volunteers to provide quality outdoor recreational opportunities while conserving the important natural and cultural resources of the forests. With DCR oversight, partner with organizations and individual volunteers to implement this RMP for the long-term stewardship of the forests.

Table 5.6. Partnership Recommendations

Recommendation	Priority	Fund[a]	Lead[b]
Work with the Bay Circuit Alliance, Essex County Greenbelt Association and the Town of Middleton to **acquire additional land to permanently connect the Harold Parker and Boxford state forests** using the Bay Circuit and local connecting trails while protecting important Priority Habitat.	High	2	P
Work with Groundwork Lawrence and the Appalachian Mountain Club to **promote camping and trail use by Lawrence residents** in Harold Parker State Forest.	High	1	S
Work with the Friends of North Andover Trails and the Town of North Andover to **create trails linking Molly Towne open spaces** with trails within the Woodchuck Hill section of Harold Parker State Forest.	High	2	F
Work with the New England Mountain Bike Association to **improve trail signage and develop loop trails in Harold Parker State Forest** that connect to other conservation lands and neighborhood paths.	Medium	2	S
Work with the Essex County Greenbelt Association and the Boxford Trails Association/BOLT to **improve trail signage and maintenance in Boxford State Forest.**	Medium	2	S
Work with the Friends of North Andover Trails to layout and construct a **new trail from Maplewood Reserve to the Bay Circuit Trail**.	Medium	3	P
Work with partners to develop and distribute **large scale trail maps** showing all approved trails and forest roads, descriptions of recommended trail loops and significant natural and cultural features for Harold Parker State Forest.	Low	2	V/S
Foster partnerships with colleges and universities with degree programs in biology, botany, archaeology and history to assist in carrying out lower priority natural and cultural resource recommendations (e.g., vernal pool certifications, Blanding's turtle and invasive species surveys and archaeological documentation for the CCC campsites).	Low	1	P
Prepare and post a list of potential volunteer projects that could be conducted by the Friends of Harold Parker State Forest, youth groups, conservation organizations, businesses or individuals within the forests.	Low	1	S

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5.7. RECOMMENDED CAPITAL PROJECTS

The state capital budget supports projects (e.g., construction and repair) and purchases (i.e., equipment) with a per-unit cost of at least $5,000 and an expected lifespan of at least seven years. Capital projects are identified and funded through a five-year capital plan. The five-year capital plan identifies proposed capital projects, their estimated costs and the year in which they are to be funded. Capital funding is subject to annual appropriation and approval by the Commissioner of the DCR, Secretary of the Executive Office of Energy and Environmental Affairs, and the Governor.

Table 5.7. Recommended Capital Projects

Project Description	Estimated Cost	Priority
Berry Pond bathhouse mold removal and roof repairs; install an exterior rinse-off station and convert the warming room into an interpretive center.	$25,000	High
Interim repairs to campground comfort station #2 to facilitate compliance with public health regulations.	$75,000	High
Replace campground comfort station #4.	$750,000	High
Engineering analysis, design and permitting to preserve the Fields, Collins and Brackett ponds dams as historic CCC landscape features. Consider the ecological, hydrological, financial, scenic and management impacts of breaching the Delano and Collins ponds dams.	$200,000	High
Place campground electrical system underground and install 10 trailer hook ups.	$400,000	High
Dredge Frye Pond to remove sediments from the campground swimming area.	$150,000	Medium
Headquarters building insulation, energy improvements and interior renovations. Preserve historic wooden windows and storm sashes. Install foundation perimeter insulation and a new well for potable water. Correct outstanding ADA, lead paint, asbestos and building code issues.	$75,000	Medium
Install a composting toilet and electricity at the Berry Pond CCC pavilion.	$60,000	Medium
Resurface Middleton Street (from Andover to North Reading town lines). Clear back brush and remove hazardous trees. Install box culverts at major wetland turtle crossings, beaver deceivers, and raised trail crossings with signage and rumble strips.	$600,000	Medium
Cut trees and shrubs; remove stumps greater than 10 inches in diameter; fill holes in the core walls; fill low and eroded embankment slopes; reconstruct the embankments and cover the core walls; provide upstream slop protection to control seepage through the embankment; and plant grass on the Collins, Brackett and Delano ponds dam embankments.	$300,000	Medium
Replace campground comfort station #2.	$750,000	Medium
Create Fields Pond fishing and boat launch area with 40-space parking area, composting toilet and information kiosk. Restore parking turn outs on Harold Parker Road.	$75,000	Medium
Modify the Fields, Collins, Brackett and Delano ponds dam spillways to provide adequate spillway flood capacity and repair spillway concrete walls.	$750,000	Medium
Open Stearns Pond day use area for picnicking, boating and fishing. Construct a new comfort station, restore picnic areas, install fireplace grills and remove some paving to create an open playfield.	$750,000	Low
Resurface Harold Parker Road (Middleton Street to Route 114). Clear back brush and remove hazardous trees. Install box culverts at major wetland crossings, beaver deceivers, and raised trail crossings with signage and rumble strips.	$400,000	Low
Suction dredge Stearns Pond to improve boating, fishing and swimming opportunities. Use a long-reach excavator to remove rocks, stumps and sediments within 60 feet of the public beach. Restore the swimming beach area.	$250,000	Low
Total Recommended Capital Projects:	**$5,610,000**	

5.8. STAFF RECOMMENDATIONS

The annual state operating budget supports daily operations and maintenance including staff salaries, utilities, supplies, equipment leases, administration, and the maintenance of facilities, vehicles and equipment. Operational funding is an ongoing issue for the operation of the forests, as it is throughout the DCR. The agency's overall operating budget decreased by 30% from Fiscal Year 2009 to 2011.

State operating funds are subject to annual appropriation by the legislature and approval by the Governor. The table below identifies additional operating funding needed to implement recommendations made in this Resource Management Plan.

Table 5.8. Identified Staff Needs

Staff Recommendation	Estimated Annual Cost	Priority
Hire a year-round Laborer.	$29,000	High
Re-open the Berry Pond day use area from the Father's Day weekend through Labor Day.	$34,000	High
Convert the short-term seasonal Interpreter position into a long-term seasonal position (April - October).	$5,000	Medium
Extend the campground season from Labor Day through Columbus Day.	$21,000	Medium
Re-open the Stearns Pond picnic area from Memorial Day through Labor Day (without swimming).	$21,000	Low
Total Annual Cost of Staff Recommendations:	**$ 110,000/year**	