Appendix A. Plan Contributors

Name	Affiliation	Area of Expertise
	Department of Conservation and Recreation	
Anderson, Bob	Park Interpreter	Interpretive services
Asen, Steve	Lakes and Ponds Program	Lake and pond management
Backman, Andy	Regional Planning	Resource planning
Baecker, Jim	Regional Planning	RMP coordination
Berkland, Ellen	Office of Cultural Resources	Archeaology
Bertrand, Dan	Legislative Affairs	Legislative relations
Briere, Gary	Bureau of Recreation	Recreation
Buls, Barbara	Visitors Services Supervisor	Visitor education and safety
Cavanagh, Paul	RMP Program	Planning
Church, Peter	Bureau of Forestry and Fire Control	Sustainable forestry
Crawford, Conrad	External Affairs	Partnerships
David, Steve	Park Supervisor	Operations and maintenance
Famulari, Tom	Dam Engineer	Dam maintenance and repair
Forgione, Darryl	Regional Engineer	Engineering
Fiesinger, Anne	Office of External Affairs and Partnerships	Public outreach
Fisher, Sean	Office of Cultural Resources	Archival materials
Geigis, Pricilla	Director of State Parks	Park operations
Greene, Judy	Office of Cultural Resources	Historic maps and plans
Hamilton, Susan	North Region	Operations
Hill, Bill	Bureau of Forestry and Fire Control	Forest management
Hunt, Dan	Legislative Affairs	Legislative relations
Jahnige, Paul	Greenways and Trails Program	Trail planning and maintenance
Karl-Carnahan, Kristin	Bureau of Ranger Services	Interpretive planning
Kimball, David	GIS Program	GIS
Kish, Patrice	Office of Cultural Resources	Cultural resources
Lloyd, Nathanael	GIS Program	GIS
Martell, Dan	Dam Maintenance	Dam engineering
McCarthy, Tom	Universal Access Program	Universal access
Moran, Barbara	Office of External Affairs and Partnerships	Web postings
Orfant, Joe	Bureau of Planning and Resource Protection	Planning
Overton, Samantha	Deputy Director of State Parks	Park operations
Pearl, Wendy	Preservation Planner	Historic preservation
Penniman, Harris	Management Forester	Forestry
Plocinski, Loni	GIS Program	GIS
Port, S.J.	Office of External Affairs and Partnerships	Media relations
Putnam, Nancy	Ecology Program	Forest ecology
Rayworth, Tim	Interpreter	Interpretive services
Regan, Andy	District 5 Fire Warden	Forest fire control
Rotondo, Joe	External Affairs	Permits and special events
Rudge, Curt	Bureau of Ranger Services	Ranger operations
Salomaa, Bill	Dam Maintenance	Dam engineering
Silva, Jason	Commisioner's Office	Chief of Staff
Silva, Raul	Deputy Chief Engineer	Capital Improvements
Stowe, Jennifer	Regional Ranger	Ranger services and enforcement
Straub, Jim	Lakes and Ponds Program	Pond ecology

Continued on next page.

Appendix A. Plan Contributors (Continued)

Name	Affiliation	Area of Expertise
	Department of Conservation and Recreation (continued)	
Tipton, Nat	RMP Program	Visitor surveys
Walsh, Thomas	Middlesex Essex District Manager	Operations and management
Ward, Kathy	District Ranger	Ranger services and enforcement
Wysloki, Anita	Camping Coordinator	Campground Management
	Other Affiliations	
Aspeslagh, Glen	Friends of North Andover Trails	Trail planning and maintenance
Becker, Ed	Essex County Greenbelt Association	Trail planning
Berry, Jim	Massachusetts Audubon Society	Bald Hill IBA
Boles, Bill	NEMBA	Trail planning and maintenance
Connolly, Bryan	NHESP	State Botanist
French, Alan	Bay Circuit Alliance	Trail planning and maintenance
Gildesgame, Mike	Appalachian Mountain Club	Trail management
Harper, Lynn	NHESP	Habitat protection
Kadis, Irina	Arnold Arboretum	Botonist
Keyes, Philip	NEMBA	Trail design
Kittredge, Walter	Friends of Harold Parker State Forest	Botonist
Lane, Frank	Northshore Chapter of NEMBA	Mountain biking
Lubin, Don	Harvard University	Ferns botony
Merrill, Nancy	Boxford Trail Association/BOLT	Trail maintenance
Nelson, Mike	NHESP	Entomologist
Petersen, Wayne	Mass Audubon Society	Important Bird Areas
Rimmer, Dave	Essex County Greenbelt Association	Land stewardship
Soule, Walt	Friends of North Andover Trails	Trail planning
Streeter, Dan	Northshore Chapter of NEMBA	Trail construction and maintenance
Swain, Patricia	NHESP	Rare natural communities
Zinovejev, Alexey	Plant Inventory	Plant photography

Appendix B. Public Participation

In accordance with Massachusetts General Laws Chapter 21: Section 2F, the Resource Management Plan (RMP) for the Harold Parker Planning Unit was developed in conjunction with a public participation process to ensure that interested stakeholders and individuals had an opportunity to review the draft RMP and offer input in its development. This appendix details the public participation process used to inform and review this RMP.

1. Input into Development of the RMP

The Harold Parker RMP began with an initial public meeting on April 18, 2012 at the Stevens Memorial Library, North Andover. A notice of the public meeting and of the DCR's intent to prepare a Resource Management Plan for the Harold Parker Planning Unit was announced on the DCR webpage, in The Environmental Monitor and through meeting notices provided to area media. Approximately 35 people attended the initial public meeting, which ran from 7:00 - 8:30 p.m.

A public trails workshop was held on June 13, 2012 from 6:30 - 8:30 p.m. at the Stevens Memorial Library, North Andover. The workshop included presentions from a variety of trail organizations and stakeholder groups. Presenters included Nancy Merrill (Boxford Trails Association/Boxford Open Land Trust), Dave Rimmer (Essex County Greenbelt Association), Walt Soule (Friends of North Andover Trails), Alan French (Bay Circiut Alliance) and Frank Lane (New England Mountain Bike Association). Presentations were followed by an open discussion of trail issues in the forests.

At each of these meetings, the public was invited to ask questions and engage in a dialogue on issues that should be addressed in the RMP. Meetings notes were recorded and posted publicly at http://www.mass.gov/dcr/news/publicmeetings/rmppast.htm. Written input on the plan was also solicited at the initial public meeting, the trails workshop, through The Environmental Monitor announcement, on the DCR webpage and in letters sent to individuals and organizations on the Harold Parker Planning Unit RMP contact list. These written comments were also posted on the DCR website at http://www.mass.gov/dcr/news/publicmeetings/rmppast.htm.

2. Public Comment on the Draft RMP

Notice of the availability of the Draft RMP for the Harold Parker Planning Unit and a public meeting to present the draft was published in the November 21, 2012 Environmental Monitor, through a meeting notice sent to area media outlets, in notices sent to individuals and organizations on the Harold Parker Planning Unit RMP contact list and on the DCR webpage. The meeting was held on December 5, 2012 at the Stevens Memorial Library.

A public comment period on the draft RMP ran from December 6 through January 11, 2012. During this period, the DCR received eight comments via email. These written comments were posted at http://www.mass.gov/dcr/news/publicmeetings/rmppast.htm.

3. Changes to the Final RMP

All comments received during the final public comment period have been reviewed, compiled and considered. Comments that were consistent with the DCR's mission and policies, Massachusetts' laws and regulations and the Management Principle and Goals of the planning unit were carefully considered for incorporation into the final RMP. Comments that were inconsistent with these, or are best implemented by another agency, are not included in the final RMP. Changes to the final RMP in response to these public comments are described below.

Section 1.9. History of the Property

The history of the ABM site in Boxford State Forest was revised to:

> 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.

Section 1.10. Landscape Designations
The woodlands description was clarified:

> **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.

Information was added about the selection criteria for 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.

Section 2.1. Atlantic White Cedar Swamps
In response to comments submitted by the Natural Heritage & Endangered Species Program (Appendix P), DCR and NHESP staff documented and mapped stands of Atlantic white cedar within Boxford State Forest. The following section was then added to the RMP:

> 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).
>
> 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).
>
> 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).

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.

Section 2.2. Harold Parker State Forest Historic Archaeological Sites
The following descriptions were added about the Timothy Eaton and Robert Mason homestead 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.

Section 2.3. Town of North Andover
The following paragraph and a map were added about Woodchuck Hill:

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.

Section 2.3. Current Trail Uses
In response to concerns about conflicts between different trail user groups, the following section was added on 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.

Section 3.6. Forest Management Approach

The following items were added to clarify the DCR's approach to forest management:

An online link to "Massachusetts Forestry Best Management Practices" was added to the Bibliography.

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.

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.

Section 3.6. Impacts and Benefits of Harvesting

The following section was added to describe the impact of forestry operations on the trail network:

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.

Section 3.7. Paved Roads
The following description of Berry Pond Road was added:

> 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.

Section 4.4. Recommended Land Stewardship Zones
- The Zone 3 at Berry Pond was expanded to include the area east of Berry Pond, including the CCC picnic pavilion and parking lot.
- The Zone 3 at Lorraine Park Campground was expanded to include campsites located on the outside of the campground road.
- The Zone 3 at Sudden Pond was reduced to include just the existing group campsites and the adjacent access road.
- The Zone 3 at Stearns Pond was reduced to exclude a red pine plantation at the intersection of Harold Parker and Middleton roads.

Table 5.1. Plant and Animal Habitat Recommendations
The following recommendations were added:

> 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.
>
> 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.

Table 5.2. Water Resource Recommendations
The last recommendation was revised:

> 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.

Table 5.6. Partnership Recommendations
The first recommendation was revised:

> 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.

Harold Parker State Forest Trail Recommendations Map
In response to comments submitted by the New England Mountain Bike Association, Friends of North Andover Trails and Bay Circuit Alliance, DCR staff and representatives of these trail organizations visited the trail

segments commented on by the trails organizations. Based on these field visits and discussions, the Harold Parker State Forest Trail Recommendations map was revised to:

- Retain the existing single track trail located between NA8 and NA12 east of Salem Pond. To avoid a vernal pool and steep grades, close the single track trail west of this trail.
- Retain the single track trail adjacent to the eastern shore of Salem Pond, constructing a new wetland crossing over a drainage swale that drains into the pond. Where the trail bifurcates near the east end of Salem Pond, close the redundant trail section adjacent to the pond.
- Improve the forest road treadway between NA8 and NA13 to prevent impacts to an adjacent vernal pool and wetlands.
- Retain the single track trail south of NA9. Construct a boardwalk over an intermittent stream crossing.
- Retain the single track trail located southeast of the Jenkins Road parking lot. Monitor off-trail use to prevent informal access to the uplands adjacent to the certified vernal pool.
- Retain the single track trail located south of A25.
- Relocate the trail at A27 further upland to the west to increase the buffer around several vernal pools.
- Retain the short bypass trail south of A16.
- Use an existing trail to connect the forest road south of NA20 to the Bay Circuit Trail south of NA22.
- Reroute existing trails around the pit area retaining the existing Bay Circuit Trail layout and creating a connector trail between NA19 and NA21.
- Retain the existing Bay Circuit Trail layout at the Jenkins Road crossing, maintaining a separation between the Bay Ciricuit Trail and the proposed parking area. Improvements to the trail are needed at the easterly roadway edge at A8 to mitigate soil erosion.
- Retain the single track trail south of NA15.
- Retain the equestrian route along the forest road north of Sudden Pond. Verify the adequacy of vernal pool buffers along the forest road.
- Close the dead end forest road that runs south of Stearns Pond Forest Road between NA2 and NA3.
- Retain the nature viewing trail south of NA3.
- Locate the new connector trail proposed between NA8A and NA13 further to the west to avoid a residential inholding.
- Close a portion of the single rack trail that intersects with the Bay Circuit Trail west of NA26 only in the area of the vernal pool adding a connection to other trails to the east. Consider creating some new trail connections that would allow closure of the Bay Circuit Trail section south of the vernal pool.
- Use an existing trail to provide off-road trail connections between trails around Field Pond south of A21.
- Improve the wetland crossing at the Bracket Pond dam west of A23.
- Provide a new trail connection between A2 and A3.
- Close the flooded trail south of NA34.
- Create a beginners trail around the north end of Stearns Pond by improving the trail between NA3A and NA30, constructing an off-road trail with boardwalk northeast of NA35 to connect the Stearns Pond Forest Road to the forest road northwest of NA35.
- Create a new trail connection between the Bay Circuit Trail at NA32 and an existing forest road at NA33.

Appendix C. Glossary

Active recreation – recreational activities requiring equipment, facilities or a degree of energy.

Agricultural Preservation Restriction (APR) – legal agreement restricting use of a property for agricultural purposes in perpetuity.

Archeological – pertaining to the study of the material remains of past human life and activities.

Bathhouse – buildings located at swimming areas for clothes changing and toilet use.

Bog – An acedic wetland dominated by a waterlogged, spongy mat of sphagnum moss that ultimately forms a thick layer of acidic peat. Bogs generally have no inflow or outflow.

Bog iron – mineral formed in swamps and shallow lakes when water deposits iron oxide between the inorganic bottom surface and layers of decaying plants.

Bog iron furnace – a furnace used to concentrate iron from bogs by burning off the organic material.

Camping area – areas containing a varied number of camp sites.

Canopy – the overhead covering of trees.

Civilian Conservation Corps (CCC) – the U.S. civilian labor force initiated during the 1930's (the Great Depression). The CCC planted trees, and built roads, trails, recreation areas and buildings in Massachusetts State Forests and Parks.

Comfort station – buildings providing men's and women's toilets.

Commercial thinning – an intermediate cut in the main forest stand designed to enhance the growth and quality of crop trees. The cut material is large enough or of such quality as to be saleable under normal market conditions.

Coniferous – terrestrial forest communities are considered deciduous if there is >75% coniferous trees in the canopy.

Conservation Restriction (CR) – legal agreements entered into between a land owner and a qualified conservation orgamization permanently restricting future use of the property for open space uses such as woodland management, farming, fishing, boating and hiking.

Contact station – building set aside for liason between DCR staff and park users.

Day use area – recreational areas that are set aside for use during daylight hours only.

Deciduous – terrestrial forest communities are considered deciduous if there is >75% deciduous trees in the canopy. Deciduous species are plants that shed foliage at the end of the growing season.

Defoliation – the removal of leaves from a plant, usually caused by leaf eating insects.

Deposition – the act or process of laying down layers of sediments.

Droughty – not being able to hold water very long and therefore drying up quickly.

Drumlin – elongated or oval hill of glacial deposits.

Easement – a right to use land of another owner for a specific limited use.

Ecosystem – a biological community and its environment consisting of all the organisms living in a particular area, as well as all non-living components of the environment with which the organisms interact, such as air, soil, water and sunlight.

Ecoregion (ie. Ecological region) – an extensive landscape with similar geology, physiology, vegetation, climate and land use history.

Eutrophic – a body of water in which the increase of mineral and organic nutrients has reduced the dissolved oxygen, producing an environment that favors plant over animal life.

Extinct – plant or animal species that have been completely eliminated from the earth.

Extirpated – Plant or animal species that have been eliminated from a specific location or range.

Fire access road – any road providing access for fire-fighting vehicles to a forested area for the prevention, detection or suppression of fires.

Game – those animal species that are hunted, trapped or fished for sport.

Geology – the science that deals with the history and structure of the earth as recorded in rocks.

Glacial – produced by a glacier, a large mass of ice that moved down a slope or spreads over a land surface.

Glacial till – unsorted, non-stratified (not layered) glacial drift, consisting of particles ranging in size from clay to boulders, transported and deposited by glacial ice.

Glaciofluvial deposits – material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice; the deposits are stratified and occur in the form of kames, eskers, deltas and outwash plains.

Gneiss – a banded, granite like metamorphic rock (rock altered in texture, composition and structure by heat and pressure) with minerals arranged in layers.

Granite – a course grained, hard, igneous rock (volcanic or molten origin) that consists of quartz and feldspar. Granite is often used for buildings and monuments.

Group sites – areas set aside for groups of overnight campers, usually non-profit organizations serving youth.

Habitat – the place or type of site where a plant or animal naturally or normally lives and grows.

Historic – in New England, the time period following European settlement, and at least 50 years before the present.

Improvement cut – a cutting made in forest stands for the purpose of improving composition and quality by removing trees of undesirable species, form or condition from the main canopy.

Indigenous – having originated in and living naturally in a particular region.

In-holdings – private land that is surrounded by land owned by DCR.

Intensive recreation – high density recreation activities involving a high number of participants on a given site. Examples include paved trails, restrooms, picnic shelters, play grounds, sports areas, swimming areas and boat launch facilities.

Intermediate cut (thinning) – trees are removed which are of poor form, in poor condition or of a commercially undesirable species as well as desirable trees whose removal will accelerate the growth of other desirable trees.

Interpretive program – educational or recreational programs which focus on the natural and cultural history of the area, as well as DCR management objectives, and public education on the proper use of DCR properties.

Invasive species – are non-native plant or animal species whose introduction causes harm to native species living in the ecosystem under consideration.

Kame – a variety of stratified landforms deposited by melt water streams in contact with the ice of a glacier.

Kettle hole – a depression formed by the melting of large chunks of buried glacial ice.

Kettle hole pond – a pond formed in a kettle hole when a portion of the depression is located below the water table.

Leaching field – an underground area designed to receive liquid overflow from septic tanks.

Legume – any of a large family of herbs, shrubs and trees bearing nodules on the roots that contain nitrogen fixing bacteria, including important food and forage plants.

Lepidoptera – the order of insects that consists of the butterflies and moths.

Legacy species – when rare species occur either entirely or mostly on DCR properties and nowhere else in Massachusetts as determined by the Massachusetts Natural Heritage and Endangered Species program.

Marsh – A water-saturated, poorly drained area, intermittentlyor permanently water covered, having aquatic and grasslike vegetation.

Microclimate – the essentially uniform local climate of a small site or habitat.

Moorland – a boggy area containing peat, and dominated by grasses and sedges.

Moraine – a landform made of glacial till, typically a ridge deposited at the edge of a glacier.

N**atural communities** – a distinct grouping of plant species that occur together in recurring patterns.

Non-game – animal species that are not hunted or fished for sport.

Non-native plant – When a plant is moved from its natural range to a new ecosystem. These species can

become invasive, outcompeting other native species for nutrients, space, and/or light resources.

Northern hardwoods – deciduous trees typical of northern climates, especially maples, aspen, and white and yellow birch.

Off-highway vehicle (OHV) – a motor vehicle designed to travel over unimproved terrain.

Open space – undeveloped land managed to protect existing and future well fields, aquifers and recharge areas, watershed land, agricultural land, grasslands, fields, forest land, fresh and salt water marshes and other wetlands, ocean, river, stream, lake and pond frontage, beaches, dunes and other coastal lands, lands to protect scenic vistas, land for wildlife or nature preserve, and land for recreational use.

Outcrop – Areas of mostly horizontal, exposed bedrock.

Outwash plain – a generally flat land area made up of sand and gravel deposited by melt water flowing from a glacial ice margin.

Overstory type – the dominant forest vegetative cover type.

Partial in-holding – private land that is partially surrounded by land owned by DCR.

Passive recreation – recreation activities which do not require extensive energy, facilities or equipment.

Percolation – the act of liquid passing through a permeable surface (such as water passing through soil).

Perennial – Plants persisting for several years, with new herbaceous growth each year.

pH – A measure of the acidity (less than 7) or alkalinity (greater than 7) of a solution.

Plantation – stands of forests or trees that have been artificially planted.

Pondshore species – those species that occur along the fringe of ponds that must be adapted to alternately dry and wet conditions.

Pre-Contact – in New England, the time period prior to European settlement.

Productive species – those tree species that provide salable wood products (e.g. red oak, white pine and black walnut).

Rare species – extremely uncommon plants or animals. In Massachusetts, rare species are listed by the Natural Heritage Endangered Species Program and protected under the Massachusetts Endangered Species Act.

Reforestation – the process of putting forest trees on a site that is presently non-forested or had its forests previously removed.

Right of way – a legal right of passage over another person's land.

Root crown – the uppermost part of a plant's root system that lies at ground level and forms the base for the plant stem, also called the root collar.

Riverfront area – the area of land regulated by the Wetlands Protection Act located between a river's mean annual high water line and a parallel line measured horizontally (310 CMR 10.58). The environmental attributes of Riverfront areas include flood control, prevent storm damage, prevent pollution, protect water supply and provide wildlife habitat.

Sample plot – an area small enough to permit complete measurement, to an established standard of scientific accuracy, of the vegetation or animals occupying the plot.

Sanctuary - a refuge where plants and animals are protected from human disturbance.

Septic system – a system for disposal of sanitary waste including a septic tank, distribution box and leaching field that is regulated by Title V of the State Sanitary Code.

Silviculture – one branch of forestry concerned with the theory and practice of controlling forest establishment, composition and growth.

Soil profile – the soil from the surface of the ground to the unchanged parent material beneath, commonly divided into layers known as horizons, formed by the action of living organisms on the original parent material.

Species of limited distribution – plants or animals that are found in only a small geographic range.

Stand – an aggregation of trees or other growth occupying a specific area and sufficiently uniform in species composition, age and condition as to be distinguishable from other growth on adjoin areas.

Swamp – an area intermittently or permanently covered with water, and having trees and shrubs.

Understory type – the vegetative cover type that lies beneath the overstory.

Vista – a distant view through or along a road, field, opening or water body.

Visual intrusion – an object or objects that block a portion of a vista.

Vernal Pool – unique wildlife habitats best known for the amphibians and invertebrate animals that use them to breed. They typically fill with water in the autumn or winter due to rising ground water and rainfall and remain ponded through the spring and into summer. Vernal pools often dry completely by the middle or end of summer each year, or at least every few years. Occasional drying prevents fish from establishing permanent populations and preying upon many amphibian and invertebrate species.

Watershed – a geographic area of land delineated by topographic features in which all surface and ground water flows downhill to a common river, lake or ocean. Watersheds provide drinking water, offer recreational opportunities, and help sustain life.

Wetlands – lakes, ponds, streams, ponds, marsh, swamp or land subject to flooding that is protected by Massachusetts Wetlands Protection Act.

Wildlife plot – an area cleared and maintained with food and/or cover for wildlife.

Wisconsinan ice sheet – discontinuous glacier extending from Nantucket and Martha's Vineyard across Block Island to southern Long Island**.** These glaciers, over several thousands of years, slowly advanced and rapidly melted depressing the land, scouring its surface and left behind layers of debris. The Wisconsin ice sheet was the most recent glacier, ending approximately 10,000 years ago. It is responsible for most topographic features in New England.

Appendix D. GIS Supplemental Information

D.1. METHODOLOGY

The following is a summary of the GIS methodology used by the Department of Conservation and Recreation (DCR) GIS Program to generate and present data within the Harold Parker Planning Unit Resource Management Plan (RMP).

Property Boundaries

A DCR GIS Specialist extensively researched the digital boundaries of Harold Parker State Forest. As a result of this research, roughly half (45%) of the forest's boundaries were edited with highly accurate data, e.g. surveys and/or hydrographic or town boundaries. The forest's remaining boundaries, approximately 55%, were edited with reasonably accurate data, e.g. draft parcel data, georeferenced plans and/or orthophotography.

The digital boundaries of Boxford State Forest were also researched by a DCR GIS Specialist, but were not edited due to the lack of highly accurate or reasonably accurate data. As a result, the majority (85%) of the forest's boundaries are based on less than accurate data, e.g. a digital sketch or an undocumented source.

Demographics

The RMP's demographic information was generated using the following methodology within ArcGIS. First, Harold Parker State Forest was buffered by 11 and 17 miles using the buffer tool. Next, a DCR GIS Specialist downloaded and joined additional attribute information from the U.S. Census Bureau's 2006-2010 American Community Survey to the Massachusetts and New Hampshire 2010 Census Block Group datalayers. These datalayers were then analyzed to determine the characteristics of the population surrounding the forest. Each Census Block Group that intersected with the 11 or 17 mile buffer was selected using the select by location tool. The information for the selected Census Block Groups is summarized in Table D.1, below.

Table D.1. Summary of Census Data within 11 and 17 miles of Harold Parker State Forest.

	MA 11 mi	NH 11 mi	MA 17 mi	NH 17 mi
2010 Census Data				
100% Population Count	1,059,961	15,027	2,095,201	95,767
100% Housing Unit Count	420,537	5,932	878,971	37,627
Age[a]				
Total Children	*247,195*	*3,507*	*427,058*	*23,070*
Total Adults	*667,513*	*9,565*	*1,396,321*	*60,616*
Total Seniors	*145,253*	*1,955*	*271,822*	*12,081*
Race				
White	848,446	13,642	1,632,691	90,872
Black or African American	43,314	145	103,389	645
American Indian or Alaskan Native	3,205	26	5,689	148
Asian	65,776	600	166,679	2,162
Native Hawaiian or Other Pacific Islander	362	3	689	25
Some Other Race (Alone)	71,954	395	128,318	796
Two or More Races	26,904	216	57,746	1,119
Ethnicity				
Hispanic	145,934	823	266,443	2,454
Not Hispanic	914,027	14,204	1,828,758	93,313
2006-2010 American Community Survey Data				
Population Estimate	1,044,400	15,229	2,063,062	95,520
Household Estimate	393,484	5,641	815,286	35,004
Language				
English	290,154	4,281	585,388	30,300
Spanish	45,226	663	80,706	1,357
European	38,434	466	95,121	2,489
Asian	15,239	187	41,890	599
Other	4,431	44	12,181	259
Income[c]				
Low	75,762	532	163,625	3,787
Medium	137,816	2,381	283,290	11,772
High	179,906	2,728	368,371	19,445

Table D.1. Summary of Census Data within 11 and 17 miles of Harold Parker State Forest. (Continued)

	MA 11 mi	NH 11 mi	MA 17 mi	NH 17 mi
2006-2010 American Community Survey Data				
Education[a,d]				
Total Pop. > 25	706,145	10,332	1,409,744	64,946
Total < H.S.	82,245	1,053	160,352	4,364
Total H.S.	196,483	3,077	347,964	18,786
Total < Bach.	175,485	3,198	297,446	19,426
Total Bach.	150,809	2,039	329,433	14,379
Total > Bach.	101,123	965	274,549	7,991

a. Children = < 18; Adults = 18-64; and Seniors = 65 and older.
b. Annual income, where Low = < $10K - $24,999; Medium = $25K - $74,999; and High = $75K - > $200K.
c. The highest level of education is identified by the following codes: < H.S. = no school, < 11th grade or 12th grade no diploma; HS = high school diploma; < Bach. = < 1 year of college, > 1 of college without a diploma or an Associate's Degree; Bach. = Bachelor's Degree; and > Bach. = a Master's Degree, professional school degree or PhD.

It is important to note that by using the select by location tool, an acceptable amount of error was introduced into the demographic information presented in the RMP. Census Block Groups that extended beyond each buffer, similar to what is depicted below in Figure D.1, were included in the analysis. As a result, the demographic information for each buffer likely includes individuals who live farther away from the forest than indicated.

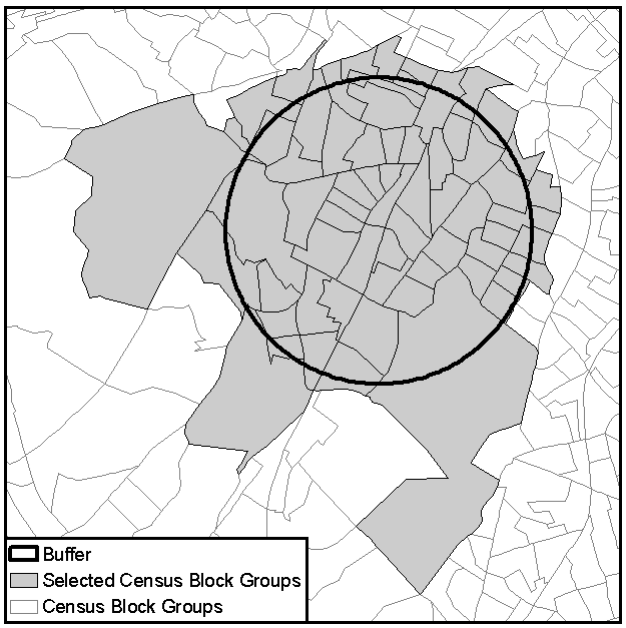

Figure D.1. Selected Census Block Groups.

Report-sized Maps

Harold Parker State Forest Water Resources. A DCR GIS Specialist digitized the forest's four water supply wells in ArcGIS using field verified documentation of the resources and the 2008-2009 Color Orthophotography datalayer as references.

Harold Parker State Forest Campground Market Area. A DCR GIS Specialist utilized the ArcGIS dot density feature to ensure that the camping reservation data points were displayed at random within each ZIP Code.

Harold Parker State Forest Campground Reservations and Massachusetts Environmental Justice Populations. A DCR GIS Specialist utilized the ArcGIS dot density feature to ensure that the camping reservation data points were displayed at random within each ZIP Code.

Recommended Land Stewardship Zoning. A DCR GIS Specialist digitized the Zone 1, Zone 2, Zone 3 and Significant Feature Overlay datalayers in ArcGIS. The 2008-2009 Color Orthophotography, Hydrography and Trail Inventory datalayers were used as a guide for defining Zone 1 within the Harold Parker Planning Unit. The same datalayers were also used to determine the existing developed areas and in turn, the planning unit's Zone 3. Finally, the Hydrography and Trail Inventory datalayers were used to delineate the Significant Feature Overlay. Every attempt was made to use "on the ground features," such as trails or streams, as the boundary for each zone and/or significant feature overlay in an effort to make the areas easily identifiable for DCR field staff.

Wall-sized Maps

Harold Parker State Forest Trail Inventory. The majority of the forest's trail data were collected by consultants in the summer of 2008, with some supplementary fieldwork taking place in the summer of 2011. A GPS application was developed by the DCR GIS Program in an attempt to standardize the data. However, it is important to note that several of the trails attributes are qualitative and subjective, e.g. trail width and condition. It is assumed that the individual collecting the data used their best judgment when populating these attributes.

A DCR GIS Specialist digitized most of the infrastructure points (e.g. Forest Headquarters,

Parking Area, Campground, Athletic Field, etc.) in ArcGIS using field verified documentation of the resources and the 2008-2009 Color Orthophotography datalayer as references.

A DCR GIS Specialist added a parcel of conservation land on Cottage Street, in North Reading, to the Other Protected Open Space datalayer in ArcGIS using the town's online maps and Level 0 Assessors' Parcels datalayer as references.

***Boxford State Forest Trail Inventory*.** The majority of the forest's trail data were collected by consultants in the fall of 2008, with some supplementary fieldwork taking place in the summer of 2011. A GPS application was developed by the DCR GIS Program in an attempt to standardize the data. However, it is important to note that several of the trails attributes are qualitative and subjective, e.g. trail width and condition. It is assumed that the individual collecting the data used their best judgment when populating these attributes.

A DCR GIS Specialist digitized the forest's Parking Areas in ArcGIS using field verified documentation of the resources and the 2008-2009 Color Orthophotography datalayer as references.

***Harold Parker State Forest Trail Recommendations*.** A DCR GIS Specialist digitized the new trail segments and recommendation points (e.g. Improve wetland crossing) in ArcGIS using field verified information and the Hydrography, Elevation Contour and 2008-2009 Color Orthophotography datalayers as references, where applicable.

See also the methodology notes related to the *Harold Parker State Forest Trail Inventory* map.

***Boxford State Forest Trail Recommendations*.** A DCR GIS Specialist digitized the new trail segments, forest roads to relocate and recommendation points (e.g. Improve wetland crossing) in ArcGIS using field verified information and the Hydrography, Elevation Contour and 2008-2009 Color Orthophotography datalayers as references, where applicable.

See also the methodology notes related to the *Boxford State Forest Trail Inventory* map.

D.2. DATALAYERS

A summary of the GIS datalayers used by the DCR GIS Program to generate and display data within the Harold Parker Planning Unit RMP is presented below, in Table D.2.

Table D.2. Summary of datalayers used to create the Harold Parker Planning Unit RMP.

Datalayer Name	Source	Additional Information
11mi, 17mi and 88mi Buffers	DCR GIS	
100-year Flood Zone	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/q3.html
500-year Flood Zone	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/q3.html
2008-2009 Color Orthophotography	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/colororthos2008.html
Bay Circuit Trail	MassGIS and DCR GIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/ldtrails.html
BioMap2 Forest Core	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/biomap2.html
BioMap2 Vernal Pool Core	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/biomap2.html
BioMap2 Wetland Core	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/biomap2.html
Camping Reservation Data	DCR GIS	
Certified Vernal Pool	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/cvp.html
Dam	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/dams.html
DEP Approved Zone II	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/dep-wellhead-protection-areas-zone-ii-iwpa.html

Table D.2. Summary of datalayers used to create the Harold Parker Planning Unit RMP. (Continued)

Datalayer Name	Source	Additional Information
Elevation Contour	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/hp.html
Environmental Justice Population	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/cen2000ej.html
Harold Parker Planning Unit (Digital Boundaries)	MassGIS and DCR GIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/osp.html
Hydrography	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/depwetlands112000.html
Infrastructure (e.g. Forest Headquarters, Parking Area, etc.)	DCR GIS	
Interim Wellhead Protection Area	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/dep-wellhead-protection-areas-zone-ii-iwpa.html
Landscape Designation	DCR GIS	
Level 0 Assessors' Parcels	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/parcels.html
Massachusetts 2010 Census Block Groups	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/census2010.html
New England States Bordering Massachusetts	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/newnglnd.html
New Hampshire 2010 Census Block Groups	U.S. Census Bureau	http://www.census.gov/cgi-bin/geo/shapefiles2010/main
Other Protected Open Space	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/osp.html
Outstanding Resource Waters	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/orw.html
Potential Vernal Pool	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/pvp.html
Priority Habitats of Rare Species	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/prihab.html
Public Roads	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/eotroads.html
Public Water Supplies	MassGIS and DCR GIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/pws.html
State Boundary	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/outline.html
Town Boundary	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/townsurvey.html
Trail Inventory Data	DCR GIS	
Trail Recommendation Data	DCR GIS	
USGS Topographic Quadrangles	MassGIS	http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/imquad.html

Appendix E. Guidelines for Protection of Vernal Pools and Associated Habitat on DCR Lands

General Guidelines for Vernal Pool Management

- **Support vernal pool certification.** Vernal pools are one of many interesting and important natural resources that DCR seeks to protect and promote, so DCR should support public collaboration toward inventorying and certifying these resources.
- **Maintain water quality.** Every effort should be made to maintain water quality in the vernal pool. Erosion of sediments into the pool (or the dry pool basin) should be avoided. This is particularly important for pools adjacent to trails on steep slopes.
- **Close or re-route trails impacting vernal pools.** Trails that go through vernal pools should be closed or re-routed. Trails that are eroding into vernal pools should be closed or re-routed. Erosion control should be used during trail construction and maintenance near vernal pools.
- **Do not alter hydrology.** Do not drain water from, channel water too, or change the flow of water near vernal pools.
- **Maintain habitat structure within the pool.** Salamanders and frogs anchor their egg masses to branches in the water column of vernal pools. Do not remove branches from a pool and do not pile branches into a pool. The vernal pool basin or depression should be left undisturbed, as well as the margin (or boundary) of the vernal pool. Native vegetation should be encouraged and invasive plant species may be removed or controlled.
- **Maintain shading immediately surrounding the pool.** While trimming of vegetation along trails will most likely not impact a nearby vernal pool, the general amount of shading over a pool should be maintained, including both canopy trees as well as the understory (e.g., shrubs and herbaceous vegetation).
- **Maintain habitat structure in adjacent uplands.** Adult amphibians traveling to and from a pool often use rocks, logs and coarse woody debris in the vicinity of a pool as refuges during their journeys. Recently metamorphosed tadpoles and salamander larvae also use these refuges when they leave the pool for the first time. Do not remove or collect rocks, tree trunks, and large branches from the vicinity of the pool (within 50 feet). These materials may be removed from a trail corridor, but they should be left near a trail as amphibian refuges; however, do not pile debris and create a barrier to amphibian movements.
- **Monitor heavily used trails for impacts.** Trails with deep ruts (> 6 inches) within 50 feet of a vernal pool should be considered for closure or re-location away from the pool. Closed trail segments should be restored to a non-compacted and rutted state. Vernal-pool amphibians may lay eggs in the ruts, which are likely to dry out before eggs hatch or larvae develop enough to leave the water; therefore, ruts may have a negative impact on the local population of vernal pool species. In addition, some amphibian species can get "stuck" in ruts and follow them for long distances away from key habitat areas.
- **Limit pesticide use in and near vernal pools.** Use the minimum amount of chemicals necessary when using fertilizers, herbicides, or pesticides to achieve management goals and objectives.
- **Limit Off-Trail Use.** Adult amphibians are active in the uplands adjacent to vernal pools during the spring, summer, and fall, while tadpoles/larvae are developing in the vernal pool itself. Off-trail activities can impact these amphibian species. Encourage all users to behave responsibly by promoting outdoor ethics and providing information about sensitive natural resources and species.
- **Limit Night Time Use.** Direct mortality of amphibians by recreational users is a concern in general, but especially during spring migration to vernal pools and metamorph emergence in the late summer to early fall; however, both of these events typically occur on rainy nights. Limit night time activity on trails during these movements to reduce the direct mortality of migrating animals.

Guidelines for Staff and Volunteers Certifying Vernal Pools

Thank you for your interest and time in helping the DCR certify our qualified potential vernal pools. Your hard work will ultimately assist the DCR to protect, promote, and enhance our common wealth's natural, cultural, and recreational resources. These guidelines have been developed to help preserve the sensitive ecosystem you will be venturing in and around. See http://www.mass.gov/dfwele/dfw/nhesp/nhesp.htm for required state Vernal Pool (VP) certification materials and instructions.

1. You must contact the parks' supervisor or the DCR Ecology Program prior to any VP certification activity on state land. A DCR permit or specific instructions may be issued prior to the activity.
2. The vegetation surrounding a VP is sensitive and often used by the species within the pool. Please respect this area and minimize any impacts to it.
3. No Bug Spray on your hands or body parts touching the water. Perhaps the most difficult of recommendations, but important for the species utilizing the pool. Mosquito netting can be useful and layering clothing can help, but bug spray is damaging to the sensitive species using the pool.
4. If there are large pieces of trash (i.e. tires, oil drums) please take note of it, but don't remove it. These objects may be used by the species in the VP. Large trash items should be reported to the DCR for removal in the fall.
5. If you travel to different parks for similar work, please clean equipment (waders, nets) with a 10% bleach solution and allow the gear to dry to potentially reduce the spread of disease and invasive species.
6. Finding a rare species is fun and a wonderful educational experience. Some pools may contain rare species subject to illegal collection, so please be careful who you share your data with but please share this important data with the MA Natural Heritage and Endangered Species Program as well as the DCR.
7. Your hard work should not go unnoticed! Please share your data with the DCR Ecology Program to help expand our database for our planning and resource protection efforts. Even vernal pools which do not meet certification criteria are important to report to DCR. Also, please inform us with the number of volunteer hours you have provided the DCR for your efforts.

Please use the following address when submitting paperwork to the DCR:
DCR – Attention Ecology Program, 251 Causeway Street, Suite 700, Boston, MA 02114
Or email Catherine.garnett@state.ma.us

Appendix F. Select Regulations Applicable to the Harold Parker Planning Unit[a]

CMR[b]	Title	Comments
105 CMR 410.000	Minimum Standards for Human Habitation (State Sanitary Code)	Includes public health and safety regulations for buildings and sanitary facilities.
301 CMR 11.00	Massachusetts Environmental Policy Act (MEPA)	Requires the systematic review of any work or activity undertaken by an agency (e.g., the DCR); involving state permitting or financial assistance; or a transfer of state land.
302 CMR 10.00	Dam Safety	Includes information on the size and hazard classification of dams, as well as dam inspection, repair, alteration, and removal.
310 CMR 10.00	Wetlands Protection Act	Regulates many activities within 100-feet of wetlands and certified vernal pools, and within 200-feet of perennial streams and rivers.
310 CMR 22.00	Drinking Water	Includes regulations for Transient Non-community Water Systems, which provide water to 25 or more persons at least 60 days/year.
314 CMR 4.00	Massachusetts Surface Water Quality Standards	These standards "secure to the Commonwealth the benefits of the Clean Water Act." They designate the most sensitive uses for which the waters of the Commonwealth shall be enhanced, maintained and protected; prescribe minimum water quality criteria; and contain regulations necessary to achieve designated uses and maintain water quality. These standards include the identification and regulation of Outstanding Resource Waters.
321 CMR 2.00	Miscellaneous Regulations Relating to Division of Fisheries and Wildlife	Addresses a variety of fish and wildlife issues, including scientific collecting permits and the importation, liberation, and transportation of fish, amphibians, reptiles, birds, and mammals.
321 CMR 3.00	Hunting	Regulates hunting and trapping in Massachusetts.
321 CMR 4.00	Fishing	Regulates the taking of freshwater fish in Massachusetts.
321 CMR 10.00	Massachusetts Endangered Species Act (MESA)	MESA protects rare species and their habitats by prohibiting the "Take" of any plant or animal species listed as Endangered, Threatened, or Special Concern. Activities that may alter rare species habitat (e.g., trail maintenance, vista pruning, digging archaeological test pits) are subject to regulatory review. On state-owned land, "all practicable means and measures shall be taken to resolve conflicts between the protection, conservation, and restoration of state-listed species…and other uses of such lands in favor of the listed species."
333 CMR 10.00	Certification and Licensing of Pesticide Applicators	Requires that anyone applying herbicides, insecticides, or other pesticides on non-residential property (i.e., all DCR properties) must be certified and licensed.
521 CMR 19.00	Architectural Access Board; Parking and Passenger Loading Zones	Specifies dimensional, pavement marking, and sign requirements for accessible parking spaces and passenger loading zones.
950 CMR 71.00	Protection of Properties Included in the State Register of Historic Places	Requires Massachusetts Historical Commission notification of projects undertaken, funded, or licensed by a state body.

a. A variety of state regulations apply to both the operation of state parks and the behavior of visitors to these parks. This table includes only those regulations directly related to topics addressed in the main body of this RMP.

b. The Code of Massachusetts Regulations, or CMR, "contains regulations promulgated by state agencies" (Massachusetts Trial Court Law Libraries 2010). These regulations "have the force and effect of law like statutes."

Appendix G. Plants of the Harold Parker Planning Unit

The following plants have been identified in Harold Parker State Forest by Walter Kittredge and Don Lubin, and in Boxford State Forest by Irina Kadis and Alexy Zinovjev. The sequence of plants is presented alphabetically by family and scientific name. Taxonomy and common names follow the United States Department of Agriculture PLANTS Database (USDA 2009). The PLANTS Database provides standardized information about plants in the United States and its territories.

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Aceraceae	Striped maple	*Acer pensylvanicum*	2		
Maple Family	Norway maple	*Acer platanoides*	1		I
	Red maple	*Acer rubrum*	1,2		
	Sugar maple	*Acer saccharum*	1,2		
Adiantaceae	Northern maidenhair	*Adiantum pedatum*	1,2,3		
Ferns Familly					
Alismataceae	Grassleaf arrowhead	*Sagittaria graminea*	1		
Arrowhead Family	Broadleaf arrowhead	*Sagittaria latifolia*	1,2		
Anacardiaceae	Smooth sumac	*Rhus glabra*	1		
Sumac Family	Staghorn sumac	*Rhus typhina*	1		
	Eastern Poison ivy	*Toxicodendron radicans*	1,2		
	Poison sumac	*Toxicodendron vernix*	1,2		
Apiaceae	Bulblet-bearing water hemlock	*Cicuta bulbifera*	2		
Carrot Family	Spotted water hemlock	*Cicuta maculata*	2		
	Queen Anne's lace	*Daucus carota*	1		
	American marsh pennywort	*Hydrocotyle americana*	1,2		
	Hemlock waterparsnip	*Sium suave*	1,2		
Apocynaceae	Spreading dogbane	*Apocynum androsae milfolium*	1,2		
Dogbane Family	Common periwinkle	*Vinca minor*	1,2		
Aquifoliaceae	Mountain holly	*Ilex mucronata*	1		
Holly Family	Common winterberry holly	*Ilex verticillata*	1,2		
Araceae	Calamus	*Acorus calamus*	1		
Arum Family	Jack in the pulpit	*Arisaema triphyllum*	1,2		
	Water arum	*Calla palustris*	2		
	Green arrow arum	*Peltandra virginica*	1,2		
	Skunk cabbage	*Symplocarpus foetidus*	1,2		
Araliaceae	Bristly sarsaparilla	*Aralia hispida*	1,2		
Ginseng Family	Wild sarsaparilla	*Aralia nudicaulis*	1,2		
Asclepiadaceae	Poke milkweed	*Asclepias exaltata*	1		
Milkweed Family	Swamp milkweed	*Asclepias incarnata ssp. pulchra*	2		
	Common milkweed	*Asclepias syriaca*	1,2		
	Louise's swallow-wort	*Cynanchum louiseae*	2		I
Aspleniaceae	Ebony spleenwort	*Asplenium platyneuron*	2,3		
Spleenwort Family					
Asteraceae	Common yarrow	*Achillea millefolium*	1,2		
Aster Family	Annual ragweed	*Ambrosia artemisiifolia*	1		
	Howell's pussytoes	*Antennaria howellii ssp. neodioica*	1,2		
	Woman's tobacco	*Antennaria plantaginifolia*	1,2		
	Corn chamomile	*Anthemis arvensis*	1		
	Common wormwood	*Artemisia vulgaris*	1		

Continued on next page.

Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Asteraceae (continued)	Devil's beggartick	*Bidens* frondosa	1,2		
Aster Family	Spotted knapweed	*Centaurea stoebe* ssp. *microanthos*	1		L
	Chicory	*Cichorium intybus*	1		
	Bull thistle	*Cirsium vulgare*	2		
	Parasol whitetop	*Doellingeria umbellata*	2		
	Eastern daisy fleabane	*Erigeron annuus*	1,2		
	Canadian fleabane	*Erigeron canadensis*	1		
	Boneset	*Eupatorium perfoliatum*	1,2		
	White wood aster	*Eurybia divaricata*	1,2		
	Bigleaf aster	*Eurybia macrophylla*	2		
	Flat-top goldentop	*Euthamia graminifolia*	1,2		
	Meadow hawkweed	*Hieracium caespitosum*	1,2		
	Queendevil	*Hieracium gronovii*	2		
	Allegheny hawkweed	*Hieracium paniculatum*	1,2		
	Mouseear hawkweed	*Hieracium pilosella*	1		
	European hawkweed	*Hieracium sabaudum*	1		
	Rough hawkweed	*Hieracium scabrum*	1		
	Rattlesnakeweed	*Hieracium venosum*	1,2		
	Flaxleaf whitetop aster	*Ionactis linariifolius*	1,2		
	Virginia dwarfdandelion	*Krigia virginica*	2		
	Canada lettuce	*Lactuca canadensis*	1,2		
	Oxeye daisy	*Leucanthemum vulgare*	1,2		
	Climbing hempweed	*Mikania scandens*	1		
	Whorled wood aster	*Oclemena acuminata*	1,2		
	Golden ragwort	*Packera aurea*	1,2		
	Gall-of-the-earth	*Prenanthes trifoliolata*	1,2		
	Rabbit-tobacco (Sweet Everlasting)	*Pseudognaphalium obtusifolium*	1		
	Blackeyed Susan	*Rudbeckia hirta var. pulcherrima*	1,2		
	Roundleaf ragwort	*Senecio obovatus*	2		
	Wreath goldenrod	*Solidago caesia*	1,2		
	Canada goldenrod	*Solidago canadensis*	1,2		
	Early goldenrod	*Solidago juncea*	1		
	Downy goldenrod	*Solidago puberula*	1,2		
	Wrinkleleaf goldenrod	*Solidago rugosa*	1,2		
	Bog goldenrod	*Solidago uliginosa*	1		
	Elmleaf goldenrod	*Solidage ulmifolia*	1		
	Common sowthistle	*Sonchus oleraceus*	1		
	Rice button aster	*Symphyotrichum dumosum*	2		
	White panicle aster	*Symphyotrichum lanceolatum*	2		
	Calico aster	*Symphyotrichum lateriflorum*	1,2		
	Swamp aster	*Symphyotrichum puniceum*	1		
	Wavyleaf aster	*Symphyotrichum undulatum*	1		
	Common dandelion	*Taraxacum officinale*	1,2		
	Meadow salsify	*Tragopogon pratensis*	1		
	Colt's foot	*Tussilago farfara*	1		L
Balsaminaceae Touch-me-not Family	Jewelweed	*Impatiens capensis*	1,2		
Berberidaceae	Japanese barberry	*Berberis thunbergii*	1,2		I
Barberry Family	Common barberry	*Berberis vulgaris*	1,2		L

Continued on next page.

Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Betulaceae	Speckled alder	*Alnus incana* ssp. *rugosa*	1		
Birch Family	Hazel alder	*Alnus serrulata*	1,2		
	Yellow birch	*Betula alleghaniensis*	1,2		
	Sweet birch	*Betula lenta*	1,2		
	River birch	*Betula nigra*	1		
	Paper birch	*Betula papyrifera*	1,2		
	Gray birch	*Betula populifolia*	1,2		
	Musclewood ironwood	*Carpinus caroliniana ssp. virginiana*	1		
	American hazelnut	*Corylus americana*	1,2		
	Beaked hazelnut	*Corylus cornuta*	1,2		
	Hophornbeam	*Ostrya virginiana*	1,2		
Blechnaceae Chain Fern Family	Virginia chainfern	*Woodwardia virginica*	1,3		
Brassicaceae	Garlic mustard	*Alliaria petiolata*	1		I
Mustard Family	Sicklepod	*Arabis canadensis*	2		
	Garden yellowrocket	*Barbarea vulgaris*	1		
	Pennsylvania bittercress	*Cardamine pensylvanica*	2		
	Virginia pepperweed	*Lepidium virginicum*	1		
	Watercress	*Nasturtium officinale*	1,2		
	Bog yellowcress	*Rorippa palustris ssp. palustris*	1		
Cabombaceae	Watershield	*Brasenia schreberi*	1,2		
Water-shield Family	Carolina fanwort	*Cabomba caroliniana*	1		I
Campanulaceae	Cardinal flower	*Lobelia cardinalis*	1,2		
Bellflower Family	Indian tobacco	*Lobelia inflata*	1,2		
	Clasping Venus' looking-glass	*Triodanis perfoliata*	1		
Caprifoliaceae	Northern bush honeysuckle	*Diervilla lonicera*	1,2		
Honeysuckle Family	Japanese honeysuckle	*Lonicera japonica*	2		I
	Morrow's honeysuckle	*Lonicera morrowii*	1		I
	American black elderberry	*Sambucus nigra* ssp. *canadensis*	1,2		
	Mapleleaf viburnum	*Viburnum acerifolium*	1,2		
	Northern arrowood	*Viburnum dentatum var. lucidum*	1,2		
	Wayfaringtree	*Viburnum lantana*	2		
	Nannyberry	*Viburnum lentago*	1,2		
	Withe rod	*Viburnum nudum* var. *cassinoides*	1,2		
	European cranberrybush	*Viburnum opulus* var. *opulus*	1		
Caryophyllaceae	Mouse-ear chickweed	*Cerastium fontanum* ssp. *vulgare*	1		
Pink Family	Deptford pink	*Dianthus armeria*	1,2		
	Bluntleaf sandwort	*Moehringia lateriflora*	1,2		
	White campion	*Silene latifolia* ssp. *alba*	1		
	Bladder campion	*Silene vulgaris*	1		
	Grass-like starwort	*Stellaria graminea*	1		
	Common chickweed	*Stellaria media*	1		
Celastraceae	Oriental bittersweet	*Celastrus orbiculatus*	1,2		I
Bittersweet Family	Burningbush	*Euonymus alatus*	1,2		I
Ceratophyllaceae Hornwort Family	Hornwort	*Ceratophyllum demersum*	1		
Chenopodiaceae Goosefoot Family	Lambsquarters	*Chenopodium album*	1		

Continued on next page.

Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Cistaceae	Longbranch frostweed	*Helianthemum canadense*	1		
Rock-rose Family	Largepod pinweed	*Lechea intermedia*	2		
	Narrowleaf pinweed	*Lechea tenuifolia*	1		
Clethraceae	Coastal sweetpepperbush	*Clethra alnifolia*	1,2		
Clethra Family					
Clusiaceae	Lesser Canadian St. Johnswort	*Hypericum canadense*	2		
Mangosteen Family	Common St. Johnswort	*Hypericum perforatum*	1		
	Spotted St. Johnswork	*Hypericum punctatum*	1,2		
	Virginia marsh St. Johnswort	*Triadenum virginicum*	1,2		
Commelinaceae	Virginia spiderwort	*Tradescantia virginiana*	1		
Spiderwort Family					
Convolvulaceae	Hedge false bindweed	*Calystegia sepium*	1		
Morning Glory Family					
Cornaceae	Alternateleaf dogwood	*Cornus alternifolia*	1,2		
Dogwood Family	Silky dogwood	*Cornus amomum*	1		
	Bunchberry dogwood	*Cornus canadensis*	1,2		
	Flowering dogwood	*Cornus florida*	1		
	Gray dogwood	*Cornus racemosa*	1,2		
	Roundleaf dogwood	*Cornus rugosa*	1		
	Blackgum	*Nyssa sylvatica*	1,2		
Cupressaceae	Atlantic white cedar	*Chamaecyparis thyoides*	1		
Cypress Family	Common juniper	*Juniperus communis* var. *depressa*	1,2		
	Eastern red cedar	*Juniperus virginiana*	1,2		
	Arborvitae	*Thuja occidentalis*	1	E	Introduced
Cuscutaceae	Dodder	*Cuscuta gronovii*	1		
Dodder Family					
Cyperaceae	Yellowfruit sedge	*Carex annectens*	1,2		
Sedge Family	Drooping woodland sedge	*Carex arctata*	2		
	Bicknell's sedge	*Carex bicknellii*	2		
	Eastern woodland sedge	*Carex blanda*	1,2		
	Brownish sedge	*Carex brunnescens*	1		
	Button sedge	*Carex bullata*	1		
	Silvery sedge	*Carex canescens*	1		
	Oval-leaf sedge	*Carex cephalophora*	1		
	Longhair sedge	*Carex comosa*	1,2		
	Fringed sedge	*Carex crinita*	1,2		
	White edge sedge	*Carex debilis var. rudgei*	1		
	Northern long sedge	*Carex folliculata*	1,2		
	Graceful sedge	*Carex gracillima*	1,2		
	Greater bladder sedge	*Carex intumescens*	1,2		
	Hairy sedge	*Carex lacustris*	1		
	Spreading sedge	*Carex laxiculmis* var. *laxiculmis*	1		
	Broad loseflower sedge	*Carex laxiflora*	1,2		
	Hop sedge	*Carex lupulina*	1		
	Shallow sedge	*Carex lurida*	1,2		
	Pennsylvania sedge	*Carex pensylvanica*	1,2		
	Plantainleaf sedge	*Carex plantaginea*	2		
	Broadleaf sedge	*Carex platyphylla*	2		
	Eastern star sedge	*Carex radiata*	1		
	Rosy sedge	*Carex rosea*	1,2		

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Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Cyperaceae (continued)	Awlfruit sedge	*Carex stipata*	1		
Sedge Family	Eastern straw sedge	*Carex straminea*	2		
	Upright sedge	*Carex stricta*	1,2		
	Swan's sedge	*Carex swanii*	1,2		
	Velvet sedge	*Carex vestita*	1		
	Fox sedge	*Carex vulpinoidea*	1		
	Strawcolored flatsedge	*Cyperus strigosus*	1		
	Threeway sedge	*Dulichium arundinaceum*	1,2		
	Needle spikerush	*Eleocharis acicularis*	1		
	Blunt spikerush	*Eleocharis obtusa*	1		
	Common spikerush	*Eleocharis palustris*	2		
	Hardstem bulrush	*Scirpus acutus*	2		
	Green bulrush	*Scirpus atrovirens var. georgianus*	1,2		
	Woolsedge	*Scirpus cyperinus*	1,2		
	Bashful bulrush	*Scirpus verecundus*	2		
Dennstaedtiaceae	Eastern hayscented fern	*Dennstaedtia punctilobula*	2,3		
Bracken Fern Family	Bracken fern	*Pteridium aquilinum*	1,2,3		
Droseraceae	Spoonleaf sundew	*Drosera intermedia*	1		
Sundew Family	Roundleaf sundew	*Drosera rotundifolia*	1,2		
Dryopteridaceae	Subarctic ladyfern	*Athyrium filix-femina*	1,2,3		
Wood Fern Family	Brittle bladder fern	*Cystopteris fragilis*	1,2		
	Fragil fern	*Cystopteris tenuis*	1,3		
	Silvery glade fern	*Deparia acrostichoides*	1,3		
	Spinulose woodfern	*Dryopteris carthusiana*	1,2,3		
	Clinton's woodfern	*Dryopteris clintoniana*	1,3		
	Crested woodfern	*Dryopteris cristata*	1,2,3		
	Intermediate woodfern	*Dryopteris intermedia*	1,2,3		
	Marginal woodfern	*Dryopteris marginalis*	1,2,3		
	Boott's woodfern	*Dryopteris* x *boottii*	1,3		
	Slosson's woodfern	*Dryopteris x slossonae*	1,3		
	Fruitful woodfern	*Dryopteris x triploidea*	1,3		
	Hybrid woodfern	*Dryopteris x uliginosa*	1,3		
	Western oak fern	*Gymnocarpium dryopteris*	3		
	Ostrich fern	*Matteuccia struthiopteris*	1,3		
	Sensitive fern	*Onoclea sensibilis*	1,2,3		
	Christmas fern	*Polystichum acrostichoides*	1,2,3		
	Blumt-lobed cliff fern	*Woodsia obtusa*	3		
Elaeagnaceae	Russian olive	*Elaeagnus angustifolia*	1		I
Oleaster Family					
Equisetaceae	Field horsetail	*Equisetum arvense*	1,2,3		
Horsetail Family	Woodland horsetail	*Equisetum sylvaticum*	2		
Ericaceae	Bearberry	*Arctostaphylos uva-ursi*	1		
Heath Family	Leatherleaf	*Chamaedaphne calyculata*	1,2		
	Eastern teaberry	*Gaultheria procumbens*	1,2		
	Black huckleberry	*Gaylussacia baccata*	1,2		
	Blue huckleberry	*Gaylussacia frondosa*	1,2		
	Sheep laurel	*Kalmia angustifolia*	1,2		
	Mountain laurel	*Kalmia latifolia*	1		
	Maleberry	*Lyonia ligustrina*	2		
	Japanese pieris	*Pieris japonica*	2		

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Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Ericaceae (continued)	Rhodora	*Rhododendron canadense*	1		
Heath Family	Early azalea	*Rhododendron prinophyllum*	1		
	Swamp azalea	*Rhododendron viscosum*	1,2		
	Lowbush blueberry	*Vaccinium angustifolium*	1,2		
	Highbush blueberry	*Vaccinium corymbosum*	1,2		
	Cranberry	*Vaccinium macrocarpon*	1		
	Blue Ridge blueberry	*Vaccinium pallidum*	1,2		
Euphorbiaceae	Common threeseed mercury	*Acalypha rhomboidea*	1		
Spurge Family	Cypress spurge	*Euphorbia cyparissias*	1		L
Fabaceae	American hog peanut	*Amphicarpaea bracteata*	1,2		
Pea Family	Groundnut	*Apios americana*	1,2		
	Horsefly weed	*Baptisia tinctoria*	1,2		
	Pointedleaf ticktrefoil	*Desmodium glutinosum*	2		
	Panicledleaf ticktrefoil	*Desmodium paniculatum*	1		
	Perennial sweet pea	*Lathyrus latifolius*	1		
	Roundhead Bushclover	*Lespedeza capitata*	1,2		
Fabaceae	Bird's-foot trefoil	*Lotus corniculatus*	1,2		
Pea Family	Black locust	*Robinia pseudoacacia*	1		I
	Rabbitfoot clover	*Trifolium arvense*	1		
	Golden clover	*Trifolium aureum*	1		
	Little hop clover	*Trifolium dubium*	1		
	Alsike clover	*Trifolium hybridum*	1		
	Red clover	*Trifolium pratense*	1,2		
	White clover	*Trifolium repens*	1,2		
	Bird vetch	*Vicia cracca*	1		
Fagaceae	American chestnut	*Castanea dentata*	1,2		
Oak and Beech Family	American beech	*Fagus grandifolia*	1,2		
	White oak	*Quercus alba*	1,2		
	Swamp white oak	*Quercus bicolor*	1,2		
	Scarlet oak	*Quercus coccinea*	1,2		
	Bear oak	*Quercus ilicifolia*	1		
	Chestnut oak	*Quercus prinus*	2		
	Northern red oak	*Quercus rubra*	1,2		
	Black oak	*Quercus velutina*	1,2		
Fumariaceae	Rock harlequin	*Corydalis sempervirens*	1,2		
Fumitory Family					
Gentianaceae	Yellow screwstem	*Bartonia virginica*	1		
Gentian Family					
Geraniaceae	Spotted geranium	*Geranium maculatum*	1,2		
Geranium Family					
Grossulariaceae	Hairystem gooseberry	*Ribes hirtellum*	1,2		
Currant Family					
Haloragaceae	Variable watermilfoil	*Myriophyllum heterophyllum*	1		I
Water Milfoil Family	Low watermilfoil	*Myriophyllum humile*	2		
	Marsh mermaidweed	*Proserpinaca palustris*	2		
Hamamelidaceae	American witchhazel	*Hamamelis virginiana*	1,2		
Witch-hazel Family					
Hydrangeaceae	Hydrangea	*Hydrangea*	1		
Hydrangea Family					

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Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Iridaceae	Harlequin blueflag	*Iris versicolor*	1,2		
Iris Family	Yellow iris	*Iris pseudacorus*	1		I
	Narrowleaf blue-eyed grass	*Sisyrinchium angustifolium*	2		
	Strict blue-gyed grass	*Sisyrinchium montanum*	1		
Juglandaceae	Mockernut hickory	*Carya alba*	2		
Walnut Family	Pignut hickory	*Carya glabra*	1,2		
	Shagbark hickory	*Carya ovata*	1,2		
Juncaceae	Tapertip rush	*Juncus acuminatus*	1		
Rush Family	Toad rush	*Juncus bufonius*	2		
	Common rush	*Juncus effusus*	1,2		
	Poverty rush	*Juncus tenuis*	1,2		
	Common woodrush	*Luzula multiflora*	1,2		
Lamiaceae	Brittlestem hempnettle	*Galeopsis tetrahit*	1		
Mint Family	Ground ivy	*Glechoma hederacea*	1		
	American bungleweed	*Lycopus americanus*	1,2		
	Northern bugleweed	*Lycopus uniflorus*	1,2		
	Canada mint	*Mentha canadensis*	1		
	Common selfheal	*Prunella vulgaris*	1,2		
	Marsh skullcap	*Scutellaria galericulata*	1		
	Blue skullcap	*Scutellaria lateriflora*	1,2		
	Woodland germander	*Teucrium scorodonia*	1		
	Forked blue curls	*Trichostema dichotomum*	1		
Lauraceae	Northern spicebush	*Lindera benzoin*	1,2		
Laurel Family	Sassafras	*Sassafras albidum*	1,2		
Lemnaceae	Common duckweed	*Lemna minor*	1,2		
Duckweed Family	Common duckmeat	*Spirodela polyrhiza*	1,2		
	Columbian watermeal	*Wolffia columbiana*	2		
Lentibulariaceae	Common bladderwort	*Utricularia macrorhiza*	1		
Bladderwort Family	Eastern purple bladderwort	*Utricularia purpurea*	2		
	Little floating bladderwort	*Utricularia radiata*	1,2		
Liliaceae	European lily-of-the-valley	*Convallaria majalis*	1		
Lily Family	Orange daylily	*Hemerocallis fulva*	1		
	Common goldstar	*Hypoxis hirsuta*	1		
	Canada lily	*Lilium canadense*	2		
	Canada mayflower	*Maianthemum canadense*	1,2		
	False Solomon's-seal	*Maianthemum racemosum*	1,2		
	Indian cucumber	*Medeola virginiana*	1,2		
	Hairy Solomon's seal	*Polygonatum pubescens*	1,2		
	Whip-poor-will flower	*Trillium cernuum*	1,2		
	Sessileleaf bellwort	*Uvularia sessilifolia*	1,2		
	Green false hellebore	*Veratrum viride*	1		
Lycopodiaceae	Shining clubmoss	*Huperzia lucidula*	1,2,3		
Club-moss Family	Running clubmoss	*Lycopodium clavatum*	2,3		
	Fan ground-cedar clubmoss	*Lycopodium digitatum*	2,3		
	Pennsylvania clubmoss	*Lycopodium hickeyi*	2,3		
	Rare clubmoss	*Lycopodium obscurum*	2,3		
	Deeproot clubmoss	*Lycopodium tristachyum*	2		
	Ground-cedar hybrid	*Diphasiastrum x habereri*	3		

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Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Lythraceae	Swamp loosestrife	*Decodon verticillatus*	1		
Loosestrife Family	Purple loosestrife	*Lythrum salicaria*	1		I
Monotropaceae	Pinesap	*Monotropa hypopithys*	2		
Indian Pipe Family	Indianpipe	*Monotropa uniflora*	1,2		
Moraceae	White mulbery	*Morus alba*	1		
Mulberry Family					
Myricaceae	Sweet fern	*Comptonia peregrina*	1,2		
Bayberry Family	Northern bayberry	*Morella pensylvanica*	2		
	Sweetgale	*Myrica gale*	1,2		
Nymphaeaceae	Variegated yellow waterlily	*Nuphar variegata*	1,2		
Water-lily Family	American white waterlily	*Nymphaea odorata*	1,2		
Oleaceae	White ash	*Fraxinus americana*	1,2		
Olive Family	Black ash	*Fraxinus nigra*	1,2		
	Green ash	*Fraxinus pennsylvanica*	1,2		
Onagraceae	Broadleaf enchanter's nightshade	*Circaea lutetiana* ssp. *canadensis*	1,2		
Evening Primrose Family	Purpleleaf willowherb	*Epilobium coloratum*	1,2		
	Bog willowherb	*Epilobium leptophyllum*	2		
	Marsh seedbox	*Ludwigia palustris*	1,2		
	Common evening primrose	*Oenothera biennis*	1		
Ophioglossaceae	Cutleaf grapefern	*Botrychium dissectum*	2	WL	
Grape Fern Family	Blunt-lobed Grapefern	*Botrychium oneidense*	1,3		
Orchidaceae	Pink Lady's slipper	*Cypripedium acaule*	1,2		
Orchid Family	Broadleaf helleborine	*Epipactis helleborine*	2		
	Downy rattlesnake plantain	*Goodyera pubescens*	2		
	Checkered rattlesnake plantain	*Goodyera tesselata*	2		
	Small green wood orchid	*Platanthera clavellata*	2		
Osmundaceae	Cinnamon fern	*Osmunda cinnamomea*	1,2,3		
Royal Fern Family	Interrupted fern	*Osmunda claytoniana*	1,2,3		
	Royal fern	*Osmunda regalis var. spectabilis*	1,2,3		
Oxalidaceae	Radishroot woodsorrel	*Oxalis corniculata*	2		
Wood-sorrel Family	Common yellow oxalis	*Oxalis stricta*	1,2		
Papaveraceae	Celandine	*Chelidonium majus*	1,2		
Poppy Family	Bloodroot	*Sanguinaria canadensis*	2		
Phytolaccaceae	American pokeweed	*Phytolacca americana*	1		
Pokeweed Family					
Pinaceae	European larch	*Larix decidua*	1		
Pine Family	Norway spruce	*Picea abies*	1		
	White spruce	*Picea glauca*	1		
	Black spruce	*Picea mariana*	1		
	Austrian pine	*Pinus nigra*	1		
	Red pine	*Pinus resinosa*	1,2		
	Eastern white pine	*Pinus strobus*	1,2		
	Scots pine	*Pinus sylvestris*	1		
	Eastern hemlock	*Tsuga canadensis*	1,2		
Plantiginaceae	Narrowleaf plantain	*Plantago lanceolata*	1		
Plantain Family	Common plantain	*Plantago major*	1,2		
	Blackseed plantain	*Plantago rugelii*	1		

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Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Platanaceae Plane-tree Family	American sycamore	*Platanus occidentalis*	2		
Poaceae Grass Family	Redtop	*Agrostis gigantea*	1		
	Upland bentgrass	*Agrostis perennans*	2		
	Sweet vernalgrass	*Anthoxanthum odoratum*	1		
	Northern shorthusk	*Brachyelytrum aristosum*	1,2		
	Sweet woodreed	*Cinna arundinacea*	2		
	Orchardgrass	*Dactylis glomerata*	1		
	Flattened oatgrass	*Danthonia compressa*	1,2		
	Poverty oatgrass	*Danthonia spicata*	1		
	Hairy Rosettegrass	*Dicanthelium acuminatum ssp. fasciculatum*	1		
	Hairy Rosettegrass	*Dichanthelium acuminatum ssp. implicatum*	1		
	Deertongue	*Dichanthelium clandestinum*	1		
	Cypress panicgrass	*Dichanthelium dichotomum*	1		
	Broadleaf rosette grass	*Dichanthelium latifolium*	1		
	Slimleaf panicgrass	*Dichanthelium linearifolium*	2		
	Quackgrass	*Elymus repens*	1		
	Fineleaf sheep fescue	*Festuca filiformis*	1		L
	Sheep fescue	*Festuca ovina*	1		
	Red fescue	*Festuca rubra*	1		
	Mannagrass	*Glyceria striata*	2		
	Atlantic Mannagrass	*Glyceria obtusa*	1		
	Fowl mannagrass	*Glyceria striata*	1		
	Virginia cutgraass	*Leersia virginica*	1		
	Perennial ryegrass	*Lolium perenne*	1		
	Fall panicgrass	*Panicum dichotomiflorum*	2		
	Reed canary grass	*Phalaris arundinacea*	1		I
	Timothy	*Phleum pratense*	1,2		
	Annual bluegrass	*Poa annua*	1		
	Canada bluegrass	*Poa compressa*	1		
	Fowl bluegrass	*Poa palustris*	1		
	Kentucky bluegrass	*Poa pratensis*	1		
	Meadow fescue	*Schedonorus pratensis*	1		
	Little bluestem grass	*Schizachyrium scoparium*	1		
Polygonaceae Buckwheat Family	Longroot smartweed	*Polygonum amphibium* var. *emersum*	1		
	Water smartweed	*Polygonum amphibium*	1		
	Halberdleaf tearthumb	*Polygonum arifolium*	1		
	Prostrate knotweed	*Polygonum aviculare*	1		
	Carey's smartweed	*Polygonum careyi*	1		
	Black bindweed	*Polygonum convolvulus*	1,2		
	Japanese knotweed	*Polygonum cuspidatum*	1,2		I
	Marshpepper knotweed	*Polygonum hydropiper*	1		
	Swamp smartweed	*Polygonum hydropiperoides*	1		
	Curlytop knotweed	*Polygonum lapathifolium*	1		
	Dotted smartweed	*Polygonum punctatum*	1,2		
	Arrowleaf tearthumb	*Polygonum sagittatum*	1,2		
	Common sheep sorrel	*Rumex acetosella*	1,2		
	Curly dock	*Rumex crispus*	1		
	Bitter dock	*Rumex obtusifolius*	1		

Continued on next page.

Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Polypodiaceae	Appalachian polypody	*Polypodium appalachianum*	1,3		
Polypody Family	Hbrid polypody	*Polypodium x incognitum*	1,3		
	Rock polypody	*Polypodium virginianum*	1,2,3		
Pontederiaceae	Pickerelweed	*Pontederia cordata*	1,2		
Water-Hyacinth Family					
Potamogetonaceae	Largeleaf pondweed	*Potamogeton amplifolius*	2		
Pondweed Family	Leafy pondweed	*Potamogeton foliosus*	2		
	Oake's pondweed	*Potamogeton oakesianus*	1		
	Spotted pondweed	*Potamogeton pulcher*	1		
	Pondweed	*Potamogeton sp.*	2		
Primulaceae	Whorled yellow loosestrife	*Lysimachia quadrifolia*	1,2		
Primrose Family	Earth loosestrife	*Lysimachia terrestris*	1,2		
	Starflower	*Trientalis borealis*	1,2		
Pyrolaceae	Striped prince's pine	*Chimaphila maculata*	1,2		
Shinleaf Family	Pipsissewa	*Chimaphila umbellata* ssp. *cisatlantica*	1,2		
	American wintergreen	*Pyrola americana*	1,2		
	Greenflowered wintergreen	*Pyrola chlorantha*	1,2		
	Waxflower shinleaf	*Pyrola elliptica*	2		
Ranunculaceae	White baneberry	*Actaea pachypoda*	2		
Buttercup Family	Wood anemone	*Anemone quinquefolia*	1,2		
	Red columbine	*Aquilegia canadensis*	1,2		
	Yellow marsh marigold	*Caltha palustris*	1,2		
	Devil's darning needles	*Clematis virginiana*	1		
	Threeleaf goldthread	*Coptis trifolia*	1,2		
	Roundlobe hepatica	*Hepatica nobilis* var. *obtusa*	1,2		
	Tall buttercup	*Ranunculus acris*	2		
	Allegheny Mountain	*Ranunculus allegheniensis*	2		
	Littleleaf buttercup	*Ranunculus abortivus*	1,2		
	Yellow water buttercup	*Ranunculus flabellaris*	2		
	Hooked buttercup	*Ranunculus recurvatus*	1,2		
	Creeping buttercup	*Ranunculus repens*	1		L
	Marsh mermaidweed	*Thalictrum pubescens*	1,2		
	Rue anemone	*Thalictrum thalictroides*	2		
Rhamnaceae	Glossy buckthorn	*Frangula alnus*	1,2		I
Buckthorn Family	Common buckthorn	*Rhamnus cathartica*	1,2		I
Rosaceae	Tall hair agrimony	*Agrimonia gryposepala*	2		
Rose Family	Canadian serviceberry	*Amelanchier canadensis*	1		
	Allegheny serviceberry	*Amelanchier laevis*	1,2		
	Running serviceberry	*Amelanchier stolonifera*	2		
	Hawthorn	*Crataegus sp.*	1,2		
	Virginia strawberry	*Fragaria virginiana*	1,2		
	White avens	*Geum canadense*	1,2		
	Rough avens	*Geum laciniatum*	2		
	Siberian crab apple	*Malus baccata*	2		
	Plumleaf crabapple	*Malus prunifolia*	1		
	Toringo crabapple	*Malus sieboldii*	1		
	Black chokeberry	*Photinia melanocarpa*	1,2		

Continued on next page.

Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Rosaceae (continued)	Silver cinquefoil	*Potentilla argentea*	1		
Rose Family	Dwarf cinquefoil	*Potentilla canadensis*	1,2		
	Sulphur cinquefoil	*Potentilla recta*	2		
	Common cinquefoil	*Potentilla simplex*	1,2		
	Pin cherry	*Prunus pensylvanica*	2		
	Black cherry	*Prunus serotina*	1,2		
	Chokecherry	*Prunus virginiana*	1,2		
	Multiflora rose	*Rosa multiflora*	1,2		I
	Swamp rose	*Rosa palustris*	1,2		
	Virginia rose	*Rosa virginiana*	1,2		
	Allegheny blackberry	*Rubus allegheniensis*	1,2		
	Northern dewberry	*Rubus flagellaris*	1,2		
	Bristly dewberry	*Rubus hispidus*	1,2		
	Gray red raspberry	*Rubus idaeus* ssp. *strigosus*	1,2		
	Black raspberry	*Rubus occidentalis*	1,2		
	Purple flowering raspberry	*Rubus odoratus*	2		
	Pennsylvania blackberry	*Rubus pensilvanicus*	1		
	Setose blackberry	*Rubus setosus*	1		
	European mountain ash	*Sorbus aucuparia*	1		
	White meadowsweet	*Spiraea alba* var. *latifolia*	1,2		
	Steeplebush	*Spiraea tomentosa*	1,2		
Rubiaceae	Common buttonbush	*Cephalanthus occidentalis*	1,2		
Madder Family	Rough bedstraw	*Galium asprellum*	2		
	Licorice bedstraw	*Galium circaezans*	1,2		
	Lanceleaf wild licorice	*Galium lanceolatum*	2		
	Common marsh bedstraw	*Galium palustre*	2		
	Stiff marsh bedstraw	*Galium tinctorium*	1		
	Threepetal bedstraw	*Galium trifidum*	1		
	Fragrant bedstraw	*Galium triflorum*	1,2		
	Azure bluets	*Houstonia caerulea*	1,2		
	Partridgeberry	*Mitchella repens*	1,2		
Salicaceae	Bigtooth aspen	*Populus grandidentata*	1,2		
Willow Family	Quaking aspen	*Populus tremuloides*	1,2		
	Large gray willow	*Salix atrocinerea*	1,2		
	Missouri River willow	*Salix eriocephala*	2		
	Black willow	*Salix nigra*	1		
Santalaceae	Bastard toadflax	*Comandra umbellata*	1,2		
Sandalwood Family					
Sarraceniaceae	Purple pitcher plant	*Sarracenia purpurea*	1		
Pitcher Plant Family					
Saxifragaceae	American golden saxifrage	*Chrysosplenium americanum*	1,2		
Saxifrage Family	Swamp saxifrage	*Micranthes pensylvanica*	1		
	Early saxifrage	*Micranthes virginiensis*	1		
Scrophulariaceae	False foxglove	*Agalinis sp.*	1		
Figwort Family	White turtlehead	*Chelone glabra*	1,2		
	Golden hedge-hyssop	*Gratiola aurea*	1		
	Butter and eggs	*Linaria vulgaris*	1		
	Allegheny monkeyflower	*Mimulus ringens*	1,2		
	Narrowleaf cowwheat	*Melampyrum lineare*	1,2		
	Canada toadflax	*Nuttallanthus canadensis*	1		
	Common mullein	*Verbascum thapsus*	1		

Continued on next page.

Appendix G. Plants of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Source[a]	MESA[b]	Invasive[c]
Scrophulariaceae (Cont)	Bird's-eye speedwell	*Veronica chamaedrys*	1		
Figwort Family	Common gypsyweed	*Veronica officinalis*	1,2		
Simaroubaceae	Tree of heaven	*Ailanthus altissima*	1		I
Quassia Family					
Smilacaceae	Smooth carrionflower	*Smilax herbacea*	1,2		
Catbrier Family	Roundleaf greenbrier	*Smilax rotundifolia*	1,2		
Solanaceae	Climbing nightshade	*Solanum dulcamara*	1,2		
Potato Family					
Sparganiaceae	American bur-reed	*Sparganium americanum*	1,2		
Bur-reed Family	Simplestem bur-reed	*Sparganium erectum*	2		
Taxaceae	Japanese yew	*Taxus cuspidata*	1		
Yew Family					
Thelypteridaceae	New York fern	*Thelypteris noveboracensis*	1,2,3		
Marsh Fern Family	Marsh fern	*Thelypteris palustris var. pubescens*	1,2,3		
	Long beech fern	*Thelypteris phegopteris*	1,2,3		
	Bog fern	*Thelypteris simulata*	1,2,3		
Tiliaceae	American basswood	*Tilia americana*	1,2		
Linden Family					
Typhaceae	Narrowleaf cattail	*Typha angustifolia*	1,2		
Cat-tail Family	Broadleaf cattail	*Typha latifolia*	1		
Ulmaceae	American elm	*Ulmus americana*	1,2		
Elm Family					
Utricaceae	Smallspike false nettle	*Boehmeria cylindrica*	1,2		
Nettle Family	Canadian clearweed	*Pilea pumila*	1		
Verbenaceae	White vervain	*Verbena urticifolia*	1		
Verbena Family					
Violaceae	Sweet white violet	*Viola blanda*	2		
Violet Family	American dog violet	*Viola conspersa*	2		
	Marsh blue violet	*Viola cucullata*	1,2		
	Alpine violet	*Viola labradorica*	1		
	Bog white violet	*Viola lanceolata*	1,2		
	Smooth white violet	*Viola macloskeyi* ssp. *pallens*	1,2		
	Three-lobe violet	*Viola palmata var. triloba*	2		
	Birdfoot violet	*Viola pedata*	2		
	Arrowleaf violet	*Viola sagittata*	1,2		
	Common blue violet	*Viola sororia*	1,2		
Vitaceae	Woodbine Virginia creeper	*Parthenocissus quinquefolia*	1,2		
Grape Family	Fox grape	*Vitis labrusca*	1,2		

a. Information on plants recorded in Harold Parker and Boxford State Forests was obtained from the following sources:
   1 = Harold Parker State Forest plant survey by Walter Kitridge, Harvard University Herbaria.
   2 = Boxford State Forest and J. C. Phillips Wildlife Sanctuary vascular plant inventory by Irina Kadis, Arnold Arboretum, and Alexy Zinovjev.
   3 = Harold Parker State Forest Ferns survey by Don Lubin.

b. Status of plants listed under the Massachusetts Endangered Species Act (MESA): E = Endangered; T = Threatened; and SC = Species of Special Concern.

c. These species have been evaluated by the Massachusetts Invasive Plant Advisory Group (MIPAG 2005) and determined to be I = Invasive or L = Likely invasive.

Appendix H. Birds of the Harold Parker Planning Unit

The followng species were reported as being present or may occur in the vicinity of Harold Parker and Boxford State Forests. Family, common and scientific names, and the sequence in which they are presented follow the seventh edition of the American Ornithologists' Union *Check-list of North American Birds* (1998).

Family	Common Name	Scientific Name	MESA[a]	Source[b]	BBA[c]
Anserinae	Canada goose	*Branta canadensis*		1,2,4,5	X
Geese and Swans	Mute swan	*Cygnus olor*		4,5	X
Anatinae	Wood duck	*Aix sponsa*		1,2,4,5	X
Ducks and Teals	Gadwall	*Anas strepera*		1,5	
	American Wigeon	*Anas Americana*		5	
	American black duck	*Anas rubripes*		1,2,4,5	X
	Mallard	*Anas platyrhynchos*		1,2,4,5	X
	Northern pintail	*Anas acuta*		1,5	
	Blue-winged teal	*Anas discors*		1,5	
	Cinnamon teal	*Anas cyanoptera*		1	
	Green-winged teal	*Anas crecca*		1,5	X
	Ring-necked duck	*Aythya collaris*		4,5	
	Bufflehead	*Bucephala albeola*		1,4,5	
	Common golden eye	*Bucephala clangula*		1,4,5	
	Hooded merganser	*Lophodytes cucullatus*		1,4,5	X
	Common merganser	*Mergus merganser*		4,5	
	Red-breasted merganser	*Mergus serrator*		4,5	
	Ruddy duck	*Oxyura jamaicensis*		4,5	
Odontophoridae	Northern Bobwhite	*Colinus virginianus*		5	X
Quails and Partridges					
Phasianidae	Ring-necked pheasant	*Phasianus colchicus*		1,2,4,5	
Pheasants and Turkeys	Ruffed grouse	*Bonasa umbellus*		1,2,3,4,5	
	Wild turkey	*Meleagris gallopavo*		1,3,4,5	X
Gaviidae	Common loon	*Gavia immer*	SC	1,5	
Loons					
Phalacrocoracidae	Double-crested cormorant	*Phalacrocorax auritus*		4,5	
Cormorants	Great Cormorant	*Phalacrocorax carbo*		5	
Ardeidae	Great blue heron	*Ardea herodias*		1,4,5	X
Bitterns and Herons	Green heron	*Butorides virescens*		1,2,5	X
	Black-crowned night-heron	*Nycticorax nycticorax*		5	
	Little blue heron	*Egretta caerulea*		1,5	
	Great egret	*Ardea alba*		5	
	Snowy egret	*Egretta thula*		1,5	
	Least bittern	*Ixobrychus exilis*	E	1,5	
	American bittern	*Botaurus lentiginosus*	E	1,5	
Threskiornithinae	Glossy Ibis	*Plegadis falcinellus*		5	
Ibis and Spoonbills					
Cathartidae	Turkey vulture	*Cathartes aura*		4,5	X
American Vultures					
Pandionidae	Osprey	*Pandion haliaetus*		1,5	
Osprey					
Accipitridae	Cooper's hawk	*Accipiter cooperii*		1,3,4,5	X
Kites, Eagles, and Hawks	Northern Goshawk	*Accipiter gentilis*		2,3,4,5	

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Appendix H. Birds of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	MESA[a]	Source[b]	BBA[c]
	Red-shouldered hawk	*Buteo lineatus*		1,2,3,5	X
	Broad-winged hawk	*Buteo platypterus*		1, 2,3,5	X
	Red-tailed hawk	*Buteo jamaicensis*		1, 2,4,5	X
Falconidae	American kestrel	*Falco sparverius*		2,4,5	
Falcons	Merlin	*Falco columbarius*		5	
Rallidae	Virginia rail	*Rallus limicola*		5	X
Rails, Gallinules, and Coots	King rail	*Rallus elegans*	T	1,5	X
	Common Gallinule	*Gallinula galeata*		1	
Charadriidae	Killdeer	*Charadrius vociferus*		1	X
Plovers and Lapwings					
Scolopacidae	Spotted sandpiper	*Actitis macularius*		1,2,5	X
Sandpipers and Allies	Sanderling	*Calidris alba*		1	
	Baird's sandpiper	*Calidris bairdii*		1,5	
	Common snipe	*Gallinago gallinago*		1,5	
	American woodcock	*Scolopax minor*		1,2,5	X
Laridae	Ring-billed gull	*Larus delawarensis*		4,5	
Jaegers, Gulls, Terns,	Herring gull	*Larus argentatus*		1,4,5	
and Skimmers	Great black-backed gull	*Larus marinus*		4,5	
Columbidae	Rock pigeon	*Columba livia*		4	X
Pigeons and Doves	Mourning dove	*Zenaida macroura*		1,2,4,5	X
Cuculidae	Black-billed cuckoo	*Coccyzus erythropthalmus*		2,5	X
Cuckoos and Allies	Yellow-billed cuckoo	*Coccyzus americanus*		5	
Strigidae	Eastern screech-owl	*Megascops asio*		1,4,5	X
Typical Owls	Great horned owl	*Bubo virginianus*		1,2,5	X
	Barred owl	*Strix varia*		1,2,3,4,5	X
	Northern saw-whet owl	*Aegolinus acadicus*		1,5	
	Snowy owl	*Nyctea scndiaca*		1,5	
	Great grey owl	*Strix nebulosa*		1	
Caprimulgidae	Common nighthawk	*Chordeiles minor*		5	
Goatsuckers	Eastern Whip-poor-will	*Caprimulgus vociferus*	SC	1,5	
Apodidae	Chimney swift	*Chaetura pelagica*		2,5	X
Swifts					
Trochilidae	Ruby-throated hummingbird	*Archilochus colubris*		2,3,5	X
Hummingbirds					
Alcedinidae	Belted kingfisher	*Megaceryle alcyon*		1,2,4,5	X
Kingfishers					
Picidae	Red-bellied woodpecker	*Melanerpes carolinus*		4,3,5	X
Woodpeckers	Yellow-bellied sapsucker	*Sphyrapicus varius*		1,4,5	
	Downy woodpecker	*Picoides pubescens*		1,2,4,5	X
	Hairy woodpecker	*Picoides villosus*		1,2,3,4,5	X
	Northern flicker	*Colaptes auratus*		1,2,3,4,5	X
	Pileated woodpecker	*Dryocopus pileatus*		1,2,3,4,5	X
Tyrannidae	Olive-sided flycatcher	*Contopus cooperi*		5	
Tyrant Flycatchers	Eastern wood-pewee	*Contopus virens*		1,2,3,5	X
	Yellow-bellied flycatcher	*Empidonax flaviventris*		5	
	Alder flycatcher	*Empidonax alnorum*		5	

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Appendix H. Birds of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	MESA[a]	Source[b]	BBA[c]
	Willow flycatcher	*Empidonax traillii*		5	X
	Least flycatcher	*Empidonax minimus*		2,5	X
	Eastern phoebe	*Sayornis phoebe*		1,2,3,5	X
	Great crested flycatcher	*Myiarchus crinitus*		2,3,5	X
	Eastern kingbird	*Tyrannus tyrannus*		1,2,3,5	X
Vireonidae	White-eyed vireo	*Vireo griseus*		1,5	
Vireos	Blue-headed vireo	*Vireo solitarius*		1,3,5	X
	Yellow-throated vireo	*Vireo flavifrons*		1,2,3,5	X
	Warbling vireo	*Vireo gilvus*		1,5	X
	Red-eyed vireo	*Vireo olivaceus*		2,3,5	X
Corvidae	Blue jay	*Cyanocitta cristata*		1,2,4,5	X
Jays, Magpies, and Crows	American crow	*Corvus brachyrhynchos*		1,2,4,5	X
	Fish crow	*Corvus ossifragus*		4,5	X
Hirundinidae	Tree swallow	*Tachycineta bicolor*		1,2,5	X
Swallows	Northern rough-winged swallow	*Stelgidopteryx serripennis*		5	X
	Barn swallow	*Hirundo rustica*		2,5	X
	Bank swallow	*Riparia riparia*		1,5	
	Purple martin	*Progne subis*		1,5	
Paridae	Black-capped chickadee	*Poecile atricapillus*		1,2,3,4,5	X
Titmice	Tufted titmouse	*Baeolophus bicolor*		1,2,3,4,5	X
Sittidae	Red-breasted nuthatch	*Sitta canadensis*		1,2,3,4,5	X
Nuthatches	White-breasted nuthatch	*Sitta carolinensis*		1,2,3,4,5	X
Certhiidae Creepers	Brown creeper	*Certhia americana*		1,2,3,4,5	X
Troglodytidae	Carolina wren	*Thryothorus ludovicianus*		4,5	X
Wrens	House wren	*Troglodytes aedon*		1,2,5	X
	Winter wren	*Troglodytes hiemalis*		2,3,4,5	X
	Short-billed marsh wren	*Cistothorus platensis*		1,5	
	Long-billed marsh wren	*Cistothorus palustris*		1,5	
Regulidae	Golden-crowned kinglet	*Regulus satrapa*		1,4,5	
Kinglets	Ruby-crowned kinglet	*Regulus calendula*		4,5	
Silviidae Gnatcatchers	Blue-gray gnatcatcher	*Polioptila caerulea*		2,3,5	X
Turdidae	Eastern bluebird	*Sialis sialis*		4,5	
Bluebirds and Thrushes	Veery	*Catharus fuscescens*		1,2,3,5	X
	Gray-cheeked thrush	*Catharus minimus*		1,5	X
	Swainson's thrush	*Catharus ustulatus*		5	
	Hermit thrush	*Catharus guttatus*		1,3,4,5	X
	Wood thrush	*Hylocichla mustelina*		1,2,3,5	X
	American robin	*Turdus migratorius*		1,2,4,5	X
Mimidae	Gray catbird	*Dumetella carolinensis*		1,2,3,5	X
Mimic Thrushes	Northern mockingbird	*Mimus polyglottos*		1,2,4,5	X
	Brown thrasher	*Toxostoma rufum*		1,2,5	X
Sturnidae Starlings	European starling	*Sturnis vulgaris*		1,2,4,5	X
Motacillidae Wagtails and pipits	American Pipit	*Anthus rubescens*		4,5	
Bombycillidae Waxwings	Cedar waxwing	*Bombycilla cedrorum*		1,2,3,4,5	X

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Appendix H. Birds of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	MESA[a]	Source[b]	BBA[c]
Parulidae	Blue-winged warbler	*Vermivora cyanoptera*		1,5	X
Wood Warblers	Golden-winged warbler	*Vermivora chrysoptera*	E	1,5	
	Tennessee warbler	*Oreothlypis peregrina*		5	
	Nashville warbler	*Oreothlypis ruficapilla*		5	
	Yellow warbler	*Dendroica petechia*		1,2,5	X
	Chestnut-sided warbler	*Dendroica pensylvanica*		2,3,5	X
	Magnolia warbler	*Dendroica magnolia*		5	
	Black-throated blue warbler	*Dendroica caerulescens*		1,5	
	Yellow-rumped warbler	*Dendroica coronata*		4,5	
	Black-throated green warbler	*Dendroica virens*		2,3,5	X
	Blackburnian warbler	*Dendroica fusca*		3,5	X
	Yellow-throated warbler	*Dendroica dominica*		3,5	
	Pine warbler	*Dendroica pinus*		3,5	X
	Prairie warble	*Dendroica discolor*		5	X
	Palm warbler	*Dendroica palmarum*		5	
	Black and white warbler	*Mniotilta varia*		3,5	X
	Cerulean warbler	*Setophaga cerulean*		3,5	
	Black-throated green warbler	*Setaphaga virens*		3	
	Bay-breasted warbler	*Dendroica castanea*		1,5	
	Cape May warbler	*Dendroica tigrina*		5	
	Black-and-white warbler	*Mniotilta varia*		1,2	
	American redstart	*Setophaga ruticilla*		1,2,5	X
	Worm-eating warbler	*Helmitheros vermivorum*		1,5	
	Ovenbird	*Seiurus aurocapilla*		2,3,5	X
	Northern waterthrush	*Parkesia noveboracensis*		3,5	X
	Louisiana waterthrush	*Parkesia motacilla*		2,3,5	X
	Mourning warbler	*Oporornis philadelphia*	SC	5	
	Common yellowthroat	*Geothlypis trichas*		1,2,3,5	X
	Wilson's warbler	*Wilsonia pusilla*		5	
	Canada warbler	*Wilsonia canadensis*		2,3,5	X
	Yellow-breasted chat	*Icteria virens*		1,5	
Emberizidae	Eastern towhee	*Pipilo erythrophthalmus*		1,2,3,5	X
Towhees, Sparrows, and Allies	American tree sparrow	*Spizella arborea*		1,4,5	
	Chipping sparrow	*Spizella passerina*		1,2,3,4,5	X
	Field sparrow	*Spizella pusilla*		2,4,5	X
	Vesper sparrow	*Pooecetes gramineus*	T	1,5	
	Savannah sparrow	*Passerculus sandwichensis*		5	X
	House sparrow	*Passer domesticus*		1,5	
	Fox sparrow	*Passerella iliaca*		1,4,5	
	Song sparrow	*Melospiza melodia*		1,2,3,4,5	X
	Lincoln's sparrow	*Melospiza lincolnii*		5	
	Swamp sparrow	*Melospiza georgiana*		2,3,4,5	X
	White-throated sparrow	*Zonotrichia albicollis*		1,4,5	X
	Dark-eyed junco	*Junco hyemalis*		1,4	
Calcariidae	Snow Bunting	*Plectrophenax nivalis*		4,5	
Snow Buntings					
Cardinalidae	Scarlet tanager	*Piranga olivacea*		1,2,3,5	X
Cardinals	Northern cardinal	*Cardinalis cardinalis*		1,2,4,5	
	Rose-breasted grosbeak	*Pheucticus ludovicianus*		1,2,3,5	X
	Evening grosbeak	*Coccothraustes vespertinus*		1,4,5	
	Indigo bunting	*Passerina cyanea*		1,3,5	X

Continued on next page.

Appendix H. Birds of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	MESA[a]	Source[b]	BBA[c]
Icteridae	Bobolink	*Dolichonyx oryzivorus*		5	X
Blackbirds, Orioles, and Allies	Red-winged blackbird	*Agelaius phoeniceus*		1,2,4,5	X
	Rusty blackbird	*Euphagus carolinus*		5	
	Common grackle	*Quiscalus quiscula*		2,4,5	X
	Brown-headed cowbird	*Molothrus ater*		1,2,4,5	X
	Orchard oriole	*Icterus spurius*		5	X
	Baltimore oriole	*Icterus galbula*		1,2,3,5	X
	Eastern meadowlark	*Sturnella magna*		2,5	X
Fringillidae	Purple finch	*Carpodacus purpureus*		1,2,3,4,5	X
Fringilline Finches	House finch	*Carpodacus mexicanus*		2,4,5	X
	Common redpoll	*Acanthis flammea*		4,5	
	Red crossbill	*Loxia curvirostra*		1,5	
	Pine siskin	*Spinus pinus*		1,4,5	X
	American goldfinch	*Spinus tristis*		1,2,4,5	X
Passeridae	House Sparrow	*Passer domesticus*		2,4	X
Old World Finches					

a. Status of birds listed under the Massachusetts Endangered Species Act (MESA): E = Endangered; T = Threatened; and SC = Species of Special Concern.

b. Information on birds recorded on or near Harold Parker and Boxford State Forests was obtained from the following sources:
1. Harold Parker State Forest GOALS Plan (DEM, 1985).
2. Boxford State Forest GOALS Plan (DEM, 1989).
3. Bald Hill Important Bird Area Nomination Form (MassAudubon, 2011).
4. Christmas Bird Survey Data 2007-2011, Andover, Massachusetts (National Audubon Society, 2002).
5. Inland species listed in the Field List of the Birds of Essex County, Massachusetts (Essex County Ornithological Club, 2002).

c. Massachusetts Breeding Bird Atlas 2 (BBA2) data for Reading Blocks 04 and 07, and Lawrence Blocks 09 and 12. Nearly all of Harold Parker and Boxford State Forests are located within these blocks. These birds were recorded on or near the state forests during the 2007-2011 breeding seasons, and represent bird species with the potential to breed in Harold Parker and Boxford State Forests (MassAudubon, 2012).

Appendix I. Mammals of the Harold Parker Planning Unit

The following mammals occur, or may occur, in Harold Parker and Boxford State Forests. Family, common and scientific names, and the sequence in which they are presented follow Cardoza et al. (2009).

Family	Common Name	Scientific Name	Status[a]
Didelphidae New World Opossums	Virginia opossum	*Didelphis virginiana*	Confirmed
Sciuridae Tree Squirrels and Marmots	Eastern gray squirrel	*Sciurus carolinensis*	Confirmed
	Red squirrel	*Tamiasciurus hudsonicus*	Confirmed
	Northern flying squirrel	*Glaucomys sabrinus*	Confirmed
	Southern flying squirrel	*Glaucomys volans*	Confirmed
	Eastern chipmunk	*Tamias striatus*	Confirmed
	Woodchuck	*Marmota monax*	Confirmed
Castoridae Beavers	American beaver	*Castor canadensis*	Confirmed
Dipodidae Jumping Mice	Meadow jumping mouse	*Zapus hudsonius*	Confirmed
Cricetidae Mice, Voles and Lemmings	Meadow vole	*Microtus pennsylvanicus*	Confirmed
	Woodland (Pine) vole	*Microtus pinetorum*	Confirmed
	Red-backed vole	*Clethrionomys gpperi*	Confirmed
	Southern red-backed vole	*Myodes gapperi*	Possible
	Common muskrat	*Ondatra zibethicus*	Confirmed
	White-footed deermouse	*Peromyscus leucopus*	Confirmed
Muridae Old World Rats and Mice	House mouse	*Mus musculus*	Confirmed
	Brown (Norway) rat	*Rattus norvegicus*	Confirmed
Erethizontidae New World Porcupines	North American porcupine	*Erethizon dorsatum*	Confirmed
Leporidae Hares and Rabbits	Eastern cottontail	*Sylvilagus floridanus*	Confirmed
	New England cottontail[b]	*Sylvilagus transitionals*	Confirmed
	Black-tailed jack rabbit	*Lepus californicus*	Confirmed
	Snowshoe hare	*Lepus americanus*	Confirmed
Soricidae Shrews	Northern short-tailed shrew	*Blarina brevicauda*	Confirmed
	Cinereus (Masked) shrew	*Sorex cinereus*	Confirmed
	American Water Shrew[c]	*Sorex palustris*	Confirmed
Talpidae Moles and Shrew-moles	Star-nosed mole	*Condylura cristata*	Confirmed
	Hairy-tailed mole	*Parascalops breweri*	Confirmed
	Eastern mole	*Scalopus aquaticus*	Confirmed
Vespertilionidae Vesper Bats	Big brown bat	*Eptesicus fuscus*	Confirmed
	Eastern red bat[b]	*Lasiurus borealis*	Possible migratory
	Hoary bat[b]	*Lasiurus cinereus*	Possible migratory
	Eastern pipistrelle	*Pipistrellus subflavus*	Possible migratory
	Silver-haired bat[b]	*Lasionycteris noctivagans*	Possible migratory
	Northern myotis	*Myotis septentrionalis*	Possible migratory
Felidae Cats	Domestic cat (feral)	*Felis catus*	Possible
	Bobcat[b]	*Lynx rufus*	Possible
Canidae Dogs, Foxes, and Wolves	Coyote	*Canis latrans*	Confirmed
	Domestic dog (feral)	*Canis lupus familiaris*	Possible
	Gray fox	*Urocyon cinereoargenteus*	Confirmed
	Red fox	*Vulpes vulpes*	Confirmed

Continued on next page.

Appendix I. Mammals of the Harold Parker Planning Unit (Continued)

Family	Common Name	Scientific Name	Status[a]
Ursidae Bears	American black bear[b]	*Ursus americanus*	Possible
Mustelidae Weasels, Minks, Martens and Otters	North American river otter	*Lontra canadensis*	Confirmed
	Fisher	*Martes pennanti*	Confirmed
	Ermine	*Mustela erminea*	Confirmed
	Long-tailed weasel	*Mustela frenata*	Confirmed
	American mink	*Neovison vison*	Confirmed
Mephitidae Skunks	Striped skunk	*Mephitis mephitis*	Confirmed
Procyonidae Raccoons, Coatis and Ringtails	Raccoon	*Procyon lotor*	Confirmed
Cervidae Deer, Elk and Moose	Moose	*Alces americanus*	Possible
	White-tailed deer	*Odocoileus virginianus*	Confirmed

a. Species classified as "Confirmed" have been recorded in Harold Parker (DEM, 1985) and/or Boxford (DEM, 1989) State Forests. Species classified as "Possible" are known to occur in appropriate habitat in northeastern Massachusetts (Cardoza et al. 2009) and may occur in the State Forests. This category includes mammals that: occur in the State Forests but have not yet been recorded; migrate through the State Forests (i.e., bats); are vagrant and dispersing on an irregular and unpredictable basis; or occur near, but not in, the State Forests.

b. These species have been designated a "Species in Greatest Need of Conservation" by MassWildlife (2006; Table 4).

c. This species is listed as a species of "Special Concern" under the Massachusetts Endangered Species Act (MESA).

Appendix J. Reptiles of the Harold Parker Planning Unit

The following reptiles occur, or may occur, in Harold Parker and Boxford State Forests. Family, common and scientific names, and the sequence in which they are presented follows Cardoza and Mirick (2009).

Family	Common Name	Scientific Name	MESA[a]	Status[b]
Chelydridae Snapping Turtles	Snapping turtle	*Chelydra serpentina*		Confirmed
Kinosternidae Mud and Musk Turtles	Eastern musk turtle	*Sternotherus odoratus*		Confirmed
Emyididae Pond Turtles	Painted turtle	*Chrysemys picta*		Confirmed
	Spotted turtle	*Clemmys guttata*		Confirmed
	Wood turtle	*Glyptemys insculpta*	SC	Confirmed
	Blanding's turtle	*Emydoidea blandingii*	T	Confirmed
	Eastern box turtle	*Terrapene carolina*	SC	Confirmed
Colubridae Harmless Snakes	North American racer	*Coluber constrictor*		Confirmed
	Ring-necked snake	*Diadophis punctatus*		Confirmed
	Eastern ratsnake	*Pantherophis allegheniensis*	E	Confirmed
	Eastern Hog-nosed snake	*Heterodon platrirhinos*		Confirmed
	Milksnake	*Lampropeltis triangulum*		Confirmed
	Northern watersnake	*Nerodia sipedon*		Confirmed
	Smooth greensnake	*Opheodrys vernalis*		Confirmed
	DeKay's brownsnake	*Storeria dekayi*		Confirmed
	Red-bellied snake	*Storeria occipitomaculata*		Confirmed
	Eastern ribbonsnake	*Thamnophis sauritus*		Confirmed
	Common gartersnake	*Thamnophis sirtalis*		Confirmed

a. Status of reptiles listed under the Massachusetts Endangered Species Act (MESA): E = Endangered; T = Threatened; and SC = Species of Special Concern.

b. Species classified as "Confirmed" have been recorded in Harold Parker (DEM, 1985) and/or Boxford (DEM, 1989) State Forests. Species classified as "Possible" are known to occur in appropriate habitat in northeastern Massachusetts (Cardoza and Mirick 2009) and may occur in the State Forests. This category includes reptiles that: occur in the State Forests but have not yet been recorded; are vagrant and dispersing on an irregular and unpredictable basis; or occur near, but not in, the State Forests.

Appendix K. Amphibians of the Harold Parker Planning Unit

The following amphibians occur, or may occur, in the DCR Harold Parker Planning Unit. Family, common and scientific names, and the sequence in which they are presented follows Cardoza and Mirick (2009).

Family	Common Name	Scientific Name	MESA[a]	Status[b]
Ambystomatidae	Blue-spotted salamander	*Ambystoma laterale*	SC	Confirmed
Mole Salamanders	Spotted salamander	*Ambystoma maculatum*		Confirmed
	Marbled salamander	*Ambystoma opacum*	T	Possible
Salamandridae	Eastern (Red-spotted) newt	*Notophthalmus viridescens*		Confirmed
Newts				
Plethodontidae	Northern dusky salamander	*Desmognathus fuscus*		Confirmed
Lungless Salamanders	Eastern redback salamander	*Plethodon cinereus*		Confirmed
	Slimy Salamander	*Plethodon glutinosus*		Confirmed
	Four-toed salamander	*Hemidactylium scutatum*		Possible
	Northern two-lined salamander	*Eurycea bislineata*		Confirmed
Pelobatidae	Eastern spadefoot	*Scaphiopus holbrookii*	T	Confirmed
Spadefoot Toads				
Bufonidae	American toad	*Anaxyrus americanus*		Confirmed
True Toads	Fowler's toad	*Anaxyrus fowleri*		Confirmed
Hylidae	Spring peeper	*Pseudacris crucifer*		Confirmed
True Tree Frogs	Gray treefrog	*Hyla versicolor*		Confirmed
Ranidae	American bullfrog	*Lithobates catesbeianus*		Confirmed
True Frogs	Green frog	*Lithobates clamitans*		Confirmed
	Pickerel frog	*Lithobates palustris*		Confirmed
	Northern leopard frog	*Lithobates pipiens*		Confirmed
	Wood frog	*Lithobates sylvaticus*		Confirmed

a. Status of amphibians listed under the Massachusetts Endangered Species Act (MESA): E = Endangered; T = Threatened; and SC = Species of Special Concern.

b. Species classified as "Confirmed" have been recorded in Harold Parker (DEM, 1985) and/or Boxford (DEM, 1989) State Forests. Species classified as "Possible" are known to occur in appropriate habitat in northeastern Massachusetts (Cardoza and Mirick 2009) and may occur in the State Forests. This category includes amphibians that: occur in the State Forests but have not yet been recorded; are vagrant and dispersing on an irregular and unpredictable basis; or occur near, but not in, the State Forests.

Appendix L. Closing and Restoring Trails

connections

The newsletter of the Massachusetts Greenways and Trails Program

May / June 2010 No. 36

Closing and Restoring Trails

All trails impact the natural environment and require on-going maintenance. But some trails, usually as a result of poor layout and design, are more damaging than others, require excessive maintenance, and diminish the user's experience. Rather than try to maintain trouble trails over and over, in many cases, closing and restoring poor condition and redundant trails is the best solution for your trail system – environmentally, economically, and socially.

However, as anyone who has tried to close a trail knows, simply putting up a sign or piling brush at the trail entrance does not work. The compacted soils of the trail tread can resist naturalization for many years, and as long as open sight lines persist, users will continue to use the trail.

In most cases, successfully closing and restoring trails takes as much planning and effort as constructing new trails. The following Best Practices can help successfully close problem trails.

Provide a Better Option

The most important component of successfully closing a trail is to provide a more appealing alternative. This includes ensuring that the new route is well designed and marked, and ***flows seamlessly*** from existing trails. This may require redesigning trail intersections to take away open sight lines and create smooth transitions that keep users on the preferred route.

Educate Users

Users who do not understand why a trail is being closed may undo all your efforts. When closing trails it is important to let users know that you are closing trails, and more importantly, why. Post information on trailheads, recruit volunteers to assist and encourage users to spread the word. ***Focus on the benefits*** of closing trails including habitat and water quality protection, along with a better trail experience.

Halt Ongoing Erosion

Some trails requiring closure will be fall-line trails that channelize water and experience continuing erosion. In order to close and naturalize these trails, active, on-going erosion must be stopped. ***Check dams and slash*** should be used to stem water flow and stabilize soils while naturalization occurs.

Close Sight Lines
Trails you can see are trails you will use. In the photos (top and left), even though barriers, signs and slash have been used to close the trail, the open sight lines still invite users to explore. The most effective way to close off sight lines is to ***transplant native vegetation*** in the trail corridor, especially any place a trail is visible from another trail. In other places along the closed trail, slash can be used to disguise the trail tread.

Consider Breaking Up Tread and Re-contouring the Land
Compacted trail tread will likely resist naturalization. Have you ever come across an old road in the woods that has not been used for years? Breaking up the soil with pulaskis and pick-mattocks, and scarifying the soil will allow natural regeneration to take hold. Re-contouring the land, particularly for eroded trails, will help remove evidence of old trails.

Block the Corridor
As a last resort, you can block the beginning and end of the trail with a fence and signs. The fence will look out of place, and could draw more attention to the closure. Be prepared to answer questions by posting signage explaining the closure on, or near, the fence. When the trail has been closed for a while the fence can be removed. This strategy may be needed especially at locations where users are looking for views and water access.

Don't Introduce or Spread Exotic Plants
Use local soils and plants in your trail reclamation project if possible. If outside materials are used, make sure they are certified weed-free and native. Clean tools and work boots before bringing them from other sites to ensure that invasive seeds are not transported.

Monitor Your Closure
Return periodically to monitor the success of your closure. Ascribe to the "broken window" theory of trail maintenance. If your closure is vandalized or damaged, fix it immediately.

Tips and Tools (Mattock and McLeod)

Closing and Reclaiming Damaged Trails webpage by IMBA is at
http://www.imba.com/resources/trail_building/reclaiming_trail.html

Naturalizing Abandoned Trail from the FHWA Trail Maintenance and Construction Notebook is at:
http://www.fhwa.dot.gov/environment/fspubs/00232839/page12.htm

The Minnesota Department of Natural Resources "Trail Planning, Design and Development Guidelines" (http://www.dnr.state.mn.us/publications/trails_waterways/index.html) includes a section of decommissioning and restoring unsustainable trails.

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Appendix M. DCR Trails Guidelines and Best Practices Manual

(Section edited to provide guidance for the Boxford and Harold Parker Trail Recommendations)

Trail Signage

"Signs are probably the quickest and easiest way to leave the trail user with a positive impression. If the signs are high quality, well maintained, and properly located, other trail problems are often over-looked. Consistent signs are the quickest way to increase the trail's identity and the public's support for the trail." (National Park Service)

Current DCR Trail Marking

Trails in Harold Parker and Boxford State Forest contain a variety of different types of trail signs and marking systems including plastic blazes, painted blazes, routed trail intersection signs, plastic intersection posts, interpretive signs, aluminum trail rules signs, and trailhead kiosks. These trail signage and marking standards will help improve trail management and user safety, and enhance the users' recreational experience. While achieving these standards may take years to realize, working toward them incrementally over time is an important goal.

Why Strive for Consistent Signage Standards?

Appropriate trail signs and markings provide information, enhance safety, and contribute to a positive user experience. Trail signage is perhaps our most important form of communication with our users, as signs are the messages that users see every time they visit. Consistent signage enhances safety, creates a positive trail identity, helps meets user expectations, and contributes to the public's support for trails.

The broad objectives of DCR's trail signage should be to:

1. Provide consistent positive exposure of the trail system to attract users
2. Educate the user about trails and trail uses
3. Reassure / ensure that the user is on the right trail and will not get lost
4. Control trail usage, reduce conflicts, and create safer, more enjoyable, and environmentally friendly recreational experiences

However, these objectives must be balanced with aesthetic considerations to avoid "sign pollution." We accomplish these objectives through the consistent use of the following different kinds of trail marking:

- Trailhead signs and kiosks
- Intersection directional signs
- Reassurance markers and blazes
- Interpretive displays

It is important to consider the different purposes of each type of sign and use them appropriately. For example, using reassurance blazes to indicate allowed trail uses is probably inappropriate because it may require more blazing, and is very difficult to change if the allowed uses change. On the other hand, using trailhead signage to designate allowed uses is simpler to implement, requires much less maintenance, and can be easily changed.

Implementation Priority

Implementing the below standards fully within the DCR system will take time. The priority for implementation should be as follows:

1. Fully implement the sign standards wherever new trails are developed or constructed.
2. Fully implement the standards when trails undergo significant restoration or repair.

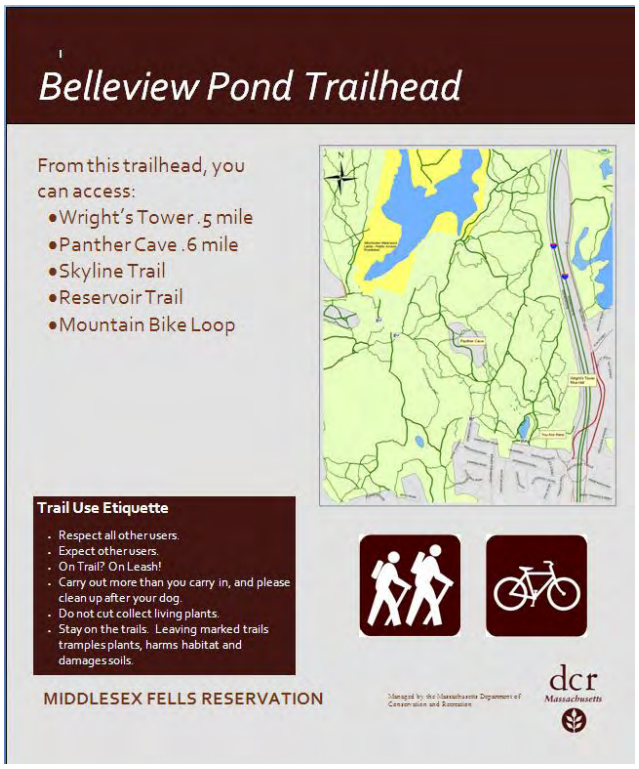
3. Implement the appropriate standards as possible as trails are worked on through routine maintenance. For example, when a trail is maintained, re-blaze then, remove old signage and install key intersection signs.
4. Implement the intersection signage standards park-wide.
5. Implement full signage standards park-wide.

General Trail Signage and Marking Standards

- Signage within the forests should be consistent with respect to colors, materials, and look.
- Intersection directional signs should be routed brown signs (wood or plastic composite material) with white lettering. Routed signs are aesthetically appealing and resistant to damage and vandalism.
- Intersection numbers should be numbers on a brown plastic wand.
- Trails should be blazed in painted 2″ x6″ vertical blazes.
- Aluminum trail signs are ***not*** recommended.

Trailhead Signs

Trailhead kiosks or signs may come in different forms depending on the setting, complexity, and information needs.



For more developed trailheads, popular trails or high profile trails, a designed and professionally fabricated trailhead sign is appropriate. The template (right) follows the general standards for "Wayside Signage" in the in the DCR Graphics Standards Manual. This template includes:

- A sign board of approximately 20″ wide by 24″ in height (5:6 portrait orientation).
- Trail name or Trailhead name in Frutiger Italics in a 4″ (1/6) brown band at the top.
- Text message (in sabon font) with trail description and perhaps additional information placed in the upper left text box.
- A map showing features, destinations, distances and connections in the upper right.
- Standard "Trail User Etiquette" is in a brown box in the lower left.
- Allowed and prohibited use symbols are in the lower right.
- Allowed and prohibited use symbols may also be in 4″ x 4″ square signs mounted on the posts below the sign.
- Park name is in capitals, left justified at the bottom with the DCR logo in the lower right corner.
- The position of the map, text boxes and symbols may be flexible depending on the specific needs of each sign.
- This type of sign should be affixed with brackets to two 4x4 pressure treated wood posts planted 24″ in the ground.

On roadsides or at lower profile trailheads, simpler routed wood signs may be used. These should be:

- A sign board of approximately 21″ wide by 15″ in height (5:7 ratio landscape orientation)
- Trail name in Frutiger italics at about .8″ – 1″
- Key trail destinations and distances at about .5″
- State Park Name in caps at the bottom
- "dcr" in the lower right corner
- Information and symbols showing allowed and prohibited trail uses and trail difficulties. This information may be in 4″x4″ square signs mounted on the post below the sign.
- Sign should be affixed with lag bolts to a single 4x4 pressure treated wood post planted 24″ in the ground.

Intersection Directional Signs

Directional signs **should** be placed at main trail intersections, decision points, and spur junctions. Intersections signs should be mounted on wood posts. Post type should be consistent within the site. Trails names and arrows **may** also be placed vertically on wood posts.

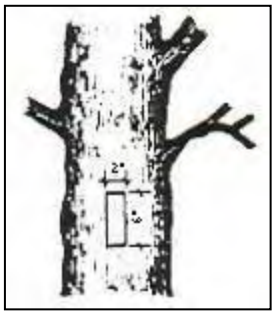
Intersection directional signs are the most important source of information for users, and can serve to enhance safety, avoid bad user experiences, and increase use of under-used sections of the trail. If someone knows that there is a tower, waterfall or other attraction down the trail, they may be tempted to hike to it and thus become intrigued with the trail idea.

Intersection signs **should** include the following information:

- Trail name, if the trail is named
- The closest significant destination (such as a view, summit, waterfalls, etc.)
- The closest trailhead
- A farther major destination or point of reference (such as road main entrance, major summit, overnight shelter, etc.)
- The distance to the destinations in miles and tenths
- The direction to these destinations indicated by arrows may be necessary
- "dcr" in the lower right corner
- markings for allowed or restricted uses
- intersection number in the lower left corner

In complex trail systems with numerous intersections, intersection numbering can be used and listed on an accompanying trail map. Numbers should not be used instead of directional signage, but can be used in conjunction and can be placed on the intersection directional sign in the lower left corner or on a brown plastic wand.

Reassurance Markers/Blazes



Trail blazes or reassurance markers are important trail elements that allow the user to stay on trails and provide a sense of reassurance. The recommended guidelines are consistent with best management practices for trail marking.

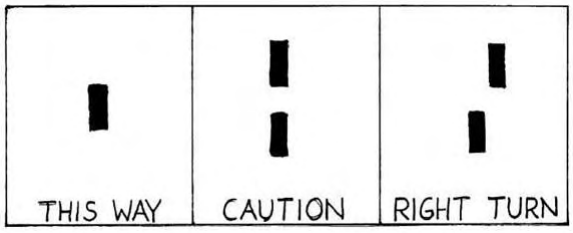
Official DCR trails **should** be blazed with vertical ***painted blazes***. Plastic blazes should be avoided and replaced when trails are re-blazed, upgraded of maintained. Painted blazes are more vandal resistant, do less damage than nail-on blazes, and are easier to alter.

Blazes are placed on trees, slightly above eye level so that hikers, bikers or riders can see them easily when traveling in either direction. Blazes should be placed immediately beyond any trail junction or road crossing. Blazes along continuous trail segments within the Fells need only be periodic, as tread is well established. It is not desirable to have more than one blaze visible in either direction at any one time. One well placed blaze is better than several that are poorly placed, and it is important to strike a balance between "over-blazing" and "under-blazing."

Standard blazes should be 2" x 6" vertical rectangles. The 2" x 6" rectangular shape is large enough to be seen easily without being visually obtrusive and is the most universally accepted style of trail blazing. Edges and corners should be crisp and sharp. Dripping paint, blotches and over-sized blazes should be avoided. On rough barked trees, the tree will first need to be smoothed using a paint scraper, wire brush, or draw knife. A high quality, glossy, exterior acrylic paint such as Sherman Williams Metalatex or Nelson Boundary Paints should be used for long durability.

Vegetation should be pruned from in front of the blazes to ensure visibility in all seasons. In non-forested areas, blazes may be placed on wooden posts 4 feet above the ground or stone cairns may be used to mark the trail. Blazes can be painted on exposed rock, but will not be visible in the winter.

Directional Change Indicators



Double blazes should be used in places that require extra user alertness (e.g. important turns, junctions with other trails, and other confusing locations). They should be used sparingly so that they do not become meaningless or visually obtrusive. They are unnecessary at gradual turns and well-defined trail locations such as switchbacks. A reassurance marker should be placed so that it can be seen from the direction indicator. Be sure to mark confusing areas to guide users coming from both (or all) directions. Avoid arrows.

Interpretive Displays

An interpretive sign must be part of a well thought out interpretive plan complete with goals, objectives, thematic statements and topics. The plan should be based on an audience and site analysis which will guide the selection of materials and interpretive approach. Contact the Interpretive Services section of the Bureau of Ranger Services if you are interested in developing an interpretive plan. Once you have completed your interpretive plan, you will need to confer with Interpretive Services and the DCR Graphics Team to develop specific displays. An outline of the wayside development process is available in the DCR Graphic Standards Manual.

Interpretive waysides are an important and effective way to provide information to visitors. There are two types of wayside: low profile and upright. Low profile exhibits are low, angled panels that provide an interpretive message related to a specific place or feature. They usually include one or more pictorial images and a brief interpretive text. Upright waysides typically provide general information, rather than site-specific interpretation; they are often located near a visitors center or trailhead to provide information about facilities, programs, and management policies.

The panels are fabricated from a high-pressure laminate material, which is both cost-effective and allows the use of color to create a more attractive presentation. They are generally guaranteed for 10 years by the fabricators, and are resistant to vandalism by spray paint or cutting.

Sign Maintenance

Sign maintenance is critical to the operation of a quality trail system. Well maintained signs that are repaired promptly convey a sense of pride and reduce further vandalism. Signs are a highly visible representation of the quality of the trail. Their maintenance or lack of maintenance leaves the visitor with a positive or negative impression about the trail. Signs convey many kinds of information and it is critical that they be in good shape. Special attention should be given to those that are damaged from shooting and other factors, those that are faded or brittle from long exposure, and those that are simply missing. All signs that are damaged or weathered no longer convey a good impression or serve the intended purpose, and should be repaired or replaced. Periodic painting and other maintenance is a necessity and will prolong the life of a sign.

Temporary Trail Signage and Blazing

Some uses such as special events may require temporary trail blazes and signs. Temporary signs installed by DCR partners should be allowed under a Special Use Permit or MOA and should follow these guidelines.

- Temporary signs shall be approved by the facility supervisor
- They should be installed on posts rather than nailed to trees
- They shall not advertise specific vendors
- They shall be removed when the temporary use is over
- Temporary signs shall not be inconsistent with these DCR standards

Appendix N. DCR Cultural Resource Policy

POLICY: The Department of Conservation and Recreation shall provide for the stewardship of all known and potential cultural resources on DCR property through sensitive resource management and planning, and compliance with local, state, and federal historic preservation regulations. DCR actions and activities shall promote and foster the preservation, protection, and appreciation of these resources.

APPLICABILITY: All DCR Divisions, Departments, Bureaus and Staff

I. Definitions

The following definitions explain terms used throughout this policy directive:

Cultural Resource - A district, site, building, structure, landscape, object or ethnographic resource that is at least fifty years old and has important historical, cultural, scientific, or technological associations. Cultural resources also include pre-historic or historic archaeological sites containing physical remains or indications of past human activity and/or any artifacts that have been constructed or manipulated by human influence and holding potential significance for understanding past, present, or future human behavior.

Cultural Resources Inventory (CRI) - A baseline inventory of cultural resources in the DCR system, consisting of location maps, related reports, and individual site inventory forms with background historical information.

National Register - The National Register of Historic Places is the official federal list of districts, sites, buildings, structures and objects significant in American history, architecture, archaeology, engineering and culture.

Project - Any action, activity, program, construction or land modification that is directly undertaken by DCR, receives any financial assistance from DCR, or requires the issuance of a license or permit by DCR.

Project Notification Form - The form that is completed by DCR or a private project proponent in order to notify the Massachusetts Historical Commission of a project requiring review under state or federal historic preservation regulations.

Secretary of the Interior's Standards for the Treatment of Historic Properties - General guidelines for the preservation, rehabilitation, restoration, and reconstruction of historic buildings, established by the National Park Service to encourage consistent preservation practices at the national, state, and local levels.

State Register - The State Register of Historic Places includes the following properties:

- All districts, sites, buildings, or objects listed in the National Register of Historic Places or formally determined eligible for listing in the National Register of Historic Places by the Keeper of the Register, United States Department of the Interior;
- All local historic districts or landmarks designated under local ordinances or by-laws;
- All structures and sites subject to preservation restrictions approved or held by the MHC;
- All historical or archaeological landmarks certified or listed pursuant to MGL Ch. 9, Sec. 26D+27.

Site - The location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.

II. Mission Statement—Office of Cultural Resources

The Office of Cultural Resources (OCR) preserves the cultural heritage of Massachusetts through stewardship of DCR's historic buildings, structures, landscapes, archaeological sites, and archival resources; through training, public education, and advocacy; and through the development of innovative tools for protecting historic landscapes.

The OCR staff provides expertise, technical assistance, and project management skills in landscape preservation, historic preservation planning, archaeology, archival records management, and compliance with local, state and federal historic preservation laws. In addition to leading OCR initiatives and programs, OCR staff directly support activities undertaken by other bureaus and divisions within DCR.

III. Implementation

The Commissioner shall designate a staff person to coordinate agency implementation of this policy.

The Commissioner shall ensure that an archaeologist is on staff who meets the professional qualifications and standards for investigation and reporting as outlined in 950 CMR 70.00 and retains DCR's state permit for archaeological investigations on public lands or lands in which the Commonwealth has an interest.

The agency shall provide training on all aspects of this policy to DCR planning, engineering, project management and operations staff.

IV. Regulatory Compliance—Project Planning

During the project planning process DCR shall comply with historic preservation laws at the local, state, and federal levels, listed below. OCR serves as the Department's liaison with local historic district commissions and the Massachusetts Historical Commission (MHC) pertaining to project notifications and requests requiring assistance from and consultation with these commissions. All inquires from MHC shall be directed to OCR.

A. Local Landmarks and Historic Districts

Many municipalities within the Commonwealth have designated local historic landmarks and historic districts to protect the distinctive characteristics of important sites and districts and to encourage new structural designs that are compatible with their historic setting. Local Historic District Commissions review all applications for exterior changes to landmarks or properties within local districts to ensure that changes to properties will not detract from their historic character. Review criteria are determined by each municipality.

MGL Ch. 40C http://www.mass.gov/legis/laws/mgl/gl-40c-toc.htm

B. State Register Review

DCR must notify MHC, through filing of a PNF or Environmental Notification Form (ENF), of any projects undertaken, funded, permitted, or licensed in whole or in part by the agency in order that MHC can make a Determination of Effect of the project on historic and archaeological resources listed in the State Register. DCR shall send copies of PNFs or ENFs to the local historical commissions in those communities that have received Certified Local Government status from MHC. It is the responsibility of the MHC to determine whether State Register properties exist within the project's area of potential impact. When MHC determines a proposed project will have an adverse effect on historic properties, DCR must consult with MHC and any interested parties to explore feasible and prudent alternatives that would eliminate, minimize, or mitigate the adverse effects and, following consultation, adopt such alternatives.

DCR may enter into a Programmatic Memorandum of Agreement (PMOA) with the MHC to streamline the state review process, including identifying possible activities that qualify as categorical exemptions. OCR is responsible for the coordination of any PMOA with the MHC and directly oversees implementation.

MGL Ch. 9, Sec. 26-27C http://www.mass.gov/legis/laws/mgl/9-27c.htm
950 CMR 71

C. Massachusetts Environmental Policy Act (MEPA)

Some DCR projects may require filing an ENF with MEPA in addition to the State Register Review. MHC reviews all ENFs and comments on those in which there are concerns that the project has the potential to affect significant historic or archaeological properties. MEPA regulations state that an ENF must be filed if a project involves: 1) demolition of all or any exterior part of any Historic Structure listed in or located in any

Historic District listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth; or 2) destruction of all or any part of any Archaeological Site listed in the State Register of Historic Places or the Inventory of Historic and Archaeological Assets of the Commonwealth unless the project is subject to a Determination of No Adverse Effect by MHC or is consistent with a Memorandum of Agreement with MHC that has been the subject of public notice and comment.

301 CMR 11.00 http://www.mass.gov/envir/mepa/thirdlevelpages/meparegulations/meparegulations.htm

D. Section 106 Review

DCR is required to comply with Section 106 of the National Historic Preservation Act when undertaking projects that require a permit, funding, license, or approval from a federal agency. The federal agency (or, in many cases, the recipient of federal assistance or permits) is required to notify MHC of such projects and take into account the effects of the project on historic properties that are listed or eligible for listing in the National Register of Historic Places. When the federal agency, in consultation with the MHC as the Office of the State Historic Preservation Officer, determines that a project will result in an adverse effect to those properties, the federal agency must take prudent and feasible measures to avoid, minimize, or mitigate those effects. Other interested parties such as local historical commissions or Indian Tribes are also consulted as part of the process.

16 USC 470 et seq http://www.cr.nps.gov/local-law/nhpa1966.htm
36 CFR 800 http://www.achp.gov/regs-rev04.pdf

V. Regulatory Compliance—Other *(See also Emergency Scenarios/Procedures below)*

Other DCR activities require compliance with additional state historic preservation laws:

A. Massachusetts Unmarked Burial Law

When human skeletal remains are discovered or if human remains are disturbed through construction or agricultural activity, DCR staff must immediately notify the Office of the Chief Medical Examiner (617-267-6767, ext. 176). The Medical Examiner shall conduct an inquiry to determine whether the remains are suspected of being 100 years old or more, and, if so determined, shall immediately notify the State Archaeologist at MHC. The State Archaeologist conducts an investigation to determine if the skeletal remains are Native American. If the remains are deemed likely to be Native American, the State Archaeologist shall immediately notify the Massachusetts Commission on Indian Affairs, which shall cause a site evaluation to be made to determine if the place where the remains were found is a Native American burial site. Consultation occurs to develop a written agreement to preserve the burials in situ or, if no other feasible alternative exists, to excavate the burials.

MGL Ch. 38, Sec. 6 http://www.mass.gov/legis/laws/mgl/38-6.htm
MGL Ch. 9, Sec. 26A and 27C http://www.mass.gov/legis/laws/mgl/9-26a.htm
http://www.mass.gov/legis/laws/mgl/9-27a.htm
MGL Ch. 7, Sec. 38A http://www.mass.gov/legis/laws/mgl/7-38a.htm\

B. Preservation Restrictions

When DCR seeks to acquire a preservation restriction on a property, MHC must review and approve the language of the restriction before it is finalized. A preservation restriction means a right, whether or not stated in the form of a restriction, easement, covenant or condition, in any deed, will or other instrument executed by or on behalf of the owner of the land or in any order of taking, appropriate to preservation of a structure or site historically significant for its architecture, archaeology or associations, to forbid or limit any or all (a) alterations in exterior or interior features of the structure, (b) changes in appearance or condition of the site, (c) uses not historically appropriate, (d) archaeological field investigation without a permit, or (e) other acts or uses detrimental to appropriate preservation of the structure or site. Certain projects on properties with a preservation restriction require MHC approval.

MGL Ch. 184, Sec. 31-33 http://www.mass.gov/legis/laws/mgl/184-31.htm
http://www.mass.gov/legis/laws/mgl/184-32.htm
http://www.mass.gov/legis/laws/mgl/184-33.htm

C. Consultation with Massachusetts Native Americans

DCR must consult directly with Wampanoag (Gay Head and Mashpee) Tribal Councils and the Massachusetts Commission on Indian Affairs (MCIA) for management of the reservation in the Fall River-Freetown State Forest. DCR must consult with the Wampanoag and Nipmuc Tribal Councils on matters affecting each of those tribes. DCR must consult with the MCIA and with other tribal and intertribal councils on matters that affect all other tribes.

Executive Order 126 http://www.lawlib.state.ma.us/ExecOrders/eo126.txt

VI. Resource Management and Planning

A. OCR Program of Inventory and Evaluation

One of the primary objectives of OCR is to provide an ongoing program of inventory and evaluation of cultural resources on DCR property. This first and most critical step in cultural resource management entails identifying potentially significant cultural resources and discovering the significance or meaning of each resource within a local, statewide, and national context. To this end, OCR shall develop, maintain and oversee the use of its own statewide baseline inventory of cultural resources, known as the Cultural Resources Inventory (CRI). Information from the CRI shall be available for use by DCR staff, but it shall not be made available to the public without approval from the OCR Director, and particularly, the written approval of the State Archaeologist for requests of disclosure of archaeological site locations.

In order to recognize highly significant cultural resources, OCR shall identify those that appear to meet the criteria for the National Register of Historic Places and, in consultation with MHC, nominate them for listing on the National Register. OCR shall initiate and manage the nomination process in consultation with other DCR staff and the MHC.

OCR shall expand and update the CRI as necessary to supplement historical background and geographical information on currently inventoried cultural resources, add newly discovered cultural resources, and update baseline information on cultural resources on properties acquired or disposed by DCR, and provide information on newly inventoried cultural resources to the MHC to coordinate with MHC's Inventory of Historic and Archaeological Assets of the Commonwealth.

The CRI shall also be supplemented with other cultural resource-oriented data and publications, such as MHC inventory forms, historic structure reports, condition assessments, interpretive materials, maintenance/repair records, and archaeological impact studies.

OCR shall provide CRI information to district, regional and facility supervisors with the understanding that archaeological site locational information is confidential, not a "public record," and must be secured from inadvertent or unauthorized disclosure or from subsequent disclosure without written permission of the State Archaeologist (MGL Ch. 9, Sec 26A and 27C (950 CMR 70.13(7)). The CRI shall be used by DCR to enable informed

preservation decisions as part of DCR's resource planning and management activities, including the prioritization of capital projects for stabilization, repair and adaptive reuse.

B. Procedures for Protecting Cultural Resources

1. Acquisition of Land and Conservation/Preservation Restrictions

OCR staff shall sit on the DCR Lands Committee and provide assistance and input into the protection of properties of significance to the state's cultural heritage through acquisition in fee, conservation restrictions, or preservation restrictions. Once an acquisition is complete, the OCR shall determine whether a baseline

inventory should be undertaken on the property to identify cultural resources. Preservation restrictions must be reviewed and approved by MHC prior to DCR acquisition.

2. Resource Management Plan Development

OCR staff shall provide technical support toward the Resource Management Planning Program to insure that the protection of cultural resources is a core component of Resource Management Plans. Depending on the type of DCR facility and the scope of the RMP, this support may range from data collection and documentation to property analysis and treatment recommendations.

3. Project Planning

DCR shall make every effort to protect cultural resources on DCR property. For projects planned at any Department level, appropriate Department staff shall consult with OCR to consider potential project impacts on cultural resources. Consultation with OCR shall occur as early as possible in the planning process, but no later than the 25% design development phase. When a conflict between a project location and its impact on cultural resources is identified, cultural resource management strategies shall be brought into consideration to determine if the impact to the resource can be avoided, adverse impacts mitigated, or whether additional site investigation is necessary. OCR shall initiate and manage those activities that will minimize or mitigate adverse impacts to cultural resources.

When necessary, OCR shall conduct a coordinated program of basic and applied research to support planning for and management of cultural resources on DCR property. Repairs, rehabilitation, and other preservation activities shall follow the guidelines in the *Secretary of the Interior's Standards for the Treatment of Historic Properties*. Adequate research to support planning and compliance with MHC Review will precede any final decisions about the treatment of cultural resources or operational activities which may impact cultural resources.

For each DCR project, a Project Notification Form (PNF), including a project description, a site plan, and photographs, shall be provided to OCR. OCR shall forward the PNF to MHC and, where required, local historic district commissions. If outside consultants are preparing the PNF, then OCR staff shall be given an opportunity to review the draft PNF before it is submitted. The submission of an Environmental Notification Form (ENF) under the Massachusetts Environmental Policy Act (MEPA) satisfies MHC notification, and no PNF is needed for project undergoing MEPA review. Copies of ENFs shall be provided to OCR.

MHC has a maximum of 30 days to make a Determination of Effect on historic resources or request supplemental information in order to make a Determination of Effect. In the event that the MHC makes a determination of "no effect" or "no adverse effect" on historic resources, the project may proceed. If MHC determines that the proposed project will have an "adverse effect" on historic resources, DCR shall consult with MHC to explore options to avoid, minimize, or mitigate the adverse effect. If, after consultation, no feasible or prudent alternative exists that would avoid the adverse effect, a Memorandum of Agreement between DCR, MHC and any other interested parties is required to resolve the adverse effect and complete the consultation process.

Local historic district commission review will vary by municipality.

No physical work for projects shall occur until the review process has been completed with MHC and (if applicable) the local historic district commission.

4. Emergency Scenarios/Procedures

In the event an unanticipated site of archaeological or cultural significance is encountered during the project implementation stage, project work shall be halted and OCR shall be notified. OCR shall initiate the review process with MHC and make a recommendation to the Deputy Commissioner of Planning & Engineering whether or not to suspend all aspects of project implementation during consultation with MHC.

If human remains are discovered during project implementation, project work shall be halted, the area must be secured, the State Police must be notified, and the Medical Examiner (617-267-6767 ext, 176) and the DCR

staff archaeologist must be contacted to determine if the remains are over 100 years old. No one should touch or remove the remains. If the remains are over 100 years old, the State Archaeologist at MHC must be notified and will consult with DCR (and the Massachusetts Commission on Indian Affairs if the remains are Native American) to avoid or mitigate impacts to the graves. In any such situation, DCR staff shall work with OCR to comply with the state's Unmarked Burial Law.

If DCR must take immediate action to avoid or eliminate an imminent threat to public health or safety or a serious and immediate threat to the environment, OCR shall be notified as soon as possible. OCR shall attempt to seek prior oral approval of the MHC for the project via telephone if written notice is not practicable, provide written notification of the emergency work within ten days, and commence full compliance with MHC review requirements within thirty days, under the terms of 950 CMR 71.10.

5. Day-to-Day Operations

Management of DCR's property shall be carried out with cultural resource protection in mind. Adverse impacts to cultural resources should be avoided and mitigated, where possible, with appropriate protection strategies. Cultural resources shall be adequately maintained, following recommended techniques where formal guidelines are in place. Cultural resource management decisions should be made with input from OCR.

Discovery of artifacts should be reported immediately to OCR, noting the exact location of the find. Be aware of sites that may be exposed or threatened by erosion or visitor impacts. Any vandalism, unauthorized digging, or removal of artifacts should be reported to the appropriate law enforcement personnel and OCR. Archaeological investigations on public lands require a permit from the State Archaeologist at MHC (MGL Ch. 9, Sec 26A and 27C (950 CMR 70)).

6. Lease/Permit Programs

The issuance of leases and permits by DCR for activities involving the physical alteration of a property must undergo MHC review with OCR and MHC, as outlined above.

The proposed issuance of DCR permits to investigate archaeological sites shall be reviewed by OCR. OCR shall coordinate the issuance of a special use permit with the State Archaeologist at MHC, who must also issue a concurrent State Archaeologist permit for any field investigations on DCR property (MGL Ch. 9, Sec 26A and 27C (950 CMR 70)).

7. Disposition of Real Property

The protection of cultural resources, including the preservation and continued use of significant historic buildings and structures, shall be accommodated as part of any disposition of DCR property. Under the State Register review regulations (950 CMR 71.05(e)), the transfer or sale of a State Register property without adequate conditions or restrictions regarding preservation, maintenance, or use will result in an "adverse effect" determination from MHC. DCR must consult with MHC and any interested parties to resolve the effect of the proposed transfer or sale of the State Register property.

Appendix O. Land Stewardship Zoning Guidelines
July 2012

The Department of Conservation & Recreation's Mission:

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

I. Authorization and Purpose

The Department of Conservation & Recreation (DCR) has a very 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 sometimes results in complex management challenges. To help meet its mission, DCR has developed a two tier system for guiding the management of all state forest and park properties[1] under its care:

1) Landscape Designations - applied statewide to assess and guide management activities throughout the DCR state forest and park system; and
2) Land Stewardship Zoning, and the RMP 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, forests 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 during 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. Table 1 illustrates how these two systems work together.

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 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.

II. Landscape Designations

The Forest Futures Visioning Process, an advisory initiative undertaken in 2009 – 2010, recommended the establishment of three landscape designations to differentiate and prioritize ecosystem values at a statewide scale. Acting upon that recommendation, DCR undertook an effort in 2010-2011 to designate all of the properties within the DCR State Parks System as either Reserves, Parklands, or Woodlands, as a means to establish the primary ecosystem services provided by these properties, guide management decisions based upon these services, and communicate the agency's landscape scale management objectives to the public.

The designations have been determined via the use of available GIS information drawing upon statewide resource databases, and incorporating extensive input from DCR field staff and the public. These designations are designed to provide a framework for overarching management guidelines that are applicable to properties within the state forest and park system.

[1] These management systems do not apply to DCR's Division of Water Supply Protection properties.

The three landscape designations are:

- Parklands focus on providing public recreation opportunities while protecting resources of ecological and cultural significance.
- 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 and age classes, and compatible recreation opportunities.
- 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.

III. Resource Management Plans and Land Stewardship Zoning

The Land Stewardship Zoning Guidelines defines 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 preparation of a Resource Management Plan (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 RMP 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."[2]

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 assessed and documented by professional resource specialists. Information on the significant features is brought into the RMP process via review of previous research projects and associated designations. Significant Feature Overlays can be applied in any of the three Land Stewardship Zones. An example is a natural or cultural resource, recognized through professional inventory / research (such as an Area of Critical Environmental Concern or National Historic District), which cuts across more than one Land Stewardship Zone. Management and protection of these resource features is guided by specific management recommendations that have been developed by resource specialists. An expanded description of Significant Feature Overlays is provided at the end of Section VI.

Application of the three-zone system**,** including Significant Feature Overlays, to individual DCR properties during the RMP process is facilitated by gathering available field data related to natural and cultural resources, recreational uses, and developed facilities, and reviewing available data sources including BioMap 2 and NHESP Priority habitat information. As a part of this approach:

- lands of special resource sensitivity and significance are identified and mapped, and
- resource and landscape features such as priority habitat areas, wetlands, streams and ponds are mapped,
- new information is brought into the RMP process through public input.

This type of mapping and data collection, based on the best information currently available, provides the basis for subsequent analysis and ultimately the development and application of appropriate management guidelines for specific resources, designed to provide greater protection to valuable natural or cultural assets. This process identifies specific areas for specialized resource management guidance beyond those protections already provided

[2] *Capacity Reconsidered: Finding Consensus and Clarifying Differences*. Journal of Park and Recreation Administration, Spring 2011, Vol. 29, No. 1, pp. 1-20.

by standard best management practices and legal regulations, such as the agency's Old Growth policy, or Coastal Zone Management's Barrier Beach Management Guidelines. Highly sensitive ecological or cultural assets identified through this process may be found within any of the three Landscape Designations.

IV. Forest Resource Management Plans

Another key tool in DCR's land management activities are the Forest Resource Management Plans (FRMPs) that have been completed for large geographic areas within the western part of the state. The FRMPs identify silvicultural treatments for properties or portions of properties that have been identified through the Landscape Designation process as being suitable for active forest management. These plans will be amended for consistency with the final Landscape Designations. Information and data collected in the FRMPs related to forested areas is similar to what is gathered for an RMP and will be utilized in the development of RMPs for properties located in these areas. As DCR continues to develop RMPs for its properties, forest management planning will occur as a part of the RMP process. Forest management decisions and activity in designated Woodlands will be directed by the Landscape Designation Management Guidelines which lay out procedures that include the identification of different approaches to appropriate silivicultural treatments to ensure resource protection.

V. Planning Integration

With the two tier planning approach – a statewide scale and a site specific scale - it is critical to understand how they work together in an integrated fashion to provide overall guidance to resource management and assist with administrative decisions. Landscape Designations will be used to inform the RMP process and the application of LSZ zones. Specific management guidelines associated with each LSZ zone are intended to provide additional protection and stewardship for site-specific natural and cultural resources and to ensure consistency among the activities that are allowed in each property under the broad management guidelines described for each Landscape Designation.

In most cases, the Landscape Designation and the LSZ zoning systems will work in coordination with each other to set high-level land management priorities based on ecosystem services, and to supplement those priorities with site specific resource protection and management guidelines. RMPs identify and assess specific resources and site conditions at a finer scale than the Landscape Designation process. However, the vertical and horizontal integration of these two systems, as exhibited in Table 1, allows us to apply consistency across processes.

Table 1. Landscape Designation & Land Stewardship Zoning – A Land Management Framework

Landscape Designation Management Guidelines →* **Land Stewardship Zones ↓ ****	**Reserve –** ***The least fragmented forested areas where ecological processes will predominate and inform management, and where commercial timber harvesting is not allowed.***	**Woodland –** ***Forested areas actively managed for forest health, resource protection, sustainable production of timber, and recreation.***	**Parkland –** ***Areas providing public recreation opportunities, connections to nature, and protection and appreciation of natural and cultural resources.***
Zone 1 – ***Highly sensitive resources requiring special management approaches.***	Rare species habitat, natural communities, archaeological sites, or fragile cultural sites identified as being sensitive to / easily degraded by human activities.		
Zone 2 – ***Resources that support recreational and management activities appropriate to the site.***	Large areas of natural vegetation and associated natural and cultural features, including rare species habitat, that is compatible with dispersed recreation.	Forest stands and associated natural and cultural features, compatible with dispersed recreation **and active forest management** intended to enhance species and age class diversity.	Stable / hardy natural and cultural landscapes, where a variety of outdoor recreation activities can be provided in a sustainable manner.
Zone 3 – ***Intensive use areas such as recreational sites or maintenance areas.***	**New zone 3s will not be established in Reserves**. *Exception* – an RMP may identify existing intensive use areas missed during designation and not already captured in a Parklands designation area, in which case the application of a zone 3 may be considered.	Intensive recreation and park administration areas currently embedded within the forested landscape.	Areas that require regular maintenance by DCR staff, including altered landscapes in active use, intensive recreation areas, and park administration areas. Sites that may accommodate administrative or intensive recreation areas to meet future demands.

*See *Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines* for complete management guidelines for Reserves, Parklands and Woodlands.

** For a complete description of management guidelines for each zone, please see Section IV of this document.

VI. Land Stewardship Zones

Each of the three Land Stewardship Zones have general management guidelines that are intended to provide additional protection for natural and cultural resources and to ensure consistency among resource stewardship, recreation and sustainable forestry. In addition, specific management recommendations derived during the preparation of each individual RMP are designed to ensure that management practices are tailored to the resources within the facility, factor in and assess existing uses, and address site specific management challenges and opportunities.

Zone 1

Management Objective:

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

A. 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 Resource Management Plan. Zone 1 areas are not suitable for future intensive development.

B. 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.

C. General Management Guidelines

- **Recreation and Public Access:** In general, recreation activities will be limited to dispersed, low impact, non-motorized recreation and dependent on assessment of specific resource sensitivity and stewardship considerations by resource specialists - e.g. NHESP, MHC, DCR Bureau of Planning and Resource Protection - in conjunction with field staff. Snowmobiles may be permitted on existing designated trails during the appropriate time of year and according to DCR policies and regulations. Existing trails will be evaluated for compatibility with resource protection goals. Trails will be discontinued if discontinuance furthers sensitive resource protection and does not compromise public safety. Proposals for new activities will be strictly evaluated, and management guidelines will be applied by resource specialists for the protection of resources and to address specific issues.
- **Vegetation Management:** Commercial timber harvesting is not permitted. Vegetation management may occur for public safety purposes, removal of invasives, stewardship of cultural sites, or historic vista maintenance.
- **Water and Soil:** Management will focus on erosion control to protect sensitive natural and cultural resources.
- **Habitat Protection:** Public access will be guided away from sensitive rare species habitat and sensitive Priority Natural Communities. Long-term protection strategies will be developed in consultation with the NHESP; Habitat Management Plans will be prepared in advance of proposed management activities.
- **Forest Health and Protection:** Spread of invasive species, forest pathogens and wildlfires may be controlled if a threat to sensitive natural or cultural resources is identified.
- **Cultural Resources:** Public access will be guided away from archaeological or historic sites sensitive to human activity and reoriented to areas that can sustain appropriate recreational activities. Management activities will focus on protection of sensitive archaeological and historic sites. Use of metal detectors, artifact collecting and digging is prohibited.

- **Facilities and Transportation:** Existing roads may be maintained to assure continued administrative and/or emergency access according to either the DCR Historic Parkways Preservation Treatment Guidelines or guidelines associated with DCR Forest Road Classification System. Roads identified as unnecessary for administrative and/or emergency access will be evaluated for compatibility with resources, and discontinued if discontinuance furthers sensitive resource protection and only after consultation with local emergency services personnel.
- **Interpretation, Public Information and Outreach:** Interpretation and public information related to the sensitive natural and cultural resources may be provided through programs, kiosks and other outreach venues that will avoid impacts to the actual resources.
- **Monitoring, Enforcement and Research:** Professional research projects in support of sensitive natural and cultural resource protection may be permitted with approval of the Director of State Parks & Recreation and the Director of Forest Stewardship. Baseline conditions will be evaluated and monitoring will be conducted to document changes, dependent on capabilities and availability of operational resources for staff and outside experts.
- **Special Use:** In general, Special Uses other than research projects described above will not be permitted.

Zone 2

Management Objective

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

A. General Description

This zone encompasses stable yet important natural and cultural resources. Zone 2 is a very important component to 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.

B. 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.

C. General Management Guidelines

- **Recreation and Public Access:** Resources will be managed to support a variety of safe, sustainable recreation opportunities that are compatible with the long-term stewardship and character of natural and cultural resources. New public access may be allowed depending upon existing area trail densities, purpose and need, physical suitability of the site, and specific guidelines for protection of rare species habitat and archaeological resources, as reflected in DCR's *Trails Guidelines and Best Practices Manual*.
- **Vegetation Management:** Vegetation may be managed for public safety purposes, stewardship of cultural sites, vista maintenance, maintaining native biodiversity, protection of recreational assets and ecological management and restoration, provided that the management activities are consistent with the applicable Landscape Designation for the property. Commercial timber harvesting will be limited to properties designated as Woodlands.
- **Water and Soil:** Prevent soil erosion via BMPs for management and recreational activities. Maintain water quality of surface and groundwater resources with pollution prevention and holistic watershed management strategies.

- **Habitat Protection:** Maintain and where possible enhance habitat for rare species, Priority Natural Communities, and ecological diversity. Management activities in NHESP designated Priority Habitat areas must follow guidelines of an approved Habitat Management Plan.
- **Forest Health and Protection:** Potential for wildfires may be lessened through fire prevention strategies. Spread of wildfires will be controlled for public safety purposes. Forest stands may be managed to lessen adverse effects of forest pathogens. Invasive species that are degrading native ecosystems may be controlled depending on availability of operational resources and trained volunteers.
- **Cultural Resources:** Management will ensure long-term stewardship of archaeological and historic sites. Newly discovered sites will be documented and inventoried in consultation with MHC. All proposed projects must be reviewed by the DCR Bureau of Planning and Resource Protection Office of Cultural Resources during their planning stages to determine potential impacts to cultural resources. Use of metal detectors, artifact collecting and digging is prohibited.
- **Facilities and Transportation:** In Parklands and Woodlands, new roads necessary for recreation, administration or emergency use may be constructed if consistent with resource management goals, after review for impacts to natural and cultural resources. Existing roads that are not required for administrative or public safety purposes may be closed and restored to a natural condition after consultation with local emergency services personnel. Roads will be maintained according to either the DCR Historic Parkways Preservation Treatment Guidelines or guidelines associated with DCR Forest Road Classification System.
- **Interpretation, Public Information and Outreach:** Interpretation will be focused on enhancing the variety of environmental education opportunities, and on building public support for the long-term stewardship of natural and cultural resources.
- **Monitoring, Enforcement and Research:** Monitoring and research projects may be conducted as approved through the Special Use Permit process. Enforcement of prohibited or regulated activities is critical related to public safety, enjoyment of appropriate recreation activities and long-term stewardship of natural and cultural resources.
- **Special Use:** Special uses may be allowed, and will be evaluated on an individual basis as provided in DCR's Special Use Policies and Procedures.

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.

A. 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.

B. 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.

C. General Management Guidelines

- **Recreation and Public Access:** Intensive recreation areas will be managed to maintain public health and safety. Agency policies, resource protection and recreational goals will determine activities that are supported in individual properties.
- **Vegetation Management:** Commercial timber harvesting is not permitted. Native species will be used for landscaping. Trees and other vegetation may be removed or trimmed for public safety, vegetative health, protection of cultural resources, and aesthetic purposes.
- **Water and Soil:** Management will focus on maintaining water quality for water-based recreation, including implementation of strategies to prevent erosion ans siltation and remediation of pollution sources. Employ Best Management Practices to capture, treat and recharge storm water run-off.
- **Habitat Protection:** Management will focus on identifying, documenting and protecting rare species habitat, in consultation with the NHESP.
- **Forest Health and Protection:** Spread of forest pathogens and invasive species may be controlled if there is a threat to native ecosystems that surround the intensive recreation or park administration sites.
- **Cultural Resources:** Historic sites that are the focus of intensive public visitation will be managed to minimize degradation of the historic resource. Proposed projects must be reviewed by the DCR Bureau of Planning and Resource Protection's Office of Cultural Resources during the planning stages for potential impacts to historic and archaeological resources. Historic buildings, structures, objects, sites and landscapes will be preserved in original use or adaptively reused when appropriate for park uses or in compatible use, such as through the Historic Curatorship Program. Use of metal detectors, artifact collecting and digging is prohibited.
- **Facilities and Transportation:** Continue efficient use of existing facilities or employ appropriate reuse of existing facilities to minimize new impacts. Roads will be maintained according to either the DCR Historic Parkways Preservation Treatment Guidelines or guidelines associated with DCR Forest Road Classification System. New roads and facilities may be established as necessary for public and administrative use after review for potential impacts to natural and cultural resources. Adaptive reuse of historic resources for park or other appropriate uses is encouraged.
- **Interpretation, Public Information and Outreach:** Interpretive programs may be provided in association with intensive recreation sites or activities. Programs will be aimed at building public support for the long-term stewardship of natural and cultural resources.
- **Monitoring, Enforcement and Research:** Monitoring will focus on water quality related to water-based recreation activities. Enforcement of prohibited and regulated activities will be conducted to provide for public safety and enjoyment of appropriate recreation activities.
- **Special Use:** Special uses may be allowed, and will be evaluated on an individual basis as provided in DCR's Special Use Policies and Procedures.

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.

A. General Description

The three land stewardship zones may be supplemented with significant feature overlays that identify 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 RMP process via review of previous research projects and associated designations.

B. 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
- Biomap2 Core Habitat
- 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.

C. Management Guidelines

Specific management guidelines are provided by resource specialists and/or by the professional staff of the agency or NGO that assessed the significant resource feature or has a regulatory role for protection of the resource. Examples include MHC requirements for treatment of historic resources within National Register Historic Districts, and NHESP guidelines for Priority Natural Community habitat stewardship.

APPENDIX P. Overview of DCR RMP Program Coordination Process with the Massachusetts Natural Heritage and Endangered Species Program (NHESP)

A. Background. Since its inception, DCR's RMP Program has actively sought and applied the expertise of the NHESP. In 2006, the NHESP and DCR established the Biodiversity Stewardship Project. The main purposes of this project were to:

a. Develop a process by which the two agencies would work together to facilitate NHESP delivery of biodiversity information and provision of management recommendations for RMPs; and

b. Guide DCR land managers in the on-site management of rare species habitat.

Between 2006 and 2008 the NHESP prepared 10 biodiversity assessments covering 17 DCR properties (Table 1). Information from available biodiversity assessments has informed the Existing Conditions and Recommendations sections of RMPs already adopted by the DCR Stewardship Council and has resulted in appropriate management recommendations for rare species. Information from the remaining biodiversity assessments will be used to inform future RMPs. The NHESP continues to provide guidance to the RMP Program and in 2009, DCR and NHESP worked together to identify the actual and potential impacts of DCR's trails and trail maintenance activities on rare species and their habitats. In addition, the NHESP informs and reviews RMPs on an ongoing basis.

Table 1. NHESP biodiversity assessments and reports prepared for the RMP Program.

Biodiversity Assessments and Reports	***Date***
Biodiversity Stewardship initiative: biodiversity data products and technical assistance for managing Massachusetts' forests, parks & reservations. Final report of the FY06 pilot project. [Includes Horseneck Beach State Reservation and Mohawk Trail State Forest]	2006
Biodiversity of Blue Hills Reservation	2007
Biodiversity of J. A. Skinner and Holyoke Range State Parks	2007
Biodiversity of Mt. Tom State Reservation and adjacent conservation lands	2007
Biodiversity of Mt. Sugarloaf State Reservation	2007
Biodiversity of Myles Standish State Forest	2007
Biodiversity of Lower Spectacle Pond, Sandisfield	2008
Biodiversity of Nickerson State Park and Hawksnest State Park	2008
Biodiversity of Bash Bish Falls State Park, Jug End State Reservation, Mt. Everett State Reservation, and Mt. Washington State Forest	2008
Biodiversity of Gilbert A. Bliss State Forest	2008
Recreational trail maintenance and biodiversity conservation. June 30, 2009	2009
Middlesex Fells Reservation: field surveys 2011. Prepared by the NHESP for Massachusetts Department of Conservation and Recreation. June 30, 2011	2011
Recreational Trail Maintenance and Biodiversity Conservation: Selected DCR Urban Parks. July 30, 2012	2012

B. Ongoing Coordination and Review. The DCR follows a standard approach to coordinate the preparation and review of RMPs with the NHESP. This approach may be modified in response to the particular circumstances associated with each RMP. This approach includes:

1. **Staff Coordination.** The NHESP has designated an official point of contact for RMPs and it is through this contact that all subsequent interaction with NHESP is coordinated.

2. **Advance Notice.** DCR provides NHESP with a list of current and upcoming RMPs.

3. **Data Request.** Up to date information is formally requested by DCR at the start of the planning process.

4. **Consultation.** Informal consultation regarding interpretation of data provided by the NHESP may occur following NHESP's response to data request.

5. **Application of Other NHESP Data.** Information and recommendations contained in biodiversity assessments, if applicable, are incorporated into the draft RMP early in the writing process.

6. **Formal Draft RMP Submission to NHESP.** The draft RMP is submitted to the NHESP for formal review under the Massachusetts Endangered Species Act (MESA). This is done before a draft plan is released to the public.

7. **Response to Comments.** NHESP provides comment letters on the draft RMP that distinguish between what must be done (i.e., actions required for compliance under MESA) and additional actions that may be taken to enhance rare species populations and habitats. As a rule, both types of recommendations are added to the revised draft. (***Note***: because the NHESP's recommendations are incorporated into RMPs, each RMP contains a *de facto* management strategy and guidance for all state-listed species within a planning unit.)

8. **Additional Coordination**. The NHESP is frequently consulted, in their roles as both regulator and subject matter expert, to discuss other (i.e., non-NHESP) rare species-related comments.

C. DCR-NHESP Coordination for the Harold Parker Planning Unit RMP. Included in this appendix is a copy of the final official comment letter from the NHESP on the Draft Harold Parker Planning Unit RMP. The observations, comments and recommendations provided therein were presented informally to the DCR throughout the RMP development process and, as such, this Draft RMP has already been edited and modified to account for the input provided by the NHESP.

Natural Heritage & Endangered Species Program
100 Hartwell Street, Suite 230, West Boylston, MA 01583

December 5, 2012

Jim Baecker
Office of Regional Planning
Mass. Department of Conservation and Recreation
251 Causeway Street, Suite 700
Boston, MA 02114

RE: Draft *Harold Parker Planning Unit Resource Management Plan*

Dear Mr. Baecker:

The Massachusetts Natural Heritage & Endangered Species Program (NHESP) is pleased to offer comments on the November 9, 2012, draft of the *Harold Parker Planning Unit Resource Management Plan.* In general, we support the Resource Management Plan as written, excepting a few minor concerns, and we appreciate DCR's attention to rare species issues. Our concerns are noted below, by page number of the draft.

2.0 Existing Conditions

p. 37: Rare Plant Species

NHESP does not track occurrences of Arborvitae where it was planted. We recommend you remove the reference to Arborvitae at Harold Parker State Forest, as mention of it may be confusing. However, there is a small occurrence of New England Blazing Star (*Liatris scariosa* var. *novae-angliae,* Species of Special Concern) in Harold Parker State Forest. This occurrence of blazing star is not very vigorous and we do not regulate the site under MESA because of that, which may be why DCR wasn't aware of this site. For this occurrence of New England Blazing Star, NHESP recommends that DCR prevent direct destruction ("take") of the plant, by ensuring that vehicles do not park on it and by mowing the field outside the growing season. Beyond that, this plant prefers dry, open habitats, so mowing the field every year or two or three will benefit the plant. Furthermore, if DCR wanted to clear more of the forest around the existing small field, that may allow the blazing star population to spread (but note the Potential Vernal Pool north of the field; the forest should be left in a closed-canopy state near the pool).

p. 43: Rare Wildlife Species

Blanding's Turtle:

The population of Blanding's Turtles at Boxford State Forest and the vicinity (including many parts of Harold Parker that are east of Rt. 114) is a very good and vigorous population; protection of land from development by DCR (and other conservation groups) here is the most important tool for protecting this population. NHESP commends DCR for considering additional land protection adjacent to Boxford State Forest.

A couple of minor edits to the natural history description for Blanding's Turtles:

- First paragraph: Blanding's Turtles use the deeper parts of marshes and ponds, not necessarily the deepest parts.

- Fourth paragraph: Predation by household pets is a relatively minor issue for Blanding's (and most turtles). A much more important threat is the unnatural large populations of raccoons, skunks, and other meso-predators in suburban areas. These predators are able to have large populations in suburbia because people provide additional food sources such as garbage, bird seed, pet food, agricultural fields, and compost. In Massachusetts, the range of Blanding's Turtles coincides unfortunately well with suburban sprawl around Boston, so these suburban predators have an over-sized effect on Blanding's Turtles in this state.

Blanding's Turtles may be limited by the availability of suitable nesting sites (dry, open, sunny soil). Females traveling long distances to reach nesting sites are more vulnerable to vehicles and other threats. Thus, NHESP recommends that DCR consider creating or enhancing a few nesting sites at Boxford State Forest. NHESP biologists will be happy to advise DCR staff on the ground as to the placement and creation/enhancement of turtle nesting sites.

Blue-spotted Salamander
Blue-spotted Salamanders occur at both Harold Parker and Boxford State Forests. However, Boxford State Forest is currently considered one of the most important sites for long-term conservation of this species in Massachusetts, because it is so widely distributed there and because the landscape offers both many vernal pools and sufficient adjacent upland forest habitats.

Intricate Fairy Shrimp
Protection of vernal pools within Boxford State Forest is adequate to ensure protection of this species.

Hessel's Hairstreak
A minor typo: Papae should be pupae. Hessel's Hairstreak caterpillars feed on the needles of Atlantic White Cedar. NHESP recommends DCR document and map stands of Atlantic White Cedar within the park boundaries, and then ensure that those stands are undisturbed by logging or disturbances to water levels or quality. Also, this record of Hessel's Hairstreak is from 1989 and needs to be updated: NHESP suggests that DCR update this record at some point, if possible.

Wood and Eastern Box Turtles
Both Wood Turtles (*Glyptemys insculpta*, Special Concern) and Eastern Box Turtles (*Terrapene carolina*, Special Concern) occur at Harold Parker State Forest, but neither population is vigorous enough to merit regulation under MESA. Wood Turtles occur just outside Boxford State Forest. NHESP has no specific recommendations relating to these two species on these properties.

3.5 Maintenance Activities
In the Trail Maintenance part of this section, it states that some routine trail maintenance activities (vegetation clearance, tread maintenance, etc, etc.) in Priority Habitat can be performed without prior NHESP review. This is true under the habitat management exemption granted to DCR for the activities and sites described in the *Recreational Trail Maintenance and Biodiversity Conservation* report and associated GIS files. However, note that maintenance of wetland crossings on some trail segments in Boxford and Harold Parker State Forests has a Yellow code of 18, meaning amphibian and vernal pool surveys must be completed before any work, as described in the report.

Similarly, for some stretches of trails on these properties, proposed moderate drainage structures, stream crossings, trail re-routes, and new trails have a Red code and must go through full review at NHESP

under MESA. If you have difficulty deciding which code applies to a particular activity at a specific site, please contact Paul Jahnige at DCR or Lynn Harper at NHESP.

5.0 Management Recommendations

Table 5.1 Plant and Animal Habitat Recommendations

- Note that NHESP review of plans under MESA is needed for any planned alteration of habitat, not just for new trails, re-routes, etc.
- NHESP recommends that enforcing OHV restrictions in Boxford State Forest (including many parts of Harold Parker that are east of Rt. 114) be bumped up to a High priority, because the forest is such an important site for Blanding's Turtles and Blue-spotted Salamanders, both of which are highly susceptible to direct take and habitat destruction by OHVs.
- Sites targeted for acquisition should include important rare species habitat (such as early successional areas for turtle nesting) as well as vernal pool clusters and Forest Core.
- Controlling invasive species should be considered as part of the management of the Woodlands portion of Harold Parker State Forest, rather than a separate item. Many forest management activities can allow the spread of existing invasive species populations or even of new invasions, so controlling invasives before and during forestry activities should be given the same priority as Woodland management itself.
- Conducting long-term biodiversity surveys and monitoring: NHESP is already conducting surveys for Blanding's Turtles in Boxford State Forest and may be able to implement a monitoring program for vernal pools and Blue-spotted Salamanders there as well. NHESP staff will be happy to assist DCR staff in creating and carrying out rare species and vernal pool surveys and monitoring, particularly at Boxford State Forest.
- NHESP recommends adding creating and enhancing turtle nest sites to the Rare Turtle Management list. The other turtle recommendations are fine (and we appreciate them!).
- As for surveys for Blanding's Turtles, NHESP and cooperators, under a regional State Wildlife Action grant, have conducted trapping surveys in past years and visual surveys in 2012, and plan to conduct further trapping surveys in 2013, all in Boxford State Forest. Less intensive surveys at Harold Parker State Forest east of Rt. 114 have not turned up any Blanding's Turtles.
- Native Bird Management: Since there are no extensive grasslands in the planning unit already, it seems unlikely that sufficient grassland habitat could be created to support true grassland birds such as meadowlarks or bobolinks. However, DCR could certainly accomplish the creation and enhancement of habitat for shrubland birds. Such habitat management can also benefit rare species by creating turtle nesting sites or additional blazing star habitat, if planned with these goals in mind. NHESP biologists will be happy to provide on-the-ground advice on these management activities to DCR staff.

Table 5.2 Water Resource Recommendations

- Re-grading the slopes adjacent to ABM Pond is likely to benefit turtles as they will find it easier to get in and out of the pond. Re-grading the slopes here can be combined with closing trails and expanding/creating rare species habitat in the vicinity. This proposed work at ABM Pond will need to be reviewed by NHESP under MESA, and NHESP can work with DCR then on assuring no harm to the turtles or salamanders during the actual construction.

Table 5.3 Cultural Resource Recommendations

- Stone walls: Leaving existing stone walls in place is fine, but rebuilding stone walls within Boxford State Forest may be an issue if by so doing, barriers to turtle movements are created.

Land Stewardship Zoning

Harold Parker and Boxford State Forests

- The Land Stewardship Zones as recommended by DCR in the draft RMP are appropriate for protecting MESA-listed rare species on these State Forests.

Trail Recommendations

- Note that NHESP completed a *Recreational Trail Maintenance and Biodiversity Conservation* report for DCR in 2009, which covers Harold Parker and Boxford State Forest routine trail maintenance activities in Priority Habitat of Rare Species. The notes below refer to that report.

Harold Parker State Forest

NHESP has no concerns with the trail recommendations for Harold Parker State Forest.

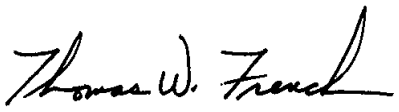
Boxford State Forest

NHESP has no concerns with any of the trail closures proposed for Boxford State Forest; in fact, closing redundant trails will likely benefit MESA-listed rare turtles and salamanders. However, the new trail sections that are proposed are in Priority Habitat and will, therefore, require review under MESA. To discuss a possible application for MESA review for new trails (or any other projects in these State Forests), please contact Amy Coman-Hoenig, our Endangered Species Review Assistant, at Amy.Coman@state.ma.us or 508-389-6364.

It is unclear from the materials provided whether the proposed improvements to wetland crossings or installation of erosion control will require full review under MESA (a Red code in the trails maintenance report) or, instead, certain conditions as listed in the trails maintenance report (a Yellow code). Please consult the report and associated GIS files to determine which code applies. If you have difficulty deciding which code applies, please contact Paul Jahnige at DCR or Lynn Harper at NHESP.

Thank you for allowing NHESP the opportunity to comment on the draft Resource Management Plan. If you have any questions regarding our comments, please contact Lynn Harper, Habitat Protection Specialist, in our West Boylston office at 508-389-6351.

Sincerely,



Thomas W. French, Ph.D.
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Natural Heritage & Endangered Species Program

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