



Dunes, beaches, and ocean views on a warm summer day; the iconic image of the Cape and Islands. (See Appendix G for photo information.)

SECTION 1. THE NICKERSON MANAGEMENT COMPLEX

1.1. INTRODUCTION

The Massachusetts Department of Conservation and Recreation (DCR) owns several properties on Cape Cod, Martha’s Vineyard, and Nantucket (i.e., the Cape and Islands). These properties, which are administered through Nickerson State Park, are collectively referred to as the Nickerson Management Complex (i.e., the Complex). A map of the properties in the Complex is presented in Figure 1.1.

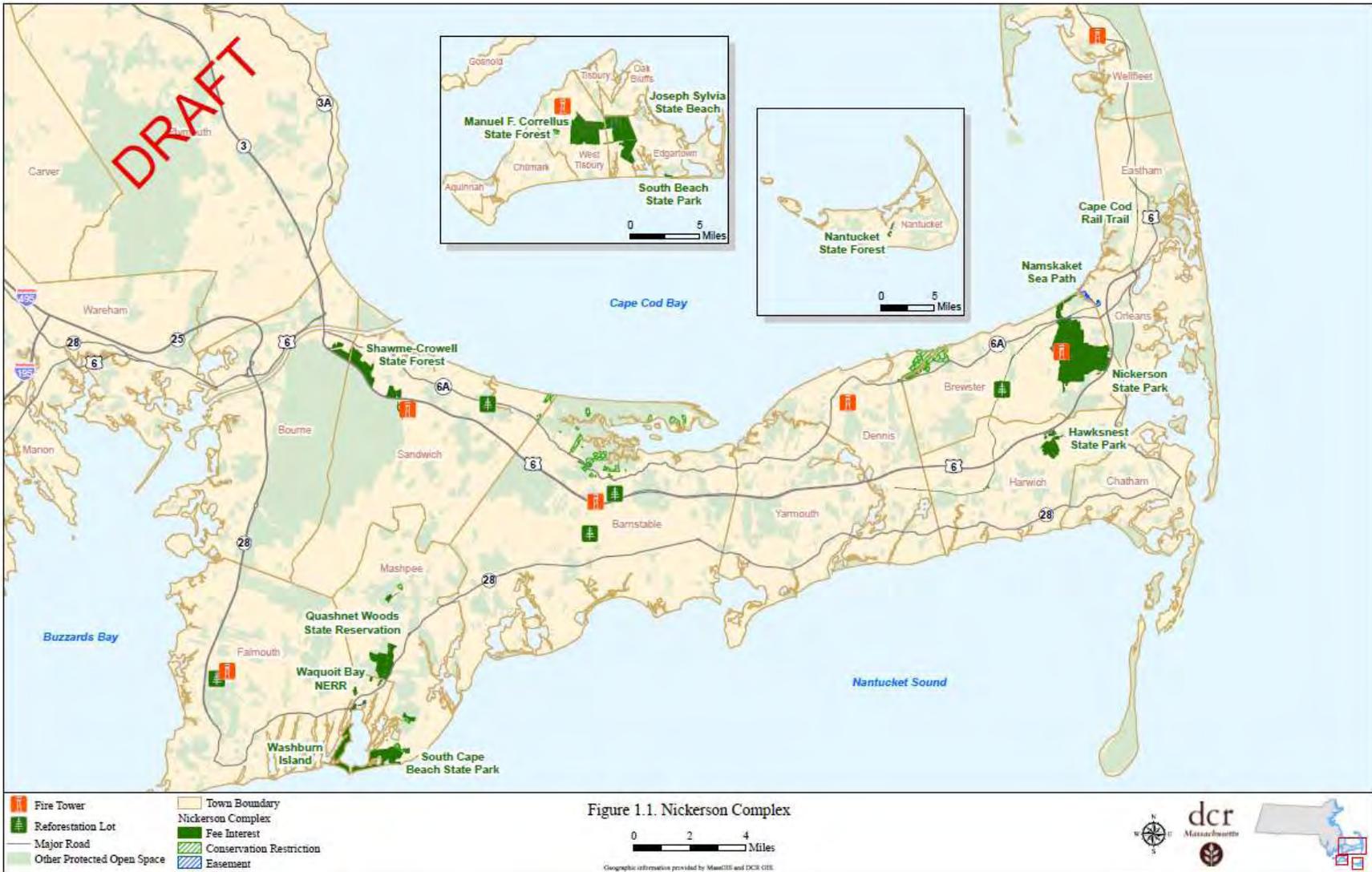
The Cape and Islands are well known for their Native American and colonial histories, scenic dunes and beaches, pleasure boating, and recreational and commercial fishing. These aspects drive the region’s most important industry, tourism. Second-home ownership and retirement populations also contribute to the region’s economy, and along with tourism, contribute to seasonal changes in population, which peaks during the summer. Estimates of seasonal population increase are 131.7% for Cape Cod and 400% for both Martha’s Vineyard and Nantucket (Richardson 2014, Martha’s Vineyard Commission 2006, Town of Nantucket n.d.).

The Complex’s parks are among the Cape and Islands’ most popular tourist destinations. Each year, hundreds of thousands of visitors enjoy the parks’ fresh and saltwater beaches, bike paths, hiking trails, and other amenities. In addition, the Complex’s two large campgrounds provide an affordable base from which visitors explore the region’s other tourist attractions.

The Complex is also home to some of the most important and sensitive resources in the Commonwealth. Rare plants and wildlife share beaches, pine barrens, pond shores, and heathlands with recreationists, as do archaeological sites that reflect more than 12,000 years of human habitation. These resources will persist, and in some cases flourish, only through informed management.

1.2. RESOURCE MANAGEMENT PLANS

The DCR is required to prepare management plans for “all reservations, parks, and forests under the management of the department” (M.G.L. Chapter 21: Section 2F). These plans “shall include guidelines for the operation and land stewardship of the aforementioned reservations, parks and forests, shall provide for the protection



and stewardship of natural and cultural resources and shall ensure consistency between recreation, resource protection, and sustainable forest management.”

This Resource Management Plan (RMP) provides an inventory and assessment of the environmental, cultural, and recreation resources; identifies current management practices and capabilities; and develops specific, implementable management recommendations to address the highest priority needs within the Nickerson Management Complex.

Public Input

Public input is an important part of the RMP process. The legislative mandate that requires the preparation of management plans directs the Commissioner of the DCR to “seek and consider public input in the development of management plans, and ... make draft plans available for a public review and comment period through notice in the Environmental Monitor.”

There were two public input periods associated with the preparation of the Nickerson Management Complex RMP. Both included public notification, posting in the Environmental Monitor, a public meeting, and a public comment period. Additional information on public participation in the development of this plan is provided in Appendix B.

Natural Heritage and Endangered Species Program Involvement

The Massachusetts Natural Heritage and Endangered Species Program (NHESP) has regulatory authority for, and are experts on, the plants and animals protected under the Massachusetts Endangered Species Act (MESA; 321 CMR10:00). They provide assistance, in both capacities, with the preparation of RMPs. (See Appendix C for additional information.)

Stewardship Council

Following public comment and revision, draft RMPs are submitted to the DCR Stewardship Council for review. Each draft RMP is presented at a public meeting of the Stewardship Council for their approval. Once adopted, the RMP becomes final.

1.3. NICKERSON MANAGEMENT COMPLEX

This RMP covers the Nickerson Management Complex, which includes 12 parks, five reforestation lots, and several properties in which the DCR holds legal interest. (Figure 1.1) The term “park” is used generically throughout this RMP to refer to all manner of DCR properties that have recreation, administrative, or operations infrastructure, including state beaches, forests, and reservations.

The following 12 parks are included in the Nickerson Management Complex:

- Shawme-Crowell State Forest (Shawme-Crowell)
- Waquoit Bay National Estuarine Research Reserve (WBNERR)
- South Cape Beach State Park (South Cape Beach)
- Washburn Island
- Quashnet Woods State Reservation (Quashnet Woods)
- Roland C. Nickerson State Park (Nickerson)
- Hawksnest State Park (Hawksnest)
- Cape Cod Rail Trail (CCRT)
- Manuel F. Correllus State Forest (Correllus)
- Joseph A. Sylvia State Beach (Sylvia)
- South Beach State Park (South Beach)
- Nantucket State Forest

Each of these parks is covered in Sections 2 through 13 of this RMP.

The Complex’s reforestation lots were initially acquired to promote the reestablishment of trees. They typically lack infrastructure, although forest roads may be present. The following reforestation lots are included in this RMP.

- Sandwich Reforestation Lot (i.e., Weeks Lot)
- Falmouth Reforestation Lot (i.e., Perry Lot)
- Barnstable State Forest; Route 132 Lot (i.e., Shoot Flying Hill Lot)
- Barnstable State Forest; Old Stage Road Lot (i.e., Eben Smith Lot)
- Brewster State Forest

All are addressed in Section 14 of this RMP.

The above properties, both parks and reforestation lots, are owned by the DCR. In addition to these properties, the Nickerson Management Complex also includes several private and municipal properties in which the DCR holds a conservation restriction. These properties are identified in Table 1.3.1. They are currently not being monitored for compliance with the terms of their conservation restrictions.

Table 1.3.1. DCR-held conservation restrictions for properties associated with the Nickerson Management Complex.^a

Town	Owner	Acres ^a
Sandwich	Town of Sandwich	37.1
Mashpee	Mashpee Tribal Council	0.4
Mashpee	Town of Mashpee	7.6
Mashpee	Orenda Wildlife Land Trust	13.7
Barnstable	Barnstable Land Trust	24.4
Barnstable	Town of Barnstable	80.5
Barnstable	Jones Investment Trust	14.0
Dennis	Town of Dennis	172.0
Brewster	Town of Brewster	188.0
Brewster	Brewster Conservation Trust	10.5
Eastham	Town of Eastham	18.0
Edgartown/ West Tisbury	The County of Dukes County	22.9
West Tisbury	Polly Hill Arboretum	60.6
Total		649.7

a. Approximate acreage (+/-), as reported in the conservation restrictions.

The DCR also holds other legal interests in private lands, such as easements and deeded rights of access. This information is presented in individual chapters, as appropriate.

Seven DCR fire observation towers are located on or near properties in the Complex. Some are in parks, others are located on properties solely associated with fire towers, and one is located on municipal land. These seven towers are addressed in Section 15.



Crowe's Pasture, Dennis, one of the properties on which the DCR holds a conservation restriction. (See Appendix G for photo information.)

1.4. NATURAL RESOURCES

Physical Features

The Cape and Islands are products of glaciation, sea level rise, and erosion. This glacial history influenced, and continues to influence, the region's ecology, culture, and economy.

Glacial Features

Moraines. The most recent continental ice sheet, the Laurentide, covered the entire Cape and portions of Martha's Vineyard and Nantucket (Oldale n.d.). Deposits of soil and stone along its edge formed terminal moraines, creating the Cape and Islands' hills. Moraines have vegetation that differs from that found on outwash plains (Motzkin et al, 2002). Within the Complex, Shawme-Crowell, two reforestation lots, and five fire towers are located atop moraines.

Outwash Plains. South of the moraines, sandy soils deposited by glacial melt water formed dry outwash plains. The physical and chemical properties of outwash plain soils influence a variety of factors, such as groundwater recharge rates and soil moisture and richness. In general, Complex properties located on the south side of Cape Cod and the central portions of both Martha's Vineyard and Nantucket are situated on outwash plains.

Coastal Erosion

The familiar shapes of today's Cape and Islands were created by sea level rise and erosion. Rising sea level and coastal processes redistributed, and continue to redistribute, glacial soils. Sylvania, South Beach, and the shorelines of Nickerson, South Cape Beach, and Washburn Island sit atop beach depositions actively being redistributed by wind and waves.



The familiar outlines of Cape Cod (center) and Martha's Vineyard (lower left) as viewed from space. (See Appendix G for photo information.)

Water Resources

Salt Marshes

Salt marshes provide the basis of complex estuarine and marine food chains, and are one of the most productive ecosystems on earth (NHESP 2012). They occur in protected estuarine waters of the Cape and Islands.

In 2001, 114 tidally restricted marshes (i.e., those with impeded water flow and salt marsh function) were documented on Cape Cod; five were on DCR properties (Cape Cod Commission 2001). Three of the tidal restrictions on DCR property have since been corrected. Similar information is unavailable for Martha's Vineyard and Nantucket.

Barrier Beaches

Barrier beaches are "narrow, low-lying strips of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast" (310 CMR 10:29). They are protected by the Wetlands Protection Act (310 CMR 10:00) and Massachusetts Executive Order 181. Under this

Executive Order, management plans are required for all five of the Complex's coastal properties that have one or more barrier beach.

Kettle Hole Ponds

Kettles are bowl-shaped depressions that form when a block of ice breaks off a glacier, is deposited in drift, and then melts. Kettle hole ponds, such as Cliff Pond at Nickerson, are typically steep sided and may or may not be connected to groundwater. Freshwater recreation is often associated with these sites.

Coastal Plain Ponds

Coastal plain ponds are shallow, highly acidic ponds with gently sloping, sandy shores. They are hydrologically connected to groundwater, with changes in water levels exposing or inundating the pondshore. Rare species are often associated with the shores of these ponds.

Vernal Pools

Vernal pools are temporarily flooded ponds that provide breeding habitat for amphibians and invertebrates. They are found throughout the Cape and Islands. Certified Vernal Pools (i.e., those that have undergone the NHESP's certification process) "provide essential breeding habitat for certain amphibians" (NHESP 2009a). Certification provides no additional protection beyond that provided by state and federal regulations, and local ordinances. Potential vernal pools are isolated water bodies that may function as vernal pools, but have not undergone the certification process.

Groundwater

Groundwater is the sole source of drinking water on the Cape and Islands. Cape Cod, Martha's Vineyard, and Nantucket each have federally designated sole source aquifers (SSAs). The Cape's is comprised of six thin, convex areas of groundwater referred to as lenses (Cape Cod Commission n.d.). Different lenses underlie different DCR properties. The Martha's Vineyard and Nantucket SSAs each have a single lens. Several parks within the Nickerson Complex serve as aquifer recharge areas and provide wellhead protection for municipal water supplies.

Flood Zones

Coastal properties and those with rivers and streams may be subject to flooding. Flooding impacts vary among properties; the potential impacts of 100- and 500-year floods are addressed at the property level.

Hurricane Surge Inundation Zones

All coastal properties within the Complex may experience storm surge during hurricanes. Inland properties are not likely to experience storm surge, but may be subject to other storm-related damage (e.g., wind damage, salt spray impacts to vegetation, extended loss of utilities). The potential impacts of hurricane surge are addressed at the property level for category 1–4 hurricanes.

Climate Change

“Unequivocal evidence...shows that the atmospheric concentrations of important greenhouse gases...have increased over the last few centuries” (Cubasch et al. 2013:121). These changes have contributed to increases in global mean surface air temperature and sea level over the last 100 years. The former has risen 0.3–0.6°C (0.5–1.1°F) and the latter by 10–20 cm (3.9–7.9 inches). These increases have not been consistent over time or uniform around the globe (Cubasch et al. 2013).

Projected Sea-Level Rise

The Cape and Islands’ extensive shorelines make the region susceptible to the impacts of climate change-related sea-level rise. Within the Complex there are six oceanfront DCR properties and several oceanfront properties in which the DCR holds conservation restrictions. All may be impacted by sea-level rise.

Potential impacts were evaluated using information developed by the International Panel on Climate Change (IPCC; Church et al 2013). The IPCC model used (i.e., RCP 8.5) predicts a 0.3m (12 inch) likely increase in global mean sea level over the next 30–50 years (i.e., from present through 2046–2065). This model was selected because it considers the highest concentrations of gasses and aerosols of the four scenarios modeled by the IPCC; planning based on this model errs on the side of caution. A 30–50 year time frame was selected over the alternative 100-year time frame model, because of lower variability associated with predicted rise in likely

mean sea-level. In addition, it is anticipated that this RMP will be revisited within the next 30 years, and that improved models will be available at that time to better predict sea-level rise in the second half of this century.

Projected Impacts on Fish and Wildlife Habitat

In Massachusetts, those habitat types most resistant to climate change tend to be at or near their northern limit, or are broadly distributed across a north-south gradient at the continental scale. Several such habitat types occur within the Complex.

Manomet and DFW (2010) assessed the vulnerability of Massachusetts’ habitat types to climate change. Their results indicate that a few of the Cape and Islands habitat types will increase in extent, some will decrease in extent, and most will be little affected. Anticipated responses to climate change, by habitat type, are identified in Table 1.4.1.

Table 1.4.1. Predicted responses of habitat types to climate change.^a

Predicted Response^b	Habitat Type^c
Likely to Greatly Benefit	Salt marsh
Likely to Benefit	Warm water ponds, lakes, and rivers
Less Vulnerable	Atlantic White Cedar Swamp Hardwood swamps Pitch pine-scrub oak Shrub swamp Vernal pools
Vulnerable	Coldwater ponds Emergent marshes
Critically Vulnerable	Brackish marshes Intertidal flats

a. From Manomet and DFW (2010).

b. Predicted responses to climate change are: Likely to Greatly Benefit = Increase in extent; Likely to Benefit = Moderate increase in extent; Less Vulnerable = Either no change, or moderate change, in extent; Vulnerable = At risk of being greatly reduced in extent; and Critically Vulnerable = At risk of being eliminated or nearly so.

c. These habitat types are either known to occur, or are likely to occur, within the Complex.

Rare Species

State-listed Species

Sixty-three state-listed species are documented from DCR properties in the Complex. (Table 1.4.2) Twelve of these species are also known from properties in the Complex in which the DCR holds a conservation restriction.

Table 1.4.2. Number of state-listed species, by type and state rank, known to occur on DCR-owned properties in the Nickerson Management Complex.

Type	Endangered	Threatened	Special Concern	Total
Amphibians	0	1	0	1
Birds	1	3	5	9
Insects	1	13	14	28
Plants	9	7	11	27
Reptiles	0	1	1	2
Total	11	25	31	67

The Complex’s rare species may be generally categorized as associated with the following habitats:

- Sandplain grasslands and heathlands (e.g., New England blazing star)
- Pine barrens communities (e.g., barrens daggermoth)
- Coastal plain ponds (e.g., Plymouth gentian)
- Beach and dune (e.g., piping plover)
- Saltmarsh (e.g., diamond-backed terrapin)

Federally-listed Species

Three of the Complex’s state-listed species are also on the U.S. endangered species list; they are the roseate tern (federally endangered), piping plover (federally threatened), and an unnamed plant (federally endangered). The name of this plant is not identified in this document in accordance with the NHESP’s practice of not revealing site-specific information on organisms susceptible to collection.

The *rufa* subspecies of red knot was recently listed as threatened under the U.S. Endangered Species Act. This medium-sized shorebird stops along the Massachusetts coast to rest and feed during both its spring and fall migrations. Low numbers of these birds have been observed at some of the Complex’s beaches. As of this writing, the knot has not yet been listed under MESA.

The New England Cottontail is currently a candidate for listing under the U.S. Endangered Species Act. Only two populations are known to occur in Massachusetts, one in the Berkshires and one on

Cape Cod (Fuller and Tur 2012). Monitoring and habitat management for this species is currently underway at some properties within the Complex.



New England cottontails have disappeared from much of their range due to a decrease in early successional habitat and the presence of the more common eastern cottontail. (See Appendix G for photo information.)

Priority Habitat

Priority Habitat is a regulatory term that refers to the geographic extent of habitat for species protected under MESA. It is delineated based on records observed within the 25 years prior to delineation. Activities within Priority Habitat may require review under MESA. (See Section 1.10) Many of the Complex’s properties have been designated Priority Habitat. This includes portions of all 12 parks, one reforestation lot, and three fire observation towers. In addition, virtually all coastal waters adjacent to the Cape and Islands have also been designated Priority Habitat.

BioMap2

In 2010, the Massachusetts Department of Fish and Game and The Nature Conservancy issued BioMap 2, a guide to conserving the biodiversity of Massachusetts (DFG and TNC 2010). This guide identified two types of areas important for conservation: Core Habitat and Critical Natural Landscape. Protection of both areas, which may overlap, is “important to conserve the full suite of biodiversity” in Massachusetts (DFG and TNC 2010), but is non-regulatory in nature. Because BioMap2 is intended to guide land protection, and because DCR parks are already protected, the primary value of this information is the identification of park-adjacent lands for future

protection efforts. Additional information on BioMap 2 is available in DFG and TNC (2011).

Vegetation

The types and distribution of vegetation on the Cape and Islands is influenced by a variety of natural and anthropogenic factors, including soil moisture, topography, land clearing, and the intentional application of fire, among others.

Excellent information exists on the historic vegetation of the Cape and Islands. Motzkin et al. (2002) identified the distribution of commonly co-occurring groups of plants on Cape Cod and related their current distribution to glacial history and historic land use. Foster and Motzkin (1999) reconstructed the vegetative history of Correllus. Dunwiddie (1989) identified the historical vegetation of Nantucket. Each study provides insight into today's forests and their management needs.

There have been no floras specific to properties within the Complex.

Invasive Species

There is no complex-wide information. Available information is presented at the property level.

Priority Natural Communities

Natural communities are assemblages of plant species that occur together in space and time (NHESP 2008). Few of the Complex's properties have been surveyed for natural communities, with the exception of Nickerson and Hawksnest (NHESP 2008). Additional verified information comes from the NHESP data set (Harper 2013). Supplemental site-specific data are provided when available. Information is presented at the property level.

Among the Complex's most important natural communities are those associated with pine barrens, Maritime Dunes, and Coastal Plain Pondshores. All require active management.

Pine Barrens. Barrens are a mosaic of communities with variable canopy closure and amounts of pitch pine, scrub oak, tree oaks, and ericaceous shrubs (Patterson and Crary 2006). The continued existence of several of these community types, such as Scrub Oak Shrublands and the Pitch Pine – Scrub Oak Community, is dependent on periodic disturbance, such as fires. They occur in many of the Complex's

parks. Barrens communities may co-occur with Sandplain Heathlands and Sandplain Grasslands. Barren and heathland communities provide habitat for several state-listed, and some globally rare, plants and animals.

Maritime Dunes. Four of the Complex's six coastal properties contain examples of the Maritime Dune community type; "the classic community of sand dunes," with patches of plants and bare sand (Swain and Kearsley 2011). Intact dune systems protect against storm damage and provide plant and wildlife habitat. Most examples of this community in the Complex are actively managed.

Coastal Plain Pondshores. The shores of coastal plain ponds are characterized by a distinct flora, often with an abundance of state-protected and globally restricted rare plants (Swain and Kearsley 2011). The best examples in the Complex are found at Hawksnest and Nickerson.



Example of a coastal plain pondshore; Walkers Pond, Harwich. (See Appendix G for photo information.)

Forests

DCR monitors its forests through an ongoing inventory process. Monitoring plots associated with the Continuing Forest Inventory (CFI) are located in most of the Complex's larger properties and in one reforestation lot. Information is incorporated into individual chapters as available and appropriate.

Wildlife

Site-specific information on wildlife is largely lacking for properties in the Complex. However, a variety of resources are available for the region. For example, county lists are available for mammals, and for reptiles and amphibians (Cardoza et al. n.d.,

Cardoza and Mirick 2009). Information is widely available for wildlife taxa with broad popular interest, such as birds, butterflies, and dragonflies (e.g., Cape Cod Bird Club and MAS 2005, Whiting and Pesch 2007, Andrews and Blackshaw 2010, Mello and Hansen 2004, Carpenter 1997). In addition, the region has been the focus of much scientific research, some of which has resulted in references intended for the general public (e.g., Keith et al. 2008). Finally, a variety of web sites offer information on the region's wildlife (e.g., capecodbirds.org).

1.5. CULTURAL RESOURCES

The Cape and Islands are an area rich in history and prehistory that, despite centuries of change, retains a cohesive identity and sense of place, perhaps more so than any other region in the Commonwealth. For over 12,000 years the landscape has been shaped by human occupation and many reminders of our shared cultural heritage remain. The Complex's properties reflect many of the economic and social patterns forged by Native Americans, European settlers in the 17th and 18th centuries, and a diverse influx of 19th and 20th century immigrants from around the globe. These stories are represented throughout the Complex in the form of archaeological resources, cultural landscapes, and built structures. Information on their management is provided in Section 1.10 and in park-specific chapters.

Archaeological Resources

Cape Cod has over 700 recorded pre-Contact sites; the highest density in New England. However, most studies were performed by avocational archaeologists and relic hunters, and little more than site locations are known. As a result, Cape Cod is less well known archaeologically than many areas with lower site frequencies. This fact, together with region's rapid population growth, places the pre-Contact resource base of Cape Cod at a higher risk than those in any other part of the state.

Paleo Indian Period (11,000–9,000 Years Before Present (YBP)

Tentative evidence from two site assemblages suggests that Cape Cod was occupied during the Paleo Indian Period, possibly as early as 12,900 years ago. Both sites are on the Mid-Cape.

Archaic Period (9,000–2,700 YBP)

Four Early Archaic sites have been identified on Cape Cod. Two are located on the Mid-Cape in close proximity to one another, while the other two are recorded on the Outer Cape. On Nantucket, four Early Archaic sites have been found near the Squam Pond and Coskata. A single Early Archaic site has been identified on the Inner Cape, near the mouth of the Quashnet River.

Only three Middle Archaic occurrences are known from the Inner Cape. It is believed that the low frequency of Middle Archaic sites on the Inner Cape is due to sampling error and the relative lack of relic hunting here compared to other parts of the Cape, rather than being a true reflection of population distribution at the time.

Clusters of Middle Archaic sites have been identified on the Mid-Cape along the Bass River in Dennis and Yarmouth, and in West Harwich on the Herring River and at the outlet of Swan Pond. In Brewster, sites situated between Upper and Lower Mill ponds, and between Flax and Cliff ponds, documented habitation around interior ponds on the Cape for the first time. These sites may represent seasonal occupations or activities that differed from those in other habitats of the region.

Many Middle Archaic sites have been identified on the Outer Cape, with most of the better known and larger sites having components from this period. At the time that Paleo, Early Archaic, and Middle Archaic sites were occupied on the Cape they were located on the highest ground on the continental shelf, over 30 miles from marine resources. Between 12,900 to 6,500 years ago, these sites were located adjacent to the headwaters of freshwater streams and outwash channels, as opposed to the marine and estuarine resources with which they were associated during subsequent occupations. Continued and recurrent occupation of these same locations in the face of this large-scale environmental change suggests a highly resilient and adjusted cultural system.

As with other parts of New England, there was a proliferation of activity 6,000–3,000 years ago and, as elsewhere, Late Archaic period sites have been found in virtually every type of habitat on the Cape. The range of site locations includes interior freshwater ponds and streams as well as various

coastal habitats, and suggests a well adapted settlement pattern that took advantage of, and used, the full range of natural resources in the region. At least one site, from the end of the Late Archaic, is recorded on Crocker Pond in West Falmouth. Collection analysis reveals that the three traditions of the Late Archaic are present in various combinations at 12 sites on the Inner Cape; few appear to have been single component. Analysis of sites from the Outer Cape suggests that semi-sedentary residence, based on the exploitation of shellfish, began during the Late Archaic.

Woodland Period (3,000–450 YBP)

Archaeological evidence for Cape Cod, in its entirety, suggests that during the three Woodland periods the intensity of occupation increased progressively. It is possible that Native American population stood at their highest levels during this time. This pattern contrasts with other portions of southern New England, where the Late Archaic period was believed to have been when populations reached their maximum levels. Very few sites on the Inner Cape have Woodland associations, possibly due to sampling error. Despite the extraordinary high Late Woodland site densities, very few Contact Period sites are currently recorded on the Cape.

The existing archaeological record for the Cape suggests a high degree of human adaptation and adjustment to constantly changing environments. Site frequencies that increase through time suggest that the local inhabitants accepted the challenge of changing habitats, from freshwater to saltwater habitats and resources, and adapted their toolkit to be better suited to the available resources, taking advantage of the opportunities the environmental changes presented. Although existing site densities are highest along the coast and estuaries, the data is too uneven to state with certainty the degree to which this is a true reflection of the pre-Contact settlement and subsistence patterns.

Today, the region is home to two federally recognized tribes, the Aquinnah Wampanoag and the Mashpee Wampanoag.

Historic Resources

Provincetown, at the tip of Cape Cod, was the first landing spot for English settlers in 1620, and nearby Eastham is the site of the first recorded encounter

with Native Americans in New England. The main English settlement became centered at Plymouth, and later Boston, and the establishment and growth of towns on the Cape and Islands was slower than their mainland counterparts. In the 17th and 18th centuries, towns developed around the region's growing fishing industry, followed by boat building and salt making, as well as other ocean-related trades. Settlers introduced small scale subsistence farming, sheep grazing, and the development of cranberry bogs. Coastal communities and the islands also became dependent in the 19th century on the whaling industry. The European settlers transformed the region into a new version of the English agricultural landscape, accented by the adopted simple wood sided housing style that would become known as "Cape Cod."

The late 19th century saw the region transform into a summer travel destination for Boston and Providence's wealthy families. Train service reached as far as Provincetown by 1873, and by the turn of the century, mansions and resorts dotted the peninsula, exemplified by Nickerson state park's Crosby Mansion.



A successful partnership among the DCR, town of Brewster, and Friends of the Crosby Mansion has revitalized this historic mansion, preserving part of the Cape's history. (See Appendix G for photo information.)

The 20th century saw major changes with the construction of the Cape Cod Canal in 1914 and the Mid-Cape Highway in the 1950s. Both had an impact on the growth of the tourism industry. The cultural landscape was also impacted by the introduction of government backed conservation initiatives. The work of the Civilian Conservation Corps in the 1930s shaped almost all state owned

land on the Cape and Islands, and resulted in the creation of many of today’s state parks.

Even with the changes brought by the 20th century, the Cape and Islands retain much of their traditional character, partially due to the conservation efforts of cities and towns, the DCR, and other natural and cultural resource protection agencies and organizations.

The Complex contains a variety of cultural resources of varying significance. (Table 1.5.1) Some are listed on the National Register of Historic Places (NR) or Massachusetts Historical Commission (MHC) inventory. Most resources are verified, but not on the National Register or Massachusetts inventory. Finally, some resources have been tentatively identified through surveys, but have not yet been verified.

Table 1.5.1. Summary of cultural resources in the Nickerson Management Complex.

Type	Number
NR - Individually listed properties ^a	0
NR - Historic Districts ^a	6
MHC documented resources	33
Verified resources not on NR or MHC inventories	78
Resources documented but unverified ^b	27

a. Properties and districts listed in the National Register of Historic Places are automatically listed on the MHC inventory. For the purposes of this table, none of the NR Historic Districts are included among the MHC documented resources.

b. These resources were documented through the 1984/1985 Cultural Resources Evaluation Project, but are not yet field verified or confirmed.

One National Register Historic District, the Old King’s Highway Regional Historic District, is a unique local historic district that encompasses six communities and mostly encompasses properties north of Route 6A. It is considered the largest historic district in the country and includes parts of three parks, three reforestation lots, and two fire towers.

1.6. RECREATION RESOURCES

The Cape and Islands are well-known for their coastal resources and associated recreation opportunities. Water-based recreation, such as swimming, fishing, and boating are common activities in the region. Where compatible with resource protection, they also take place in the Complex’s parks.



Water-based recreational activities, such as surfcasting, are popular with both tourists and residents. (See Appendix G for photo information.)

Away from the coast, visitors to the Complex may enjoy camping, hiking, mountain biking, horseback riding, cross-country skiing, disc golf, and freshwater-based recreation activities such as swimming, and fishing.

1.7. INFRASTRUCTURE

The amount and types of infrastructure vary among properties. In general, parks with campgrounds tend to be the most developed and reforestation lots the least developed properties. Properties without campgrounds, but with administrative or operations facilities (e.g., WBNERR) also tend to be highly developed.

Several trails within the Complex connect to municipal or long-distance trails. The Claire Saltonstall Bikeway runs concurrent with the entire length of the CCRT. The CCRT also connects to the Old Colony Rail Trail, which extends from Harwich to Chatham. Bike paths in parks on Martha’s Vineyard and Nantucket connect to municipal bike paths, contributing to alternative transportation networks on these islands. The Namskaket Sea Path is an intertidal walking trail that extends from Crosby Landing in Brewster to Skaket Beach in Orleans; it connects to both the CCRT and Nickerson.

1.8. INTERPRETATION

There is no Complex-wide interpretive programming. Instead, programming takes place at those properties with on-site interpretive staff (i.e., Nickerson and WBNERR). Information on interpretive programming is presented by park.

1.9. MANAGEMENT RESOURCES

Administrative Structure

All parks and reforestation lots in this RMP are part of the Nickerson Management Complex. This Complex and the Myles Standish Management Complex jointly constitute the Cape Cod District, which is one of three districts in the DCR's South Region.

Staffing

Park management is a challenging task that requires expertise in a variety of disciplines. It is carried out by DCR staff, with supplemental support provided by state and municipal government employees, friends groups, and volunteers.

DCR Staffing

The operation and management of properties within the Complex requires the participation of regional and district personnel, as well as DCR staff from other bureaus and offices. Supplemental staffing is provided by personnel from the Executive Office of Energy and Environmental Affairs, as well as public safety agencies. Day to day management primarily involves DCR personnel at the region, district, and complex level.

Region. Administrative, clerical, and support functions are performed by personnel located in the regional office in Carver. The Regional Director performs a variety of administrative functions, including supervision of regional staff and District Managers. Clerical and fiscal support (e.g., procurement, payroll, processing seasonal employee paperwork) is provided by the regional Business Management Specialist, Clerk, and Administrative Assistant. A regional Construction Maintenance Foreman and park operations support personnel provide minor plumbing, electrical, HVAC, fencing, and mechanical system repairs. A regional mechanic services and repairs vehicles within the Complex.

District. The Cape Cod District Manager reports to the Regional Director, and is responsible for the management of all properties, and supervision of all Field Operation Team Leaders, within the District.

Complex. Each complex has a Field Operations Team, comprised of all personnel from properties within the Complex, and one Field Operations Team

Leader. (FOTL; Table 1.9.1) There are 23 year-round positions; three are currently vacant.

The FOTL has the ability to allocate resources within the Complex in order to improve park operations. Resources may also be reallocated on a temporary basis to assist with special projects that require staffing, skill sets, or equipment unavailable at any one park.

Table 1.9.1. Mass Parks personnel assigned to the Nickerson Management Complex.

Job Title	Number of Positions ^a
<i>Year-round Personnel</i>	
Administrative Assistant II	1
Bookkeeper II	1
District Fire Warden ^b	1
Environmental Analyst II	2
Forest and Park Regional Coordinator (Field Operations Team Leader)	1
Forest and Park Supervisor I	0.5
Forest and Park Supervisor II ^c	2
Forest and Park Supervisor III	2
Laboratory Technician II	1
Laborer II	3.5
Patrolman ^b	1
Program Coordinator I	4
Recreation Facilities Repairer ^d	1
Reserve Manager	1
Skilled Laborer ^d	1
<i>Seasonal Personnel</i>	
Forest and Park Supervisor I (Long-term)	8
Forest and Park Supervisor I (Short-term)	4
Laborer I (Short-term)	6
Laborer I (Long-term)	10
Laborer II (Long-term)	2
Laborer II (Short-term)	1
Lifeguard I	4
Lifeguard II	1
Park Interpreter (Long-term)	2
Park Interpreter (Short-term)	1
Patrolman ^b	5
Recreation Facility Repairer (Long-term)	1
Recreation Facility Repairer (Short-term)	1
Recreation Facility Supervisor I (Short-term)	1
Recreation Facility Supervisor IV	1
Summer Worker ^e	4

a. Number of position is based on 2014 staffing levels.

b. This position is with the Bureau of Forest Fire Control and Forestry, and is not a MassParks position.

c. One of these positions is vacant.

d. This position is vacant.

e. Two of these positions went unfilled in 2014.

The District Manager has identified several positions needed to enhance park operations in the Complex (Petersen 2014). (Table 1.9.2) This includes filling three vacant positions and adding five new positions. Two new positions are for the Cape Cod Rail Trail, which is currently unstaffed.

Table 1.9.2. Additional year-round personnel identified as needed for improved operation of the Nickerson Management Complex.

Location and Job Title	Number of Positions	Status^a
Shawme-Crowell		
Forest and Park Supervisor I	1	New
WBNERR		
Recreation Facilities Repairer	1	Vacant
Skilled Laborer	1	Vacant
Cape Cod Rail Trail		
Forest and Park Supervisor I	1	New
Recreation Facilities Repairer	1	New
Nickerson		
Forest and Park Supervisor II	1	Vacant
Recreation Facilities Repairer	1	New
Correllus		
Maintenance Equipment Operator	1	New

a. Positions identified as New do not currently exist; those identified as Vacant exist but are currently unfilled.

Partnerships and Volunteers

There are no Complex-wide organized partnerships or volunteer programs, but there are friends groups associated with four parks within the Complex.

Public Safety

The Massachusetts State Police has primary law enforcement authority on state-owned lands. Local police provide additional law enforcement within their respective jurisdictions. The Massachusetts Environmental Police provide primary enforcement of hunting, fishing, boating, OHV, and snow vehicle regulations.

Fire control is provided by local fire departments with assistance from DCR Fire District 1. Municipalities also provide emergency medical response. DCR rangers, lifeguards, and other trained DCR personnel may provide first aid.

Park Operations

DCR personnel perform a variety of activities related to the operation and maintenance of the Complex’s resources and facilities. These activities differ among parks and, within each park, differ from day to day and among seasons. However, general routines are followed to maintain operations of the properties for visitor use and to protect natural, cultural, and recreation resources.

Buildings and grounds related activities include: cleaning, painting, minor carpentry, electrical and plumbing tasks, mowing grass, removing leaves, picking up litter, emptying trash barrels, and graffiti removal.

Visitor services related activities include: parking fee collection and ParksPass sales and processing, providing interpretive programming, responding to visitor questions, ensuring public safety, and promoting awareness of park regulations and enforcing those regulations.



Nickerson state park staff greets arriving campers and directs them to their site. (See Appendix G for photo information.)

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

General Budgetary Information

Typical Funding

Three major types of funds support the operations, maintenance, and capital improvement of DCR facilities.

Operating Budget. The annual operating budget supports daily operations and maintenance including utilities, supplies, equipment leases, administration, and the maintenance and minor repair of facilities, vehicles, and equipment. All regions and districts receive operations funds.

Capital Budget. The capital budget supports projects (e.g., construction, repair) and items (i.e., equipment) with a per-unit cost of at least \$5,000 and an expected lifespan of at least seven years.

Capital projects are identified and funded through a five-year capital plan. These plans identify proposed capital projects, their costs, and the year in which they are to be funded. Recent Capital Project in the Complex include \$357,000 in paving and bike path repairs at Correllus, and upgrades to WBNERR facilities (e.g., construction of a new garage and parking lots, solar panel array, and grounds improvements).

Capital plans are extensively reviewed within the DCR, approved by the Commissioner, and included in DCR's annual budget. This budget is then reviewed by the Executive Office of Energy and Environmental Affairs, the Executive Office of Administration and Finance, and the Governor. Additional capital initiatives may be identified and added to the budget by the Commissioner of Conservation and Recreation, Secretary of Energy and Environmental Affairs, or the Governor during this review process.

Deferred Maintenance. These funds are used for infrastructure repair that exceed typical maintenance, but do not rise to the level of a capital project. They may also be used to address emergency capital projects for which funds have not been programmed. Each region is allotted deferred maintenance funds on an annual basis; the Regional Director determines how these funds are to be used. Repair to a water line at the Shawme-Crowell State Forest's dump station is an example of the types of projects funded through deferred maintenance.

Supplemental Funding

In addition to operations, capital, and deferred maintenance funds, DCR facilities may receive funding through other sources.

Grants. Federal and private funds, in the form of grants, are periodically awarded on a competitive

basis to the DCR for park maintenance and operation activities (e.g., recreational trails grants). In addition, much of the federal funding that supports WBNERR is received in the form of federal grants from the National Oceanic and Atmospheric Administration.

Earmarks. Earmarks are funds directed to specific projects by the Massachusetts General Court via the annual state budget. There have been no recent earmarks for properties in the Complex.

Conservation Trust Fund. This fund uses donations to support special initiatives above and beyond basic property maintenance. It is funded through charitable contributions to the DCR, including those donations placed into the "iron rangers" (i.e., a secure metal donation box).

Dedicated Funds. Dedicated property funds may come from a variety of sources (e.g., telecommunication tower fees), and are limited to use at the property on which they are derived

Retained Revenues. These funds are generated from park revenues, such as camping, day use, and concession fees. They are deposited in a DCR account to support park operations and improvements across the Commonwealth.

In-kind Contributions. In-kind contributions are the donation of goods or services, rather than funds. For example, between 2008 and 2014, the Friends of the Crosby Mansion expended over \$303,000 toward the maintenance and repair of that building, and in 2009 the Nantucket Disk Golf Foundation constructed an \$87,000 disc golf course in Nantucket State Forest. Other similar projects are identified in successive chapters of this RMP. There have been no in-kind contributions at the Complex level.

1.10. MANAGEMENT PRACTICES

Management of the Complex's natural, cultural, and recreation resources is complicated and subject to a variety of laws, regulations, policies, and agreements. It is also subject to available resources and staffing.

The types of activities that may take place on DCR parks are also guided by DCR's landscape designations. Lands are designated as Reserve, Parkland, or Woodland; each "has its own set of ecosystem services and management priorities" These designations influence such things as forestry practices and the types and level of allowable

recreation. (DCR 2012). Readers are directed to *Landscape Designations for DCR Parks & Forests: Selection Criteria and Management Guidelines* (DCR 2012) for details on how these designations affect park use and management.

Unlike most Regional Planning Agencies (RPAs), the enabling legislation that created the Martha's Vineyard and Cape Cod commissions authorized them to have regulatory authority (Chapter 637 of the Acts of 1974 and Chapter 716 of the Acts of 1989, respectively). This authority, which includes the regulation of state agencies, is exercised through the designation of Districts of Critical Planning Concern (DCPCs). Most of the Complex's properties fall within one or more DCPC. Because each DCPC has a unique set of regulations, readers are directed to the RPAs' web pages for specific information.

This section describes current management practices and identifies relevant regulations, policies, agreements, and legal considerations that guide this management. Select Massachusetts regulations relevant to the management of properties within the Complex are presented in Appendix D.

Natural Resources

Research Permits are required for all ecological research on DCR properties. Prior to research taking place on a Reserve (e.g., most of Correllus), a proposal outlining the purpose of the research, techniques used, and potential impacts on the land must be submitted to the Forest Reserves Science Advisory Committee for review. Additional state and federal permits may be required, depending on the nature and location of research. Research within wetland and river jurisdictional areas may also require regulatory review and approval from the local conservation commission.

DCR's Bureau of Planning, Design & Resource Protection has begun developing Best Management Practices (BMPs) for common park activities with the potential to affect natural resources (e.g., trail maintenance). They are identified in the following descriptions of resource management, as applicable. These BMPs are available at <http://www.mass.gov/eea/agencies/dcr/conservation/planning-and-resource-protection/best-management-practices.html>.

Areas of Critical Environmental Concern (ACEC)

ACECs are places in Massachusetts that receive special recognition because of the quality, uniqueness, or significance of their natural and cultural resources. Within ACECs, the DCR shall "take actions, administer programs, and revise regulations in order to" acquire useful scientific data; preserve, restore, or enhance resources; and ensure that activities in or impacting the area minimize adverse effects on seven specific resource values. (301 CMR 12.00; Appendix D)

There are seven ACECs on Cape Cod; the DCR owns or holds a legal interest in properties within three of these. There are no ACECs on the Islands.



Pocasset River Area of Critical Environmental Concern in Bourne, one of seven on the Cape and Islands. (See Appendix G for photo information.)

Water Resources

Sanitary Waste. Sanitary wastes are any liquid or solid waste originating from human and human activities, such as wastes from bathrooms, washing machines, and dishwashing (310 CMR 27:00). Their sub-surface disposal is regulated by a variety of regulations, including Title 5 of the State Environmental Code (310 CMR 15:00), Underground Injection Control regulations (310 CMR 27:00), and groundwater discharge permits (314 CMR 5.00).

Disposal of sanitary waste at Nickerson and Shawme-Crowell (i.e., the two large campgrounds in the Complex) is regulated through park-specific discharge permits, which are described in their corresponding section.

Fertilizers. In 2013, the Barnstable County Assembly of Delegates approved the establishment of a county-wide ordinance (Barnstable County Ordinance 13-07) to manage fertilizer use and application in order to limit the amount of nitrogen entering ground and surface waters (<http://www.capecodcommission.org/index.php?id=139>). Individual towns must promulgate and approve implementing regulations. To date, only the towns of Falmouth and Mashpee have done so.

Storm Water Management. Activities on DCR properties that affect the quantity or quality of storm water are regulated by a National Pollutant Discharge Elimination System (NPDES) storm water management plan (DCR 2007a). This plan describes control measures that the DCR uses to satisfy NPDES Phase II permit requirements for transportation and non-traditional Municipal Separate Storm Sewer Systems (MS4s). Although emphasis is placed on parks in the Greater Boston area, the plan is applicable to the entire DCR park system.

The plan identifies Best Management Practices (BMPs) and measurable goals. Most are implemented at the agency-level, while others, such as the stenciling of catch basins, are implemented at the facility-level. For additional information see <http://www.mass.gov/eea/agencies/dcr/conservation/stormwater-mgmt/>.

Outstanding Resource Water (ORWs). ORWs are designated based on their “outstanding socio-economic, recreational, ecological and/or aesthetic values.” Discharges to these waters are regulated by Massachusetts Surface Water Quality Standards. (314 CMR 4:04(3); Appendix D)

Wetlands. Activities within a wetland resource area or buffer are regulated by the Massachusetts Wetland Protection Act. (310 CMR 10:00; Appendix D)

Vernal Pools. The identification and protection of vernal pools in DCR parks is addressed in a BMP (*Vernal pool certification on DCR lands*; DCR n.d.a).

Rare Species

The Massachusetts Endangered Species Act protects rare species and their habitats by prohibiting the “take” of any plant or animal listed as Endangered,

Threatened, or Special Concern (http://www.mass.gov/dfwele/dfw/nhESP/regulatory_review/mesa/mesa_home.htm). Projects within identified Priority Habitat of rare species must undergo review by the NHESP, unless otherwise exempted under the law. (See 321 CMR 10:00 for the full definition of “Project.”) Many staff and volunteer activities that take place within the Complex (e.g., invasive species removal, mowing along bike paths) meet the definition of Project and must go through regulatory review if they are to occur in Priority Habitat.



The eastern box turtle, a Species of Special Concern, occurs on many properties within the Complex. (See Appendix G for photo information.)

State agencies have special obligations under MESA. First, agencies are directed to use their authorities in furtherance of the purposes of MESA and “use all practicable means and measures to avoid or minimize damage.” Next, they are required to submit draft management plans, such as RMPs, to the NHESP for review. Finally, state-owned lands “that provide habitat for state-listed species shall be managed for the benefit of such listed species;” agencies “shall give management priority to the protection, conservation, and restoration of” state-listed species on state-owned lands. 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.”

These requirements guide operations activities in, and planning activities for, Priority Habitat in the Complex. A BMP is available to help field operations personnel comply with these requirements (*Compliance with MESA*; DCR 2014).

Vegetation

There is no single management plan for the Complex's vegetation. The *de facto* management policy is to permit populations of most species of plants to increase or decrease without human intervention. Exceptions include the maintenance of lawns, recreation fields, and other turf areas; fire break maintenance and management, removal of hazardous trees; removal of plantations of non-native trees, timber harvests; road and trail maintenance; removal of non-native or invasive plants; vegetation cutting associated with the management of plant or wildlife habitat.

Invasive Species. Continuous Forest Inventory (CFI) sampling protocols include the recording of invasive species observed within sampling plots (DCR Bureau of Forestry 2010). There are no other Complex-wide monitoring efforts, and no eradication efforts. BMPs are available to help field operations personnel manage terrestrial and aquatic invasive plants (DCR n.d.b, n.d.c).

Forests. CFI monitoring plots are located in seven parks and one reforestation lot in the Complex. A series of forestry related metrics, including the number of trees five or more inches in diameter, tree regeneration, amount of coarse woody debris, presence of invasive plants, and presence of tree diseases are collected at each plot. On average, each plot is visited, and data collected, once every ten years.

Wildlife

There is no single wildlife management plan for the complex. The *de facto* management policy is to permit most wildlife populations to increase or decrease without human intervention. Exceptions include rare species management; fishing for shellfish and fin fish; and the hunting of game species at Shawme-Crowell, Quashnet Woods, South Cape Beach, Hawksnest, and Correllus. (See Recreation Resources: Hunting and Fishing, below.)

Cultural Resources

The DCR's Office of Cultural Resources (OCR) provides technical assistance on issues relating to the preservation of the agency's vast and diverse portfolio of cultural resources. A copy of the DCR Cultural Resources Policy has been included as Appendix E.

The OCR conducts a coordinated program of basic and applied research to support planning for, and management of, cultural resources on DCR properties through project management and resource management planning. The OCR also nominates properties for inclusion in the State and National registers.

The OCR is also responsible for overseeing the historic preservation regulatory compliance responsibilities of the agency. It assesses regulatory needs and, when applicable, notifies the Massachusetts Historical Commission (MHC) through the filing of a Project Notification Form or Environmental Notification Form for any proposed projects undertaken, funded, permitted, or licensed in whole or in part by the agency. This is done so that the MHC may make a Determination of Effect of the project on archaeological and historic resources. Projects may be large or small and involve any level of impact on an above or below ground cultural resource. Finally, the OCR coordinates all archaeological survey, testing, and excavation with the State Archaeologist at the MHC through an archaeological permit.

OCR defines a cultural resource as 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.

There are a number of different designations for individual cultural resources and districts in Massachusetts; including local designation, inclusion on the statewide inventory, listing in the State Register of Historic Places, listing in the National Register of Historic Places, and designation as a National Historic Landmark. Although these designations indicate different levels of significance and compliance, for the purposes of DCR's cultural resource policy and statutory requirements, projects involving any of these resources may require review and approval by and/or consultation with the MHC.

Best Management Practices

In order to provide technical support to field operations staff, OCR has developed a series of BMPs to guide the day-to-day management of common cultural resources in our state parks. At present there are 11 cultural resources BMPs available to field operations personnel. (See <http://www.mass.gov/eea/agencies/dcr/conservation/planning-and-resource-protection/best-management-practices.html> for these BMPs.) Although many of these practices may be performed without any level of statutory review or compliance, it is important to coordinate with OCR staff in order to determine whether any compliance is required. This is especially important with resources or districts that are designated at the local level, as these designations carry specific guidelines that may differ from those at the state level. BMPs applicable to specific resources are identified under “Guidance” in Cultural Resources tables in Sections 2–15.

Archaeological Resources

Massachusetts law requires the review of all sub-surface disturbances on state property. The DCR’s archaeologist holds a general archaeology permit from the MHC that allows them to provide initial review of activities that result in sub-surface disturbance. The DCR archaeologist is the primary reviewer of such projects and activities in the Complex.

Underwater Archaeological Resources. The inspection, investigation, or removal of underwater archaeological resources is also regulated under Massachusetts law (M.G.L. 6:179–180). No person may remove, displace, damage or destroy any underwater archaeological resource except in conformity with permits issued by the Massachusetts Board of Underwater Archaeological Resources (BUAR). This applies to both coastal and inland waters. The Commonwealth holds the title to all underwater archaeological resources and retains regulatory authority over their use. Additional information on the BUAR is available at <http://www.mass.gov/eea/agencies/czm/buar/>.

Native American Hunting, Fishing, and Gathering Rights. Most Native American tribes and indigenous groups have the inherent right to be self-governing, including regulating their landscapes and resources. The right to hunt and fish was guaranteed to many

tribes in their treaties with the United States and it is presumed to exist even if not mentioned in the treaty.

Tribal hunting, fishing, and gathering rights include the use of modern techniques for obtaining wildlife. A tribe is limited only by two rules, other than those it creates for itself. First, the tribe cannot take so much wildlife that it endangers propagation (continuation) of the species in violation of state or federal conservation laws. Second, the tribe cannot take any wildlife that Congress has prohibited it from taking.

Recreation Resources

Regulations guiding the recreational use of forests and parks may be found in 302 CMR 12.00. Key aspects of these and related regulations are identified below.

Permits

Some recreational activities require either Special Use or Recreational Use permits. Special Use Permits are required for special activities and events such as concerts, charity walks, and community service projects. Recreational Use Permits are required for all group activities involving 25 or more people, and for such things as the use of pavilions, group use areas, and athletic fields and courts. Additional information on these permits, and how they may be obtained, is available on DCR’s web page (<http://www.mass.gov/dcr/permits/>).

Swimming and Beach Use

Swimming is restricted to designated swimming areas. People, pets, and domesticated animals are prohibited from entering sensitive beach habitat posted as restricted. Pets and domesticated animals are also prohibited from coastal beaches and designated swim areas of inland beaches between April 1 and September 15. Additional rules of conduct may be found in 302 CMR 12.06.

Boating

Boating is regulated through a variety of Massachusetts Regulations (i.e., 323 CMR 2.00, 323 CMR 4.00, and 312 CMR 12; Appendix D). Allowed uses vary among parks and watercraft type; specific restrictions are identified in 302 CMR 12.07. Of the Complex’s parks, only Nickerson has specific boating restrictions. (Section 7)

Camping

Campsites are reserved through Reserve America (www.reserveamerica.com), a commercial on-line reservation system for campgrounds and marinas throughout the United States. Reservations at DCR campgrounds are managed through proprietary Reserve America software at the point of check-in. Rules of conduct at campgrounds are identified in 302 CMR 12.08.

Hunting and Fishing

Hunting, fishing, and trapping are regulated through Massachusetts Regulations (321 CMR 3.00 and 321 CMR 4:00), DCR Parks and Recreation Rules (302 CMR 12.11), official Massachusetts Hunting, Freshwater Fishing, and Trapping Regulations that are promulgated annually, and local shellfishing regulations. Summaries of these and other applicable regulations are presented in Appendix D. Officers from the Executive Office of Energy and Environmental Affairs' Office of Law Enforcement (i.e., Massachusetts Environmental Police officers) enforce hunting, fishing, and OHV regulations.

In general, all DCR properties are open to hunting, fishing, and trapping unless otherwise specified in the Parks and Recreation Rules (302 CMR 12.11). Within the Complex, hunting is specifically prohibited at Nickerson state park and the Cape Cod Rail Trail.

Trail Use

General trail use is regulated through 302 CMR 12.00. The same regulations govern the use of horses and non-motorized vehicles on trails. Dogs may accompany trail users provided the animals are kept under control and do not interfere with any other park patron's enjoyment of DCR property. (302 CMR 12.13; Appendix D) Exceptions apply for service, hunting, and sled dogs.

With the exception of DCR, public safety, and utility company vehicles, motor vehicles are generally not permitted on trails in the Complex.

A March 15, 2011 Department of Justice ruling allows individuals with mobility disabilities to use "other power-driven mobility devices" on trails. Such devices include any device powered by batteries, fuel, or other engines that are used by individuals with mobility disabilities for the purpose

of locomotion. Use of such devices may be restricted on trails due to factors such as: the type, size, weight, and speed of the device; the volume of pedestrian traffic; and the potential for substantial risk of serious harm to the environment or natural and cultural resources. No trails within the Complex have been assessed for their compatibility with these devices.

Geocaching

There is no Massachusetts regulation or agency policy on the placement of geocaches on DCR property. A BMP for managing the placement of geocaches on DCR properties is in development.

Infrastructure

Park lands acquired with funding from the Land and Water Conservation Fund, a federal program administered by the National Park Service (NPS), must comply with a variety of program requirements. This includes keeping the property boundary intact, using the property for outdoor recreation purposes, inspections by the NPS at least once every five years, and the posting of signs acknowledging the financial support of the Land and Water Conservation Fund. A full listing of program requirements is provided in NPS (2008).

Two parks in the Complex, South Cape Beach and Hawksnest, were acquired with funding from the Land and Water Conservation Fund.

Property Boundary

The Management Forester attempts to locate and mark property boundaries every 15 years. They also mark the boundaries of new properties as they are acquired. Boundary marking typically involves locating and painting cement bounds or pipes, and the posting of boundary signs.



Example of a standard DCR boundary marker, shown posted on a tree at Barnstable State Forest. (See Appendix G for information on photo.)

Buildings and Structures

The management of DCR-owned buildings is performed by DCR employees or contractors. Minor maintenance and repair is performed by on-site staff. More technical repairs (e.g., plumbing, electrical) are performed by DCR in-house trades staff or by trade or engineering contractors whose activities are coordinated through DCR's Park Support Operation Program. Major repairs are performed solely by licensed contractors.

A five-year High Ground Special Use Permit allows the Massachusetts State Police to place radio equipment and antenna systems at various DCR fire and radio tower locations throughout Massachusetts, including the Barnstable, Falmouth, and Sandwich fire towers. The West Tisbury Fire Tower is not specified in this agreement.

Roads

The DCR maintains and repairs park roads and parkways. Management of traffic and related systems is supervised by the Parkways Section of the DCR's Engineering Bureau, and guided by American Association of State Highway and Transportation Officials standards; the Manual on Uniform Traffic Control Devices (MUTCD; FHA 2009); and the *Historic Parkway Preservation Treatment Guidelines* (DCR 2007b), if applicable. Public roads adjacent to DCR properties are maintained and repaired by either local municipalities or MassDOT.

Snow removal is performed by the DCR, MassDOT, and local municipalities. In general, municipalities

or MassDOT plow public roads adjacent to parks and the DCR is responsible for plowing internal park roads.

Parking

The DCR is responsible for maintaining and repairing its parking areas. Most snow removal is performed by the DCR.

Multi-Use Paths

Ongoing maintenance and repair of paved multi-use trails, such as the Cape Cod Rail Trail, are subject to review under MESA and require review by the NHESP.

Trails

A variety of regulations and policies guide the management of trails. The design, management, and marking of trails are guided by the DCR's *Trails Guidelines and Best Practices Manual* (DCR 2010a). In addition, BMPs were recently developed for the closing and restoring of trails and trail maintenance (DCR n.d.d, n.d.e). Trail work is subject to both 950 CMR 70 (Appendix D) and the DCR Cultural Resource Policy (Appendix E).

Many trails in the Complex are located within Priority Habitat; all work on these trails must be performed in accordance with guidance and restrictions identified in *Recreational Trail Maintenance and Biodiversity Conservation* (NHESP 2009^b).

Additional regulations, such as the Massachusetts Wetlands Protection Act may also apply, depending on location. These regulations and policies apply to DCR employee, partner, and volunteer activities. If work is to be performed by volunteers it must also be consistent with DCR volunteer guidelines (DCR 2014).

Kiosks and Signs

The format and placement of regulatory and informational signs are governed by the MUTCD (FHA 2009) and guided by the DCR *Graphics Standards Manual* (DCR n.d.f). The design and construction of kiosks are solely governed by the graphics manual.

Informational kiosks are managed by park staff as new information becomes available; they also perform kiosk installation and repair.

Memorials and Markers

The placement or removal of memorials and plaques is prohibited unless authorized by the DCR. (302 CMR 12.04(26); Appendix D). Notable markers in the Complex, such as park dedication plaques, are identified in the individual chapters. Other markers, such as memorial benches or gardens, are not identified.



Example of a park dedication plaque, in this case from South Cape Beach. (See Appendix G for photo information.)

Management Resources

Volunteers

Volunteer activities in parks must be consistent with DCR guidelines (DCR 2014), including completion

of a Volunteer/Stewardship Agreement. Additional information on DCR’s volunteer guidance may be found at: <http://www.mass.gov/eea/agencies/dcr/get-involved/volunteer-ops/dcr-volunteer-in-parks-program-guide.html>.

1.11. RECOMMENDATIONS

Three priority management recommendations were developed for the entire Nickerson Management Complex. (Table 1.11.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

Table 1.11.1. Priority management recommendations for the Nickerson Management Complex.

Recommendation	Implementation^a
Conduct regular monitoring of properties in which the DCR has a legal interest (i.e., conservation restriction, easement) for consistency with agreements.	P, R, V
Prepare barrier beach management plans for all properties in the Complex with barrier beaches; assess the potential to include all of these properties in a single (i.e., Complex-wide) plan.	P, R
Contact the Office of Cultural Resources before starting any project beyond those described in the BMPs that may impact cultural resources identified in this RMP, especially those in locally designated historic districts.	P, R

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

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Campers arriving at Shawme-Crowell. (See Appendix G for photo information.)

SECTION 2. SHAWME-CROWELL STATE FOREST

2.1. INTRODUCTION

Shawme-Crowell State Forest is located in the towns of Bourne and Sandwich, south of the Cape Cod Canal. (Figure 2.1) It is accessed via Route 130 in Sandwich.

The history of Shawme-Crowell is one of early, rapid expansion followed by decades of reduction in area. Acquisition of forest lands began in 1909 and Shawme State Forest, as it was then known, was formally dedicated in 1922. By 1925 it had expanded to nearly 8,400 acres, making it the largest parcel of public land on Cape Cod at that time. The years leading up to World War II brought military training to the forest. Much of the forest's acreage was eventually transferred to the Special Military Reservation Commission to create the Massachusetts Military Reservation, now called Joint Base Cape Cod. The construction of Route 6 and a variety of land transfers and easements for municipal and state projects has reduced Shawme-Crowell to its current size of 605 acres.

Today, Shawme-Crowell is best known as a campground from which visitors explore Cape Cod

and southeastern Massachusetts. It is the only year-round campground in the Nickerson Complex.

The forest's physical, political, and regulatory attributes are summarized below. (Table 2.1.1)

Table 2.1.1. Physical, political, and regulatory settings of Shawme-Crowell State Forest.

Setting	Name or Metric
Location:	Bourne, Sandwich
Area (acres)^a:	605.47
Perimeter (miles)^a:	12.35
Landscape Designation(s)^b:	Parkland
Legislative Districts:	
House	Fifth Barnstable
Senate	Plymouth and Barnstable
Regulatory Designations:	Priority Habitat
	Old King's Highway
	Regional Historic District
	Fertilizer Management
	DCPC

a. Calculated using a Geographic Information System (GIS).

b. For a summary of DCR's landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.

DRAFT



Building	Town Boundary	Shawme-Crowell State Forest	N W E S		
Water Tower	Marsh				
Fire Tower	Open Water	Other Protected Open Space	Geographic information provided by MassGIS and DCR GIS.		

Shawme-Crowell State Forest
Figure 2.1.

0 0.25 0.5 Mile

Associated Properties. Four additional DCR-owned properties, all reforestation lots, are associated with Shawme-Crowell State Forest. These properties, The Sandwich and Falmouth reforestation lots and the two parcels that comprise Barnstable State Forest are managed by Shawme-Crowell personnel. They are addressed in detail in Section 14.

2.2. NATURAL RESOURCES

Physical Features

Shawme-Crowell is located atop the Sandwich Moraine, which runs East-West through the forest. It was formed when an advancing ice front overrode previously deposited sediments, pushing them upward and forward to form a large ridge, as if created by a bulldozer (Oldale n.d.). Elevations range from approximately 46 feet at Doughnut Pond to 292 feet at Telegraph Hill.

Water Resources

Shawme-Crowell has few water resources, with only one pond (i.e., Doughnut Pond) and little wetland acreage. (Table 2.2.1) Its elevation and distance from Cape Cod Bay result in low susceptibility to flooding, storm surge, and anticipated sea-level rise. (Table 2.2.2)

Table 2.2.1. Water resources of Shawme-Crowell State Forest.

Water Resource	Name or Metric
Watershed:	Cape Cod
Aquifer:	Cape Cod SSA
Lens	Sagamore
Rivers and Streams (miles)	0.53
Vernal Pools	
Certified (#)	0
Potential (#)	2
Wetlands (acres)	1.39
Lakes and Ponds (acres)	0.82

Table 2.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to Shawme-Crowell State Forest.

Type of Impact	Acres	%
Flooding:		
100-year Storm	0.00	0.00
500-year Storm ^a	0.00	0.00
Hurricane Inundation:		
Category 1 Storm	0.00	0.00
Category 2 Storm ^b	0.00	0.00
Category 3 Storm ^b	0.00	0.00
Category 4 Storm ^b	0.00	0.00
Sea Level Rise	0.00	0.00

a. Cumulative value; includes 100-year storm impacts.

b. Cumulative value; includes impacts of all lower category storms.

Rare Species

State-listed Species

Five state-listed species are known from the state forest. (Table 2.2.3)

Table 2.2.3. State-listed species of Shawme-Crowell State Forest, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d
Chain dot geometer	I	SC
Coastal swamp metarranthis	I	SC
Eastern box turtle	R	SC
Sandplain euchlaena	I	SC
Slender clearwing sphinx moth	I	SC

a. Presented alphabetically, by common name.

b. Fact sheets are available at:

<http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.

c. Types of state-listed species include: B = Bird; I = Insect; and R = Reptile.

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

Priority Habitat

Most of Shawme-Crowell (73.50%) has been designated Priority Habitat under MESA. This includes all of the forest except that portion located north of Route 6, east of the intersection of Roads C and D, and west of Pocasset Road.

Vegetation

There have been no comprehensive surveys of the flora of Shawme-Crowell. However, the regular monitoring of forest inventory plots provides basic information on common species present.

Extensive plant inventories have been conducted at the nearby Camp Edwards. The Camp's Integrated Natural Resources Management Plan identifies 556 taxa and also lists common species by natural community type (Massachusetts Army National Guard 2009). The flora of Shawme-Crowell State Forest is a sub-set of Camp Edwards' flora, and common plants of Camp Edwards likely occur within the same natural communities on the state forest.

Invasive Species

Five species of invasive or likely invasive plants have been incidentally observed. (Table 2.2.4) One of these, Japanese barberry, was planted as an ornamental shrub around comfort stations in Camping Area 1. Concentrations of invasives were noted in the operations area, former superintendent's residence area, and at leaf and wood piles west of the dumping station. Unidentified species of rose, olive, and honeysuckle occur at the former FAA building and at the former superintendent's residence. These plants may be invasive.

Table 2.2.4. Known invasive and likely invasive plants of Shawme-Crowell State Forest.

Species ^a	Status ^b
Black locust	I
Japanese barberry	L
Norway maple	I
Oriental bittersweet	I
Spotted knapweed	I

- Presented alphabetically, by common name.
- Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).
- Barberry was planted as an ornamental at Area 1 comfort stations and the camp store. Because of this, they are part of these buildings' cultural landscapes.

Natural Communities

There have been no formal surveys of natural communities. However, some community types have been identified; all are common in Massachusetts. (Table 2.2.5)

Table 2.2.5. Known natural communities of Shawme-Crowell State Forest.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Black Oak-Scarlet Oak Forest ^e	T	S3/S4	1
Cultural Grassland ^e	T	-	1
Mixed Oak Forest	T	S5	1
Pitch Pine - Oak Forest ^e	T	S5	1
Red Maple Swamp	P	S5	2
Shrub Swamp	P	S5	2

- Classified according to Swain and Kearsley (2011).
- E = Estuarine, P = Palustrine, T = Terrestrial.
- The NHESP ranks communities from most rare (S1) to the most common (S5).
- Information contained in this table was obtained from the following sources:
 - Incidentally observed by RMP Planner during site visits.
 - DEP Wetlands (1:12,000) data layer.
- Plants and wildlife commonly associated with these community types on nearby Camp Edwards are presented in Tables 6-2, 6-4, and 6-6 of Massachusetts Army National Guard (2009).

Forests

Much of Shawme-Crowell (87.79%), including its campsites, is forested. Non-forested areas include power line rights-of-way, roads, and small sections of cultural grassland associated with buildings and the dumping station.

Common forest trees include pitch pine, black oak, white oak, and sassafras. Common understory and shrub species include teaberry, black huckleberry, sheep laurel, low-bush blueberry, northern arrowwood, and greenbrier. A few remnant plantations of non-native Norway spruce, Scott's pine, and red pine also remain in the forest. (DCR, unpublished CFI data) Major causes of tree loss include borers, winter moth, bark beetles, white pine weevil, and heart rot. A remnant stand of Chinese chestnut, planted in 1954, remains near the former superintendent's residence.

Wildlife

No formal surveys have been conducted; as a result, there is little information specific to the forest. However, the Integrated Natural Resource Management Plan for the nearby Camp Edwards includes information on the common and rare wildlife of this area (Massachusetts Army National Guard 2009).

2.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic landscapes, buildings, structures, and objects. An

overview of significant events in the history of Shawme-Crowell State Forest is presented in Table 2.3.1. Cultural resources are identified in Table 2.3.2.

Table 2.3.1. Significant events in the history of Shawme-Crowell State Forest.

Year(s)	Events
1909-1911	Reforestation lands acquired along the Sandwich-Bourne town line.
1922	Shawme State Forest is formally established.
1925	Area of state forest estimated at 8,372 acres.
1930s	Civilian Conservation Corps conducts forestry activities and creates water holes for fire fighting.
1935	Special Military Reservation Commission is established for “the purpose of establishing a camp site for the use and training of military forces of the Commonwealth.” The Massachusetts Military Reservation is created along the southern boundary of Shawme State Forest.
1936	The Massachusetts legislature authorizes the governor to “place under the jurisdiction and control of the Special Military Reservation Commission...such parts of Shawme State Forest within two thousand yards of the southern boundary thereof” between June 15 and September 15.
1938	Forest renamed Shawme-Crowell in honor of Lincoln Crowell, a Cape official of the State Forestry Division and an advocate for the establishment of the forest.
1941	Additional portion of Shawme State Forest placed under the Special Military Reservation Commission.
ca. 1950	Construction of the Mid-Cape Highway through former state forest lands.
1956	An additional 1,090 acres are transferred from the state forest to the Massachusetts Military Reservation.
1953	A 25-year lease is issued to town of Sandwich for use of a portion of the state forest as a landfill. Similar leases follow.
1956-1960	Development of Area 1 campground; construction of current comfort stations.
1964	Development of Area 2 campground; construction of current comfort stations.
1981	Approximately 2.4 acres of state forest transferred to Department of Public Works for a maintenance depot.
1988	Sandwich Water District obtains easements through state forest. Additional easements are authorized in 1990.
2006	KeySpan Energy acquires easements through the state forest for a natural gas pipeline and buildings.
2015	Transfer of 13 acres of state forest land to MassDOT in exchange for 85 acres of land added to Scusset Beach State Reservation.

Table 2.3.2. Cultural resources of Shawme-Crowell State Forest.

Location and Resource ^a	Type ^b	Date ^c	Condition ^d	Integrity ^e	In Use ^f	Utilities ^g	MHC # ^h	Guidance ⁱ
Old King's Highway Regional Historic District	NRHD	17 th -19 th c.	-	-	-	-	SDW.R	-
Main Street – Route 130 Area	NRHD	18 th -19 th c.	-	-	-	-	SDW.1	-
Park Entrance	LA	1922-1960	-	H	-	-	-	1, 2
Camp Store – Mass. Forest Ranger Station	BU	ca. 1960	3	H	Y	E, S, W	SDW.509	3
Shawme State Forest Monument	OB	1922	-	H	-	-	-	1
Highway Boundary Markers	OB	-	-	U	-	-	-	1
Headquarters/Operations Area	LA	1914-1962	-	H	-	-	-	1
Administration Building – Building #356	BU	-	3	H	Y	E, H, I, S, T, W	-	3
Maintenance Garage – Building #355	BU	1962	4	M	Y	E, H	-	3
CCC Building – Building #347	BU	1914/1936	5	H	Y	E, H, S, T, W	-	3, 4
CCC Dynamite Bunker	ST	1934	4	M	-	-	-	1, 2
Former Superintendent's Residence Area								
Superintendent's House and Outbuildings	LA	Early 20 th c.	-	H	-	-	-	1, 2
Superintendent's House – Building #349	BU	1922	5	M	N	-	-	3, 4
Garage	BU	Early 20 th c.	5	L	N	-	-	3, 4
Calf Barn Foundation	BU	Early 20 th c.	6	L	N	-	-	3, 4
Chicken Coop	BU	Early 20 th c.	4	M	N	-	-	3, 4
Tool Shed	BU	Early 20 th c.	5	L	N	-	-	3, 4
Camping Area 1	LA	1936-1960	-	H	-	-	-	1, 2
CCC-built retaining walls	LA	1936-1941	3	M	-	-	-	1
Comfort Stations (4)	BU	1956-1960	4	H	S	E, S, W(S)	-	3
Camping Area 2	LA	1964	-	H	-	-	-	1, 2
Comfort Stations (5)	BU	1964	4	H	S	E, S, W(S)	-	3
455 Route 130, Sandwich								
Metal Building	BU	ca. 1960	4	M	N	-	-	3, 4
402 Route 130, Sandwich								
Former FAA Building	BU	-	4	H	N	E	-	3, 4
Additional Resources^j								
Indian Occupation Site	AR	-	-	U	-	-	-	5

- a. Geographic sub-regions of the forest are identified in Figure 2.1.
- b. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- c. Date of construction provided, when known.
- d. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- e. Integrity is a relative assessment of the condition of a resource's retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- f. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- g. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- h. Massachusetts Historical Commission inventory number.
- i. The following guidance is offered for the ongoing maintenance of these cultural resources:
 1. Refer to Historic Landscapes - Built Features BMP (DCR n.d.g)
 2. Refer to Vegetation in Historic Landscapes BMP (DCR n.d.h)
 3. Refer to Historic Building Maintenance BMP (DCR n.d.i).
 4. Refer to Mothballing Historic Buildings BMP (DCR n.d.j).
 5. Refer to Archaeological Features BMP (DCR n.d.k).
- j. Documented through the 1984/1985 Cultural Resources Evaluation Project but not yet field verified or confirmed.

Archaeological Resources

One pre-contact site is located within the limits of the forest. However, four “find spots” are documented abutting the parcel. Seven systematic archaeological surveys have been conducted adjacent to/near the forest during the last 30 years. One small campsite was located just outside the forest limits, where the manufacture/maintenance of chipped stone tools appears to have been the primary on-site activity. Shawme-Crowell State Forest has not been systematically surveyed and has a high archaeological potential.

Historic Resources

European settlers from the 17th century forward practiced many of the same land uses as the Native Americans who had worked the land for centuries prior, including wood harvesting, hunting and charcoal making. The Old King’s Highway (i.e., Route 6A), was the major transportation and communication link for the towns of the Cape in the 18th century, and residential and small agricultural development grew along the route in the 19th century. The Old King’s Highway Regional Historic District overlays nearly all of the state forest.

The state forest rapidly expanded in size following its establishment in 1922. A major fire in 1923 led the Commonwealth to purchase hundreds of acres of burned land in Bourne and Sandwich for the purposes of fire management and prevention. The forest became the center of operations for District 1 Forest Fire Control and Suppression, which is still based there today.

The 1930s saw the emergence of two trends, the development of forest infrastructure and the transfer of forest lands to the military. Two CCC camps were located in the forest between 1933 and 1935. Major projects included fire prevention, road construction, and recreation infrastructure. Much of the CCC’s handiwork (e.g., water holes) now lies within Camp Edwards on Joint Base Cape Cod; few resources remain within Shawme-Crowell.

Recreation development expanded in the 1950s and 1960s, with the construction of camping areas 1 and 2. This infrastructure remains in use by campers and park staff.

Historic Landscapes

Most of Shawme-Crowell’s historic resources are concentrated in four areas: the Park Entrance Area; the Headquarters/Operations Area; the Former Superintendent’s Residence Area; and Camping Areas 1 and 2. (Table 2.3.2; Figure 2.1). The following information describes these landscapes and their contributing elements.

Park Entrance Area. The park’s current entrance on Route 130 was also its entrance during the CCC period. A triangular median splits traffic in two directions; this feature dates to the CCC era. West of the median is a stone bearing a metal plaque commemorating the park’s dedication in 1922.



Dedication plaque and ornamental plantings, part of the Park Entrance Area landscape. (See Appendix G for photo information.)

The original point of contact for visitors was most likely the park headquarters on Flat Rock Road. In the 1960s, a new contact station (now the camp store) was constructed at a new entrance west of the current location and closer to Camping Area 1. The date of construction for this building is recorded in the MHC inventory form as 1923, but the building and new entrance does not appear on a map until 1963 and the building’s materials and foundation suggest a 1960s construction date. Its distinctive Colonial Revival design matches that of the comfort stations built during the same period, and features a deep overhanging eave and a four-sided portico. It may have been influenced by the design of the CCC-designed Contact Station at Nickerson State Park. The building also closely resembles the original design of the Sully Cottage, located at Nickerson. Although there is no longer access to Route 130 from this location, the split roadway around the

former contact station remains. The building is in good repair. In the 1980s, the current 6-sided contact station was built in the parking area between the entrances, and traffic was once again directed through the CCC-era entrance.



Shawme-Crowell's park store, the forest's former contact station. (See Appendix G for photo information.)

Both the present and former entries feature ornamental plantings, including rhododendrons, azaleas, white birch, arbor vitae, and red pine. Japanese barberry was included in plantings near the camp store. Some of the entrance area's plantings, most likely the rhododendrons at the current entry median, may have been introduced by the CCC; others were most likely introduced during the mid-century redesign.

The structures, plantings and road features create a landscape that retains integrity from three different periods of park management and recalls 75 years of welcoming visitors to Shawme-Crowell.

Headquarters/Operations Area. This area includes an eclectic mix of historic and non-historic buildings and structures. (See Section 2.5 for information on non-historic infrastructure.) The CCC building was constructed prior to the creation of Shawme State Forest and reconstructed by the CCC in the 1930s; it is the oldest building in the park. This building served as the initial park operations facility, around which the rest of the Headquarters/Operations Area developed. The CCC building is currently in use by the Massachusetts Division of Marine Fisheries (DMF) and is in poor condition, with roof damage, water damage, and mold throughout.



The CCC building predates the state forest, it is currently in disrepair. (See Appendix G for photo information.)

Later buildings include the forest's headquarters and a 10-bay, L-shaped maintenance garage (buildings #355 and #356, respectively). Both were constructed in a regional shingled style. Building #356 retains much of its original integrity while #355 has been altered with more modern materials. Both buildings are currently in use. The main floor of the headquarters is divided into two separate offices; one for MassParks employees who administer Shawme-Crowell, and the second for Bureau of Forest Fire Control and Forestry personnel. The Bureau also occupies two bays of the maintenance garage.

The remaining historic resource in this area, a CCC dynamite bunker is located behind the maintenance garage. It is in poor condition.

The collection of rustic utilitarian structures from different periods set around a central lot represents a typical DCR park headquarters' landscape and connects the first days of the park's development in the 1930s to the present day management of the facility.



Forest headquarters showing regional architectural style. (See Appendix G for photo information.)

Former Superintendent's Residence Area. This area includes one main building (i.e., the residence) and multiple outbuildings. (Table 2.3.2.) Although dates of construction are unknown, the style and construction methods suggest the 1920s or 1930s. The field stone faced foundations on the house and calf barn foundation are similar to that of the CCC building at the Headquarters/Operations area (which predates the CCC period). This collection of buildings is in poor condition, but the repurposing of existing buildings for park management is a common theme in the history of park development. Through the arrangement of reused agricultural outbuildings around the residence and the presence of planted shrubs, perennials and annuals, the landscape retains integrity as a typical staff-occupied residential setting.



Former superintendents house at Shawme-Crowell, (See Appendix G for photo information.)

Camping Areas 1 and 2. Most of the forest's comfort stations were designed and constructed in

the 1960s, based on the same regionally influenced Cape Cod-style template, featuring wood shingles, simple wood trim and gable end roof forms. Although the buildings are simply constructed, this level of design consistency throughout a facility is rare at DCR facilities. Most have rot and insect damage; some also have woodpecker damage. The general layout of the camping area and road network retains its original design. A stone retaining wall, believed to have been constructed by the CCC, borders a portion of Road C in Camping Area 1.



Comfort station in Camping Area 2, showing Cape Cod style architecture. (See Appendix G for photo information.)

Buildings

There are two historic buildings not associated with historic landscapes. Both are located off Route 130 in Sandwich; neither was constructed for park purposes. The first is a metal communications building purportedly associated with phone lines installed during and for the Kennedy administration. The other is a masonry block building formerly occupied by the Federal Aviation Administration (FAA). Both are in Poor condition.

Structures

There are no historic structures that are not associated with historic landscapes.

Objects

Granite boundary markers, with the letters MHB (i.e., "Massachusetts Highway Boundary") carved into the side facing the road, border Route 130 near the park's entrance. It is unknown how many of these objects remain along the park's 1,300 feet of frontage on the state highway.

2.4. RECREATION RESOURCES

The most popular recreation activity at Shawme-Crowell is camping and nearly all the forest's infrastructure is dedicated to this activity. There are 285 camp sites; arranged into two distinct areas. (Table 2.4.1; Figure 2.1) Both areas are open daily from early May through mid-October (i.e., camping season); Area 2 is open Thursday through Sunday the remainder of the year (i.e., off-season).

Table 2.4.1. Summary of camping resources at Shawme-Crowell State Forest.

Camping Resource	Area 1	Area 2	Total
Camp Sites (total)	100	185	285
Host Camper sites ^a	6	7	13
Management sites ^b	7	12	19
Group sites	0	4	4
Yurts	0	6	6
Other sites	87	156	243
Comfort Stations (total)	4	5	9
Winterized	0	1	1
Non-winterized	4	4	8
Shower Houses	0	1	1

a. For additional information see:

<http://www.mass.gov/eea/agencies/dcr/massparks/recreational-activities/host-camping-program-generic.html>

b. Management sites are held in reserve in case of registration errors (e.g., double booking).

Nearly all camping takes place from spring through early fall. In 2013, 11,154 campers, 94.5% of the annual total, stayed at Shawme-Crowell during the camping season. Only 614 people camped there during the off-season. All site types are popular during the summer; the most popular winter types are RV and group camping. (Table 2.4.1)

Table 2.4.2. Campsite occupancy rates, by type and season, for Shawme-Crowell State Forest.

Campsite Type	Summer ^a	Winter ^b
Group	36.8	48.5
Host	0.0	0.0
Pop-up Tent	25.8	0.9
RV/Trailer, non-electric	31.4	28.6
Standard non-electric	42.7	15.6
Tent only	30.5	10.2
Yurt	62.2	0.0
Total	35.43	15.13

Campers are primarily from Massachusetts and neighboring states and provinces. (Table 2.4.3)

Table 2.4.3. Common geographic origins of campers staying at Shawme-Crowell State Forest.^a

Geographic Origin	Summer ^b	Winter ^c
Massachusetts	64.7	75.4
Quebec	6.8	2.8
New York	4.9	1.2
Connecticut	4.3	1.6
Rhode Island	3.5	3.2
Unknown	2.3	2.4
New Hampshire	2.2	1.6
Ontario	1.5	-
Vermont	1.4	1.6
Maine	-	3.6
New Jersey	-	1.9
Total	91.6	95.3

a. Only states and provinces with one or more percent of total camping registrations are included.

b. Early May through mid-October 2013.

c. Mid-October 2013-early May 2014.

Accessible and partially accessible camp sites were established in both camping areas. This included 25 sites with accessible picnic tables; 10 of which also had accessible cooking grills. Many of these tables and grills are no longer usable due to a combination of age and vandalism. As a result, the forest's campsites do not meet the 5% accessibility minimum required under the Massachusetts Architectural Access Code (521 CMR 19.5.1). The shower house is equipped with ADA compliant showers; they do not work.

Between Camping Areas 1 and 2 is the forest's dumping station. It is used for dumping waste from self-contained campers (i.e., RVs) into a tight tank.

Two recreation resources, a playground and the Friends' of Shawme-Crowell (henceforth "Friends") pavilion area are located in Camping Area 2. The playground includes three features: a play ship, a climbing dome; and swings. Some of the climbing dome's bolts are rusted and protrude into the interior of the dome. The swings' chains and "s"-hooks are uncovered. The Friends' pavilion area includes a pavilion with picnic tables, storage shed, grill, outdoor sink, fire ring, six benches, two bike racks, and a locking bulletin board. It is used by the Friends for social events and fundraisers.



Two play features in the Shawme-Crowell playground; climbing dome is in foreground. (See Appendix G for photo information.)

In addition to camping, the following non-facility based recreation activities (i.e., those activities not requiring a building, rink, court, recreation field, or other constructed venue) take place at Shawme-Crowell:

- Cross-country skiing
- Dog walking
- Geocaching (11 caches as of October 2014)
- Hiking
- Horseback riding
- Hunting
- Ice hockey/Ice skating (Doughnut Pond)
- Letterbox (1 cache as of October 2014)
- Mountain biking
- Nature study
- Sledding

Campers at Shawme-Crowell are provided free access to nearby Scusset Beach State Reservation, Sandwich, for the purposes of access to Cape Cod Bay and the Cape Cod Canal.

2.5. INFRASTRUCTURE

Property Boundary

Most of the park lies within an area delineated by Routes 6, 6A, and 130. Numerous private properties also occur in this area; many about the forest. Several isolated parcels occur along Route 130; one borders Camp Edwards on Joint Base Cape Cod. This is the only portion of the forest that is contiguous with

other protected open space. The forest's boundary is not marked.

Buildings and Structures

Most of Shawme-Crowell's buildings and structures are historic. (Table 2.3.2) With a few notable exceptions (i.e., the shower house, comfort station, Friends' pavilion), recent DCR construction has focused on sheds and other temporary buildings (e.g., contact station). (Table 2.5.1; Figure 2.1) Recent major construction in the park has largely been by the federal government (i.e., the FAA Remote Command Air Ground (RCAG) facility), water companies, or utility companies. A new park contact station is scheduled to be built later in 2014.

Most DCR-owned buildings, both historic and non-historic) are in use by forest personnel or park visitors. The most notable exceptions are the buildings located at the former superintendent's residence; none of which are in use. One building, the 6-bay garage, is in use by the DMF (5 bays) and the Bureau of Fire Control and Forestry (1 bay). The DMF has proposed construction of a combined office, laboratory, and storage building adjacent to the 6-bay garage.

Utilities vary among buildings. (Tables 2.3.2 and 2.5.1) The headquarters and CCC buildings are heated with oil. All other heated buildings are heated with propane. Propane is also used to heat domestic water in all Area 1 comfort stations and the Comfort Station 1 and the shower house in Area 2. All water is provided by the Sandwich Water District.

There are 13 active septic systems; they discharge to groundwater. These are associated with the forest's 10 comfort stations, shower building, headquarters, and camp store. There are two inactive septic systems; one at the CCC building and the other at the former superintendent's residence. Waste from recreational vehicles is discharged into a "tight tank" via the dumping station. Two outdoor sinks, one at the break shed and the other adjacent to the Friends' shed, discharge to dry wells. An unsealed floor drain located at the bottom of the stairs leading to the headquarters' basement has been previously identified as out of compliance and needing to be sealed (Gannet Fleming, Inc. 1998a).

A CNG filling station is located at the entrance to the Operations Yard; it has been out of service for several years.

Table 2.5.1. Non-historic buildings and structures of Shawme-Crowell State Forest.

Location and Infrastructure ^a	Date ^c	Condition ^b	In Use ^d	Utilities ^e
Park Entrance				
Contact station	1982	3	Y	E, H, I, T
Break shelter	-	2	S	E, W(S)
Interpreter shed	1987	2	Y	E
Wood shed	1996	2	Y	-
Headquarter/Operations Area				
CNG filling station	-	3	N	E
6-Bay garage	1968	3	Y	-
Bundled wood storage shed	ca. 2012	1	Y	-
NStar Station 919 ^f	-	-	Y	E
Former Superintendent's Residence Area				
Air quality ("sniffer") shed ^f	-	-	Y	E
Air quality("sniffer") platform ^f	-	-	Y	E
Pig shed	-	6	N	-
Dumping Station Area				
Dumping station and tight tank	-	2	Y	E, S, W
Recycling shed	1999	2	Y	-
Camping Area 2				
Comfort station	-	2	Y	E, H, S, W
Shower house	-	3	Y	E, H, S, W
Friends' pavilion	2005	2	Y	E
Friends' shed	ca. 2005	2	Y	E, W(S)
Water towers				
Sandwich Water District tower ^f	1990	-	Y	E, W
Bourne Water District tower 1 ^f	-	-	Y	E, W
Bourne Water District tower 2 ^f	-	-	Y	E, W
455 Route 130, Sandwich				
Algonquin Gas/KeySpan building 1 ^f	2007	-	Y	E
Algonquin Gas/KeySpan building 2 ^f	2007	-	Y	E
402 Route 130, Sandwich^g;				
FAA Remote Center Air Ground (RCAG) Site				
FAA building ^f	ca. 1999	-	Y	E, H, I, S, T, W
FAA shed ^f	ca. 1999	-	Y	-
FAA outdoor classroom ^f	ca. 1999	-	Y	-
Confined space training structure ^f	ca. 1999	-	Y	-
Antenna towers (3) ^f	ca. 1999	-	Y	-

a. Geographic sub-regions of the forest are identified in Figure 2.1.

b. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.

c. Date of construction provided, when known.

d. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.

e. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

f. Infrastructure located on DCR property, but not owned or controlled by the DCR. Its condition is not assessed.

g. The Telegraph Hill Fire Tower is also located here; see Chapter 15 for information on this tower.

Roads

There are more than six miles of roads. (Figure 2.1) The conditions of these roads are summarized in Table 2.5.2.

Table 2.5.2. Condition and length of roads at Shawme-Crowell State Forest.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	4.03	1.25
Fair	0.00	1.06
Poor	0.00	0.00
Total	4.03	2.31

a. Based on field assessment; all distances calculated using GIS.

Paved roads are associated with the forest's headquarters and two camping areas. (Figure 2.1) Each camping area has a network of paved roads, with each road identified by a letter of the alphabet ranging from B to E. These camping areas connect to each other, and to the entrance area, via Road A.

Flat Rock Road runs from the park entrance, approximately southward, to Road A. Its use is restricted to official vehicles, and DCR and DMF employee's personal vehicles, and vehicles used by consultants to access air monitoring equipment.

A little-used access road, which connects Camping Area 2 to Route 130, is located between 88 Main Street and 2 Pine Street. There is no access gate and the road bed is indistinct, blending in with ornamental landscaping from abutting properties.

Parking

Parking is almost exclusively associated with campsites. Campers are allowed up to two vehicles per site. Additional vehicles, including boats on trailers, may be parallel parked on the paved shoulders of the park entrance road.

There are relatively few additional public parking spaces; none are HP accessible. (Table 2.5.3; Figure 2.1) Only those at the contact station have pavement markings. There is no formal parking at the playground; campers park their vehicles among the trees along Road E.

Table 2.5.3. Number of public parking spaces, by location and type, at Shawme-Crowell State Forest.

Location	HP	Other	Total
Contact station ^{a, b}	0	11	11
Camp store ^c	0	5	5
Shower building, Area 2 ^c	0	23	23
Friends' pavilion ^c	0	2	2
Total	0	41	41

a. Number of spaces is based on pavement markings.

b. There is room for an additional 28 vehicles to parallel park along the road shoulder.

c. Number of spaces is based on the number of potential 9-foot-wide spaces.

Employees park in the operations yard and along the entrance road adjacent to the Contact Station.

Trails

Shawme-Crowell lacks a formal, planned trail system. However, the combination of trails, forest roads, and utility corridors provides access to the entire park. The numbers of miles of trails, by condition, are presented in table 2.5.4. There is no forest-wide trail map; a guide exists for the nature trail loop. (See Section 2.6)

Table 2.5.4. Condition and length of official trails at Shawme-Crowell State Forest.

Trail Condition	Length (Miles)
Good	7.63
Fair	2.05
Poor	0.25
Total	9.93

Kiosks and Signs

There are two kiosks; both have DCR statewide property maps and announcements of interest to park visitors (e.g., hunting season dates). The first kiosk is located near the contact station and the second is located at the shower house parking lot in Camping Area 2. There are also two message boards. The first is located adjacent to the camp store and the second is located on a traffic island in Camping Area 2, at the intersection of Roads A and B. These boards, which were purchased by the Friends, are used to advertise events (e.g., pancake breakfasts).

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are six known markers. The Shawme State Forest dedication plaque and monument are located near the current park entrance. All remaining markers are associated with the Friends (e.g., memorial bench plaque).

2.6. INTERPRETATION

There were no formal interpretive programs offered in 2013. Ranger-led hikes take place on January 1 (i.e., First Day hikes), on Park Serve Day, and as requested by campers. These hikes include an interpretive component.

A self-guided nature trail is located adjacent to, the recycling shed dumping station. It includes 11 numbered points of interest that correspond to interpretive information provided on laminated trail guides.

2.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

Shawme-Crowell State Forest is managed by MassParks Staff. There are three year-round personnel. (Table 2.7.1) Seasonal employees provide additional staffing during the peak use period (i.e., Memorial Day through Columbus Day). There is no information on past staffing levels.

Table 2.7.1. Mass Parks personnel assigned to Shawme-Crowell State Forest.

Job Title	Number of Positions 2014
<i>Year-round Personnel</i>	
Forest and Park Supervisor III	1
Laborer II	2
<i>Seasonal Personnel</i>	
Clerk II	0
Forest and Park Supervisor I	4
Laborer I (Short-term)	1
Laborer I (Long-term)	4
Laborer II	2
Summer Worker	3 ^a

a. Only one of these positions was filled in 2014; the employee did not stay for the full term of employment.

Two Bureau of Fire Control personnel, a Fire Warden and Patrolman, are based at Shawme-Crowell on a year-round basis.

Partnerships and Volunteers

The Friends provide the majority of volunteer hours. Typical activities include aiding and assisting campers, trimming brush along roads, trail maintenance, and assisting with First Day hikes and Park Serve day. Additional volunteer support comes from Boy and Girl scouts whose community service projects have included performing trail work, constructing benches, and creating a nature trail map. Scouting projects tend to be one-time activities, while the Friends' activities are ongoing.

Public Safety

Sandwich Fire Department provides fire response and emergency services.

Funding

Conservation Trust Fund

When the camp store is closed, the DCR offer bags of firewood in exchange for donations of \$5.00. In 2013, an estimated 2,000 bags were provided to campers (L. Perry, pers. comm.). Portions of donations in excess of DCR's cost of providing the firewood are deposited into the DCR Conservation Trust Fund for use at Shawme-Crowell.

Retained Revenue

The summer 2013 camping season generated approximately \$192,200 in retained revenue; an additional \$5,700 was generated in the off-season. The camp store concession generated an additional \$250.

Other Revenues

A portion of Shawme-Crowell is leased to the town of Sandwich for use as a landfill, and later a transfer station. Fees associated with this lease are held in a dedicated fund for use at the park.

The Friends raise funds to support the park through events such as ice cream socials, hot dog socials, and pancake breakfasts held during the busy summer months. They also pursue grants and donations for their activities. Their efforts have resulted in the purchase of a pavilion, shed, and playground equipment.



Message board used to advertise fund raising activities in the forest. (See Appendix G for photo information.)

2.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs (e.g., Table 2.3.2), legal agreements, and institutional knowledge. This section describes those practices unique to the management of Shawme-Crowell State Forest. Legal agreements unique to the forest are listed in Table 2.8.1.

Table 2.8.1. Key legal agreements for the use of Shawme-Crowell State Forest.

Party and Subject of Agreement	Type^a	Expiration Date^b
<i>Existing Agreements</i>		
Algonquin Gas/Keyspan Energy Siting of pipeline and buildings.	E	None
MassDOT Land transfer to facilitate site clean-up.	U	None
William K. Earl Concession for camp store.	-	2013
Mass Division of Marine Fisheries Use of existing building.	A	-
Mass Division of Marine Fisheries Permission to construct new building.	A	-
Federal Aviation Administration Siting of buildings at Telegraph Hill. License No. DOT-FA77NE-0665.	L	None
<i>Unknown Status^c</i>		
Genon Canal, LLC (formerly Mirant) Siting of air monitoring equipment.	-	-

- a. Agreement types include: A=Memorandum of Agreement; E=Easement; L=Lease; and U=Memorandum of Understanding.
- b. Year that agreement expires. Permanent agreements are indicated by an expiration date of "None."
- c. Unknown status includes uses for which there is no agreement and uses for which an agreement exists but was not located during the preparation of this RMP.



Air monitoring equipment and associated shed; an agreement for this equipment was not located during the preparation of this RMP. (See Appendix G for photo information.)

Key management and guidance documents are identified in Table 2.8.2.

Table 2.8.2. Key management and guidance documents for Shawme-Crowell State Forest.

Author and Document	Year
Gannett Fleming, Inc. Environmental Audit Report: Shawme-Crowell State Forest, Sandwich, Massachusetts.	1998a

Annual Maintenance

Ongoing management practices typically follow a regular schedule. Common activities, and the desired frequency with which they occur, are identified in Table 2.8.3.

Table 2.8.3. Annual cycle of management activities at Shawme-Crowell State Forest.

Activity	Spring ^a	Summer ^a	Fall ^a	Winter ^a
Bathroom-Open for season	1	N/A	N/A	N/A
Bathroom-Winterize	N/A	N/A	1	N/A
Cleaning - Bathroom(s)	AN	AN	AN	AN
Cleaning-Campsites	AN	AN	AN	AN
Cleaning - Walkways	AN	AN	AN	AN
Litter removal-Recreation areas	AN	AN	AN	AN
Litter removal - Trails	AN	AN	AN	AN
Maintenance - Picnic sites, fences, etc.	AN	AN	AN	N/A
Mowing and trimming	AN	AN	AN	N/A
Playground inspection	AN	AN	AN	AN
Pruning - Trees and shrubs	AN	AN	AN	AN
Sweeping - Walkways	AN	AN	AN	AN
Trash - Empty - Barrels	AN	E7	AN	AN
Trash-Empty-Bathroom	D1	D1	D1	D1
Weeding - Flower beds and grassy areas	N/A	AN	N/A	N/A
Weeding - Paved areas	N/A	AN	N/A	N/A

a. Frequency codes are: AN = As needed; D = Daily, # times; E = Every # days; N/A = Not applicable.

Natural Resources

Water Resources

The Groundwater Discharge Permit (#860-0) for the forest's 13 Subsurface Sewage Disposal Systems (SSDSs) specifies monitoring and maintenance activities. This includes pumping and formally inspecting all septic tanks at least once every three years and sampling and analyzing groundwater from up- and down-gradient monitoring wells on a quarterly basis. These activities are performed under contract for the DCR. See the most recent Groundwater Discharge Permit for full monitoring and reporting requirements. When issued, this permit had an expiration date of April 16, 2014; it was automatically extended four years under the Permit Extension Act (Section 173 of Chapter 240 of the Acts of 2010).

Septage accumulated in the dumping station's tight tank is transported off-site for treatment and disposal. This takes place approximately 8–10 times during peak camping season.

Neither the town of Bourne nor Sandwich has promulgated or approved local fertilizer regulations under the Fertilizer Management DCPC.

Rare Species

There are no activities unique to this property.

Invasive Species

There are no monitoring or management activities.

Vegetation

Lawn mowing and weeding takes place on an as needed basis at the park entrance, adjacent to comfort stations and park headquarters, and at the dumping station. Utility companies are responsible for vegetation management along their rights-of-way. Under the terms of their lease, the FAA has the right to maintain vegetation within their RCAG facility, as well as a 10-foot buffer outside their fence.

Air Quality

Genon Canal, LLC monitors particulate emissions from its canal plant with sampling equipment located at the air quality shed and air quality monitoring platform. An environmental consultant

visits the site and monitors the equipment at least once per week on a year-round basis.

Cultural Resources

Portions of the forest north of Route 6 are within the Old Kings Highway Regional Historic District. Changes in the exterior of buildings, structures, fences; new construction; and demolition are subject to review by the Old King's Highway Historic District Committee. See the Committee's web page for additional information.

(<http://www.townofbarnstable.us/OldKingsHighway>)

Recreation Resources

The Friends provide ongoing maintenance of the playground area, including maintaining the wood chip ground covering.

The park's recycling center provides containers for a variety of recyclable materials (e.g., glass, metal cans) and empty propane tanks, and dumpsters are provided for solid waste. During peak camping season an additional dumpster is placed at the park entrance. Dumpsters are emptied twice per week during peak camping season and once per week the rest of the year. Recycling is transported to the Sandwich transfer station as needed. Litter is picked up and disposed of as needed.

The Camp Store is operated in accordance with terms identified in an annual permit agreement between the DCR and the concessionaire. (Table 2.8.1)

Infrastructure

Buildings

Forest employees perform major repairs (e.g., roofing a building) when materials are made available by the Regional Office. In the past, the Friends have used their funds to hire private contractors to perform repairs or upgrades (e.g., installing electric lights and outlets in the Friends' Pavilion).

There are two agreements with the DMF for their use of buildings on Shawme-Crowell. (Table 2.8.1) The first is for their current use of the CCC building and the second is to allow the DMF to construct a new building in the Headquarters/Operations Area. Under these agreements, the DMF is "solely

responsible for maintaining" their premises in a "clean and orderly manner."

Utility and public service companies with facilities in the state forest are solely responsible for the maintenance of their buildings and structures.

An agreement with Genon Canal, LLC could not be located during the preparation of this RMP. It is presumed that they are solely responsible for the operation and maintenance of their air quality monitoring facility.

Roads

Dirt roads are repaired by either park staff or easement holders, depending on the location of the needed repair. The Sandwich Water District maintains the roads between its water tower and the intersection of Bayview Road and Road A. The Bourne Water District is responsible for maintaining access to its water towers from Route 6. NStar is responsible for maintaining vehicle access along its utility line right-of-way. Algonquin Gas and Keyspan Energy are responsible for maintaining access roads along their easement, for their use.

State forest personnel plow snow on the following roads: the main entrance road; Road A to Camping Area 2; portions of roads A and B, and all of roads C and D in Camping Area 2 (i.e., roads associated with those camp sites open in winter); Flat Rock road from the forest entrance to the former superintendent's residence; and the travel lane through the operations yard.

Utility companies and the FAA are responsible for providing winter access to their facilities.

Parking Areas

State forest personnel provide minor repairs (i.e., filling potholes) and snow removal to the shower house's parking lot, and paved areas adjacent to the operations area's buildings.

Trails

Trails are maintained by volunteers, including members of the Friends.

Kiosks and Signs

Park employees are responsible for updating the content of kiosks. The Friends are responsible for

updating their message boards and the bulletin board near the pavilion.

2.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of Shawme-Crowell State Forest. Applied Land Stewardship Zoning recommendations provide general guidance for managing Shawme-Crowell. Future activities and projects should be checked against the zoning map (Figure 2.2) for consistency. Management recommendations for Shawme-Crowell are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 2.2)

The following Land Stewardship Zoning is recommended for Shawme-Crowell State Forest.

Zone 1

- No sections of Shawme-Crowell have been designated Zone 1.

Zone 2

- Most of the forest has been designated Zone 2. This keeps most currently undeveloped areas undeveloped. It also maintains a forested buffer between the two camping areas and Route 6, and the two camping areas and residences that abut the state forest.

Zone 3

Most areas designated Zone 3 are currently developed. This includes:

- Entrance Area
- Headquarters/Operations Area
- Former Superintendent's Residence Area
- Camping Area 1
- Camping Area 2
- Dumping station and recycling area

- Bourne Water District towers
- Sandwich Water District tower
- Sandwich transfer station
- MassDOT operations yard
- Algonquin Gas/Keystone Energy buildings
- FAA RCAG facility
- Telegraph Hill fire tower and former FAA building area.

The only currently undeveloped area designated as Zone 3 is located immediately southeast of Camping Area 2. Roads C and D were previously extended south from area 2 to allow for the future expansion of camping. Designating this area Zone 3 preserves the potential for future campground development, as previously envisioned. No expansion is proposed at this time.

Significant Feature Overlay

There are no Significant Feature Overlays.

Management Recommendations

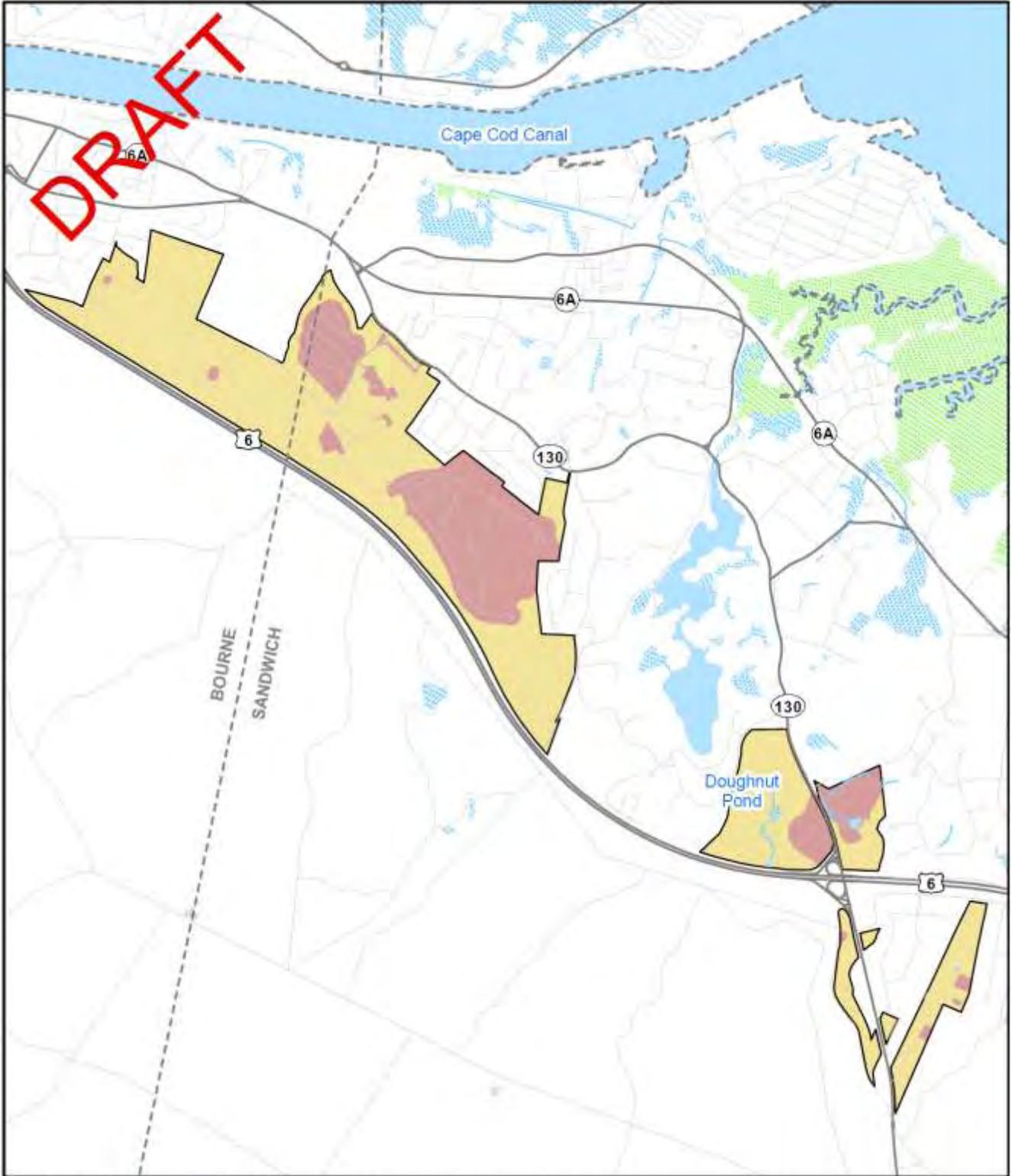
Fifteen priority management recommendations were developed for Shawme-Crowell State Forest. (Table 2.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

DRAFT



Shawme-Crowell State Forest
Figure 2.2. Recommended Land Stewardship Zoning

— Major Road	Marsh
— Minor Road	Salt Marsh
— Hydrologic Connection	Open Water
- - - Town Boundary	Land Stewardship Zoning
	Zone 2
	Zone 3

0 0.25 0.5 Mile

Geographic information provided by MassGIS and DCR GIS.

Table 2.9.1. Priority recommendations for Shawme-Crowell State Forest.

Recommendation	Implementation^a
Install an external sink on the comfort station near the Friends' pavilion; remove current temporary sink from near the pavilion.	R, V
Seal the floor drain in the basement stairwell of the park headquarters and install an alternative drainage system to prevent flooding.	C, E, R, O
Perform a structural analysis of the former superintendent's residence and associated outbuildings to determine whether they can be reasonably rehabilitated. Assess for eligibility in Historic Curatorship Program and, if appropriate, seek possible addition to enabling legislation.	C, E, P
Rehabilitate all 1950s and 1960s vintage comfort stations in a manner that provides campers current bathroom amenities while maintaining the existing regionally-influenced design standard.	C, E
Evaluate and re-roof the CCC building; mothball it until a park-related use can be identified.	C, P, O
Clear vegetation from the CCC dynamite bunker and evaluate for masonry repairs.	C, P
Continue existing maintenance practices for the administration building (# 356); no alteration to the exterior should take place without consultation with the OCR.	R
Secure and mothball former FAA building to prevent access, identify ownership and, if appropriate, demolish the building.	C, E, O
Address safety issues in playground equipment and increase frequency of inspections.	E, R
Ensure that at least 15 camp sites have accessible tables and grills.	R, U
Repair ADA accessible showers in the shower house.	C, E, R
Investigate potential encroachment along Main and Pine Streets and resolve with abutters if warranted.	L, R
Develop and distribute a Shawme-Crowell trails map to allow visitors to safely navigate the forest's trail system.	B
Locate and review the agreement for the presence of air monitoring structures and equipment in the park, and for consultant access to this equipment.	L, R
Provide at least one accessible space, access aisle, and proper pavement markings and signs in each of the following parking lots: contact station, camp store, shower building, and Friends' pavilion.	C, E

- a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.



Waquoit Bay as viewed from WBNERR headquarters. (See Appendix G for Photo information.)

Section 3. Waquoit Bay National Estuarine Research Reserve

3.1. INTRODUCTION

Waquoit Bay is an 825 acre shallow coastal embayment in the towns of Falmouth and Mashpee. It is protected from the waters of Vineyard Sound by large barrier beaches backed by salt marshes and upland forests (Geist 1996). The bay connects to its larger watershed through both surficial waters (e.g., Childs and Quashnet rivers, Abigail's Brook) and groundwater flow.

The term "Waquoit Bay National Estuarine Research Reserve" (WBNERR) is often used interchangeably to refer to two different concepts. First, it is used to refer to the collection of DCR properties located on Waquoit Bay and throughout its watershed that collectively form one of 28 National Estuarine Research Reserves (i.e., the Reserve). Each of these areas is protected for long-term research, water quality monitoring, education, and coastal stewardship. Second, the term references a specific property, where the Reserve's headquarters is located, on Route 28 in the Falmouth village of Waquoit. (Figure 3.1) The headquarters area, also referred to as the "campus," includes the Reserve's administrative, operations, and visitor facilities. This section addresses only the WBNERR headquarters

area and the nearby Caleb Pond parcels. (Figure 3.1) Information on the entire Reserve may be found in WBNERR (2014).

The WBNERR headquarters is located on the grounds and in the buildings of the former Sargent Estate, which is situated on a bluff overlooking the bay. (See Section 3.3 Cultural Resources for additional information.) The estate was acquired in 1987 to serve as the Reserve's visitor center and headquarters. The Reserve itself was formally designated the following year.

Today, the WBNERR headquarters is perhaps best known to the public as an information, education, and research center. From an agency perspective, it is also the administrative and operations facility for both the National Estuarine Research Reserve and the individual DCR properties that comprise the Reserve.

WBNERR's physical, political, and regulatory attributes are summarized in Table 3.1.1. This table, and all others in this Section, include combined information on WBNERR and associated properties.



Table 3.1.1. Physical, political, and regulatory settings of WBNERR and Caleb Pond.

Setting	Name or Metric
Location:	Falmouth
Area (acres)^a:	33.37
Perimeter (miles)^a:	1.80
Landscape Designation(s)^b:	Reserve, Parkland
Legislative Districts:	
House	Fifth Barnstable
Senate	Plymouth and Barnstable
Regulatory Designations:	Priority Habitat
	Waquoit Bay ACEC
	Outstanding Resource
	Waters – Waquoit Bay ACEC
	Fertilizer Management
	DCPC

- a. Calculated using a Geographic Information System (GIS).
 b. For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.

Associated Properties. One additional property, Caleb Pond, is included in this section. (See Figure 3.1 for the location of this property.)

- **Caleb Pond.** This 11.4 acre property is located on the shores of Bourne and Caleb ponds, off Metoxit Road, Falmouth.

WBNERR headquarters and the Caleb Pond property are part of the Waquoit Bay National Estuarine Research Reserve. Other properties in the Reserve include South Cape Beach (Section 4), Washburn Island (Section 5), and Quashnet Woods State Reservation and associated watershed lands (Section 6).

3.2. NATURAL RESOURCES

An overview of the ecology of Waquoit Bay was presented in Geist (1996).

Physical Features

WBNERR is located on the north shore of Waquoit Bay. Elevations range from sea level to approximately 30 feet above sea level at the headquarters and at the Caleb Pond parcels.

Water Resources

There are three ponds; an unnamed salt pond immediately west of the Reserve’s headquarters, and Bourne and Caleb ponds at the Caleb Pond property. (Table 3.2.1) Short tidal creeks connect the unnamed salt pond and Caleb Pond to Waquoit Bay. An additional stream segment passes through the Caleb Pond property.

Table 3.2.1. Water resources of WBNERR and Caleb Pond.

Water Resource	Name or Metric
Watershed:	Cape Cod
Aquifer:	Cape Cod SSA
Lens	n/a
Rivers and Streams (miles)	0.00
Vernal Pools	
Certified (#)	0
Potential (#)	0
Wetlands (acres)	2.12
Lakes and Ponds (acres)^a	1.87

- a. Includes overlap with adjacent water bodies.

Its proximity to Waquoit Bay makes all low-lying portions of WBNERR susceptible to flooding, storm surge, and anticipated sea-level rise. (Table 3.2.2) A category 1 hurricane would inundate the unnamed salt pond and adjacent marshes, and damage the seaward side of the boat house. A category 3 storm would inundate the entire boat house.

Table 3.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to WBNERR and Caleb Pond.

Type of Impact	Acres	%
Flooding:		
100-year Storm	8.43	25.25
500-year Storm ^a	8.56	25.64
Hurricane Inundation:		
Category 1 Storm	6.17	18.48
Category 2 Storm ^b	7.41	22.20
Category 3 Storm ^b	8.70	26.08
Category 4 Storm ^b	10.54	31.59
Sea Level Rise	4.19	12.57

- a. Cumulative value; includes 100-year storm impacts.
 b. Cumulative value; includes impacts of all lower category storms.

A barrier beach (Fm-6) extends approximately 450 feet along the shore of Waquoit Bay to the south of the unnamed salt pond.



A small barrier beach (Fm-6) on the west side of WBNERR separates a salt marsh from the larger bay. (See Appendix G for Photo information.)

Rare Species

State-listed Species. Five state-listed species are known from the WBNERR headquarters area; two are also federally listed. (Table 3.2.3) One candidate for federal listing, the New England Cottontail, is present in the Caleb Pond property. As of this writing, the bushy rockrose has been proposed for delisting under MESA.

Table 3.2.3. State-listed species of WBNERR and Caleb Pond, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^{c, e}	MESA ^d
Bushy rockrose	P	SC
Common tern	B	SC
Data sensitive rare plant ^{e, f}	P	E
Eastern box turtle	R	SC
Roseate tern ^e	B	E

- a. Presented alphabetically, by common name.
- b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.
- c. Types of state-listed species include: B = Bird; P = Plant; and R = Reptile.
- d. Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.
- e. This species is also federally endangered.
- f. The name of this species is not released in accordance with NHESP's policy of not revealing in site-specific documents the name or location of rare species susceptible to collection.

Priority Habitat

Priority Habitat at WBNERR (2.52 acres, 7.54%) is restricted to two areas: the headquarters' cultural grasslands and the waters of Waquoit Bay. The latter provides foraging habitat to terns that nest off the property.

Vegetation

Surveys have largely focused on aquatic plants. Lists of macroalgae and vascular plants common to the bay are provided in Geist (1996). More recently, a multi-year survey identified the aquatic vascular plants of Waquoit Bay and its tributaries. A guide to the common plants of the Sargent Estate was developed as part of WBNERR's interpretive materials.

Invasive Species. Four invasive plants are known from the headquarters and Caleb Pond areas. (Table 3.2.4) An unidentified species of bittersweet is present at Caleb Pond; it is potentially invasive.

Table 3.2.4. Known invasive and likely invasive plants of WBNERR and Caleb Pond.

Species ^a	Status ^b
Japanese barberry	I
Multiflora rose	I
Norway maple ^c	I
Oriental bittersweet	I

- a. Presented alphabetically, by common name.
- b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).
- c. Recorded only on the Caleb Pond parcel.

One potentially invasive plant, chee reedgrass, has also been observed on WBNERR grounds. This species was not evaluated by MIPAG (2005), but has life history traits consistent with invasive plants.

Natural Communities

There have been no formal surveys of natural communities. However, some community types have been tentatively identified. (Table 3.2.5) Forest cover types have been classified and mapped for this property and for all others in the Reserve.

Table 3.2.5. Known natural communities of WBNERR and Caleb Pond.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Coastal Salt Pond Marsh	E	S2	1
Cultural Grassland	T	-	1
Maritime Beach Strand	T	S3	1

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from the following sources:
 1. Incidentally observed by RMP Planner during site visits.

Forests

WBNERR is 63.49% forested. This includes the eastern portion of the headquarters and nearly all of the Caleb pond property.

Wildlife

Terrestrial wildlife has not been surveyed; finfish and invertebrates common to the bay were identified in Geist (1996). The stream through the Caleb Pond parcel serves as a diadromous fish run for American eel.

3.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic buildings, structures, and landscapes. An overview of significant events in the history of WBNERR is presented in Table 3.3.1. Cultural resources are identified in Table 3.3.2.

Archaeological Resources

Sites in the vicinity of WBNERR range in age from possibly as early as the Paleo Indian Period (12,900 years ago) to the Contact Period (450 BP) and may be expected to have survived on undeveloped land. In its entirety, WBNERR must be considered highly archeologically sensitive for pre-Contact resources. Four pre-Contact sites are recorded in WBNERR and two archaeological surveys have been conducted within the limits of the parcel.

One known archaeological resource, a well, is located behind the Carriage House.

Historic Resources

The abundance of natural resources that attracted native Mashpee Indians to the area also attracted white settlers soon after their 17th century arrival. The area around WBNERR flourished in the 19th century as a local manufacturing and seafaring center with a strong agricultural base. In the late 19th century the area became a popular location for the construction of summer estates for wealthy urban dwellers. The late 19th century Sargent Estate makes up the core of WBNERR. The main house was built between 1880 and 1890 by Ignatius Sargent in the Shingle Style of late Victorian construction and used as a summer “cottage” for family vacations until it was damaged by the 1938 hurricane. Following the 1938 hurricane, the building was boarded up for almost fifty years until it was acquired by the Commonwealth in 1987 for use as the Reserve’s headquarters. All of the historic buildings have been adapted for new uses.

Historic Landscapes

Sargent Estate Landscape. WBNERR’s most significant historic resource is the Sargent Estate landscape. The core of this 1880s estate consists of four buildings built for Ignatius Sargent: the Visitor Center/Main Offices; Gate House; Boat House; and Carriage House. The landscape and buildings are contributing resources to the Waquoit Village National Register District.



The Ignatius Sargent House is the administrative headquarters for the four parks within the Reserve. The accessible entrance to the visitor center is visible in the center of the photo. (See Appendix G for Photo information.)

Table 3.3.1. Significant events in the history of WBNERR and Caleb Pond.

Year(s)	Events
1974-1978	The state investigates the feasibility of establishing one or more National Estuarine Sanctuaries (now called National Estuarine Research Reserves) at Waquoit Bay.
1979	Waquoit Bay designated as an Area of Critical Environmental Concern.
1981	Commonwealth recommends Waquoit Bay for designation as a National Estuary Sanctuary. It is awarded a pre-acquisition grant to further evaluate the site, collect information necessary for a management plan, draft an Environmental Impact Statement, and begin preliminary acquisition activities.
1987	Federal funding is used to acquire the Sargent Estate to serve as the Reserve's visitor center and headquarters.
1988	Formal designation as a National Estuarine Research Reserve.
1989-1991	Legislature authorizes over \$1,500,000 for the establishment of WBNERR.
1994-1999	\$1,240,000 in federally-funded grants is authorized for exhibits and renovations.
2008	Caleb Pond parcel added to the reserve.

Table 3.3.2. Cultural resources of WBNERR and Caleb Pond.

Location and Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance ^h
Waquoit Village	MHCA	1750-1900	-	-	-	-	FAL.A	-
Waquoit Historic District	NRHD	1750-1900	-	-	-	-	FAL.AY	-
Reserve Headquarters								
Sargent Estate Landscape	LA	1880s	-	M	-	-	-	1
Ignatius Sargent House	BU	1885	3	H	Y	E, H, I, S, T, W	FAL.242	1
Gate House	BU	1885	2	M	Y	E, H, I, S, T, W	FAL.795	1
Boat House	BU	1885	3	M	Y	E, H, I, S, T, W	FAL.796	1
Carriage House	BU	1885	3	H	Y	E, H, I, S, T, W	FAL.797	1
Well	AR	ca. 1885	5	M	N	-	-	2

- Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; MHCA – Massachusetts Historic Commission Area; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- Date of construction provided, when known.
- Building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS): 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- Integrity is a relative assessment of the condition of a resource's retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- Massachusetts Historical Commission inventory number.
- The following guidance is offered for the ongoing maintenance of these cultural resources:
 - Refer to Historic Landscapes - Built Features BMP (DCR n.d.g).
 - Refer to Archaeological Features BMP (DCR n.d.k).

The landscape retains integrity in the collection of original structures and the prominence of the estate's original circular drive. Much of the planted landscape has been altered to create educational exhibits, however, many mature trees including maple, birch, and oak which most likely date from the estate period remain, and the vista from the house to the bay remains cleared. The entry drive is edged with planted trees and although the estate is relatively small, the open, undeveloped naturalistic landscape bordering the approach retains its historic integrity and sense of separation from Route 28. In addition, the low stone wall and entry gates that enclose the estate remain in excellent condition.



The Sargent Estate's circular drive and Carriage House. (See Appendix G for Photo information.)

The estate core is the last remaining example of the late 19th century summer estates that once characterized the Waquoit Village area. This intact collection of estate buildings and landscape features is a significant and rare resource within the DCR system, as many former estates acquired by the agency have lost significant structures and landscape elements to deferred maintenance and vandalism. The active reuse of the buildings by the Reserve is a great benefit to the long term preservation of the resource but also carries additional care and responsibility.



The Boat House as viewed from the shore of Waquoit Bay. (See Appendix G for Photo information.)

Structures

There are no historic structures that are not associated with Sargent Estate landscape.

Objects

There are no known historic objects.

3.4. RECREATION RESOURCES

WBNERR's main functions are research, education/outreach, administration, and operations. As a result, there is little recreation infrastructure, and few recreation activities take place here. There is no beach access for the general public. The following recreational activities are known to take place:

- Fishing, shellfish
- Geocaching (1 caches as of November 2014)
- Hiking
- Nature study (e.g., bird watching)
- Scenic viewing (view across bay to Washburn Island)

3.5. INFRASTRUCTURE

Property Boundary

The WBNERR headquarters area is situated between Waquoit Bay to the south, Waquoit Landing Road to the west, Route 28 and Whistler's Way to the north, and private residences to the east. None of the boundaries are posted.

The Caleb Pond parcels are bounded by a mixture of Private residences, pond shores, and Metoxit Road.

These boundaries are posted. Despite this, encroachment may be occurring along Metoxit Road.

A 0.30 acre easement on 71 Whistler’s Way (Figure 3.1) allows access for “bathing and other recreational purposes.” An additional easement, on 0.46 acres of town of Falmouth land, allows access to the Caleb Pond property from between 26 and 80 Whistler’s Way.

Buildings and Structures

Most of WBNERR’s buildings are historic; constructed as part of the Sargent Estate. (Table 3.3.2) Non-historic buildings are limited to a newly constructed garage/maintenance building, and two sheds. (Table 3.5.1)



This maintenance garage, built in 2013, is the operational center for the four parks within the Reserve. (See Appendix G for Photo information.)

Recent construction and building renovations have focused on increasing energy efficiency and

decreasing greenhouse gas emissions. All buildings are heated with natural gas. Solar panels provide domestic hot water to the Gatehouse. Photovoltaic panels adjacent to the Gatehouse and on the roof of the garage feed into the electric grid, offsetting electric costs.

There are four septic systems; one for the Sargent House (i.e., headquarters), Carriage House, and Boat House, and a combined system for the Gate House and Maintenance Garage. There are two tight tanks, one for a sink in the Carriage House and the other for the floor drains and shop sink in the Maintenance Garage. All water is provided by the town of Falmouth.

Roads

A network of unpaved driveways, either gravel or gravel covered with crushed seashells, provides access to buildings and parking areas. (Figure 3.1) The conditions of these driveways are summarized in Table 3.5.2.

Table 3.5.2. Condition and length of driveways at WBNERR.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	0.04	0.44
Fair	0.00	0.00
Poor	0.00	0.00
Total	0.04	0.44

a. Based on field assessment; all distances calculated using GIS.

Table 3.5.1. Non-historic buildings of WBNERR and Caleb Pond.

Location and Infrastructure	Date^a	Condition^b	In Use^c	Utilities^d
Reserve Headquarters				
Garage/Maintenance Building	2013	1	Y	E, H, I, S, T, W
Shed	-	3	Y	-
Shed, “Andy’s Place”	-	2	Y	E

- a. Building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS): 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- b. Date of construction provided, when known.
- c. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.
- d. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

Parking

Parking is limited, with only 41 public spaces. (Table 3.5.3; Figure 3.1). Accessible parking lot is provided in a two-car lot adjacent to the Sargent House. This lot is gravel, with a covering of crushed seashell. It lacks proper signs and an access aisle.

Table 3.5.3. Number of public parking spaces, by location and type, at WBNERR.

Location	HP	Other	Total
Main Lot ^a	0	20	20
Boat House ^a	0	2	2
Carriage House – West Side ^a	0	5	5
Off-Loop ^a	0	4	4
Sargent House	2	0	2
Gate House ^a	0	8	8
Total	2	39	41

a. Number of spaces is based on the number of potential 9-foot-wide spaces.

During the summer, parking spaces adjacent to the gate house are used by visiting researchers staying in that building. Employees park in the main lot, adjacent to the boat house, to the south of the carriage house, and in a lot adjacent to the new garage. Only the last of these lots is paved.



WBNERR's only designated HP parking is located adjacent to the Sargent House's ramp, on soft soil. (See Appendix G for Photo information.)

Trails

A small formal trail system loops through the property. It is largely located among the forested portion of the property. This trail incorporates portions of the driveway, walkways, and lawns, as well as more traditional single-track. The numbers of

miles of trails, by condition, are presented in table 3.5.4.

Table 3.5.4. Condition and length of official trails at WBNERR.

Trail Condition	Length (Miles)
Good	0.46
Fair	0.09
Poor	0.00
Total	0.55

Paved walkways extend from the carriage house to the main building. However, the paved sections are discontinuous, with no pavement at the two locations where the walkways cross the driveway.

Kiosks and Signs

An illuminated main identification sign is located at the park's entrance. It is set amidst a wooden trellis bearing metal silhouettes of fish. A three-sided kiosk is located along the path between the carriage house and the main building. The first side bears an interpretive panel on the Sargent Estate; the second side has a panel that identifies the four DCR properties in the National Estuarine Research Reserve, and the third side has a lockable bulletin board for meeting and program notices.



WBNERR's three-sided kiosk is centrally located along the main pathway between the parking lot, Carriage House, and the Sargent House. (See Appendix G for Photo information.)

Iron Ranger

There is no iron ranger. The Waquoit Bay Reserve Foundation (WBRF) has a donation box in the visitor center in the headquarters building.

Memorials and Markers

A six foot diameter compass rosette, made of stones and bricks, is set in the lawn behind the main building. A National Oceanic and Atmospheric Administration National Geodetic Survey marker is located at the center of the rosette.

3.6. INTERPRETATION

The National Estuarine Research Reserve System's mission is to "practice and promote stewardship of coasts and estuaries through innovative research, *education, and training* using a place-based system of protected areas" (NOAA 2011). Emphasis is placed on increasing environmental literacy through education and training. As a result, extensive formal and informal interpretive and educational programs are offered throughout the Reserve, including:

- Coastal Training Program (CTP; for coastal decision makers)
- K-12 Estuarine Education Program (KEEP; for teachers)
- Teachers on the Estuary (TOTE; for teachers)
- Summer Science School (five different week-long educational experiences for grades 2-12)
- Let's Go N'Seine
- Discovery Day
- Waquoit Bay Estate Tour
- Guided Osprey Watching
- Evenings on the Bluff
- Junior Ranger Program, including Fish Prints, Forest Food Webs, All About Waters, and Science at the Shore
- Research at the Reserve seminar series

Additional information on programming at WBNERR and throughout the Reserve is provided in WBNERR (2014).

The ground floor of the headquarters includes a multi-use room for presentations and a visitor center. The latter includes several professionally developed and prepared static displays covering watershed-related topics (e.g., septic systems and nutrients).



Interpretive displays in the visitor center; emphasis is on watershed protection. (See Appendix G for Photo information.)

A self-guided nature trail runs throughout the developed portion of the property. It includes the following nine interpretive displays; all relate to features on the WBNERR landscape, many involve demonstration projects:

- It takes a Watershed to Protect a Bay
- Energy Efficiency
- Lawn Care
- Composting (demonstration project)
- Gardens (demonstration project)
- Green Your Ride
- Taming Stormwater (demonstration project)
- Ecological Landscaping (demonstration project)
- Powered by the Sun (demonstration project)



Many interpretive displays, such as this rain garden, include both signs and practical demonstration projects so that visitor's may apply these lessons to their own backyards. (See Appendix G for Photo information.)

3.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

All WBNERR staff members are DCR employees whose positions are funded through a combination of state and federal funds. (Table 3.7.1) Many of these positions are unique to this park. All staff members are based at WBNERR, but their responsibilities are Reserve-wide.

A variety of seasonal employees supplement the permanent staff. These employees may be assigned to work at any of the four properties in the Reserve. However, some are primarily associated with South Cape Beach and others are primarily associated with Washburn Island. Because of this, seasonal staffing information is presented in Sections 4 and 5.

Partnerships and Volunteers

The Waquoit Bay Reserve Foundation (WBRF) was established to support the Reserve through fundraising and volunteerism. They organize the science summer school, manage grants, and raise funds. Their activities cover all four parks within the Reserve.

Public Safety

The Falmouth Fire and Police departments provide fire response, emergency services, and law enforcement.

Funding

Conservation Trust Fund

There are no funds in the Conservation Trust Fund dedicated to WBNERR.

Retained Revenue

There are no retained revenues.

Other Revenues

Funding for WBNERR and the other three properties that constitute the Reserve is unique in the DCR system, as it originates from both the Commonwealth and NOAA. Federal funds are provided in the form of grants to the

Table 3.7.1. Mass Parks personnel assigned to WBNERR; current and past.

Job Title	Number of Positions	
	2014	2005
<i>Year-round Personnel</i>		
Administrative Assistant II	1	1
-Fiscal Administrative Assistant		
Environmental Analyst II	1	1
-Research Coordinator		
Environmental Analyst II ^a	1	1
-Stewardship Coordinator		
Forest and Park Supervisor II	1	1
Laboratory Technician II ^b	1	0
-GIS/Research Technician		
Program Coordinator I ^a	0	1
-Community Educator		
Program Coordinator I ^a	1	1
-CTP Coordinator		
Program Coordinator I	1	1
-Education Coordinator		
Program Coordinator I ^a	1	0
-School & Interpretive Program Coordinator		
Program Coordinator I ^a	1	0
-Volunteer & Events Coordinator		
Program Coordinator I ^a	0	1
-Volunteer & Interpretive Coordinator		
Recreation Facilities Repairer ^c	1	1
Reserve Manager	1	1
Skilled Laborer II ^c	1	1
Technology & GIS Coordinator ^a	0	1
<i>Seasonal Personnel</i>		
Forest and Park Supervisor I (Short-term)	1	0
Park Interpreter (Long-term)	1	1
Park Interpreter (Short-term)	1	0

a. Federally funded.

b. Combined position funded through a combination of federal funds and grants in 2014.

c. These positions exist, but are unfilled in 2015.

Commonwealth. Typically a “Consolidated Funding” grant is awarded to partially support staff, programming, and operations. Additional grants may be awarded to support specific activities, such as land acquisition, facility and exhibit upgrades, and technology upgrades. In federal FY 2014, there was \$593,000 in Consolidated Funding and no land acquisition funds. A \$216,112 grant was awarded to WBNERR by NOAA, for the purpose of reducing the Reserve’s carbon footprint.

The WBRF may “solicit, receive, distribute, and administer grants and donations for funding of research, monitoring, stewardship, education, interpretive, cultural, and recreational programs, activities, supplies, and equipment related to” the entire Reserve. They may also operate on-site concessions.

There are two ways that the WBRF generates revenue at WBNERR; both involve donations. Visitors staying overnight in the Gate House (e.g., visiting researchers) are asked to consider making a voluntary contribution of \$20 per night to WBRF; these revenues are used to maintain and clean the gatehouse. Second, contributions placed in the headquarters’ donation box also go to the WBRF. These donations are combined with revenues generated off-site (e.g., membership fees) to fund such items and activities as supplies for volunteers and the visitor center (e.g., display cases), and thank you cookouts for volunteers.

3.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs (e.g., Table 3.3.2), legal agreements, and institutional knowledge. In addition, WBNERR’s inclusion in the National Estuarine Research Reserve System carries with it a variety of federal and NOAA requirements. This section describes those practices unique to the management of WBNERR. Emphasis is placed on state and DCR practices; additional requirements are identified in WBNERR (2014).

Legal agreements unique to WBNERR are listed in Table 3.8.1.

Table 3.8.1. Key legal agreements for WBNERR.

Party and Subject of Agreement	Type ^a	Expiration Date ^b
National Oceanic and Atmospheric Administration State and federal roles in management of WBNERR	U	None
Waquoit Bay Reserve Foundation Support for mission of WBNERR	A	2018

- Agreement types include: A=Memorandum of Agreement; E=Easement; L=Lease; and U=Memorandum of Understanding.
- Year that agreement expires. Permanent agreements are indicated by an expiration date of “None.”

Key management and guidance documents are identified below. (Table 3.8.2)

Table 3.8.2. Key management and guidance documents for WBNERR.

Author and Document	Year
Gannett Fleming, Inc. Environmental Audit Report: Waquoit Bay National Estuarine Research Reserve, Falmouth, MA.	1998 ^b
Massachusetts Natural Heritage and Endangered Species Program and Massachusetts Department of Natural Resources Conservation (sic). Habitat management for a federally-listed plant..., Falmouth.	2009
Louis Berger Group, Inc. Waquoit Bay stream restoration master plan; Falmouth and Mashpee, Massachusetts.	2010
Waquoit Bay National Estuarine Research Reserve Emergency operations plan for the Waquoit Bay National Estuarine Research Reserve.	2012
Whiddon, A. J. Prescribed Fire Plan. Administrative Unit(s): Waquoit Bay National Estuarine Research Reserve.	2012 ^a
Waquoit Bay National Estuarine Research Reserve. Hurricane preparedness and response plan for the Waquoit Bay National Estuarine Research Reserve. 2013.	2013
Waquoit Bay National Estuarine Research Reserve. Waquoit Bay National Estuarine Research Reserve; Management Plan; 2013-2017.	2014

The 2014 Management Plan (WBNERR 2014) covers all properties in the Reserve, and addresses Reserve research, educations program, and staffing in detail. It does so from the perspective of the National Estuarine Research Reserve System. This plan is updated every five years, per NOAA requirements.

Advisory Committees

There following three committees provide input on matters of policy and operations at WBNERR.

- Waquoit Bay National Estuarine Research Reserve Advisory Committee
- CTP Advisory Committee
- KEEP Advisory Committee

Research Activities

The Reserve has a formal registration procedure for research activities; it is administered by the Research Coordinator. Visiting researchers must submit a Research Registration Form in order to obtain temporary housing in the Gate House, or to use classroom or lab space. Researchers must submit a formal Field Safety Plan prior to beginning their studies. Moorings are available for research vessels on a first-come first-served basis. The Reserve has general research permits from the Towns of Falmouth and Mashpee that cover common activities; less common activities may require project-specific filings under the Wetlands Protection Act.

Annual Maintenance

Ongoing management practices typically follow a regular schedule. Common activities, and the desired frequency with which they occur, are identified in Table 3.8.3.

Table 3.8.3. Annual cycle of management activities at WBNERR.

Activity	Spring ^a	Summer ^a	Fall ^a	Winter ^a
Cleaning - Bathroom(s)	AN	E3/AN	E3/AN	E3/AN
Cleaning-Visitor Center	D1/AN	D1/AN	D1/AN	D1/AN
Cleaning - Walkways	AN	AN	AN	D1/AN
Litter removal - Trails	AN	AN	AN	AN
Maintenance - Picnic sites, fences, etc.	AN	AN	AN	N/A
Mowing and trimming	E7/AN	E7/AN	E7/AN	N/A
Pruning - Trees and shrubs	AN	AN	AN	AN
Trash - Empty - Barrels	N/A	AN	N/A	N/A
Trash-Empty-Bathroom	E7/AN	E7/AN	E7/AN	E7/AN
Weeding - Flower beds and grassy areas	N/A	N/A	N/A	N/A
Weeding - Paved areas	N/A	N/A	N/A	N/A

a. Frequency codes are: A1 = Once annually; AN = As needed; D = Daily, # times; E = Every # days; N/A = Not applicable.

Natural Resources

Water Resources

There are five rain gardens. They serve the dual functions of managing storm water and educating the public about storm water management.

Wastewater accumulated in the Carriage House and garage’s tight tanks is transported off-site for treatment and disposal. The Carriage House’s tank has not needed pumping in the past 14 years, and the Maintenance Garage’s tank is too new to have identified the frequency of pumping.

The town of Falmouth has not promulgated or approved local fertilizer regulations under the Fertilizer Management DCPC. However, fertilizers are not used at WBNERR and reducing their use in the watershed is a major focus of the Reserve’s education programs.

There is no barrier beach management plan for the park.

Rare Species

The headquarters’ cultural grasslands are managed to promote a population of a rare plant. Portions of these grasslands have been designated “no mow” areas from June to December. These areas are

identified with post and rope symbolic fencing, and a sign.

From 2009–2012, autumn olive, yucca, wisteria, and bayberry encroaching on rare plant habitat were removed from the site. Additional management, including prescribed burns (Whiddon 2012a) is implemented as needed.



Prescribed burning is periodically used to maintain appropriate vegetative conditions in the rare species management area. (See Appendix G for photo information.)

Invasive Species

Invasive plants are actively managed in critical resource areas as staffing and funding allow.

Vegetation

The timing and location of mowing has been adjusted in response to rare plant management needs. (See Rare Species, above) Lawns outside the rare plant management area are cut in accordance with the annual work cycle. (Table 3.8.3)

Cultural Resources

The entire headquarters area is within the Waquoit Village National Register Historic District. If federal funds, such as NOAA grants, are used to change the property, the Advisory Council on Historic Preservation must be allowed to comment on the project.

Recreation Resources

There are no recreation resources to manage.

Infrastructure

Buildings

Visiting researchers may use on-site housing, and laboratory and classroom space. Access to these facilities requires submission of a Research Registration Form.

Roads

The use of broken seashells as the driveway surface requires that snow plows be raised above the driveway surface. The driveway and parking lots are sanded when plowed.

Parking Areas

The use of broken seashells as the surface of the main lot and off-loop lot requires that snow plows be raised above the lot surface.

Trails

Trails are maintained by the Stewardship Coordinator with the assistance of volunteers.

Kiosks and Signs

Park employees are responsible for updating the content of kiosk's bulletin board and an additional bulletin board on the headquarters' porch.

3.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of WBNERR. Applied Land Stewardship Zoning recommendations provide general guidance for managing WBNERR. Future activities and projects should be checked against the zoning map (Figure 3.2) for consistency. Management recommendations for WBNERR are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 3.2)

The following Land Stewardship Zoning is recommended for Waquoit Bay National Estuarine Research Reserve.

Zone 1

Two sections of WBNERR have been designated Zone 1.

- The barrier beach, salt pond marsh, and coastal bank.
- The rare species management area.

Zone 2

Three areas have been designated Zone 2.

- Forested uplands surrounding the salt pond.
- The forest area north and east of WBNERR's buildings and lawns.
- Caleb Pond parcels.

Zone 3

Areas designated Zone 3 include:

- All existing buildings, driveways, walkways, and parking areas.
- Sections of maintained lawn that is not rare plant habitat.

Significant Feature Overlay

There are no Significant Feature Overlays.

Management Recommendations

Six priority management recommendations were developed for Waquoit Bay National Estuarine Research Reserve. (Table 3.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

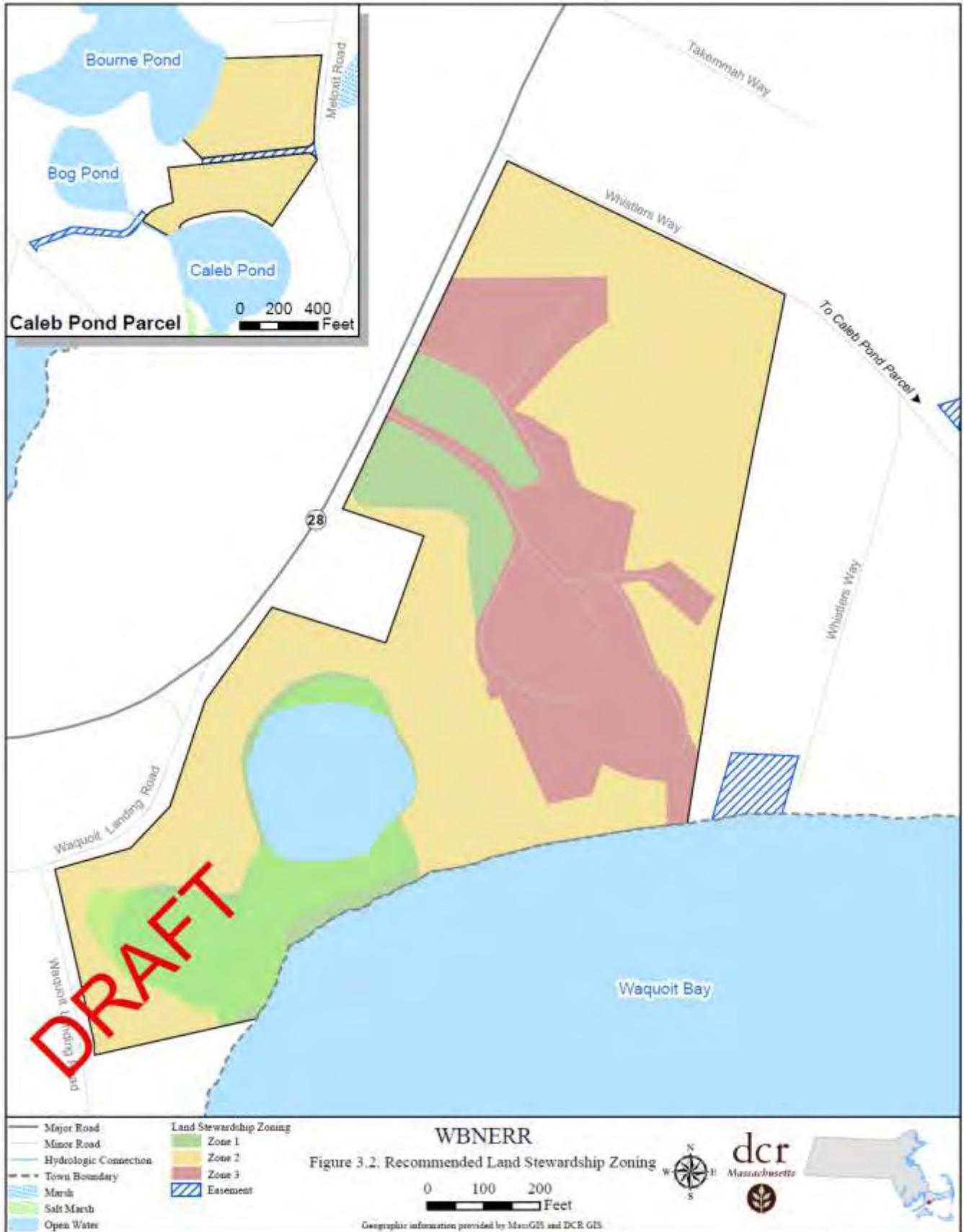
Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

Table 3.9.1. Priority recommendations for WBNERR and Caleb Pond.

Recommendation	Implementation^a
Prepare a barrier-beach management plan.	P, R
Continue ongoing rare plant monitoring and management activities.	R
Minimize any further impact on the historic landscape by retaining trees, keeping the view from the Main House/Visitor's Center to the bay cleared, and limiting the introduction of new features in areas that retain the integrity of the historic landscape.	R, V
Investigate potential encroachment along Metoxit Road and resolve with abutters if warranted.	L, R
Provide at least two accessible spaces, access aisles, and proper pavement markings and signs At least one must be van accessible.	C, E, U
Fill vacant park operations positions.	O, R

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning and Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.





Beachgoers enjoying a day at South Cape Beach. (See Appendix G for photo information.)

SECTION 4. SOUTH CAPE BEACH STATE PARK

4.1. INTRODUCTION

South Cape Beach State Park is located in Mashpee, along the southeast shore of Waquoit Bay. (Figure 4.1) Its most famous features are a series of low dunes and an adjacent white sand beach that extend from the channel entrance of Waquoit Bay, eastward to the south shore of Flax Pond.

South Cape Beach is a seasonally-staffed park that draws thousands of summer visitors who seek it out for the relatively warm and calm waters of Nantucket Sound. However, there is much more to the park than the beach and dunes. It also includes extensive salt marshes, brackish ponds, the shores of Waquoit Bay and Great River, and pitch pine and oak forests typical of coastal Cape Cod. Often overlooked by beachgoers, these forests are enjoyed by a variety of recreationists, including hikers, bird watchers, and hunters.

Within the boundaries of the state park is a 15.9 acre municipal park called Mashpee Town Beach. During the summer, it is operated by the town of Mashpee for exclusive use by residents. In the off-season, when the DCR parking lot is gated, it provides parking for all visitors.

Initial efforts to establish a state beach in Mashpee were contentious. In 1958 the legislature authorized the Commissioner of Public Works, the agency then responsible for state beaches, to acquire South Cape Beach for the purpose of creating and maintaining a state reservation. (Chapter 647 of the Acts of 1958) Initial acquisitions were followed by litigation, which in turn was followed by authorization from the legislature for the “reconveyance” of parcels to their original owners. (Chapter 635 of the Acts of 1962) It wasn’t until the early 1970s that acquisition efforts began anew. This time, Mashpee municipal lands were specifically excluded from acquisition, and the Mashpee Select Board had approval of all acquisitions. The Town and the Commonwealth now enjoy a productive working relationship.

The interests of the town and Commonwealth remain inextricably linked. South Cape Beach is one of the few state parks in the DCR system with a mandated advisory committee; one largely comprised of representation from Mashpee. In addition, the park’s operations are governed by a 1981 agreement between the town and Commonwealth.



South Cape Beach’s physical, political, and regulatory attributes are summarized below. (Table 4.1.1)

Table 4.1.1. Physical, political and regulatory settings of South Cape Beach and Abigail’s Brook.

Setting	Name or Metric
Location:	Mashpee
Area (acres)^a:	495.11
Perimeter (miles)^a:	11.24
Landscape Designation(s)^b:	Reserve, Parkland
Legislative Districts:	
House	Third Barnstable
Senate	Cape and Islands
Regulatory Designations:	Priority Habitat
	Waquoit Bay ACEC
	Outstanding Resource Waters – Waquoit Bay ACEC
	Fertilizer Management DCPC

- a. Calculated using a Geographic Information System (GIS).
- b. For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.
- c. Chapter 716 of the Acts of 1989 established the Cape Cod Commission and allowed for the creation of Districts of Critical Planning Concern (DCPC).

Associated Properties. One additional property, the Abigail’s Brook parcel, is included in this section. (See Figure 4.1 for the location of this property.)

- **Abigail’s Brook.** This 35 acre property is located along the north shore of Abigail’s Brook, on Hush Road in Mashpee. Access is from Great Oak Road, the same road used to access South Cape Beach.

South Cape Beach and the Abigail’s Brook parcel are part of the Waquoit Bay National Estuarine Research Reserve. Other properties in the Reserve include WBNERR (Section 3), Washburn Island (Section 5), and Quashnet Woods and associated watershed lands (Section 6).

4.2. NATURAL RESOURCES

An Environmental Impact Report (EIR) was prepared for the park in 1990 (Albert Veri & Associates, Inc.). It remains the only document to comprehensively address the park’s natural resources. Lists of common plant and animal species are included in that document.

Physical Features

South Cape Beach is located on the southeast shore of Waquoit Bay. Elevations range from sea level at the beach and salt marshes to approximately 20 feet above sea level to the north and east of Flat Pond. Most of the park is less than 10 feet above sea level. Elevations at the Abigail’s Brook parcel range from sea level at the brook, to approximately 40 feet above sea level in the parcel’s northeast corner. Elevations rise quickly as distance from the brook increases.

Water Resources

There are two major ponds: Sage Lot (i.e., Sedge Lot) Pond; and Flat Pond. The former is located entirely within the park and is connected, via a channel, to Waquoit Bay. The latter is located partially in the park and partially in the adjacent residential resort community of New Seabury. (Table 4.2.1) A tidal creek connects Flat Pond to Sage Lot Pond. A network of creeks drain water from brackish wetlands into salt marshes, and then into Waquoit Bay; not all have been mapped. The length of mapped rivers and streams is presented in Table 4.2.1.

Table 4.2.1. Water resources of South Cape Beach and Abigail’s Brook.

Water Resource	Name or Metric
Watershed:	Cape Cod
Aquifer:	Cape Cod SSA
Lens	n/a
Rivers and Streams (miles)	0.24
Vernal Pools	
Certified (#)	0
Potential (#)	1
Wetlands (acres)	105.95
Lakes and Ponds (acres)	17.30

- a. Includes overlap with adjacent water bodies.

Its low elevations and coastal location make most of South Cape Beach susceptible to flooding, storm surge, and anticipated sea-level rise. (Table 4.2.2) The Abigail’s Brook parcel is predicted to be minimally affected by flooding, inundation, and sea level rise. This is due to its elevation and distance from the open ocean.

Table 4.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to South Cape Beach and Abigail’s Brook.

Type of Impact	Acres	%
Flooding:		
100-year Storm	451.75	93.14
500-year Storm	461.16	1.90
Hurricane Inundation:		
Category 1 Storm	358.23	72.35
Category 2 Storm	429.96	86.84
Category 3 Storm	450.23	90.93
Category 4 Storm	455.37	91.97
Sea Level Rise	76.57	15.47

- a. Cumulative value; includes 100-year storm impacts.
- b. Cumulative value; includes impacts of all lower category storms.

A Category 1 hurricane would inundate virtually all park infrastructure including most of Great Neck, Wills Work, and McGregor roads; all parking areas; boardwalks; and the changing station. A category 2 storm would inundate nearly the entire dune system, as well as additional upland areas

A one-foot rise in sea-level is predicted to close the southern portion of Great Neck Road and the connector road from Great Neck Road to the Mashpee town beach. Other DCR infrastructure is predicted to be unaffected over the next 30–50 years.

Between 1846 and 2008 the shoreline of South Cape Beach has been retreating landward at an average rate of 1.4 feet per year (Maio et al. 2014). Continued acceleration in the rate of sea level rise, coupled with an increase in the intensity and frequency of extreme storms will likely lead to an increased rate of land loss (Maio et al. 2014). Local losses may be greater than those predicted by the IPCC RCP 8.5 model (Church et al. 2013), as presented in Table 4.2.2.

There are two barrier beaches, Ms-4 and Ms-5. The first lies immediately south of Flat Pond and includes portions of the New Seabury Golf Course. The second extends from the Mashpee town beach westward to the main channel into Waquoit Bay; it includes all of Dead Neck.



Predicted hurricane inundation of South Cape Beach. Areas predicted to be inundated by Category 1 storms are represented in light green; additional areas inundated by Category 2, 3, and 4 storms are represented in dark green, yellow, and red, respectively. Nearly all of the park’s infrastructure is vulnerable to Category 1 or greater storms. (See Appendix G for photo information.)

Rare Species

State-listed Species. Five state-listed species are known from South Cape Beach; two are also federally listed. (Table 4.2.3)

One federally listed species not currently listed under MESA (i.e., the red knot) and one candidate for federal listing (i.e., the New England Cottontail) also occur at South Cape Beach. Small numbers of migratory red knots forage along the shoreline in August and September (www.ebird.org); New England Cottontails are present year-round.

Table 4.2.3. State-listed species of South Cape Beach and Abigail’s Brook, as identified by the NHESP.^{a, b}

Species ^{a, b}	Type ^c	MESA ^d
Common tern	B	SC
Least tern	B	SC
Mattamuskeet panic grass	P	E
Piping plover ^e	B	T
Roseate tern ^f	B	E

- a. Presented alphabetically, by common name.
- b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/esa-list/list-of-rare-species-in-massachusetts.html>.
- c. Types of state-listed species include: B = Bird and P = Plant.
- d. Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.
- e. This species is also federally threatened.
- f. This species is also federally endangered.

Priority Habitat

Approximately 112.38 acres (22.70%) of South Cape Beach and Abigail’s Brook is Priority Habitat. This includes all of the shore and beach, most of barrier beach Ms-5, Flat Pond, Sage Lot Pond, and the waters of Waquoit Bay and Nantucket Sound.

Vegetation

There have been no comprehensive surveys of the vegetation of South Cape Beach. Common species are identified in Albert Veri and Associates, Inc. (1990).

Invasive Species. There have been no formal surveys; only one species of invasive plant is currently known from the park. (Table 4.2.4) The native, non-invasive sub-species of common reed

(i.e., *Phragmites australis* ssp. *americanus*) has also been recorded.

Table 4.2.4. Known invasive and likely invasive plants of South Cape Beach and Abigail’s Brook.

Species ^a	Status ^b
Common reed	I

- a. Presented alphabetically, by common name.
- b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).

Natural Communities

There have been no formal surveys of natural communities. However, some community types have been identified. (Table 4.2.5) Forest cover types have been classified and mapped for this property and for all others in the Reserve.

Table 4.2.5. Known natural communities of South Cape Beach and Abigail’s Brook.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Coastal Forest/Woodland	T	S3	1
Maritime Beach Strand	T	S3	2
Maritime Dune	T	S2	2
Maritime Shrubland	T	S3	2
Pitch Pine - Oak Forest ^e	T	S5	1
Salt Marsh	E	S3	1
Shrub Swamp	P	S5	1

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from the following sources:
 1. Based on “Habitat Types of South Cape Beach State Park, Mashpee, Mass.” in Albert Veri & Associates, Inc. (1990).
 2. Incidentally observed by RMP Planner during site visit.

Forests

South Cape Beach is 52.63% forested; the Abigail’s Brook property is almost entirely forested (99.41%). Two CFI plots, one on the edge of a saltmarsh and the other in a stand of pitch pine, do not provide representative data on the park’s forests.

Erosion from a 2010 storm revealed 111 “subfossil” eastern red cedar stumps and a preserved peat outcrop (Maio et al. 2014). These stumps ranged in age from approximately 413 to 1239 YBP and

represent an ancient forest that once covered the back of the barrier beach. Portions of this ancient forest are visible in the intertidal area east of the guarded swimming area.

Wildlife

No formal surveys have been conducted. However, because the park is a birding hotspot, there is an extensive species list. As of October 2014, 184 species were listed on eBird (www.ebird.org) for the park. Many are sea, shore, and marsh birds attracted to the park's intertidal areas and shallow waters. Historic information on the park's mammals, reptiles, and amphibians may be found in Albert Veri and Associates, Inc. (1990).

4.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic buildings, structures, and landscapes. An overview of significant events in the history of South Cape Beach State Park is presented in Table 4.3.1. Cultural resources information is presented in Table 4.3.2.

ARCHAEOLOGICAL RESOURCES

There are no recorded pre-Contact sites located in South Cape Beach. In the early 1980s the 435 acre South Cape Beach parcel was archaeologically surveyed for the then proposed parking lot. Subsurface testing failed to recover any cultural materials. The pre-Contact archaeological sensitivity in the immediate area is highest in the Popponesset Bay area, along the major wetland margins, including the kettle ponds, smaller streams, swamps and ponds considered dense resource procurement areas.

Sage Lot Pond. A fragment of a ship's hull is located in Sage Lot Pond. It has alternately been exposed and covered by sand and marsh vegetation. A preliminary inspection was conducted by the Massachusetts Board of Underwater Archaeology, but little is known about this vessel.

Abigail's Brook Area. Three pre-Contact sites are located just north of the Abigail's Brook parcel. One archaeological survey was conducted in the area (MHC Report# 999) *An Intensive Archaeological Investigation of the Bufflehead Bay Project* area, and an important Wampanoag home site was located and recorded. MACRIS # MAS.13, the "Alves House Site" dates to the 18th and 19th centuries. It is located off DCR-owned property.

Historic Resources

When DCR acquired the property it preserved the undeveloped natural landscape; one familiar to previous generations of Native and European occupants. English colonists settled in the Mashpee area in the 1650s and took control from the resident Native American population. The converted Christian Wampanoags in the area were granted a settlement area within the colony and allowed a degree of self governance. This became Massachusetts' largest reservation, and retained political independence until the late eighteenth century. The culture of the Wampanoags continues to maintain a strong presence in the area. While the area around Waquoit Bay developed around the fishing and cranberry cultivation industries throughout the eighteenth and nineteenth century, little remaining evidence remains of any major settlement or land use at the area that is now South Cape Beach.

Historic Landscapes

No historic landscapes have been identified at this facility.

Structures

The only historic structure identified the 1984/1985 Cultural Resources Evaluation Project is "Mrs. Hall's Cottage." This structure, which was located north of the mouth of Sage Lot Pond, is no longer standing.

Objects

No historic objects have been identified at this facility

4.3.1. Significant events in the history of South Cape Beach and Abigail's Brook.

Year(s)	Events
1958	The Commissioner of Public Works is authorized to acquire “the whole or any portion of the properties comprising South Cape Beach...together with marshlands or uplands adjacent to said beach” for the purpose of creating and maintaining a state reservation. (Chapter 647 of the Acts of 1958)
1962	Following initial acquisitions and associated litigation, the Massachusetts Legislature provides for the “reconveyance by the Commonwealth to the original owners of certain lands comprising South Cape Beach.” (Chapter 635 of the Acts of 1962)
1971	The Department of Natural Resources is authorized to acquire “South Cape Beach...and such adjacent land and water as it deems necessary...for the purpose of outdoor recreation and conservation; Mashpee municipal lands are specifically excluded. (Chapter 1058 of the Acts of 1971). This Act is modified in 1976 to require the town of Mashpee Select Board approval of all acquisitions. (Chapter 283 of the Acts of 1976)
1976	Legislature authorizes \$1,500,000 for land and water acquisition in Mashpee for the “development, redevelopment, construction, and improvement of outdoor recreation and conservation areas.” This authorization is modified in 1982 to scale back the level of proposed development. (Chapter 481 of the Acts of 1976, Chapter 287 of the Acts of 1982). Funding from the federal Land and Water Conservation Fund supplement state acquisition funds.
1980	The town of Mashpee and DEM enter into an agreement regarding the acquisition and operation of South Cape Beach; it is amended in 1981. The amended agreement remains the primary park guidance document.
1982	South Cape Beach is acquired through eminent domain. (Chapter 287 of the Acts of 1982)
1989	A draft Environmental Impact Report, proposing the development of beach facilities, is released in January. A Final EIR, containing less intensive development, is issued in September, 1990.
2003	Abigail's Brook property acquired.
2006	Transfer of a portion of South Cape Beach to the town of Mashpee “solely for conservation and recreation purposes” is authorized by the Massachusetts Legislature. (Chapter 229 of the Acts of 2006)

Table 4.3.2. Cultural resources of South Cape Beach and Abigail's Brook.

Location and Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance ^h
Sage Lot Pond								
Shipwreck	AR	-	6	L	-	-	-	1

- Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; MHCA – Massachusetts Historic Commission Area; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- Date of construction provided, when known.
- Building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS): 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- Integrity is a relative assessment of the condition of a resource's retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- Massachusetts Historical Commission inventory number.
- The following guidance is offered for the ongoing maintenance of these cultural resources:
 - Refer to Archaeological Features BMP (DCR n.d.k).

4.4. RECREATION RESOURCES

South Cape Beach is best known for its saltwater beach on the shores of Nantucket Sound. The park's official beach and associated recreation resources are located at the end of McGregor Road. Picnic tables and grills, and the changing station are located near the parking lot; portable toilets are present on a seasonal basis. A boardwalk extends from the changing station to a viewing platform overlooking the beach. A beach wheelchair is available for access to the surf.

Although the park is open year-round, beach access and staffing vary seasonally. Beach facilities are open from mid-April through mid-October, with life guards present from the last week of June through mid-August. At this time, a day use fee is required to park in the main lot. Summer access to the Mashpee Town beach, which is also staffed and guarded, is restricted to vehicles with a Mashpee resident sticker, Mashpee Wampanoag tribal sticker, weekly or monthly pass, or those with tribal IDs.

Water quality is tested weekly during active beach season (i.e., when guarded). Water quality data applies to both the DCR beach and the adjacent Mashpee Town Beach. The last closure due to exceedance of *Enterococcus* bacterial standards was in July of 2007.

There is an unofficial, unguarded beach in the park. Callies Beach is located off of Wills Work Road, on the eastern shore of Waquoit Bay. From June through August the Barnstable County Department of Health and Environment monitors water quality on a monthly basis. Water quality data from June 2003 to July 2014 indicate no recorded exceedances of *Enterococcus* bacterial standards. However, the infrequent sampling at the beach may not capture periods of temporary exceedance.

Hunting occurs in the fall and winter; the exact schedule varies annually and is determined by regulations promulgated by MassWildlife. Pheasant, which are stocked by MassWildlife along Wills Work Road, and rabbit are the most popular game species. Deer and waterfowl are also hunted.

Other recreation activities, such as hiking, dog walking, fishing, wind surfing, and kite boarding occur year-round.

The following recreation activities are known to occur at South Cape Beach.

- Dog walking
- Fishing (saltwater)
- Geocaching (1 cache as of October 2014)
- Golf (New Seabury Country Club has portion of course on park, as per deed.)
- Hiking/walking
- Horseback riding
- Hunting
- Kayaking
- Kite boarding
- Mountain biking
- Nature study
- Picnicking (4 accessible grills)
- Sun bathing
- Swimming (salt water only)
- Wind surfing

Some of these activities take place along the eastern shores of Waquoit Bay and Great River at the end of Wills Work Road. Kite boarding, night fishing, and kayaking commonly take place here. Access is through a residential neighborhood and does not require passing through the main park entrance or paying a fee.



Entrance to Wills Work Road (left, back of photo), which provides access to the eastern shore of Waquoit Bay. Ornamental plantings and a residence from local neighborhood are visible at right. (See Appendix G for photo information.)

Table 4.5.1. Non-historic buildings and structures of South Cape Beach and Abigail’s Brook.

Infrastructure	Date ^a	Condition ^b	In Use ^c	Utilities ^d
Culvert under McGregor Road (150 x 3 feet)	2007	2	Y	-
Garage/storage building	-	2	Y	-
Changing station	2012	1	Y	-
Boardwalk – Main beach	c. 2011	2	Y	-
Accessible viewing platform	c. 2011	2	Y	-
Bayberry Parking Area, fenced-in storage yard; 120 foot by 34 foot	-	3	Y	-
Bridge – Great Oak Road, over creek to Sage Lot Pond	2008	2	Y	-
Boardwalk – Dead Neck crossover	-	3	Y	-

- a. Building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS): 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- b. Date of construction provided, when known.
- c. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.
- d. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

4.5. INFRASTRUCTURE

Most of the park’s infrastructure is in support of getting visitors in automobiles to the beach; providing them a place to park once there; and getting them from the from the parking lot, over the dunes, to the shore. There are few buildings and structures. (See Table 4.5.1)

Property Boundary

The park is bounded on the west by Waquoit Bay and Great River, on the south by Nantucket Sound, on the east by New Seabury, and on the north by a combination of Great River, private residences along Whippoorwill Circle, and Great Oak Road. The north and east boundaries do not bear conspicuous markers.

The town of Mashpee holds a conservation restriction on approximately 29.49 acres near the park’s boundary with New Seabury.

The Abigail’s Brook parcel is bounded on the south by Abigail’s Brook and on the west, north, and east by Mashpee National Wildlife Refuge. The boundaries of the refuge are posted.

Buildings and Structures

There are only two buildings, a garage/storage building and a four-room changing station. (Table 4.5.1)



Garage/storage building at South Cape Beach, the park’s largest building. (See Appendix G for photo information.)

Two boardwalks provide beach access. The first is located between the parking area and the beach; it has an accessible viewing platform with benches overlooking the ocean. The second boardwalk (i.e., the Dead Neck crossover) is located at the southern end of Great Oak Road. A foot path from the Mashpee Town Beach’s parking lot also connects to this boardwalk.

A third boardwalk, constructed of metal grates, extends into the marshes in the southeast corner of Sage Lot Pond. This temporary boardwalk, which is scheduled to be removed in 2015, provides access to equipment associated with scientific research in the Reserve. It is not open to the general public.



Temporary research boardwalk in saltmarsh at South Cape Beach. (See Appendix G for photo information.)

Roads

There are three park roads: Great Oak Road, McGregor Road, and Wills Work Road. Great Oak Road is the park’s main access road. It runs from the park’s entrance to the Dead Neck Trail. It is paved for 0.7 miles, and gravel for an additional 0.1 miles. McGregor Road runs 0.4 miles from Great Oak Road to the park’s main lot; it is open to the public on a seasonal basis. The third road, Wills Work Road, provides access to the eastern shore of Waquoit Bay. This 0.9 mile long gravel road originates on Manitoba Road in a residential neighborhood west of the park entrance.

The access road to the Mashpee Town Beach originates at the end of the paved portion of Great Oak Road.

Table 4.5.2. Condition and length of roads at South Cape Beach.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	1.00	0.26
Fair	0.00	0.30
Poor	0.00	0.00
Total	1.00	0.56

a. Based on field assessment; all distances calculated using GIS.

Parking

There are two DCR parking lots off Great Oak Road, the Main Lot adjacent to the beach and the Bayberry lot on Great Oak Road. (Table 4.5.3). Only the HP spaces and access aisles in the main lot are paved, the remainder of the lot and all of the Bayberry Lot are gravel. The main lot is open seasonally; the

Bayberry Lot is available year-round. Most off-season parking takes place in the Mashpee town beach’s lot due to its paved surface, ocean views, and year-round maintenance.

Table 4.5.3. Number of public parking spaces, by location and type, at South Cape Beach.

Location	HP	Other	Total
Main Lot – East ^{a, b}	6	86	92
Main Lot – West ^{a, b}	0	132	132
Bayberry Lot ^a	0	28	28
Wills Work Road – Great River ^a	0	4	4
Wills Work Road – Pull off ^a	0	2	2
Wills Work Road – End Lot ^a	0	9	9
Total	6	261	267

- a. Number of spaces is based on the number of potential 9-foot-wide spaces.
- b. Number of HP spaces base on pavement markings.

Several aspects of the HP parking in the Main Lot do not meet current Architectural Access Board requirements. There are currently six 80-inch-wide spaces separated by 50-inch-wide access aisles. Current standards require a minimum of seven 96-inch-wide spaces with 60-inch wide access aisles. A 96-inch-wide access aisle is required for van accessible spaces.



Some of the designated HP parking at Main Lot-East. (See Appendix G for photo information.)

Bicycle parking is provided at the main parking lot (16 space) and adjacent to the Dead Neck Crossover boardwalk (5 spaces).

There are three parking areas along Wills Work Road (Table 4.5.3); all have sand surfaces. The first is a small lot near where Great River enters Waquoit Bay. The second is a small pull-off on the east shoulder of the road. The third lot provides roadside parking at the southern end of Wills Work Road.

Only the first lot appears to have been formally developed for parking. When these areas are full, visitors park cars along the road shoulder.

Trails

There are two formal trails. The first, the Great Flat Pond Trail includes a nested loop that provides scenic views of both Sage Lot Pond and Great Flat Pond. A trail spur connects this loop with Great Oak Road to the east of the park’s entrance. The second trail is the Dead Neck Trail; it extends from the Mashpee town beach westward to the channel into Waquoit Bay. Both trails have informative and interpretive signs. The condition of these trails is identified in Table 4.5.4.

Table 4.5.4. Condition and length of official trails at South Cape Beach.

Trail Condition	Length (Miles)
Good	2.84
Fair	1.01
Poor	0.82
Total	4.67

Kiosks and Signs

There are two kiosks. The first is located along Great Oak Road near the park entrance, and the second is located between the picnic area and changing station. Both have maps of the park and Reserve, and announcements regarding visitor safety and park programs. They use the Reserve’s color scheme of gray wooden structures with pale green panels.

Informational and interpretive signs are located at the park entrance, parking lot entrance, and trail heads. The park’s main identification sign is a modified version of DCR’s standard main identification sign, but in the Reserve’s color scheme. This palette is also used on the park’s internal park information signs.

There are no signs acknowledging the role of the Land and Water Conservation Funds in the acquisition of this property.



Kiosk, with interpretive panel, located at the entrance to South Cape Beach. This color scheme is used at all Reserve properties. (See Appendix G for photo information.)

Iron Ranger

An iron ranger is located between the picnic area and the changing station.

Memorials and Markers

An ornamental stone with a metal commemorative plaque is located between the picnic area and the changing station. It lists the names of DCR commissioners, elected officials, and South Cape Beach Advisory Board members that assisted in creating the park.

4.6. INTERPRETATION

The National Estuarine Research Reserve System’s mission is “To practice and promote stewardship of coasts and estuaries through innovative research, education, and training using a place-based system of protected areas” (NOAAA 2011). Emphasis is placed on increasing environmental literacy through education and training. As a result, extensive formal and informal interpretive and educational programs are offered throughout the Reserve, including the following programs at South Cape Beach:

- Teachers on the Estuary (TOTE)
- Coastal Bird Walk
- Creature Feature, including: Crabbie Critters, In a Shell, and Is That a Fish?
- Field Walks
- Science by the Sea, including: Changing Coastlines, Salt Marsh Secrets, and Wildlife Walk
- Sunset Beach Stroll
- Trail Adventures, including Cranberry Chronicles, Marsh Madness, Tidal Treasure Hunt, and Wetland Wonders

Additional information on programming at South Cape Beach and throughout the Reserve is provided in WBNERR (2014).

The following interpretive panels are located at the Dead Neck Trail trailhead:

- Please Help Protect the Dunes
- Caution: Threatened Birds Ahead

These are standard panels used in similar contexts throughout the Complex. Additional interpretive panels are planned for 2015.

4.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

All South Cape Beach staffing is seasonal. (Figure 4.7.1) With the exception of lifeguards, all South Cape Beach staff may work at any of the Reserve's four properties. However, due to the high levels of use at South Cape Beach, seasonal staff members spend most of their time at this park.

Seasonal employees are managed by a combination of other seasonal personnel and year-round personnel from WBNERR. The Summer Worker, Recreation Facility Repairer, and Laborer positions report to the Seasonal Forest and Park Supervisor I, who reports to the year-round Forest and Park Supervisor II at WBNERR.

All Lifeguard I positions report to the Lifeguard II position, who in turn reports to both the on-site Forest and Park Supervisor I and the Regional Waterfront Coordinator.

Park Interpreters report to the School and Interpretive Program Coordinator at WBNERR.

Table 4.7.1. Mass Parks personnel assigned to South Cape Beach; current and past.

Job Title	Number of	Number of
	Positions	Positions
	2014	2005
<i>Seasonal Personnel</i>		
Endangered Species Monitor	0	1
Laborer I (Short-term)	1	
Lifeguard I (Short-term)	4	3
Lifeguard II (Short-term)	1	1
Summer Worker	1	5

Three positions administratively located at South Cape Beach are based in a different park. Three Forest and Park Supervisor I positions serve as Island Managers at Washburn Island; they are not addressed in this section. Additional information on these positions is included in *Section 5. Washburn Island*.

Partnerships and Volunteers

The Waquoit Bay Reserve Foundation was established to support the Reserve through fundraising and volunteerism. Their activities cover all four parks within the Reserve, including South Cape Beach. (See Section 3.7 for additional information on the WBRF.)

Public Safety

The Mashpee Fire and Police departments provide fire response, emergency services, and law enforcement. The Police Department also locks the gate to Wills Work Road in the evening.

Funding

Conservation Trust Fund

There are no funds in the Conservation Trust Fund dedicated to South Cape Beach.

Retained Revenue

The 2014 beach season generated \$48,464 in revenue from entrance fees. This includes 6,132 day use tickets, 145 resident season passes, seven non-resident season passes, and 10 second car passes.

Other Revenues

In 2014 the WBRF began selling light snacks from the garage/storage building. They recently donated portable speed bumps to slow traffic at the entrance to South Cape Beach.

The 2014 environmental bond bill included \$500,000 for the realignment of Wills Work Road, so that it is accessed from Great Oak Road within the park, rather than from the Quail Hollow Village residential neighborhood.

4.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs legal agreements, and institutional knowledge. An agreement between the DEM and the town of Mashpee, specific to South Cape Beach, heavily influences park operations. This and other legal agreements unique to the park are presented in Table 4.8.1.

Table 4.8.1. Key legal agreements for South Cape Beach and Abigail’s Brook.

Party and Subject of Agreement	Type ^a	Expiration Date ^b
Town of Mashpee Deposition of 2,500 CY of dredge spoil in South Cape Beach.	U	2012
Waquoit Bay Reserve Foundation Support for mission of WBNERR	A	2018
Town of Mashpee Amended agreement	A	2080
National Oceanic and Atmospheric Administration State and federal roles in management of WBNERR	U	None
U.S. Fish and Wildlife Service Establishing a formal basis for cooperation and coordination for matters pertaining to the Mashpee NWR.	U	None

- a. Agreement types include: A=Memorandum of Agreement; and U=Memorandum of Understanding.
 b. Year that agreement expires. Permanent agreements are indicated by an expiration date of “None.”

Key management and guidance documents are presented in Table 4.8.2.

Table 4.8.2. Key management and guidance documents for South Cape Beach and Abigail’s Brook.

Author and Document	Year
Albert Veri and Associates, Inc. Environmental Impact Report; Final. South Cape Beach State Park, Mashpee, Massachusetts.	1990
Massachusetts Department of Environmental Management Waquoit Bay National Estuarine Research Reserve, South Cape Beach Recreation Area, Management Plan.	1995 ^a
Gannet Fleming, Inc. Environmental Audit Report: South Cape Beach State Park, Mashpee, Massachusetts.	1998 ^c
National Park Service Land and Water Conservation Fund State Assistance Program. Federal Financial Assistance Manual.	2008
Louis Berger Group, Inc. Waquoit Bay stream restoration master plan; Falmouth and Mashpee, Massachusetts.	2010
Waquoit Bay National Estuarine Research Reserve Emergency operations plan for the Waquoit Bay National Estuarine Research Reserve	2012
Waquoit Bay National Estuarine Research Reserve Hurricane preparedness and response plan for the Waquoit Bay National Estuarine Research Reserve. 2013.	2013
Waquoit Bay National Estuarine Research Reserve Waquoit Bay National Estuarine Research Reserve; Management Plan; 2013-2017. Supporting Coastal Communities through science.	2014

The 2014 Management Plan (WBNERR 2014) covers all properties in the Reserve, and addresses Reserve research, educations program, and staffing in detail. It does so from the perspective of the National Estuarine Research Reserve System. This plan is updated every five years, per NOAA requirements.

Advisory Committees

The following committees provide input on matters of policy and operations of the Reserve, including South Cape Beach:

- South Cape Beach Advisory Committee
- Waquoit Bay National Estuarine Research Reserve Advisory Committee

The South Cape Beach Advisory Committee was established by the amended agreement between the DEM and the town of Mashpee. It is “responsible for making recommendations to the Department on such matters to include, but not limited to, park management and operations, rules and regulations, design and plan review.” The Committee has the following 11 voting members:

- Residents of, or representatives for, the town of Mashpee (8).
- Resident of, or representative for, the town of Sandwich (1).
- Resident of, or representative for, the town of Falmouth (1).
- Resident of, or representative for, the town of Barnstable (1).

It also has the following four non-voting, ex-officio members.

- Representatives of the Office of Coastal Zone Management (1).
- Representative of the Department of Fisheries, Wildlife and Recreational Vehicles (1).
- State Representative, Third Barnstable District.
- State Senator, Cape and Islands District.

There is no tribal representation on this committee.

Additional information on the Waquoit Bay National Estuarine Research Reserve Advisory Committee maybe found in WBNERR (2014)

Research Activities

The Reserve has a formal registration procedure for research activities; it is administered by the Research Coordinator. See Section 3.8 for additional information.

Annual Maintenance

Ongoing management practices typically follow a regular schedule. Common activities, and the desired frequency with which they occur, are identified in Table 4.8.3.

Table 4.8.3. Annual cycle of management activities at South Cape Beach.

Activity	Spring ^a	Summer ^a	Fall ^a	Winter ^a
Cleaning - Walkways	AN	D1/AN	N/A	N/A
Litter removal - Beaches, parking lots, walkways	AN	D1/AN	N/A	N/A
Litter removal - Trails	AN	AN	N/A	N/A
Maintenance - Picnic sites, fences, etc.	AN	AN	AN	N/A
Mowing and trimming	E7/AN	E7/AN	AN	N/A
Pruning - Trees and shrubs	AN	AN	AN	AN

a. Frequency codes are: A1 = Once annually; AN = As needed; D = Daily, # times; E = Every # days; N/A = Not applicable.

Natural Resources

Water Resources

Pedestrian access over the dunes is restricted to minimize damage. At two locations, the path from the main parking lot to the beach and at the Dead Neck Crossover, access is provided via boardwalks atop, or elevated above, the dunes. The pathway through the dunes in barrier beach Ms-4 is via a clearly demarcated pedestrian corridor that winds across, rather than straight through, the dunes so as to avoid creating a direct channel. The path between the Mashpee Town Beach and the Dead Neck Crossover also has a pedestrian corridor. Most of the dunes between the Dead Neck Crossover and the channel into Waquoit Bay have unregulated access, with numerous foot paths through the dunes.



Pedestrian corridor through dunes near Flat Pond. (See Appendix G for photo information.)

There is no barrier beach management plan.

The Cape Cod Mosquito Control Project maintains the flow of water from Flat Pond, through the salt marsh, to Sage Lot Pond by removing obstructions from the drainage system (Sakolsky 2008).

A 2007-2012 MOU between the DCR Division of Waterways and town of Mashpee allowed the Town to deposit dredge spoils along the eastern shore of Waquoit Bay, south of Callie's Beach. This location was selected without input from Reserve staff. Sediment deposition at this location may close the entrance to Sage Lot Pond, alter pond ecology, and nullify long-term monitoring stations in the associated marsh.

In 2014 the town of Mashpee approved local fertilizer regulations under the Fertilizer Management DCPC. The local bylaw and DCPC designation have no impact on park operations, as fertilizers are not used at South Cape Beach.

Rare Species

Populations of beach-nesting birds are managed and monitored by the Massachusetts Audubon Society under a statewide contract, in accordance with state and federal standards. This includes searching for nests, working with DCR to close portions of the beach and dunes critical to shorebird protection, installing symbolic fencing and educational signs, educating park visitors, monitoring nesting and fledging success, and removing signs and symbolic fencing at the end of the nesting season.

Dogs are seasonally restricted from the beach and dunes west of the Dead Neck Crossover between April 1 and September 30 in order to protect migratory and nesting shorebirds.

Invasive Species

There is no invasive species monitoring or management at this park..

Vegetation

Lawns are cut in accordance with the annual work cycle. (Table 4.8.3) Mowing takes place at the park entrance, along roadsides, and at the picnic area.

Cape Cod Mosquito Control Project maintains access paths along drainage ditches by cutting back vegetation (Sakolsky 2008).

Cultural Resources

There are no management activities unique to this park.

Recreation Resources

Lifeguard chairs are transported to the fenced-in storage yard at the Bayberry Lot and secured at the end of the beach season. They are returned to the beach the following June. Picnic tables remain outdoors at the picnic area year-round; cooking grills are permanently mounted.

The 1981 amended agreement between the DEM and the town of Mashpee includes provisions for the use of "designated service roads for the sole purpose of fishing access" for:

- Persons over 60 years of age
- Those suffering from ambulatory disabilities
- Those holding disabled veteran status.

Under this agreement, nighttime access was to be provided under a permit system, for a maximum of six vehicles at any one time. There are no designated service roads and no permit system.

The deed to that portion of the park acquired from the New Seabury Great Flat Pond Nominee Trust (Document #642521) reserved the grantor (i.e., the Trust) a tee easement and a rough easement with the reserved right to install utilities and to "occasionally cut brush in connection with its use as a rough." As a result, portions of the Country Club at New Seabury are on the state park.

Infrastructure

The 1981 amended agreement between the DEM and the town of Mashpee included a provision that the Department would support the transfer of a 10 acre parcel along Wills Work Road to the Town, for use as a “boat launch/pier facility” on Great River. Chapter 229 of the Acts of 2006 authorized the disposition of this property, specifying that it should be used “solely for conservation and recreation purposes, passive recreation purposes only, with shoreline access limited to non-motorized boats and canoes, and open to the general public without restriction or discrimination.” Access is to be from Wills Work Road “during the normal operating hours for South Cape Beach State Park.” The status of this 10 acre parcel is unclear.

The town of Mashpee’s conservation restriction on a portion of the park near New Seabury (Figure 4.1) specifies activities prohibited and allowed. Among those activities specifically allowed are: the placing of fences, construction of wildlife viewing platforms and osprey nesting platforms; selective cutting for public safety and trail purposes; and the erection, maintenance, and replacement of signs, including interpretive displays.

Buildings

The garage/storage building and changing station’s doors are covered with plywood and secured for the winter (i.e., October through April).



Changing stations secured for winter. (See Appendix G for photo information.)

Roads

McGregor Road is closed to the public from mid-October through mid-April; it is not plowed during

the winter. The town of Mashpee performs the snow plowing on Great Oak Road, within the park in order to provide year-round access to the Mashpee Town Beach.

In the summer of 2014 the DCR added fill materials to, and graded, Wills Work Road.

The deed to that portion of the park acquired from the New Seabury Great Flat Pond Nominee Trust (Document #642521) provides DCR the right to “use Walton Heath Way, Fairway Lane, and Mid-Iron Way...for management and maintenance purposes and not for public access.” In addition, the DCR has the deeded right to “use once a year, more or less...the cartpath from Mid-Iron Way...for emergency management purposes.” Use requires coordination with the golf course management, and terminates when DCR “constructs an internal pathway adequate to accommodate vehicle traffic.”

Parking Areas

The main parking lot is closed to the public from mid-October through mid-April.

The amended agreement between the DEM and the town of Mashpee limits the number of parking spaces in the park to no more than 400 vehicles.

Trails

Trails are maintained by the WBNERR Stewardship Coordinator with the assistance of volunteers, as needed and as time and resources permit.

Kiosks and Signs

Park employees are responsible for updating the content of kiosk’s bulletin board.

4.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of South Cape Beach. Applied Land Stewardship Zoning recommendations provide general guidance for managing South Cape Beach. Future activities and projects should be checked against the zoning map (Figure 4.2) for consistency. Management recommendations are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 4.2)

The following Land Stewardship Zoning is recommended for South Cape Beach State Park.

Zone 1

The following sections of South Cape Beach have been designated Zone 1.

- Barrier beaches Ms-4 and Ms-5.
- All salt marsh.

Zone 2

All upland areas not on barrier beaches are designated Zone 2.

Zone 3

The following portions of South Cape Beach are currently developed, appropriate for potential future development, or intensively used for recreation.

- The beach, from the foredune to the low tide line. This area is intensively used for swimming and sunbathing, fishing and fishing access, and launching and landing kite boards.
- Bayberry Lot and storage yard.
- Main lot, picnic area, and adjacent changing station area.
- A 100-foot buffer to either side of Great Oak Road, from the park entrance to a point 500 feet into the park. A portion of this area may be used for a future relocation of the entrance to Wills Work Road, the construction of a contact station, and the reconfiguration of the park entrance.

Significant Feature Overlay

The following Significant Feature Overlay was developed to protect state and federally listed beach-nesting birds.

- ***Rare Shorebird Significance Overlay, with NHESP management guidelines.*** This overlay covers piping plover nesting and foraging areas, and common and least tern nesting areas. Beach and dune closures within this overlay area may occur as needed and may expand or contract over time.

Management Recommendations

Nine priority management recommendations were developed for South Cape Beach State Park, all are of equal importance. (Table 4.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

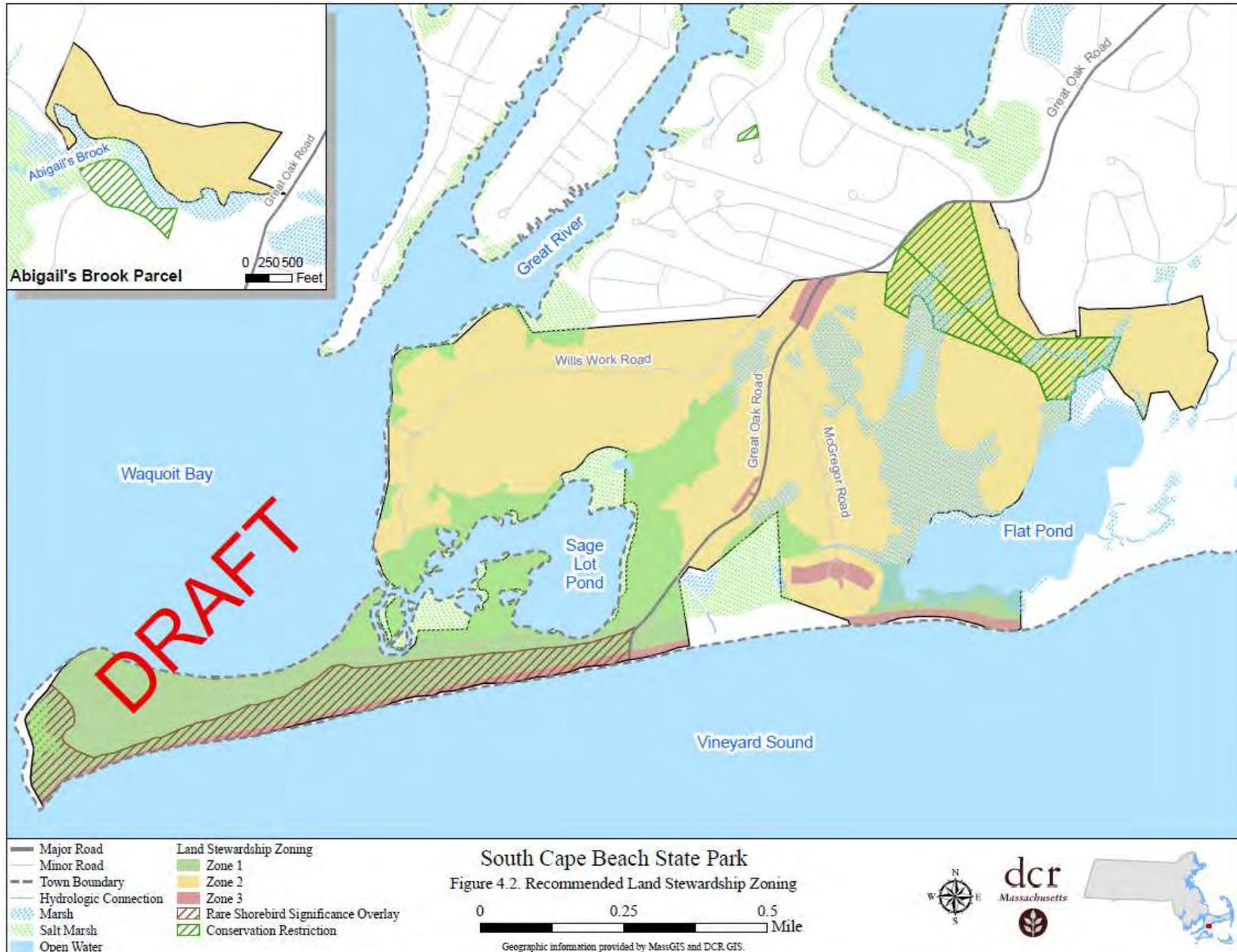


Table 4.9.1. Priority recommendations for South Cape Beach and Abigail’s Brook.

Recommendation	Implementation^a
Continue ongoing rare shorebird monitoring and management activities.	P, R
Update HP parking in the Main Lot to increase the number of spaces to seven, and increase space and access aisle widths to current standards.	C, R, U
Reconfigure the entrance to Wills Work Road to remove it from the residential neighborhood and connect it to Great Oak Road near the park’s entrance gate.	E, P, R, V
Install standard Land and Water Conservation Fund signs at kiosks.	R
Request that the town of Mashpee permanently dedicate at least one of its eight seats on the South Cape Beach Advisory Committee to a representative of the Mashpee Wampanoag Tribe.	R
Prevent pedestrians from crossing dunes between the Dead Neck Crossover and the entrance to Waquoit Bay, by creating pedestrian corridors, similar to those used elsewhere in the park.	P, R
Improve coordination between DCR Division of Waterways, WBNERR staff, and the town of Mashpee in future agreements governing the placement of dredge spoils at South Cape Beach.	O, R, V
Prepare a barrier-beach management plan.	P, R
Clarify the status of the 10 acre Wills Work Road parcel, and continue working with the town of Mashpee to create a non-motorized boat and canoe launch area at this site.	L, P, R

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning and Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

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View of Waquoit Bay from a campsite on Washburn Island. (See Appendix G for photo information.)

SECTION 5. WASHBURN ISLAND

5.1. INTRODUCTION

Washburn Island is located on the Falmouth side of Waquoit Bay. (Figure 5.1) The island, along with portions of South Cape Beach, forms a protective barrier that buffers the bay from the impacts of coastal storms. Between Washburn Island and South Cape Beach is a narrow channel, approximately 250–350 feet wide, that serves as the main entrance to the bay. Stone jetties line the channel’s entrance.

Historically, the island was alternately connected to, and isolated from, the mainland by coastal storms. In the mid-twentieth century an armored causeway and multiple bridges provided temporary connections. Today, Washburn Island is once again a true island, separated from the Falmouth mainland by a series of narrow waterbodies.

Washburn Island was acquired by the Commonwealth in 1983 for inclusion in the state park system. It is a seasonally-staffed park that draws boaters to its shores and campers to its woods. Access is limited; there is no commercial or public boat service. Those fortunate enough to visit Washburn Island are rewarded with a unique recreational experience.

Washburn Island’s physical, political, and regulatory attributes are summarized below. (Table 5.1.1)

Table 5.1.1. Physical, political, and regulatory settings of Washburn Island.

Setting	Name or Metric
Location:	Falmouth
Area (acres)^a:	284.68
Perimeter (miles)^a:	7.89
Landscape Designation(s)^b:	Reserve, Parkland
Legislative Districts:	
House	3rd Barnstable
Senate	Plymouth and Barnstable
Regulatory Designations:	Priority Habitat
	Waquoit Bay ACEC
	Outstanding Resource Waters – Waquoit Bay ACEC
	Fertilizer Management DCPC

- Calculated using a Geographic Information System (GIS).
- For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.
- Chapter 716 of the Acts of 1989 established the Cape Cod Commission and allowed for the creation of Districts of Critical Planning Concern (DCPC).



Associated Properties. Washburn Island is part of Waquoit Bay National Estuarine Research Reserve. Other properties in the Reserve include WBNERR (Section 3), South Cape Beach (Section 4), and Quashnet Woods and associated watershed lands (Section 6).

5.2. NATURAL RESOURCES

There is little information on Washburn Island’s natural resources. However, its plants and animals are believed to be a subset of those found elsewhere in Falmouth. An overview of the ecology of Waquoit Bay was presented in Geist (1996). A botanical inventory is currently underway.

Physical Features

Washburn Island is located in the southwest corner of Waquoit Bay. It is approximately “L” shaped, with a north, central, and south section. (Figure 5.1) The central section, where a campground is located, is approximately 6,900 feet long. The north section, which is approximately 3,000 feet long, connects to the central section via a salt marsh and an approximately 75-foot-wide section of upland. The south section is perpendicular to the rest of the island, and is approximately 5,500 feet wide.



The northern and central portions of Washburn Island are connected by this saltmarsh and a narrow strip of upland. (See Appendix G for photo information.)

Elevations range from sea level at the beach and salt marshes to approximately 25 feet above sea level at the highest point on the island’s north section. Elevations are lowest along Vineyard Sound.

Water Resources

The island’s water resources are largely estuarine; freshwater resources are uncommon. There are no rivers or streams on the island. A summary of these resources is provided in Table 5.2.1.

Table 5.2.1. Water resources of Washburn Island.

Water Resource	Name or Metric
Watershed:	Cape Cod
Aquifer:	Cape Cod SSA
Lens	n/a
Rivers and Streams (miles)	0.00
Vernal Pools	
Certified (#)	0
Potential (#)	1
Wetlands (acres)	30.27
Lakes and Ponds (acres)	4.58

a. Includes overlap with adjacent water bodies.

Much of the park is susceptible to flooding, hurricane inundation, and sea-level rise. (Table 5.2.2) Portions of the main trail, to the north and south of the campground are predicted to be impacted by a 100-year storm, as is the eastern edge of the campground.

A Category 1 hurricane is predicted to inundate nearly the entire southern end of the island as well as low-lying areas to the north. A Category 3 storm would inundate the entire campground and nearly the entire trail system.

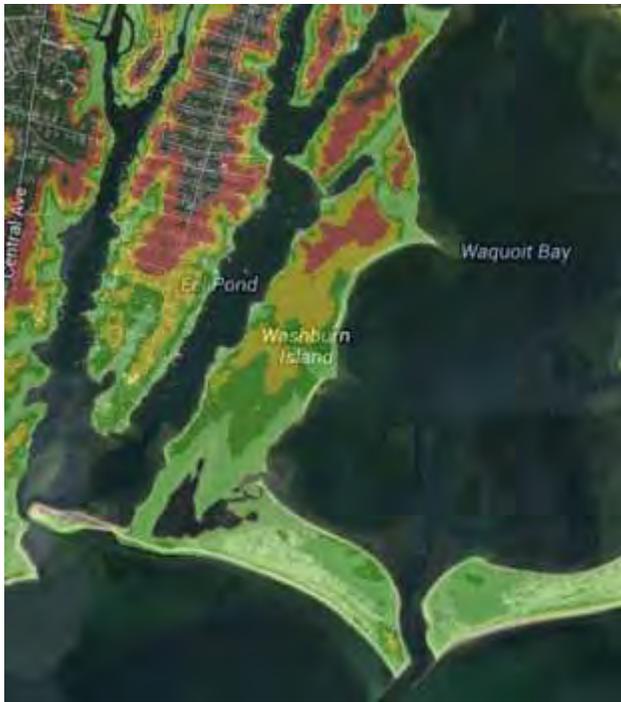
The projected one-foot rise in sea-level will not directly affect the campground, but will flood trails in low-lying areas.

Table 5.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to Washburn Island.

Type of Impact	Acres	%
Flooding:		
100-year Storm	212.31	74.58
500-year Storm ^a	243.74	85.62
Hurricane Inundation:		
Category 1 Storm	138.79	48.75
Category 2 Storm ^b	192.18	67.50
Category 3 Storm ^b	246.94	86.74
Category 4 Storm ^b	276.90	97.26
Sea Level Rise	54.17	19.03

a. Cumulative value; includes 100-year storm impacts.

b. Cumulative value; includes impacts of all lower category storms.



Predicted hurricane inundation of Washburn Island. Areas predicted to be inundated by Category 1 storms are represented in light green; additional areas inundated by Category 2, 3, and 4 storms are represented in dark green, yellow, and red, respectively. (See Appendix G for photo information.)

There are six barrier beaches; Fm-10 on the west side of the island, Fm-7 at the northernmost point, Fm-8 and Fm-9 to the east, and Fm-1 and Fm-11 to the south. The last two are the most extensive, constituting most of the island's frontage on Vineyard Sound.

Rare Species

State-listed Species. Seven state-listed species are known from Washburn Island; two are also federally listed (Table 5.2.3)

Table 5.2.3. State-listed species of Washburn Island, as identified by the NHESP.^{a, b}

Species ^{a, b}	Type ^c	MESA ^d
Bristly foxtail	P	SC
Common tern	B	SC
Eastern box turtle	R	SC
Least tern	B	SC
New England blazing star	P	SC
Piping plover ^e	B	T
Roseate tern ^f	B	E

- a. Presented alphabetically, by common name.
- b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.
- c. Types of state-listed species include: B = Bird; P = Plant; and R = Reptile.
- d. Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.
- e. This species is also federally threatened.
- f. This species is also federally endangered.

Priority Habitat

Much of Washburn Island (165.65 acres, 58.19%) is Priority Habitat. This includes the north and south ends of the island, as well as Eel Pond to the west and Waquoit Bay to the east. The entire beach adjacent to the campground is Priority Habitat.

Vegetation

A multi-year floristic inventory of Washburn Island is currently underway.

Most of the island's forests are dominated by pitch pine; canopy oaks are less common. The southern barrier beaches, along Vineyard Sound, are dominated by American beach grass, salt spray rose, and eastern red cedar. Poison ivy is ubiquitous and abundant throughout the park.

Invasive Species. Five invasive and one likely invasive species are known from the island. (Table 5.2.4) The greatest concentrations occur along the former army road, to the west of Tim's Pond. Concentrations also occur in thickets along the barrier beaches.

Table 5.2.4. Known invasive and likely invasive plants of Washburn Island.

Species ^a	Status ^b
Black locust	I
Common reed	I
Japanese honeysuckle	I
Multiflora rose	I
Oriental bittersweet	I
Spotted knapweed	L

- a. Presented alphabetically, by common name.
- b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).

Natural Communities

Due to historic land use, the island is mostly covered by cultural, rather than natural, communities. Previously developed areas, including the campground, typically have an even-aged canopy of pitch pine and a ground cover of Pennsylvania sedge; vegetation is largely absent from the shrub and sub-canopy layers.



Historic land use, including agriculture and military development, has shaped the island's vegetation. (See Appendix G for photo information.)

Some natural community types have been identified. (Table 5.2.5) They tend to be associated with aquatic areas not prone to development, or occur in areas less impacted by previous land uses. The dunes along Vineyard Sound are intermediate between the Maritime Dune and Maritime Shrubland community types; invasives are abundant at this location.

Forest cover types have been classified and mapped for this property and for all others in the Reserve.

Table 5.2.5. Known natural communities of Washburn Island.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Maritime Beach Strand	T	S3	1
Pitch Pine - Oak Forest ^e	T	S5	2
Salt Marsh	E	S3	3
Shrub Swamp	P	S5	3

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from the following sources:
 1. RMP Planner.
 2. Whiddon (2012a).

Forests

Washburn Island is 53.27% forested. Non-forested areas include salt marsh and dunes. There are no CFI data for this property.

Wildlife

No formal surveys have been conducted.

Raccoons are common and can be a nuisance for campers. Visitors are advised to secure their food containers and the composting toilet buildings to keep raccoons out.

5.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic buildings, structures, and landscapes. An overview of significant events in the history of Washburn Island is presented in Table 5.3.1. Cultural Resources are identified in Table 5.3.2.

Table 5.3.1. Significant events in the history of Washburn Island; based on Keay (2005).

Year(s)	Events
ca. 1850	Three working farms on island; grazing cattle and sheep present.
1893-1895	Washburn Island acquired by Henry Bryant, who built a three-story house there. A hand ferry linked the island to the mainland.
1912	Island is sold to a group of corporate investors following the death of Henry Bryant; 4.5 acres along the southern beach is sold and developed.
ca. 1912	Albert Henry Washburn and Florence Washburn acquire the remainder of the island. They construct a house stable, boathouse, pier, and a narrow-bridged causeway to the mainland.
1926	Fire destroys Washburn residence.
1938	Hurricane of 1938 washes out causeway that connected Washburn Island to the mainland.
ca. 1940	Federal government leases land around Waquoit Bay, including Washburn Island, for amphibious landing training; the island is reconnected to the mainland. The former causeway is rebuilt and a paved road constructed; a wooden bridge with water and fuel pipelines is later constructed.
ca. 1940	U.S. Army constructs a paved road network, parade grounds, obstacle course, docks, and five 12-foot by 900-foot piers.
1944	Military training activities are moved to Florida; demolition of Army facilities begins.
1945	Demolition of facilities halted; construction of a recreation and recovery center begins.
1946	Demolition of facilities resumes following end of World War II.
ca. 1950	Washburn Island returned to custody of Florence Washburn, who allows locals to use it for recreation.
1976	Washburn family offers to sell island to the Town of Falmouth, but fails to reach agreement with the town. Two successive development companies acquire a purchase option and begin development plans.
1983	Washburn Island is acquired by the Commonwealth via eminent domain.
1990	Seasonal island managers are hired to live on the island during the camping season, enforce regulations, and offer interpretive services. This practice continues today.

Table 5.3.2. Cultural resources of Washburn Island.

Location and Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance ^h
WW2 era foundations, slabs, asphalt roads, and bridge abutments.	AR	1942-1945	6	L	Y	-	-	1
Additional Resourcesⁱ								
<i>Former Bryant Estate sites</i>	AR	1894-1914	6	L	N	-	-	1
<i>Foundation, former Collins Home garage</i>	AR	c. 1912	6	L	N	-	-	1
<i>Indian occupation site</i>	AR	-	-	U	N	-	-	1
<i>Indian skull discovery site</i>	AR	-	-	U	N	-	-	1
<i>Washburn Family House site</i>	AR	early 20 th c	6	L	N	-	-	1
<i>Washburn Boat House site</i>	AR	early 20 th c	6	L	N	-	-	1

- a. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; MHCA – Massachusetts Historic Commission Area; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- b. Date of construction provided, when known.
- c. Building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS): 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- d. Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- e. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- f. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- g. Massachusetts Historical Commission inventory number.
- h. The following guidance is offered for the ongoing maintenance of these cultural resources:
 1. Refer to Archaeological Features BMP (DCR n.d.k).
- i. Documented through the 1984/1985 Cultural Resources Evaluation Project but not yet field verified or confirmed.

ARCHAEOLOGICAL RESOURCES

Artifacts from the island inventoried by professional archaeologists indicate Native American activity from Late Archaic times (ca. 6,000–3,000 years ago) through to the Late Woodland Period. The range of implements suggests the island served as a habitation site and possibly a lithic workshop. A pestle and pendent were also reported from one of the sites. In 1985 a burial, that of a 30 year old Native American woman was exposed in the dunes. If these people elected to bury their loved ones here, this pattern would suggest that more than one person would have been buried at any given location. Washburn Island is considered highly sensitive for pre-Contact resources.

Ten pre-Contact sites are recorded on Washburn Island and three systematic archaeological surveys have been conducted on island (MHC Reports #1622, #3201, #3359).

Historic Resources

In the 18th and 19th centuries, Washburn Island, and ‘Menauhant’ (the Native American name) was mostly cleared for livestock grazing and small scale agriculture. At the end of the 19th century businessman Henry Bryant purchased the island and built a grand summer cottage. The eclectic Colonial-Revival residence included a large barn and servant’s quarters. In 1912, Bryant’s widow sold most of the island to a group of investors including Albert Henry Washburn. The cottage was lost to fire in 1926, and the former estate fell into disrepair.

Between 1942 and 1944, the island served as the Camp Edward’s Engineer Amphibian Command and became one of the Army’s principle amphibious training grounds. Washburn Island has been referred to as “the cradle of our European invasion,” as the men who trained on its shores went on to spearhead the assaults at Normandy, France; Oran, Algeria; and Salerno, Italy. Toward the end of the war, the base was used as an “R & R” center for convalescing

soldiers from nearby Camp Edwards. The island was acquired by the Commonwealth in 1983.

Historic Landscapes

World War Two Resources. The island has become significantly overgrown with vegetation since the 1940s, however the collection of extant remains and road systems continue to exhibit the area’s important role as a military training site. Although heavily obscured by growth, the main north-south road constructed during this period still retains integrity and is used as the general route of the island’s main trail. Deteriorating concrete foundations and slabs located toward the northern and central portion of the island are associated with the WW2 era. The bridge abutment on the northwest shore of the island is also a remnant from the period. Some of these slabs may also be related to the post war convalescence center, though the Army contracted for the demolition and removal of most of the military infrastructure before transferring the property back to the Washburn Family. The remains of a corrugated metal shed on the north island may also be associated with this period.



Concrete slabs eroding into Waquoit Bay were once part of Washburn’s military development. (See Appendix G for photo information.)

Structures

The only potential remaining evidence of the Bryant summer estate is a concrete slab and exposed metal pipe. A circular concrete structure, possibly a cistern, is located in the area identified as the Washburn Family House site. A concrete slab and step at Collins Hill are most likely associated with the garage at the Collins summer home, which was allegedly moved to the mainland when beach

erosion undermined the foundation in the early 20th century.



Remains of the Collins summer house are visible along Washburn’s southern shore. (See Appendix G for photo information.)

Objects

There are no objects that are not associated with historic landscapes.

5.4. RECREATION RESOURCES

There are two main recreational uses of Washburn Island; camping and day use by boaters.

There are 10 primitive camp sites located in the center of the island; none are accessible. (Table 5.4.1; Figure 5.1) The campground is open from May through mid-October. Campers must provide their own transportation to the island, cooking grills, and drinking water. A metal campfire ring, water bucket, and shovel are provided at each camp site. Composting toilets are stocked and operational from mid-May through mid-October; they are left open throughout the year.

Table 5.4.1. Summary of camping resources at Washburn Island.

Camping Resource	Number
Camp Sites (total)	10
Group sites ^a	1
Tent only ^{b,c}	9
Comfort Stations^d	3

- a. Maximum allowable occupancy of 25 campers and 10 tents per night.
- b. Maximum allowable occupancy of four campers and two tents per night, per site. As of 2015, two tent
- c. Two sites are reserved for campers arriving by kayak.
- d. Composting toilets, only two are in use at any given time.

Despite boat only access, occupancy rates are relatively high. (Table 5.4.2) A total of 1,274 registered campers stayed on Washburn Island in 2013.

Table 5.4.2. Campsite occupancy rates, by type, at Washburn Island.

Campsite Type	Percent
Group	64.6
Tent only	66.5
Total	66.3

Campers are overwhelmingly from Massachusetts and contiguous states. (Table 5.4.3)

Table 5.4.3. Common geographic origins of campers staying at Washburn Island.^a

Geographic Origin	Percent
Massachusetts	91.4
Connecticut	2.6
New Hampshire	1.1
Rhode Island	1.1
Total	96.2

a. Only states and provinces with one or more percent of total camping registrations are included.

Campers also typically swim, sunbathe, beach comb, and walk the island’s trails during their stay.

Day use by boaters is more common than camping. During July, the number of day use visitors to Washburn Island may exceed 1,200 per week. During the same period, campers number approximately 300 per week.

Boaters typically anchor in the calm waters of Waquoit Bay, along the island’s south shore. They use the island for swimming, sunbathing, and picnicking. Some use the trail system to explore the island or to travel to the composting toilets in the campground.



Day use visitors’ boats line the shore of Washburn Island.

The following recreation activities are known to occur at Washburn Island.

- Camping
- Fishing, fin fish
- Fishing, shellfish
- Geocaching (2 caches as of November 2014)
- Hiking/walking
- Hunting
- Kayaking
- Nature study
- Picnicking
- Sun bathing
- Swimming

5.5. INFRASTRUCTURE

There is little non-historic infrastructure. (See Table 5.5.1)

Property Boundary

The park is bounded on the south by Vineyard Sound, on the west by Eel Pond and the Seapit River; and on the north and east by Waquoit Bay. The boundaries are conspicuous, constantly changing, and unmarked.

Table 5.5.1. Non-historic buildings of Washburn Island.

Infrastructure	Date ^a	Condition ^b	In Use ^c	Utilities ^d
Composting toilet buildings (3)	-	2	S	E

- a. Building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS): 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- b. Date of construction provided, when known.
- c. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.
- d. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.



The Seapit River borders the northwest corner of the island; residential development is within 250 to 500 feet. Commercial oyster production occurs just offshore. (See Appendix G for photo information.)



Stairs from the shore to campsites are repeatedly undermined by storms, resulting in an ongoing maintenance need. (See Appendix G for photo information.)

The Commonwealth holds a deeded interest in a 4-foot wide way along the southwest boundary of a private residence at 28 Nichols Road, Falmouth. This interest was established in 1897 to allow owners of land on Washburn Island access between Nichols Road and Waquoit Bay (Book 231, Page 308). This right transferred with land ownership to the Commonwealth. A 1991 agreement between the Commonwealth and the then residents of 28 Nichols Road formalized the terms of access (Document Number 523650).

Buildings and Structures

There are only three buildings, all are self-contained composting toilets. (Table 5.5.1) Two are equipped with solar powered ventilation fans.

Eight sets of wooden steps provide access to the campground from the island’s eastern shore. Coastal erosion has undermined and destabilized some of the stairs. An additional set of steps is located on the Eel Pond side of the portage trail. (See Trails, below.)

Roads

Only historic roads exist; it is associated with the past military use. (See Section 5.3 Cultural Resources for more information.) This road is largely overgrown, and is classified as a trail. (See Table 5.5.2.)



This former military road runs much of the island’s length, forming the basis for its trail system. (See Appendix G for photo information.)

Parking

There is no parking on Washburn Island. Campers are advised to park their vehicles and boat trailers at the Town of Falmouth’s nearby White’s Landing.

Trails

Washburn’s trail system incorporates the existing road and paths. There are two major components to the system: the main trail and the campground loop. The main trail runs approximately north-south through the main part of the island, over the remnants of a paved military road. The campground loop is a small nested loop system that connects to the main trail. Trails are identified with triangular blue plastic markers; intersections are identified with wooden signs identifying destinations and distances. The condition of the island’s trails is identified in Table 5.5.2.

Table 5.5.2. Condition and length of official trails at Washburn Island.

Trail Condition	Length (Miles)
Good	2.10
Fair	0.00
Poor	0.00
Total	2.10

A short (97-foot), portage trail allows kayakers to carry their crafts cross the island from Eel Pond to Tim’s Pond, avoiding the rougher waters of Vineyard Sound.



A sign along the island’s western shore directs kayakers to the Tim’s Pond Portage. (See Appendix G for photo info.)

Kiosks and Signs

Sign boards are located at every access point to the campground. They identify the beach as being for use by campers; provide information on Washburn Island and the entire reserve; and list campground rules.

Trail signs are located at intersections.

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are no known memorials or markers.

5.6. INTERPRETATION

Island Managers provide interpretation on an ad-hoc basis. There are no formal programs.



A seasonal Island Manager engages visitors at their camp site, providing information on the history and ecology of Washburn Island. (See Appendix G for photo information.)

5.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

Washburn Island is seasonally staffed (Table 5.7.1). Each Island Manager lives and works on-island five days and four nights per week, from May through mid-September. Although they work at Washburn Island, they are administratively associated with South Cape Beach. They are supervised by the Reserve’s Stewardship Coordinator.

Table 5.7.1. Mass Parks personnel assigned to Washburn Island.

Job Title	Number of Positions ^a
<i>Seasonal Personnel</i>	
Forest and Park Supervisor I (Short-term)	3

a. Number of position is based on 2014 staffing levels.

Partnerships and Volunteers

The Waquoit Bay Reserve Foundation was established to support the Reserve through fundraising and volunteerism. Their activities cover all four parks within the Reserve, including Washburn Island. (See Section 3.7 for additional information on the WBRF.)

Public Safety

The Falmouth Fire and Police departments provide fire response, emergency services, and law enforcement.

Funding

Conservation Trust Fund

There are no funds in the Conservation Trust Fund dedicated to Washburn Island.

Retained Revenue

The 2013 camping season generated \$10,400 in revenue.

Other Revenues

There are no other revenues.

5.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs legal

agreements, and institutional knowledge. Legal agreements unique to the park are presented in Table 5.8.1.

Table 5.8.1. Key legal agreements for Washburn Island.

Party and Subject of Agreement	Type ^a	Expiration Date ^b
DEM and Geoffrey M. and Deborah G. Converse. Right of Access across 28 Nichols Way, Falmouth. (Doc # 523650)	A	None
National Oceanic and Atmospheric Administration State and federal roles in management of WBNERR.	U	None
Waquoit Bay Reserve Foundation Support for mission of WBNERR.	A	2018

- a. Agreement types include: A=Memorandum of Agreement; and U=Memorandum of Understanding.
b. Year that agreement expires. Permanent agreements are indicated by an expiration date of “None.”

Key management and guidance documents are presented in Table 5.8.2.

Table 5.8.2. Key management and guidance documents for Washburn Island.

Author and Document	Year
Gannet Fleming, Inc. Environmental Audit Report, Washburn Island, Falmouth, Massachusetts.	1998
Waquoit Bay National Estuarine Research Reserve Emergency operations plan for the Waquoit Bay National Estuarine Research Reserve.	2012
Whiddon, A. J. Prescribed fire plan. Administrative Unit(s): Waquoit Bay National Estuarine Research Reserve.	2012a
Waquoit Bay National Estuarine Research Reserve Hurricane preparedness and response plan for the Waquoit Bay National Estuarine Research Reserve. 2013.	2013
Waquoit Bay National Estuarine Research Reserve Waquoit Bay National Estuarine Research Reserve; Management Plan; 2013-2017.	2014

The 2014 Management Plan (WBNERR 2014) covers all properties in the Reserve, and addresses Reserve research, educations program, and staffing in detail. It does so from the perspective of the National Estuarine Research Reserve System. This plan is updated every five years, per NOAA requirements.

Advisory Committees

The following advisory committee provides input on matters of policy and operations of the Reserve, including Washburn Island:

- Waquoit Bay National Estuarine Research Reserve Advisory Committee

Additional information on this committee maybe found in WBNERR (2014).

Research Activities

The Reserve has a formal registration procedure for research activities; it is administered by the Research Coordinator and Assistant Research Coordinator. Research on Washburn Island is governed by this process. See Section 3.8 for additional information.

Annual Maintenance

Ongoing management practices typically follow a regular schedule. Common activities, and the desired frequency with which they occur, are identified in Table 5.8.3.

Table 5.8.3. Annual cycle of management activities at Washburn Island.

Activity	Spring ^a	Summer ^a	Fall ^a	Winter ^a
Cleaning - Campsites, grills, fireplaces	D1	D1	D1	N/A
Composting toilet maintenance	D1	D1	D1	N/A
Litter removal - Beaches, parking lots, walkways	D	D	AN	N/A
Litter removal - Trails	AN	AN	AN	N/A
Mowing and trimming	AN	AN	AN	N/A
Pruning - Trees and shrubs	AN	AN	AN	N/A

a. Frequency codes are: A1 = Once annually; AN = As needed; D = Daily, # times; E = Every # days; N/A = Not applicable.

Natural Resources

Water Resources

The Town of Falmouth has a nitrogen control bylaw. However, fertilizers are not and will not be used on Washburn Island.

With the exception of areas being actively managed for nesting beach-nesting birds, pedestrian access over dunes is not restricted.

There is no management plan for the island's six barrier beaches.

Rare Species

Populations of beach-nesting birds are managed and monitored by the Massachusetts Audubon Society under a statewide contract, in accordance with state and federal standards. This includes searching for nests, working with DCR to close portions of the beach and dunes critical to shorebird protection, installing symbolic fencing and educational signs, educating park visitors, monitoring nesting and fledging success, and removing signs and symbolic fencing at the end of the nesting season.

A prescribed fire plan exists for Washburn Island (Whiddon 2012a); it was approved by the NHESP (Review # 14-33080). One of the stated goals is "to conserve, protect, and enhance the habitat of northern blazing star and other special concern species that rely on grasslands, coastal heathlands, and pitch pine open vegetation structure." Implementation of this plan is the responsibility of the Bureau of Forest Fire Control and Forestry, in coordination with the Reserve's Stewardship Coordinator.

Invasive Species

There is no systematic invasive species monitoring or management at this park.

Vegetation

Vegetation management is limited to that associated with trail maintenance, downed trees, hazard trees, and the creation and maintenance of fire breaks. Downed and hazard tree management, and fire break creation and maintenance are performed by the Reserve's Stewardship Coordinator.

Cultural Resources

There are no management activities unique to this park.

Recreation Resources

Island Managers live on-site, in primitive camping conditions, around the clock, for multiple days at a time. All materials, supplies, and trash must be transported by boat. These conditions are unique to Washburn and DCR campgrounds in Boston Harbor Islands State Park.

Infrastructure

Given the lack of infrastructure, there are few infrastructure-related management practices.

Buildings

Composting toilets require special maintenance. During the camping season, Island Managers add wood chips to the toilets and mix the compost several times per week. This requires opening an access panel to the toilet's compost bin, lying on the ground with arms extended forward, and circulating the compost with a rake and shovel. One of the three composting toilets is out of service at all times, to allow materials to compost. In periods of heavy use, the rate of composting cannot keep up with the rate of input.



Composting toilets in Washburn's campground protect the groundwater, but are labor intensive to maintain. Levels of use often exceed their capacity. (See Appendix G for photo information.)

Although intensively managed during the camping season, there is no ongoing long-term maintenance of the toilets. Compost accumulates over the years, decreasing the volume available for additional input, until the toilets can no longer be used. The physical

removal, transfer off-island, and disposal of composted materials are periodically needed, although they have only occurred once since the toilets were installed. The island's remote location, coupled with the unusual nature of the task, makes it difficult to find a vendor.

Roads

There is no road maintenance.

Parking Areas

The recommended parking area for campers' vehicles is White's Landing, which is owned and managed by the Town of Falmouth.

Trails

Trails are maintained by the Island Managers, as needed and as time and resources permit. Gas-powered string trimmers are periodically transported to the island and used to trim vegetation along trail edges. Because portions of the main trail and campground loop are located within Priority Habitat, NHESP review is required before any work may be performed in these areas.

Kiosks and Signs

Island Managers are responsible for maintaining signs. Informational signs adjacent to the camping areas are taken down in the fall and reinstalled in the spring.

5.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of Washburn Island. Applied Land Stewardship Zoning recommendations provide general guidance for managing South Cape Beach. Future activities and projects should be checked against the zoning map (Figure 5.2) for consistency. Management recommendations are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 5.2)

The following Land Stewardship Zoning is recommended for Washburn Island.



DRAFT

Washburn Island

Figure 5.2. Recommended Land Stewardship Zoning

<ul style="list-style-type: none"> — Major Road — Minor Road — Hydrologic Connection - - - Town Boundary Marsh 	<ul style="list-style-type: none"> Salt Marsh Open Water Land Stewardship Zoning Zone 1 Zone 2 Rare Shoreland Significance Overlay 	<p>0 500 1,000 Feet</p> <p>Geographic information provided by MassGIS and DCR GIS</p>
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Zone 1

The following sections of Washburn Island have been designated Zone 1.

- All barrier beaches.
- All salt marshes.

Zone 2

- All areas that are not barrier beaches or salt marshes are designated Zone 2.

Zone 3

- No portion of the park has been designated Zone 3.

Significant Feature Overlay

The following Significant Feature Overlay was developed to protect state and federally listed beach-nesting birds.

- Rare Shorebird Significant Feature Overlay, with NHESP management guidelines. This overlay covers piping plover nesting and foraging areas, and common and least tern

nesting areas. Beach and dune closures within this overlay area may occur as needed and may expand or contract over time.

Management Recommendations

Six priority management recommendations were developed for Washburn Island. (Table 5.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

Table 5.9.1. Priority recommendations for Washburn Island.

Recommendation	Implementation^a
Continue ongoing rare shorebird monitoring and management activities.	C, P
Submit trail maintenance activities in Priority Habitat to NHESP for review under MESA.	R
Prevent pedestrians from crossing dunes on the southern barrier beaches through the limited use of symbolic fencing and signs.	P, R
Prepare a barrier-beach management plan.	P, R
Replace damaged steps from beach to campground.	R
Develop and implement a strategy for the long-term maintenance of composting toilets.	R

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning and Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.



The Quashnet River runs through the heart of Quashnet Woods State Reservation. (See Appendix G for photo information.)

SECTION 6. QUASHNET WOODS STATE RESERVATION

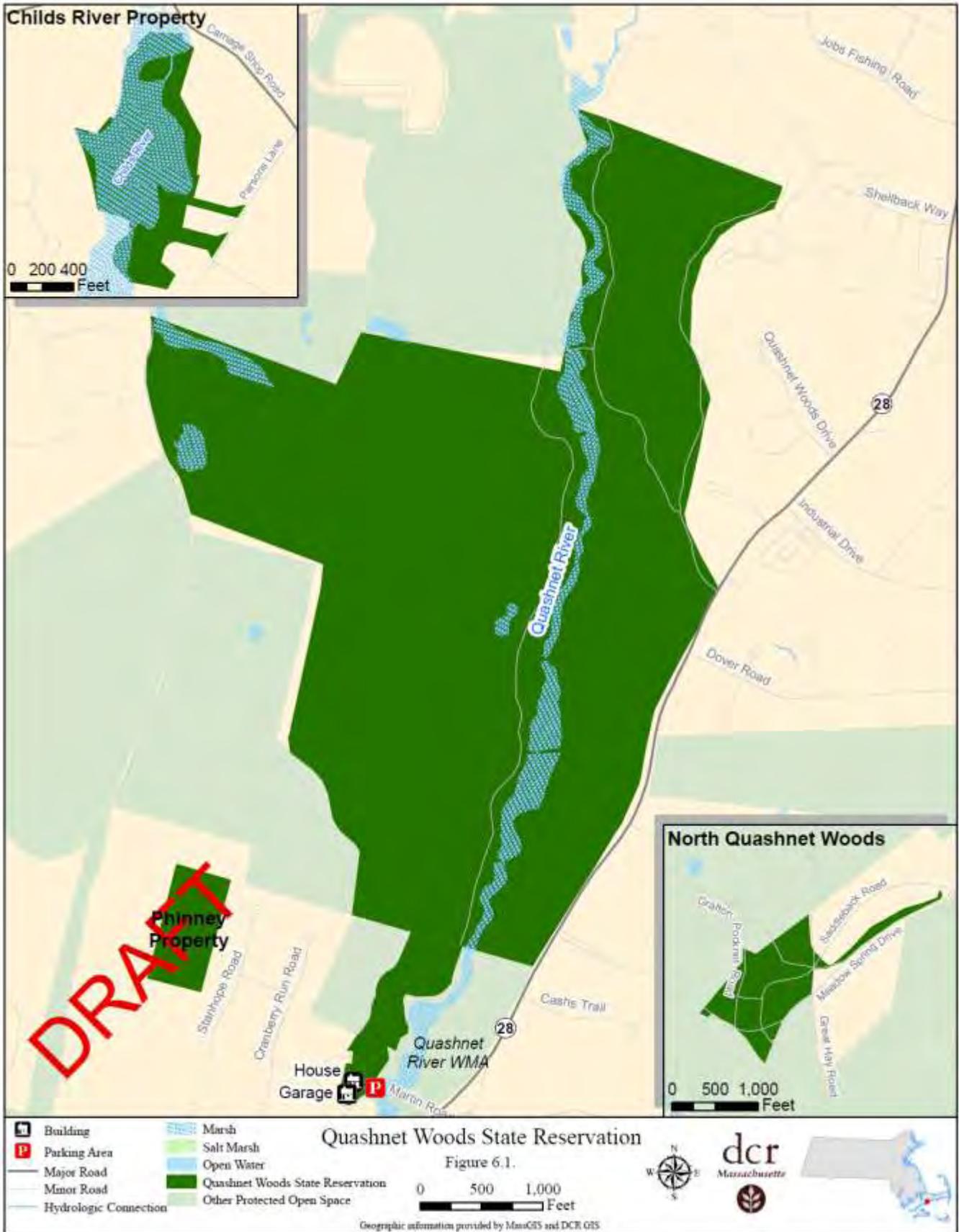
6.1. INTRODUCTION

Six main streams flow into Waquoit Bay; the largest is the Quashnet River (Keay 2000, Louis Berger Group, Inc. 2010). It originates at John's Pond in Mashpee and flows southward to the Bay. As it enters Falmouth its name changes to the Moonakis River. The Quashnet's main source of water is springs from the Sagamore Lens of the Cape Cod SSA.

Protection of the Quashnet River Valley is an extension of decades of efforts to protect the river's fish. The Quashnet's cold waters historically supported populations of sea-run brook trout (i.e., salters), herring, and eels (Keay 2010). As early as 1864, restrictions were placed on the taking of salters from the Quashnet (Chapter 150 of the Acts of 1864). In the 1950s, Massachusetts Division of Fisheries and Game, later the Division of Fisheries and Wildlife (DFW), stocked brook trout (Mullan 1958) and began acquiring property along the river to protect their habitat. This established the Quashnet River Wildlife Management Area (WMA); additional acreage was added in the late 1980s.

Recognizing that protection of water quality and fish habitat requires watershed protection, the Commonwealth purchased 336 acres of stream corridor and adjacent uplands. This property, Quashnet Woods State Reservation (i.e., Quashnet Woods), is contiguous with and north of, the WMA. Quashnet Woods is jointly owned and managed by DFW and the DCR; the former responsible for the riverbanks and the latter responsible for the rest of the property. It has expanded in size since established, and is part of a larger conservation landscape in Falmouth and Mashpee. (Figure 6.1)

The creation of Quashnet Woods reflects an increased emphasis on protecting Waquoit Bay by protecting the rivers and streams that flow into the bay. Other recent watershed protection efforts include acquisitions along the Childs River in Falmouth, and the acquisition of streamside properties associated with WBNERR (Section 3) and South Cape Beach (Section 4).



Quashnet Wood’s physical, political, and regulatory attributes are summarized below. (Table 6.1.1)

Table 6.1.1. Physical, political, and regulatory settings of Quashnet Woods and associated properties.

Setting	Name or Metric
Location:	Falmouth, Mashpee
Area (acres)^a:	468.09
Perimeter (miles)^a:	8.15
Landscape Designation(s)^b:	Woodlands, Reserve
Legislative Districts:	
House	Third Barnstable
Senate	Plymouth and Barnstable Cape and Islands
Regulatory Designations:	Priority Habitat Waquoit Bay ACEC Outstanding Resource Waters - Waquoit Bay ACEC Fertilizer Management DCPC Waquoit Historic District

- a. Calculated using a Geographic Information System (GIS).
- b. For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.
- c. Chapter 716 of the Acts of 1989 established the Cape Cod Commission and allowed for the creation of Districts of Critical Planning Concern (DCPC).

Associated Properties. Three additional properties are included in this Section: the Phinney property, North Quashnet Woods, and the Childs River property. None are contiguous with Quashnet Woods. These properties, along with Quashnet Woods State Reservation, were acquired to protect the quality and quantity of water flowing into Waquoit Bay. All are located north of Route 28. Throughout this section they are collectively referred to as the watershed properties. (See Figure 1.1 for locations of these properties.)

- **Phinney Property.** Located in Falmouth, west of Stanhope Road; 10 acres.
- **North Quashnet Woods.** Located on Boghouse Road, Mashpee; 27 acres.
- **Childs River.** This property consists of two parcels located on the river, south of Carriage Shop Road, Falmouth; 19 acres. Cranberries were once farmed on portions of this property.

The watershed properties are administered from the WBNERR headquarters as part of the National Estuarine Research Reserve. Other properties in the reserve include WBNERR (Section 3), South Cape Beach (Section 4), and Washburn Island (Section 5).

6.2. NATURAL RESOURCES

Fisheries studies have been conducted in the Quashnet River since at least the late 1940s; this information is available from MassWildlife. There are few other sources of information on Quashnet Woods and the watershed lands’ natural resources.

Physical Features

Quashnet Woods and associated watershed properties are located on an outwash plain the slopes gently toward the south and east.

Elevations along the Quashnet River range from approximately 10 feet near Route 28 to approximately 20 feet at the northern end of Quashnet Woods. Elevations reach approximately 50 feet to both the east and west of the river valley; there are numerous depressions in the uplands. The Phinney property is approximately 50 feet above sea level and nearly level. The North Quashnet property has the highest elevations, ranging from 50-90 feet; it slopes westward toward the Quashnet River. Elevations at the Childs River parcel range from approximately 10 to 30 feet, with the topography sloping from both the east and west toward the river bottom.

Water Resources

Quashnet Woods and the watershed lands have the greatest length of rivers and streams of any property in the Complex. A summary of these resources is provided in Table 6.2.1.

Table 6.2.1. Water resources of Quashnet Woods and associated properties.

Water Resource	Name or Metric
Watershed:	Cape Cod
Aquifer:	Cape Cod SSA
Lens	n/a
Rivers and Streams (miles)	1.28
Vernal Pools	
Certified (#)	3
Potential (#)	0
Wetlands (acres)	35.62
Lakes and Ponds (acres)	0.0

The Quashnet and Childs river valleys are predicted to be impacted by flooding and storm surge. (Table 6.2.2)

Table 6.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to Quashnet Woods and associated properties.

Type of Impact	Acres	%
Flooding:		
100-year Storm	32.46	6.93
500-year Storm ^a	41.80	8.93
Hurricane Inundation:		
Category 1 Storm ^b	2.56	0.55
Category 2 Storm ^b	12.72	2.72
Category 3 Storm ^b	51.58	11.02
Category 4 Storm ^b	68.07	14.54
Sea Level Rise	0.00	0.00

a. Cumulative value; includes 100-year storm impacts.

b. Cumulative value; includes impacts of all lower category storms.

Approximately 3,800 feet of the Quashnet River Valley is predicted to be impacted by a 100-year storm. Much of the Childs River parcel will be impacted by a 100 year storm; nearly the entire parcel will be affected by a 500-year storm.

Inundation models predict no impacts to the Quashnet Woods State Reservation from Category 1 or 2 storms. A Category 3 storm is predicted to inundate nearly the entire river valley within the park. However, it is not predicted to impact the Martin Road parking lot or adjacent buildings.

In contrast a Category 1 hurricane is predicted to impact the Childs River parcel, with a Category 2 storm inundating almost of the entire property. There is no infrastructure on the parcel to be impacted by these storms.

The projected one-foot rise in sea-level will not affect any of the properties.

Rare Species

State-listed Species.

There are two known state-listed species (Table 6.2.3). One candidate for federal listing, the New England Cottontail, also occurs in the park.

Table 6.2.3. State-listed species of Quashnet Woods and associated properties, as identified by the NHESP.^{a, b}

Species ^{a, b}	Type ^c	MESA ^d
Barrens buckmoth	I	SC
Eastern box turtle	R	SC

a. Presented alphabetically, by common name.

b. Fact sheets are available at:

<http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.

c. Types of state-listed species include: I = Insect; and R = Reptile.

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

Priority Habitat

Approximately half of Quashnet Woods and associated properties (52.02%) is Priority Habitat. This includes the entire southern half and the powerline corridor to the north. Almost all of the Phinney and North Quashnet properties (greater than 97%, each) are also Priority Habitat. None of the Childs River parcel has been so designated.

Vegetation

There have been no comprehensive surveys of the vegetation.

Invasive Species

Five species of invasive or likely invasive plants have been incidentally observed. (Table 6.2.4) They are located adjacent to the Martin Road parking lot. An unidentified honeysuckle is associated with the former residence on Martin Road; it is potentially invasive.

River restoration efforts in the 1970s involved the introduction of a highly invasive plant, reed canary grass (Keay 2000). A 1984 article on the restoration efforts described the shores “as covered by three-

foot-high canary grass” (Berger 1984, in Keay 2000). The current distribution of this plant within the park is unknown.

Table 6.2.4. Known invasive and likely invasive plants of Quashnet Woods and associated properties.

Species ^a	Status ^b
Autumn olive	I
Multiflora rose	I
Norway maple	I
Oriental bittersweet	I
Reed canary grass	I

- a. Presented alphabetically, by common name.
- b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).

Natural Communities

There have been no formal surveys of natural communities. Three community types are currently known to occur, others are present but remain unidentified. (Table 6.2.5) Forest cover types have been classified and mapped for this property and for all others in the Reserve.

Table 6.2.5. Known natural communities of Quashnet Woods and associated properties.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Pitch Pine - Oak Forest	T	S5	1
Red Maple Swamp	P	S5	2
Shrub swamp	P	S5	2

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from the following sources:
 1. WBNERR (2014).
 2. DEP Wetlands (1:12,000) data layer.

Forests

Collectively, Quashnet Woods and the watershed properties are largely forested (91.54%). However, the Childs River property is only partially forested (36.09%), while the remaining properties are almost entirely forested (greater than 93% each). CFI data provide an incomplete picture of these properties’ forests, identifying only pitch pine, scrub oak, black

huckleberry, lowbush blueberry, eastern teaberry, northern bayberry, and unidentified ferns in the park’s one plot.

Wildlife

No formal surveys have been conducted. Spawning populations of sea-run brook trout are known from the Quashnet and Childs’ rivers; the latter was established using fish from the former.

6.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic buildings, structures, and landscapes. An overview of significant events in the history of Quashnet Woods is presented in Table 6.3.1. Known cultural resources are identified in table 6.3.2.

ARCHAEOLOGICAL RESOURCES

Quashnet Woods State Reservation. No pre-Contact sites are recorded. Archaeological surveys have been conducted on the northern and southern limits of the parcel, and zones of archaeological sensitivity were identified. These can be found in MHC Reports # 1430, #2033, and #2693. Because the parcel contains the Quashnet River and drainage, it is highly sensitive for pre-Contact sites.

Childs River. One pre-Contact site is recorded in the area; there is no information on this site included in the inventory. Three systematic surveys have been conducted in the Childs River area and are reported in MHC Reports # 503, 1622, and 2693. The area is highly sensitive for pre-Contact sites.

Phinney Parcel. No pre-Contact sites are recorded in or near the property. The area is however, moderately sensitive for pre-Contact sites.

North Quashnet. No pre-Contact sites have been recorded in this property. In 2001 and 2002 an intensive archeological survey was conducted of a 350 acre parcel that included the North Quashnet property. The results of these surveys are found in MHC Report #2076 and 2168. The area is moderately sensitive for pre-Contact sites.

Table 6.3.1. Significant events in the history of Quashnet Woods and associated properties.

Year(s)	Events
1956	Massachusetts Division of Fisheries and Game, later the DFW, purchases 31 acres along the Quashnet River to protect salter brook trout fishery.
1987-1988	DFW purchases 4.8 acres on the eastern side of the river in 1987 and an additional 13.5 acres in 1988. These purchases were made to further protect the brook trout fishery.
1987	The Department of Environmental Management and DFW purchase 336 acres of land along the river and on adjacent uplands. DFW has primary management responsibility for the DFW-owned riverbanks and DEM has primary responsibility for the rest of the property.
1995	Mashpee National Wildlife Refuge established; most properties in the Waquoit Bay watershed fall within the refuge boundary.
1996	Loop trail constructed along both sides of the Quashnet River.
1998	Memorandum of Understanding (MOU) developed between DEM and MassWildlife for the management of Quashnet Woods State Reservation; an updated MOU is signed in 2000.
2000	WBNERR boundary expanded to include lands upstream of Waquoit Bay.
2002	Childs River property acquired.
2004	Phinney property acquired.
2004	Conservation Restriction acquired on 7 acres of Mashpee municipal land.
2005	NStar property added to Quashnet Woods.
2007-2008	Approximately 13 acres added to Quashnet Woods State Reservation.

HISTORIC RESOURCES

The Quashnet River Valley was part of the semi-autonomous Mashpee area that was set aside in the mid-seventeenth century by English colonists for use by the native Wampanoag population. The river was an abundant source of fish for both the Native American and colonist population and in the Eighteenth Century, a number of mills were constructed to harness the water power for processing locally grown grains. Mill dams significantly impacted the fishing stocks, and when the river’s main dam was removed in the 1890s, the river banks attracted cranberry growers. By the 1960s, the cranberry industry had crashed due to environmental and market factors. Conservation efforts over the subsequent decades lead to the restoration of the river valley as an ecosystem, and in the process removed many of the historic features including dams and mill structures. The remaining cultural resources are crucial to the story of the river’s role in the economic and cultural development of the region.

Historic Landscapes

Childs River Agricultural Landscape. The Waquoit Herring River Company operated a fishery on the Childs River in the late nineteenth and early twentieth centuries. They dammed the river and surrounding creeks as early as 1872, and fish were diverted from downstream flows by means of fish ladders. An earthen dam and ladder north of the property boundary were constructed in 1908.

Two bogs located in the Childs River property serves as tangible reminders of the region’s late 19th and early 20th century cranberry industry. Although recent conservation efforts have sought to reverse many of the impacts associated with cranberry farming, this landscape serves as an important reminder of the historic significance of the cranberry on the local economy. The industry harnessed the region’s rivers and streams, and often competed with fisheries for water resources until overfishing and environmental conditions brought an end to both by the middle of the 20th century. The entire Childs River parcel is part of both the Waquoit Historic National Register District and the Waquoit Village inventoried area.

Table 6.3.2. Cultural resources of Quashnet Woods and associated properties.

Location and Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance ^h
Wauquoit Village	MHCA	1750-1900	-	-	-	-	FAL.A	-
Wauquoit Historic District	NRHD	1700-1950	-	-	-	-	FAL.AY	-
46 Martin Road								
Residence	BU	1925	3	M	N	E, H, S, W	-	1
Garage	BU	1925	3	H	N	-	-	1
Middle Quashnet Reach								
Concrete bog sluice #1 (4 x 18 feet)	ST	Early–mid 20 th c.	5	M	N	-	-	2, 3
Concrete bog sluice #2 (8 x 10 feet)	ST	Early–mid 20 th c.	5	M	N	-	-	2, 3
Concrete bog sluice #3 (10 x 29 feet)	ST	Early–mid 20 th c.	5	M	N	-	-	2, 3
Childs River Parcel								
Childs River Industrial Landscape	LA	c. 1900	-	-	N	-	-	2, 4
Wauquoit Village Cranberry Bog and Upland (West of Childs River)	NRHD	c.1900	-	-	N	-	FAL.949	4
Wauquoit Village Cranberry Bog and Upland (East of Childs River)	NRHD	c.1900	-	-	N	-	FAL.950	4

- a. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; MHCA – Massachusetts Historic Commission Area; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- b. Date of construction provided, when known.
- c. Building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS): 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- d. Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- e. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- f. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- g. Massachusetts Historical Commission inventory number.
- h. The following guidance is offered for the ongoing maintenance of these cultural resources:
1. Refer to Historic Building Maintenance BMP (DCR n.d.i).
 2. Refer to Historic Landscapes - Built Features BMP (DCR n.d.g).
 3. Refer to Archaeological Features BMP (DCR n.d.k).
 4. Refer to Vegetation in Historic Landscapes BMP (n.d.h).

Buildings

There are two historic buildings located in this park. The circa 1920s Cape style Colonial Revival house and small single car garage located at 46 Martin Road. Both are used for storage. These buildings are adjacent to but not included in the National Register nomination, but are included in the boundary as presented in the MACRIS online map (<http://maps.mhc-macris.net/>). For the purposes of this RMP the property will not be considered to be part of the National Register District, however projects that impact the appearance of the property must still be submitted to the Office of Cultural Resources for review.



This house at 46 Martin Road, Falmouth is one of two DCR-owned buildings in Quashnet Woods. (See Appendix G for photo information.)

Structures

Quashnet River Valley Cranberry Bog Sluices.

Three diversion sluices are located along the section of the Middle Quashnet Reach within Quashnet Woods (Louis Berger Group, Inc. 2010). The sluices were built to divert river water into cranberry bogs established during the growth of the industry in the first half of the 20th century. The sluices were built between 1920 and 1960. Sluice #1 is constructed of cast concrete side walls set in an earthen dam and includes a secondary sluice for high flows. Sluice #2 features concrete side walls braced by a series of log timbers. Sluice #3 is set in an earthen embankment and has a wide set channel framed by high formed concrete walls. Further research is required to determine the age and significance of these features, which are all in fair to poor condition.

Two additional historic resources, a box culvert under Martin Road and a former sawmill site are located in the Quashnet River WMA, adjacent to the Quashnet Woods parking lot.

Objects

No objects were identified in this park.

6.4. RECREATION RESOURCES

The following recreation activities are known to occur at Quashnet Woods.

- Fishing, fin fish (catch and release only)
- Hiking/walking
- Hunting
- Nature study

6.5. INFRASTRUCTURE

There is little non-historic infrastructure.

Property Boundary

Much of Quashnet Woods' boundary is physically indistinct from adjacent conservation lands and open space, and from abutting residential development. The exception to this is the eastern boundary, which is contiguous with Route 28 for approximately 3,500 feet, and then with Whittings Road for approximately 3,800 more feet. Its boundaries are unmarked.

Boundaries of the Phinney parcel are indistinct from adjacent undeveloped land. Its boundaries are unmarked.

The North Quashnet parcel's boundaries are indistinct from adjacent municipal and private conservation lands and a residential neighborhood. Its boundaries have been marked.

The Child's River parcel is indistinct from adjacent wetlands to the west and residential lots to the east. Its boundaries are marked. Despite this, there is possible encroachment along Parson's Lane.

Buildings and Structures

There are no non-historic buildings or structures on Quashnet Woods State Reservation. A U.S. Geological Survey (USGS) stream gauging station shed is located on the Quashnet River WMA, adjacent to the parking lot for Quashnet Woods.

Roads

There are three major forest roads in Quashnet Woods; all run north-south. There is one road west of the river and two to the east; an earthen embankment and concrete sluiceway connects the roads. The easternmost forest road, Whiting Road, approximates the Reservation's boundary. Multiple dirt roads run through the North Quashnet property. The Phinney and Childs River properties have no roads. Information on these roads is summarized in Table 6.5.1.

Table 6.5.1. Condition and length of roads in Quashnet Woods and associated properties.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	0.00	0.00
Fair	0.00	0.00
Poor	0.00	0.00
Total	0.00	0.00

a. Based on field assessment; all distances calculated using GIS.

Parking

There is one parking lot, located on Martin Road in Falmouth. The capacity of this lot is identified in Table 6.5.2. This lot is on the Quashnet River WMA, and not on Quashnet Woods State Reservation.

Table 6.5.2. Number of public parking spaces, by location and type, at Quashnet Woods and associated properties.

Location	HP	Other	Total
Martin Road parking lot (trailhead) ^a	0	6	6

a. Number of spaces is based on the number of potential 9-foot-wide spaces.

Trails

Only Quashnet Woods has a formal trail system; it consists of forest roads that predate establishment of the park, as well as trails specifically created for visitor access. The latter run north-south, on both sides of the river, creating a loop that originates from the Martin Road parking lot. Smaller loops are incorporated into the trail system to the west of the river. The condition of these trails is identified in Table 6.5.4.

Table 6.5.3. Condition and length of official trails at Quashnet Woods and associated properties.

Trail Condition	Length (Miles)
Good	3.29
Fair	2.42
Poor	0.70
Total	6.41

Kiosks and Signs

A three-panel kiosk, erected by the DCR, is located adjacent to the Martin Road parking lot within the Quashnet River WMA.



Kiosk at Martin Road parking area. (See Appendix G for photo information.)

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are no known memorials or markers.

6.6. INTERPRETATION

There are no ongoing interpretive programs. WBNERR personnel periodically offer “A river runs through it”, a program on the Reserve’s natural and cultural histories.

The kiosk displays the following interpretive panels:

- Mashpee National Wildlife Refuge: Working Together to Protect Land and Water
- River as Habitat: A Legacy of Neglect Inspires Restoration
- Quashnet River: A Natural Resource Shapes the History of a Community

There are other interpretive displays.

6.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

Quashnet Woods is unstaffed. Staff members from Waquoit Bay provide labor as needed and available.

MassWildlife Personnel

Quashnet Woods is unstaffed. MassWildlife employees from the Southeast Regional Office in Bourne provide labor as needed and available.

Partnerships and Volunteers

The Waquoit Bay Reserve Foundation was established to support the Reserve through fundraising and volunteerism. Their activities cover all four parks within the Reserve, including Quashnet Woods State Reservation and its watershed lands. (See Section 3.7 for additional information on the WBRF.)

The U.S. Geological Survey monitors stream flow from an equipment shed near the Martin Road parking area; these data are made available to the general public.

The Cape Cod Chapter of Trout Unlimited has been working to restore brook trout populations and

habitat in the Quashnet River since the 1970s. They continue to hold monthly volunteer events. For more information, see the Chapter’s web page at <http://www.capecodtu.org/>.

Public Safety

The Falmouth and Mashpee Fire and Police departments provide fire response, emergency services, and law enforcement.

Funding

Conservation Trust Fund

There are no funds in the Conservation Trust Fund dedicated to Quashnet Woods State Reservation.

Retained Revenue

There are no retained revenues.

Other Revenues

There are no other revenues.

6.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs legal agreements, and institutional knowledge. Legal agreements unique to Quashnet Woods are presented in Table 6.8.1.

Table 6.8.1. Key legal agreements for Quashnet Woods and associated properties.

Party and Subject of Agreement	Type^a	Expiration Date^b
Massachusetts Division of Fisheries and Wildlife Expansion of WBNERR boundaries to include the Quashnet River property. Update of July 1988 MOU.	A	None
National Oceanic and Atmospheric Administration State and federal roles in management of WBNERR.	U	None
U.S. Fish and Wildlife Service et al. MOU concerning cooperation and coordination regarding Mashpee National Wildlife Refuge.	U	1998
Waquoit Bay Reserve Foundation Support for mission of WBNERR.	A	2018

- a. Agreement types include: A=Memorandum of Agreement; and U=Memorandum of Understanding.
- b. Year that agreement expires. Permanent agreements are indicated by an expiration date of “None.”

The year 2000 agreement between the DEM and DFW defines management responsibilities. The DFW has primary responsibility for the management of “DFW owned riverbanks.” The DCR, acting through WBNERR, “has primary responsibility for rest of the property.” Functionally, both agencies coordinate their efforts and work cooperatively to manage the property and its resources.

Key management and guidance documents are presented in Table 6.8.2.

Table 6.8.2. Key management and guidance documents for Quashnet Woods and associated properties.

Author and Document	Year
Louis Berger Group, Inc. Waquoit Bay stream restoration master plan: Falmouth and Mashpee, Massachusetts.	2010
Waquoit Bay National Estuarine Research Reserve Emergency operations plan for the Waquoit Bay National Estuarine Research Reserve.	2012
Waquoit Bay National Estuarine Research Reserve Hurricane preparedness and response plan for the Waquoit Bay National Estuarine Research Reserve.	2013
Waquoit Bay National Estuarine Research Reserve Waquoit Bay National Estuarine Research Reserve; Management Plan; 2013-2017.	2014

The 2014 Management Plan (WBNERR 2014) covers all properties in the Reserve, and addresses Reserve research, educations program, and staffing in detail. It does so from the perspective of the National Estuarine Research Reserve System. This plan is updated every five years, per NOAA requirements.

Advisory Committees

The following advisory committee provides input on matters of policy and operations of the Reserve, including Quashnet Woods State Reservation:

- Waquoit Bay National Estuarine Research Reserve Advisory Committee

Additional information on this committee maybe found in WBNERR (2014)

Research Activities

There is a formal registration procedure for research activities in Waquoit Bay National Estuarine Research Reserve. See Section 3.8 for additional information.

Annual Maintenance

Ongoing management practices typically follow a regular schedule. Common activities, and the desired

frequency with which they occur, are identified in Table 6.8.3.

Table 6.8.3. Annual cycle of management activities at Quashnet Woods and associated properties.

Activity	Spring ^a	Summer ^a	Fall ^a	Winter ^a
Litter removal - Beaches, parking lots, walkways	E7	E7	E7	E7
Litter removal - Trails	AN	AN	AN	AN
Mowing and trimming	E7/AN	E7/AN	E7/AN	E7/AN
Pruning - Trees and shrubs	N/A	A1	N/A	N/A

a. Frequency codes are: A1 = Once annually; AN = As needed; D = Daily, # times; E = Every # days; N/A = Not applicable.

Natural Resources

Water Resources

Both the towns of Falmouth and Mashpee have adopted nitrogen control bylaws.

Rare Species

The DFW and DCR are working together to maintain, enhance, and create early successional habitat for the New England cottontail. A Cutting plan has been approved for portions of Quashnet Woods in Mashpee (Cutting Plan No. 172-6927-14; NHESP Tracking No. 13-32276a and 13-32276b). This is part of a broader effort to restore cottontail habitat throughout the Mashpee National Wildlife Refuge.

Invasive Species

There is no systematic invasive species monitoring or management at this park.

Vegetation

The lawn at the 46 Martin Road residence is mowed weekly, or more often, during the spring and summer. It is cut on an as needed basis in the fall.

Cultural Resources

The Waquoit Bay Stream Restoration Master Plan has identified the three historic sluices on the Quashnet River as possible candidates for removal as part of ongoing fisheries restoration efforts (Louis Berger Group, Inc. 2010). Review by cultural

resource specialists is recommended for all proposed dam and sluice removals (Louis Berger Group, Inc. 2010).

Recreation Resources

Fishing in the Quashnet River is catch and release only and limited to the use of artificial lures.

Infrastructure

There are no infrastructure-related management practices unique to this property.

Buildings

The building, garage, and grounds at 46 Martin Road are visited weekly to check for vandalism.

Roads

There is no regular road maintenance; potholes are filled as needed.

Parking Areas

The parking lot is inspected weekly. Illegally dumped materials are removed from the parking lot as encountered.

Trails

Trails are maintained by volunteers and the Reserve's Stewardship Coordinator. Because portions of the trails are located within Priority Habitat, NHESP review is required before any work may be performed in these areas.

Kiosks and Signs

The interpretive panels on the kiosk at the Martin Road parking lot are static displays; they do not need regular updating.

6.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of Quashnet Woods State Reservation and associated watershed lands. Applied Land Stewardship Zoning recommendations provide general guidance for managing these properties. Future activities and projects should be checked against the zoning map (Figure 6.2) for consistency. Management recommendations are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 6.2)

The following Land Stewardship Zoning is recommended for Quashnet Woods State Reservation.

Zone 1

- No portion of Quashnet Woods State Reservation has been designated Zone 1.

Zone 2

- All portions of Quashnet Woods State Reservation, with the exception of a residential lot at 46 Martin Road, Falmouth. (See Zone 3, below.)
- North Quashnet Woods.
- Phinney property.
- Childs River property.

Zone 3

- 46 Martin Road (entire parcel).

Significant Feature Overlay

- There are no Significant Feature Overlays.

Management Recommendations

Four priority management recommendations were developed for Quashnet River State Reservation and its associated watershed lands. (Table 6.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

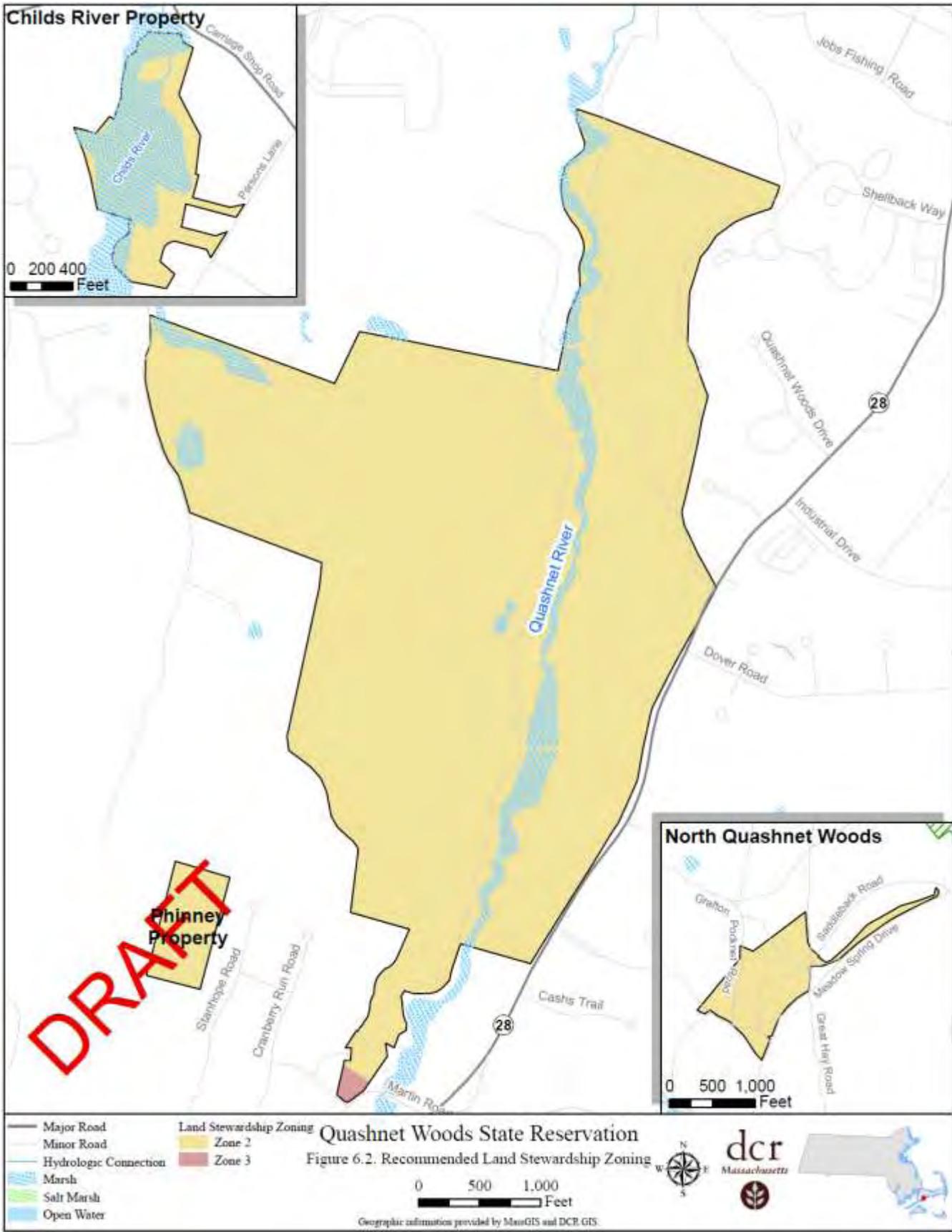
The following recommendations are of equal priority.

Table 6.9.1. Priority recommendations for Quashnet Woods and associated properties.

Recommendation	Implementation^a
Investigate potential encroachment along Parsons Lane and resolve with abutters if warranted.	L, R
Continue efforts to restore New England Cottontail habitat.	F, R, V
Coordinate activities with the DCR Archaeologist when developing plans to remove sluiceways, dams, mill structures, or other similar archaeological resources.	P, R
Submit proposed trail maintenance and construction activities to NHESP for review under MESA.	P, R, V

- a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

DRAFT





A lone kayaker paddles the calm waters of Little Cliff Pond. (See Appendix G for photo information.)

SECTION 7. ROLAND C. NICKERSON STATE PARK

7.1. INTRODUCTION

Roland C. Nickerson State Park is located in the towns of Brewster and Orleans, at Cape Cod's "inner elbow." (Figure 7.1) It was the first state park, or "state forest park" as it was originally called, in the Commonwealth. The park was established in 1934 when members of the Nickerson family donated approximately 1,727 acres to the state in memory of Roland C. Nickerson, Junior and Senior. All lands were located south of Route 6A. Prior to the donation, the property had been used as the Nickerson's private game preserve (Edmonds 1988); a use reflected in the name of the park's main road, Deer Park Road. Development of recreation infrastructure began almost immediately after the park's establishment; it continued through the 1970s.

In 1983, the park expanded northward to the shores of Cape Cod Bay. It now included coastal resources and recreation opportunities. Also acquired in the expansion were dozens of buildings, including the historic Crosby Mansion and Crosby House.

Today, Nickerson is perhaps best known for its campground, the largest in the Complex; water-based recreation, and for its connection to the Cape Cod Rail Trail.

The park's physical, political, and regulatory attributes are summarized in Table 7.1.1.

Associated Properties. Two additional properties are included in this section, they are:

- **Former Gavigan Property.** This 0.78 acre parcel is located directly on Cape Cod Bay, at 64 Willie Atwood Road, Orleans. It was acquired in 1998 to provide coastal access as part of the Namskaket Sea Path. There are no developed facilities.
- **High Head.** This 1.06 acre parcel is located between Routes 6 and 6A in Truro. It is part of a larger conservation area owned by the town, Massachusetts Department of Public Works (now MassDOT), and the DCR. A 1988 Acquisition and Management Agreement restricts its use to passive recreation.

Nickerson state park personnel manage, as time and resources permit, all DCR properties on the mid and lower Cape. This includes Hawksnest State Park (Section 8), Cape Cod Rail Trail (Section 9), and Brewster State Forest (Section 14).



Table 7.1.1. Physical, political, and regulatory settings of Nickerson state park and associated properties.

Setting	Name or Metric
Location:	Brewster, Orleans
Area (acres)^a:	1,978.01
Perimeter (miles)^a:	15.96
Landscape Designation(s)^b:	Parkland
Legislative Districts:	
House	First Barnstable Fourth Barnstable
Senate	Cape and Islands
Regulatory Designations:	Priority Habitat Inner Cape Cod Bay ACEC Outstanding Resource Waters – Inner Cape Cod Bay ACEC Old King’s Highway Regional Historic District Fertilizer Management DCPC ^c Brewster Water Protection DCPC ^c

- a. Calculated using a Geographic Information System (GIS).
- b. For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.
- c. Chapter 716 of the Acts of 1989 established the Cape Cod Commission and allowed for the creation of Districts of Critical Planning Concern.

One state park, formerly managed by Nickerson personnel, no longer exists. In 1955 Pilgrim Spring State Park was established in Truro, along High Head Road. In 1962 it was incorporated into the newly created Cape Cod National Seashore. The park’s sign, which now hangs in the garage at Nickerson, is the one of the few remaining indicators of its existence.

7.2. NATURAL RESOURCES

Physical Features

Nickerson state park generally increases in elevation from north to south. On Cape Cod Bay, the park is at sea level. Elevation increases to approximately 40 feet above sea level at the Crosby Mansion and 50 feet at the park entrance. The central portion of the park includes a series of ponds and wetlands that are located in kettle holes. Surface elevations for these ponds are approximately 25 feet. Elevations increase

quickly as you move away from the ponds in any direction; surrounding uplands have elevations of approximately 100 to 130 feet. This pattern of relatively gentle topography punctuated by multiple ponds in bowl-like depressions extends westward, southward, and eastward out of the park.

Water Resources

Nickerson has abundant water resources, with freshwater ponds, and freshwater and estuarine wetlands. These resources are summarized in Table 7.2.1.

Table 7.2.1. Water resources of Nickerson state park and associated properties.

Water Resource	Name or Metric
Watershed:	Cape Cod
Aquifer:	Cape Cod SSA
Lens	Monomoy
Rivers and Streams (miles)	0.02
Vernal Pools	
Certified (#)	8
Potential (#)	7
Wetlands (acres)	48.54
Lakes and Ponds (acres)	325.50

Many of the larger ponds have impaired water quality. (Table 7.2.2) Only the waters of Little Cliff Pond are not impaired. The shallow portions of two other ponds, Flax and Higgins, also meet water quality standards for healthy ecosystems. This does not directly reflect their ability to support recreational use. Information on water quality as it relates to the park’s water-based recreation is presented in Section 7.4.

Table 7.2.2. Relationships between water quality parameters and environmental thresholds for monitored ponds in Nickerson state park^a.

Pond ^b	Dissolved Oxygen ^c	Total Phosphorous ^d	Total Nitrogen ^e
Flax Pond (Shallow)	Meets	Meets	Meets
Flax Pond (Deep)	Fails	Fails	Fails
Cliff Pond (Shallow)	Fails	Fails	Meets
Cliff Pond (Deep)	Fails	Fails	Fails
Little Cliff Pond	Meets	Meets	Meets
Higgins Pond (Shallow)	Meets	Meets	Meets
Higgins Pond (Deep)	Fails	Meets	Meets
Eel Pond	Fails	Fails	Fails

- Based on Coastal Systems Group and Cape Cod Commission (2009).
- Shallow ponds are less than 9 meters (i.e., 29.5 feet) deep (Coastal Systems Group and Cape Cod Commission 2012). Deep ponds often stratify by temperature so that shallow and deep waters do not mix, resulting in depth-related differences in water quality.
- Concentrations at or above 5 milligrams per liter are considered to meet water quality standards for healthy pond ecosystems.
- Concentrations below 10 micrograms per liter are considered to meet standards for healthy pond ecosystems.
- Concentrations below 31 milligrams per liter are considered to meet standards for healthy pond ecosystems.

Observed differences in nutrients indicate that Flax, Cliff, and Higgins ponds are stratified. (Table 7.2.2) Flax and Cliff ponds also have excessive phosphorous and nitrogen; such conditions typically lead to increased phytoplankton growth and decreased oxygen concentrations. These conditions contribute to the blue green algae blooms that have periodically occurred in Cliff Pond since the late 1990s. Such blooms result in beach closures and pose a health risk to humans, pets, and wildlife. They are driven by the release of phosphorous from iron compounds in anoxic sediments, which has created “a self-sustaining cycle of declining water quality and overall pond condition that is independent of any watershed influences” (Water Resource Services, Inc. 2014).

The impacts of flooding, hurricane inundation, and sea-level rise are projected to have only minor impacts on the park. (Table 7.2.3) However, these impacts are disproportionately concentrated on the shore of Cape Cod Bay and in Namskaket Marsh where they may be severe. No critical park or recreation facilities are predicted to be affected by

coastal flooding, storm-related inundation, or sea-level rise.

Table 7.2.3. Potential impacts of flooding, hurricane inundation, and sea-level rise to Nickerson state park and associated properties.

Type of Impact	Acres	%
Flooding:		
100-year Storm	420.25	21.25
500-year Storm ^a	420.25	21.25
Hurricane Inundation:		
Category 1 Storm	8.47	0.43
Category 2 Storm ^b	30.52	1.54
Category 3 Storm ^b	42.95	2.17
Category 4 Storm ^b	50.62	2.56
Sea Level Rise	16.40	0.83

- Cumulative value; includes 100-year storm impacts.
- Cumulative value; includes impacts of all lower category storms.



Predicted hurricane inundation of coastal portions of Nickerson. Areas predicted to be inundated by Category 1 storms are represented in light green; additional areas inundated by Category 2, 3, and 4 storms are represented in dark green, yellow, and red, respectively. Linnell Landing Road is at the bottom left of the photo. (See Appendix G for photo information.)

All of the park’s ponds and pond shores are within the 100-year flood zone. Infrastructure within this zone includes the Cliff and Little Cliff pond boat ramps, and boat rental concession buildings on Cliff and Flax Ponds.

The park serves as an important groundwater recharge area for the Monomoy Lens of the Cape Cod SSA; the source of Brewster’s water. Potable water for the park originates in municipal wells, which are located off-site.

There is one continuous barrier beach (Br-1); it extends from Linnell Landing Road eastward to the Orleans Town Line. There is no management plan for this beach.

Rare Species

State-listed Species

Twenty-one state-listed species are known from the state park. (Table 7.2.4) Most are associated with barrier beaches and coastal plain pondshores. As of this writing, the spatterdock darner has been proposed for delisting under MESA.

Table 7.2.4. State-listed species of Nickerson state park and associated properties, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d
Acadian quillwort	P	E
Attenuated bluet	I	T
Common tern	B	SC
Common's panic-grass	P	SC
Diamond-backed terrapin ^e	R	T
Dwarf bulrush	P	T
Eastern box turtle ^f	R	SC
Long-beaked bald-sedge	P	SC
Maryland meadow beauty	P	E
Mitchell's sedge	P	T
Oysterleaf	P	E
Pine barrens bluet	I	T
Piping plover ^g	B	T
Plymouth gentian	P	SC
Pondshore knotweed	P	SC
Roseate tern ^h	B	E
Salt reedgrass	P	T
Scarlet bluet	I	T
Seabeach dock	P	T
Spatterdock darner	I	SC
Terete arrowhead	P	T

- Presented alphabetically, by common name.
- Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.
- Types of state-listed species include: A = Amphibian; B = Bird; I = Insect; P = Plant; and R = Reptile.
- Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.
- Recorded at both Nickerson and the Namskaket Sea Path parcel.
- Recorded in Nickerson, and the High Head and Namskaket Sea Path parcels.
- This species is also federally threatened.
- This species is also federally endangered.

Priority Habitat

Much of Nickerson (73.04%) has been designated Priority Habitat under MESA. Exceptions include much of the former Camp Monomoy and some southern portions of the park. Most of the former Gavigan property (80.61%) and all of the High Head property (100.00%) are also designated Priority Habitat.

Vegetation

There have been no comprehensive surveys of the flora of Nickerson. However, the regular monitoring of forest inventory plots provides basic information on common species present.

In general, the park's vegetation is a variable mixture of oaks and pitch pine in the canopy, with an understory of blueberries, black huckleberry, poison ivy, greenbrier, spotted wintergreen. Red maple, black gum, sassafras, and viburnums occur in moister sections of the uplands. Red and white pine plantations are also present. Wetlands may be dominated by trees (e.g., red maple, Atlantic white cedar), shrubs, or herbaceous vegetation (e.g., salt marsh). Dunes are dominated by American beach grass, with clusters of shrubs (e.g., eastern red cedar, salt spray rose) interspersed.

Recent investigations into the ecology of Cliff Pond identified common rooted and floating aquatic plants (Water Resource Services, Inc. 2014).

Invasive Species

Five species of invasive plants have been incidentally observed. (Table 7.2.5) One or more unidentified species of honeysuckle, a group of plants that are commonly invasive in Massachusetts, have also been observed.

Table 7.2.5. Known invasive and likely invasive plants of Nickerson state park and associated properties.

Species ^a	Status ^b
Black locust	I
Common reed	I
Oriental bittersweet	I
Purple loosestrife	I
Tree of heaven ^c	I

- Presented alphabetically, by common name.
- Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).
- Reported in DEM (1993); not field verified for this RMP.

Natural Communities

There are nine known natural communities. (Table 7.2.6) those associated with coastal plain ponds and dune systems are uncommon in Massachusetts. Additional community types are likely present.

Table 7.2.6. Known natural communities of Nickerson state park and associated properties.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Coastal Plain Pondshore	T	S2	1
Deep Emergent Marsh	P	S4	2
Estuarine Intertidal: Salt Marsh	E	S3	1
Maritime Beach Strand	T	S3	3
Maritime Dune	T	S2	3
Pitch Pine-Oak Forest	T	S5	1
Red Maple Swamp	P	S5	3
Shallow Emergent Marsh	P	S4	2
Shrub swamp	P	S5	2

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from the following sources:
 1. NHESP (2008).
 2. DEP Wetlands (1:12,000) data layer.
 3. Observed by RMP Planner.

Forests

Much of Nickerson (68.94%), including its campsites, is forested. Non-forested areas include power line rights-of-way, roads and parking areas, cultural grasslands, fresh and saltwater wetlands, and dunes. None of the former Gavigan property is classified as forested, while all of the High head parcel is classified as forested.

A 2005 winter storm caused severe blowdown in the campgrounds and surrounding forest. Clean up efforts focused on returning the campgrounds to usable conditions. The impacts of the storm may still be observed in reduced tree cover at some campsites, as downed trees in the forest, and in two log and stump piles created by the cleanup. The disposal of stumps in Massachusetts is regulated by 310 CMR 19.00; see Appendix E for more information.

In 2007 dying and dead non-native red pine were removed from Camping Area 1, Camping Area 6X, the Ruth Pond Trail, and in the vicinity of Keeler

Pond (Rassman 2006a). Plantations of dead and dying red pine still occur elsewhere in the park.

Wildlife

No formal surveys have been conducted. However, Nickerson is a birding “hotspot” and Species lists exist for different portions of the park. As of October, 2014, 33 species are listed for Crosby Landing, 80 for Crosby Beach, and 102 for Nickerson (www.ebird.org). Collectively, 142 different species of birds have been reported for the park and adjacent waters.

A recent investigation into the water quality at Cliff Pond documented four species of mussels and six species of fish (Water Resource Services, Inc. 2014).

7.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic landscapes, buildings, structures, and objects. An overview of significant events in the history of Roland C. Nickerson State Park is presented in Table 7.3.1. Cultural Resources are identified in Table 7.3.2.

ARCHAEOLOGICAL RESOURCES

Nickerson and its environs are well documented in the archaeological record. A total of seven pre-Contact sites are recorded within the forest, and four systematic archaeological surveys have been conducted (MHC Reports # 138, 1597, 2552, 2898). Many additional sites are adjacent to and near the forest and multiple surveys have been completed nearby. A pre-Contact site lies on high ground that separates Flax and Cliff ponds. The site was discovered on the knoll in the 1960s by Ray Seamans, a collector of Native American artifacts from Carver. In 1986, Seamans’ collection was analyzed by the Massachusetts Historic Commission and subsequently recorded as 19-BN-580. Although contextual data is missing from the record, some interesting implications suggest that the site was occupied at least on two, and possibly three, occasions over the course of several thousand years. Significantly, relatively few Middle Archaic Period sites are known from the entire Cape. Only one other Middle Archaic site has been identified in Brewster, near Upper and Lower Mill Ponds. The inland setting of this site is of particular interest, because

most pre-Contact sites on the Cape and Islands are coastal.

Nickerson state park has a high archaeological sensitivity. Steep and eroding slopes have a low archaeological potential. Native Americans undoubtedly traversed these same locations going to and from the water's edge from their camp sites which would have been located nearby on high, level, well-drained ground however evidence of that type of use would not survive the archaeological record.

HISTORIC RESOURCES

The 1,900-plus wooded acres that make up the bulk of the park once belonged to Roland Nickerson, a multimillionaire who founded the First National Bank of Chicago. The Nickerson's, who lived farther west on Mass. 6A in an opulent estate, now known as Ocean Edge Resort, had a hunting lodge in what is now the State Park. The Nickersons hosted private hunts at their "Bungalow Estates," as they referred to their sprawling retreat. Nickerson's wife, Addie, donated the land to the state in 1934 in honor of their son, a victim of the 1918 influenza epidemic, and in honor of her husband.

Table 7.3.1. Significant events in the history of Nickerson state park and associated properties.

Year(s)	Events
1934	Addie Daniels Nickerson and Helen Nickerson Sears donate land to the Commonwealth in memory of Roland C. Nickerson Sr. and Roland C. Nickerson Jr., thus establishing the first state park in the Commonwealth.
1935-1938	Civilian Conservation Corps (CCC) develops recreation facilities, constructs roads, creates fire breaks, and plants trees.
1938-c. 1945	Former CCC camp used for WWII veterans and later as a naval rest and relaxation camp.
1940s-1950s	Camping Areas 2-4 completed and Camping Area 5 constructed.
1951	Establishment of Department of Correction camps in state forests is authorized by the legislature "for the employment of prisoners in reforestation, maintenance and development." (Chapter 755 of the Acts of 1951) A camp is soon established in Nickerson and in 1959 is named the Stephen L. French Youth Forestry Camp. (Chapter 140 of the Acts of 1959)
1955	Pilgrim Springs State Park is established in Truro; it is transferred to the United States of America in 1962 for inclusion in Cape Cod National Seashore.
Late 1950s	New park headquarters and operations yard constructed.
1960s	Camping Area 6 constructed.
1970s	Camping Area 7 constructed; French forestry camp expands.
1977	Legislature authorizes a 30-year lease for the Stephen L. French Youth Forestry Camp. (Chapter 765 of the Acts of 1977) This Act identifies the camp's boundaries for the first time.
1983	Nickerson State Park begins expansion north of Route 6A, eventually including the former Camp Monomoy and Camp Seascapes.
1985	Permanent easement granted to the town of Brewster for constructing and maintaining a water main and other underground utilities.
1989	High Head Conservation Area in Truro acquired through multi-partner effort.
1992	Select structures and adjacent lands north of Route 6A are leased to the Cape Cod Repertory Theater Company ("Cape Rep"). (Chapter 518 of the Acts of 1991, as amended by Chapter 255 of the Acts of 1994)
1994	Legislature authorizes lease of historic buildings on DEM properties, including the Crosby Mansion and Graham House at Nickerson State Park. (Chapter 85 of the Acts of 1994)
1998	Former Gavigan property in Orleans acquired as part of the Namskaket Sea Path.
1999	Legislature authorizes lease of Crosby Mansion and two cottages to the town of Brewster. (Chapter 127 of the Acts of 1999)
2012	Day use fee implemented.

Table 7.3.2. Cultural resources of Nickerson state park and associated properties.

Location and Resource^a	Type^b	Date^c	Condition^d	Integrity^e	In Use^f	Utilities^g	MHC #^h	Guidanceⁱ
Old King's Highway Regional Historic District	NRHD	17 th -19 th c.	-	-	-	-	BRE.G	-
East Brewster	LHD	1795-1900	-	-	-	-	BRE.A	-
Park Entrance								
Comfort station	BU	1964	3	H	Y	E, S, W(S)	-	1
Headquarters/Operations Area Landscape								
Park headquarters	BU	-	3	H	Y	E, H, I, S, T, W	-	1
Workshop/Garage	BU	-	3	M	Y	E	-	1
Camping Area 1								
CCC brick-lined kiln	ST	1930s	4	M	-	-	BRE.902	2
Crosby Cemetery	LA	1840s	-	H	-	-	BRE.801	3
Comfort station - South	BU	ca. 1960	3	H	Y	E, S, W(S)	-	1
Park Store Area								
Park Store	BU	1930s	3	M	Y	E, S, T, W(S)	-	2
Camping Area 4								
Comfort Stations (2)	BU	ca. 1950	3	H	S	E, S, W(S)	-	2
Pavilion	BU	1930s-1940s	3	H	S	-	BRE.904	2
CCC Camp Landscape	LA	1930s-1940s	-	L	-	-	BRE.K	4, 5
CCC Camp chimney	ST	1930s-1940s	3	H	N	-	BRE.920	2
CCC Camp foundations	ST	1930s-1940s	6	L	N	-	BRE.921	2
Eldredge Cemetery	LA	Mid-19 th c.	-	M	-	-	BRE.802	3
Camping Area 6								
Comfort stations (5)	BU	ca. 1960	3	H	S	E, S, W(S)	-	1
Pavilion	BU	1930s-1940s	3	M	S	-	-	1
Camping Area 6X								
Comfort stations (2)	BU	ca. 1960	3	H	S	E, S, W(S)	-	1
Pavilion	BU	1930s-1940s	3	H	S	-	-	1
Camping Area 7								
Comfort stations (2)	BU	ca. 1960	3	H	S	E, S, W(S)	-	1
Pavilion	BU	-	5	H	S	-	-	1
Building foundation and steps	ST	-	-	L	-	-	-	-
Cedar water tower	ST	-	3	H	-	-	-	1
Camping Area 5								
Former ice house site	AR	-	-	L	-	-	-	2
Stephen L. French Youth Forestry Camp - 456 Flax Pond Road^j	BU	-	-	-	-	-	-	-
Flax Pond Day Use Area								
Picnic area concrete slab and stone pier	ST	-	6	L	-	-	-	2
Pump house	ST	-	6	L	-	-	-	6
Former Camp Monomoy - 3381 Main Street								
Camp Monomoy Landscape	LA	Early-mid 20 th c.	-	-	-	-	-	5
Crosby House – Cape Rep Theater offices	BU	Late 18 th -early 19 th c.	2	M	Y	E, H, I, S, T, W	BRE.41	7
Robert J. Delahanty Outdoor Theater (200 seat)	ST	ca. 1959	3	H	S	E	-	1
Cape Rep Theater indoor theater (135 seat)	BU	1959	2	H	Y	E, H, S, T, W	-	7
Cape Rep Theater Barn	BU	Late 19 th c.	3	H	Y	E	-	7
Linnell Cottage (Building 31)	BU	-	5	H	N	-	-	-

Location and Resource ^a	Type ^b	Date ^c	Condition ^d	Integrity ^e	In Use ^f	Utilities ^g	MHC # ^h	Guidance ⁱ
Crosby Estate - 163 and 179 Crosby Lane								
Crosby Estate (Crosby Mansion-Nickerson Park)	LA	1889	-	M	-	-	BR.E	4, 5
Crosby Mansion grounds	LA	1920s-1930s	-	M	-	-	-	8
Crosby Mansion	BU	1823/1888	3	M	Y	E, H, S, T, W	BRE.152	8
Crosby Cottage	BU	1920s-1930s	3	M	N	E, H, S, W	-	8
Crosby Garage	BU	1920s-1930s	3	H	N	-	-	8
Building near tennis courts	BU	1920s-1930s	6	L	N	-	-	6
Weathervane's Way								
Sully Cottage - 222 Weathervanes Way	BU	1920s	3	M	S	E, H, S, T, W	-	8
Additional Resources^f								
<i>Former school house remains</i>	AR	-	-	-	-	-	-	2
<i>Former Crosby livery stable foundations</i>	AR	-	-	-	-	-	-	2
<i>Multiple historic trails/roads</i>	LA	-	-	-	-	-	-	2
<i>Cement pads from CCC buildings</i>	AR	1930s	-	-	-	-	-	5
<i>Multiple bottle dumps</i>	AR	-	-	-	-	-	-	2
<i>Multiple cellar holes</i>	AR	-	-	-	-	-	-	2
<i>Former gunning camp blind</i>	AR	-	-	-	-	-	-	2
<i>Former boat/fish house site</i>	AR	-	-	-	-	-	-	2
<i>Former youth forestry camp</i>	AR	-	-	-	-	-	-	2
<i>Boundary marker</i>	OB	-	-	-	-	-	-	5
<i>Former hunting camp</i>	AR	-	-	-	-	-	-	2
<i>Former school house remains</i>	AR	-	-	-	-	-	-	2

- a. Geographic sub-regions of the forest are identified in Figure 7.1.
- b. Resource types include the following: AR = Archaeological; BU = Building; CM = Cemetery; LA = Landscape; LHD = Local Historic District; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- c. Date of construction provided, when known.
- d. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- e. Integrity is a relative assessment of the condition of a resource's retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- f. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- g. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- h. Massachusetts Historical Commission inventory number.
- i. The following guidance is offered for the ongoing maintenance of these cultural resources:
1. Refer to Historic Building Maintenance BMP (DCR n.d.i).
 2. Refer to Archaeological Features BMP (DCR n.d.k).
 3. Refer to Cemetery and Burial Grounds BMP. (DCR n.d.l).
 4. Refer to Vegetation in Historic Landscapes BMP (DCR n.d.h).
 5. Refer to Historic Landscapes - Built Features BMP (DCR n.d.g).
 6. Refer to Mothballing Historic Buildings BMP (DCR n.d.j).
 7. Under lease, refer to current lease.
 8. Under Historic Curatorship Program, refer to current lease.
- j. Documented through the 1984/1985 Cultural Resources Evaluation Project but not yet field verified or confirmed.
- k. This Department of Youth Services camp was established within Nickerson ca. 1958; it has an unknown number of historic buildings.

In 1935 a Civilian Conservation Corps (CCC) camp was established. The CCC constructed the first roads, campsites, parking and picnic areas near Flax Pond. The CCC also drilled wells, developed parking areas and hiking trails, and planted 88,000 white pine, hemlock, and spruce trees. During the three years of the camp's existence, Nickerson's basic design was carved out of the forest. The CCC camp disbanded in 1938 and for a few years a World War I veteran camp and then a naval rest and relaxation camp were located in the Park. When the state assumed management of the park in the early 1940s, Robert and Fred Hooper managed Nickerson, building upon the work of the CCC by developing additional recreational and camping facilities.

Historic Landscapes

Headquarters/Operations Area. This area includes a mix of historic and non-historic buildings and structures. (See Section 2.5 for information on non-historic infrastructure.) The Headquarters Building, built in the 1950s, is a unique structure built in a rustic style, with a central one story building flanked by connected garages on both sides. The building retains its clapboard siding, wood windows with screens, and loft doors and arms at the gable end of both garages. The woodshop to its west has been altered, with the two left side garage bays walled in with replacement windows added. A small storage shed appears to have been built when the headquarters and woodshop were constructed and shares a similar style. These buildings are arranged in a paved lot that retains its original dimensions as designed in the 1950s and despite the addition of new structures, retains its historic integrity as an example of a mid-century park headquarters and operations area.

Crosby Cemetery. This small family cemetery is located on a heavily wooded knoll west of Triangle Pond. There are two grave markers dating from 1816 and 1843. An ornamental split rail fence surrounds the cemetery; it is neither original nor historic. There are no other known features associated with this cemetery. Higgins (1984) considered the size of the plot and the number of stones present and speculated that additional graves may be present.



Nickerson's headquarters consists of a central office building flanked by two multi-bay garages. (See Appendix G for photo information.)

CCC Camp Site. Established in 1935, SP-19, housed CCC Company 1115. The camp was laid out in a typical CCC-camp configuration, with an officer's quarters at the head of a parade ground flanked by enrollee barracks. The camp operated from 1935 to 1938 and the enrollees developed much of the existing park infrastructure, including roads, a bathhouse (no longer extant), erosion control, forest conservation, beach improvements and the original contact station. The stone chimney from what was most likely the recreation building and a number of concrete features are the only remnants of the camp.



Chimney from former CCC building is the most prominent feature remaining at the CCC Camp Site historic landscape. (See Appendix G for photo information.)

Eldredge Cemetery. This small family cemetery contains two grave markers, one for "Capt. David Eldredge" and one for "Mrs. Tamzen wife of David Eldridge." These stones date from 1855 and 1836, respectively. The latter features a simple carving of a weeping willow. There are no other known historic

features. Like the Crosby Cemetery, this cemetery is also surrounded by a non-original, non-historic split-rail fence.

Former Camp Monomoy. Camp Monomoy started as Camp Mon-O-Moy in 1922, moving from West Harwich to Brewster in 1926. Robert J. “Captain Del” Delahanty founded the boys’ camp, started Camp Wono for Girls in 1939, and added a day camping program in the 1960s, forming the Cape Cod Sea Camps. The camp was purchased in 1983 and added to Nickerson. Today the property consists of a number of concrete block and wood frame structures, building remnants and former athletic courts all in extremely poor condition.



This Camp Monomoy shower building is one of many reminders of the property’s former use. (See Appendix G for photo information.)

In 1991, the Cape Rep was named lessee of some of the camp buildings as well as the Cape House and Barn through special legislation. Under the 25 year lease agreement, the non-profit theater uses the properties for theatrical programs and performances. The buildings include the 1790 expanded Cape Cod style residence that is used as offices, the late 19th century barn, which is used for storage, the mid-twentieth century Outdoor Theater, which was an outdoor Chapel at Camp Monomoy, and the former Camp Monomoy dining hall which is used as an indoor theater.



Cape Cod Repertory Theater Company’s offices and artist residences are located in this 1790 Cape Cod style house at Nickerson. (See Appendix G for photo information.)

Crosby Estate. The 1888 eclectic 35-room Crosby Mansion is the centerpiece of Albert Crosby seaside estate. The mansion, named “Tawasentha” was built around Crosby’s childhood home, an early 19th century cape-style house. The mansion is a study in Queen Anne style ornamentation and asymmetry, incorporating multiple styles into the exterior and interior design. Following the death of Crosby’s widow Matilda in 1930, the mansion was used as a hotel, a school for the arts, and in 1959, became Camp Seascape for Girls.



Fireplace hearth and mantle in Crosby Mansion, bearing the house’s original name, “Tawasentha.” (See Appendix G for photo information.)

In 1985, DCR purchased the mansion, several outbuildings, and some cottages once connected to the Nickerson family estate as well as the former Camp Monomoy (see below). In 1999, legislation designated the town of Brewster, in partnership with the Friends of Crosby Mansion, as lessees for the Mansion, the Crosby Cottage and Garage, and two

seaside cottages (i.e., Sully and Graham). A 25-year lease was executed in 2003; it is managed through DCR’s Historic Curatorship Program. The lessees rent the Sully and Graham cottages and use revenues generated to rehabilitate the Mansion. Since the program began, over \$325,000 in cash and countless hours of volunteer sweat equity have been put into the rehabilitation, management and maintenance of the property as a house museum and event center.

Buildings

Comfort Stations (facility-wide). Several of the park’s comfort stations were designed and constructed in the 1960s, based on the same regionally influenced Cape Cod-style template, featuring wood shingles, simple wood trim and gable end roof forms. This design was also used at Shawme-Crowell State Forest (Section 2). Although simply constructed, this level of design consistency throughout a DCR facility is rare. This design is gradually being replaced by buildings constructed of textured concrete block.



Example of the park’s historic comfort station, built in Cape-Cod style template. (See Appendix G for photo information.)

CCC-built Pavilions. Nickerson contains four CCC-built picnic pavilions that represent one of the best preserved collections of CCC-built recreational resources. The rustic style stone and timber construction of these structures are excellent examples of the distinctive style.



Example of CCC built pavilions located within Nickerson’s camping areas. (See Appendix G for photo information.)

Structures

There are no structures that are not associated with a historic landscape.

Objects

There are no objects that are not associated with a historic landscape.

7.4. RECREATION RESOURCES

The most popular recreation activity is camping and nearly all the forest’s infrastructure is dedicated to this activity. There are 406 camp sites; arranged into eight camping areas. (Table 7.4.1; Figure 7.1) Campsites are open daily from early May through mid-October. Not all sites are available for the entire camping season; some camping areas are closed in the spring and fall, when there is reduced demand.

Table 7.4.1. Summary of camping resources at Nickerson state park.

Camping Resource	Total
Camp Sites (total)	406
Group sites	9
Pop-up Tent	149
Standard non-electric	203
Tent only	39
Yurts	6
Comfort Stations^a (total)	18
Winterized	0
Non-winterized	18
Shower Houses	2

a. Does not include comfort stations at the entrance and the Flax Pond day use area.

Use levels are generally high, with an overall occupancy rate of nearly 90 percent. (Table 7.4.2).

Table 7.4.2. Campsite occupancy rates, by type, at Nickerson state park.

Campsite Type	Occupancy Rate (%)
Group	54.1
Pop-up Tent	86.7
Standard non-electric	93.5
Tent only	79.6
Yurt	90.3
Total	88.9

In 2013, campers came from 45 states, 10 Canadian provinces, and two European countries. Most were from Massachusetts, the Northeast, or adjacent Canadian provinces. (Table 7.4.3)

Table 7.4.3. Common geographic origins of campers staying at Nickerson state park.^a

Geographic Origin	Percent ^b
Massachusetts	58.9
Quebec	7.3
New York	7.3
Connecticut	6.5
Unknown	3.1
New Hampshire	2.6
Rhode Island	2.2
Ontario	1.5
New Jersey	1.5
Vermont	1.4
Maine	1.0
Total	93.3

a. Only states and provinces with one or more percent of total camping registrations are included. Based on 2013 data.

There are few accessible campsites; the park does not meet the 5% accessibility minimum required under the Massachusetts Architectural Access Code (CMR 19.5.1). The shower houses are ADA compliant.

A modern playground is located among the camping areas; it includes five features. An accessible walkway encircles the playground; benches and accessible picnic tables are present.



Playground at Nickerson state park. (See Appendix G for photo information.)

The park's dump station is located opposite Camping Area 4. It is used for dumping waste from self-contained campers (i.e., RVs) into a tight tank. Dumpsters are located in the parking lot opposite Camping Area 1; recycling is collected at a shed adjacent to the camp store.

In addition to camping, the following recreation activities take place at Nickerson:

- Bicycling, mountain
- Bicycling, road
- Boating (sail and power)
- Canoeing/kayaking
- Dog walking
- Fishing, fin fish
- Geocaching (9 as of November 2014)
- Hiking
- Horseback riding
- Live Theater (Cape Cod Repertory Theater Company)
- Nature study
- Picnicking
- Running/jogging
- Skiing, cross-country skiing
- Swimming (salt and freshwater beaches)

A day-use recreation area is located on the eastern shore of Flax Pond. It includes a picnic area, bath house, and an unguarded beach that is open from Memorial Day to Labor Day. Several informal

beaches, adjacent to camping areas and used by campers, are located on Flax and Cliff ponds.

Water quality at Cliff and Flax Ponds is tested weekly during the beach season. In the past decade there have been four exceedances of Enterococcus bacteria standards, all in Cliff Pond.

Coastal access is provided along the park's approximately 4,200 feet of shoreline on Cape Cod Bay. The sandy beach and shallow, warm waters of the Bay make it popular with beachgoers. Hundreds of acres of flats are exposed. Sections of the beach are closed seasonally to protect state-listed beach-nesting birds. The beach is unguarded and there are no bathroom facilities. Portable toilets are available seasonally at two adjacent municipal beaches; Linnell Landing Beach and Crosby Landing Beach. There are no signs identifying the DCR-owned portions of the beach; they appear to be extensions of town of Brewster beaches. There are also no signs directing visitors between the beach and campgrounds.

The Barnstable County Department of Health and Environment tests water quality weekly during the beach season. In the past decade there have been 10 exceedances of Enterococcus bacteria standards at the Crosby Landing Beach; the most recent in August 2011. Weekly testing at Linnell Landing Beach began in June 2012; only one exceedance, in June 2012, has been recorded.

The park's coastal beach is also used for flying radio-controlled model airplanes. An informal group, known as the Crosby Lane Flyers, operates from the municipal parking lot on Crosby Landing. From this location they fly model aircraft over the surrounding each, dunes, and marshes. The planes' flights and the flyers' movements across the dunes to retrieve downed planes has been observed to disturb nesting birds (Kelley 2014).

Boating occurs in the park's larger ponds and Cape Cod Bay. Office of Fishing and Boating Access (OFBA) boat ramps are located on the west side of Cliff Pond and the northern end of Little Cliff Pond. An informal boat launch area exists on the western shore of Higgins Pond. A park concession, with facilities on Cliff and Flax ponds, rents a variety of

watercraft including canoes, kayaks, stand up paddle boards, sailboats and pedal boats. An informal boat launch area exists on the western shore of Higgins Pond.

There is an internal bike path. See Trails, below, for additional information.

The Friends of Nickerson State Park (the Friends) arrange entertainment programming for park visitors and campers, including:

- Lucy Gilmore, Storyteller
- Marcus the Magician
- Music is Natural, Roger Ticknell
- Rainforest Reptiles
- Trevor the Juggler

7.5. INFRASTRUCTURE

Property Boundary

The park is irregularly shaped and largely surrounded by residential development. Roads and water bodies form only a small portion of its boundary, which is not posted. The boundaries of the former Gavigan property are not posted, nor are the boundaries of the DCR-owned parcel in the High Head Conservation Area.

One abutter, located at 3600 Main Street (Route 6A), Brewster, has a deeded 42-foot wide right of way across a portion of the park. (Book 3540, Page 027) This right of way is for "all purposes for which ways are commonly used in the town of Brewster."

Buildings and Structures

Nickerson's non-historic buildings reflect ongoing efforts to update camping amenities. (Tables 7.3.2 and 7.5.1) Approximately one-third of the park's comfort stations are modern, constructed of brown textured masonry blocks in a traditional cape form. In contrast, the contact station and Camping Area 3 shower building retain both traditional Cape Cod design and materials. The modern comfort stations and both shower buildings are accessible; older comfort stations are not.

Table 7.5.1. Non-historic buildings and structures of Nickerson state park and associated properties.

Location and Infrastructure^a	Date^c	Condition^b	In Use^d	Utilities^e
Park Entrance				
Contact station	2005	1	Y	E, H, I, S, T, W
Headquarter/Operations Area				
Shed	ca. 2013	1	Y	-
Storage shed	-	3	Y	-
Flammables shed	-	2	Y	-
Nature Center	-	4	S	E
Camping Area 1				
Amphitheater	-	3	S	E
Comfort station 1 – North	-	2	S	E, S, W(S)
Comfort station 2 – Central	-	2	S	E, S, W(S)
Camping Area 2				
Comfort station	-	3	S	E, S, W(S)
Camping Area 3				
Comfort station	1990	4	S	E, S, W(S)
Shower building	-	2	S	E, S, W(S)
Pump house	-	2	S	E, W
Park Store Area				
Park store shed	-	2	S	E
Recycling shed	-	4	S	-
Camping Area 4				
Comfort station 1 - North	-	3	S	E, S, W(S)
Dumping station	1972	2	S	E, S
Fisherman’s Boat Access – Nook Road				
Boat ramp (OFBA ID# 165)	-	2	Y	-
Camping Area 6				
Shower Building	-	4	S	E, S, W(S)
Pump House Shed	-	2	S	E, W
Camping Area 5				
Comfort Station	-	5	S	E, S, W
Flax Pond Day Use Area				
Comfort Station	-	2	S	E, S, W(S)
Boat Rental Shed 1	-	3	S	-
Boat Rental Shed 2	-	2	S	-
Boat Locker 1 ^f	-	5	S	-
Boat Locker 2 ^f	-	2	S	-
Boat Rack ^f	-	3	S	-
Stephen L. French Youth Forestry Camp – 456 Flax Pond Road^{f, g}				
	-	-	Y	-
Fisherman’s Boat Access – Flax Pond Road				
Boat Ramp (OFBA ID# 104)	-	3	Y	-
Cliff Pond				
Boat Rental Shed	-	3	S	-
Former Camp Monomoy – 3381 Main Street				
Three-bay Garage (Building 32)	ca. 1970	4	Y	E, H, S, W
Crosby Estate – 163 and 179 Crosby Lane				
Amphitheater	-	3	S	-
Weathervane’s Way				
207 Weathervane’s Way	1970	3	N	E, H, S, T, W

Location and Infrastructure ^a	Date ^c	Condition ^b	In Use ^d	Utilities ^e
235 Weathervane's Way – Graham Cottage	1967	2	S	E, H, S, W(S)
Cape Cod Bay				
Rock groins (3)	-	3	Y	-

- Geographic sub-regions of the forest are identified in Figure 2.1.
- Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- Date of construction provided, when known.
- N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.
- The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- Infrastructure located on DCR property, but not owned or controlled by the DCR. Its condition is not assessed.
- This Department of Youth Services camp was established within Nickerson ca. 1958; it has an unknown number of non-historic buildings.



Comfort station at Flax Pond day use area, showing textured masonry block construction. (See Appendix G for photo information.)

Most DCR-owned buildings, both historic and non-historic, are in use by park personnel, concessionaires, or partners. Those not in use are mostly associated with the former Camp Monomoy.

Utilities vary among buildings. (Tables 7.3.2 and 7.5.1) Shower buildings in Camping Areas 3 and 6 have oil-fired boilers; both have twin external 275 gallon tanks. Cottages on Weathervanes Way also use oil. Propane is used to heat water at the north comfort station in Camping Area 4. The park headquarters, Crosby Mansion, and heated buildings at the Cape Rep use natural gas. The contact station has a combination electric heating and cooling unit.

Also within the park are a Bureau of Fire Control and Forestry fire observation tower and The Stephen L. French Youth Forestry Camp. The latter is a Department of Youth Services facility that contains

a ropes course, administrative buildings, cabins, workshops, and sheds. There is no public access. Additional information on the fire observation tower is provided in Section 15.

There are 31 active septic systems; they discharge to groundwater. These are associated with the campground, staff buildings, Cape Cod Repertory Theater, Crosby Mansion, and the Stephen L. French Youth Forestry Camp. These septic systems have a total design flow of 50,926 gallons per day. Waste from recreational vehicles is discharged into a “tight tank” at the dumping station. All potable water is provided by the Brewster Water Department.

Roads

The park's main entrance is located on Route 6A. Traffic surveys conducted immediately east of the park entrance in 2013 identified an annual average daily traffic volume of 12,611 vehicles and a summer average daily traffic volume of 16,593 vehicles (Cape Cod Commission 2014). There are no internal park traffic counts.

There are two main paved roads within the park: Deer Park Road – Nook Road to the west and south of the ponds; and Flax Pond Road to the east of the ponds. Both are dead ends. Additional paved roads are associated with the camping areas. (Figure 7.1) Each camping area has a network of paved roads providing access to sites.

There are approximately 11 miles of roads. Their conditions are summarized, by surface type, in Table 7.5.2.

Table 7.5.2. Condition and length of roads at Nickerson state park^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	8.52	1.98
Fair	0.37	0.11
Poor	0.00	0.00
Total	8.89	2.09

a. Based on field assessment; all distances calculated using GIS.

Parking

Parking is available throughout Nickerson. (Table 7.5.3) Campers are allowed up to two vehicles per site. Additional vehicles, including boats on trailers, may be parked in lots located adjacent to Camping Areas 1, 4, 6, and 7. Day use visitors use parking lots adjacent to the Contact Station, at the Flax Pond Day Use Area, or adjacent to boat ramps. In 2014, self-service “pay and display” parking permit dispensers were installed at the Contact Station and at the entrance to the CCRT. All vehicles parked in Nickerson must display either a day parking permit or a permit issued to campers.

There are no accessible parking spaces at the day use lot near the park’s entrance, at shower buildings, or at the park store. The total number of accessible spaces in the park does not meet the 2% of total requirement.

Coastal beach parking is limited. The day use lot at the park entrance is for both CCRT and beach parking. Beachgoers also park along Crosby Lane on the grounds of the Crosby Mansion. The town of Brewster operates two beach parking lots adjacent to the park, with a total capacity of 86 vehicles. Municipal parking permits are required for both lots. During the preparation of this RMP, the Town requested that additional beach parking be developed on Nickerson State Park.

Employee vehicles are parked in either the operations yard or adjacent to the Contact Station.

The town of Brewster’s Select Board has expressed interest in working with DCR to create beach parking on the grounds of former Camp Monomoy.

Table 7.5.3. Number of public parking spaces, by location and type, at Nickerson state park.

Location	HP	Other	Total
Contact Station ^{b, c}	2	0	2
Day use parking at entrance ^d	0	64	64
Area 1 parking ^d	0	35	35
Playground ^d	2	17	19
Areas 1–4 showers ^d	0	26	26
Park store ^d	0	7	7
Area 4 parking ^d	0	49	49
Cliff Pond boat ramp ^e	0	16	16
Nook Road lot ^d	0	7	7
Area 6 showers ^d	0	22	22
Area 6 parking ^d	0	80	80
Area 7 parking ^d	0	24	24
Day use – picnic area ^f	0	13	13
Day use – beach ^{b, g}	2	33	35
Little Cliff Pond boat ramp ^d	0	26	26
Crosby Mansion – along Crosby Landing ^d	0	34	34
Crosby Mansion – Grass lot ^d	0	60	60
Cape Rep – 10 minute parking ^d	0	2	2
Cape Rep – HP lot – Delahanty Outdoor Theater ^b	2	0	2
Cape Rep – Indoor theater ^b	3	46	49
Total	11	561	572

- a. In addition to the parking lots, up to two vehicles are allowed at each camp site.
- b. Number of spaces is based on pavement markings and/or signs.
- c. Two staff only spaces are also located adjacent to the contact station.
- d. Number of spaces is based on the number of potential 9-foot-wide perpendicular spaces.
- e. Number of spaces is based upon the number of 9 x 18-foot vehicle spaces estimated to fit among the trees.
- f. Number of spaces is based upon the number of 9-foot-wide, 45-degree angled parking spaces.
- g. HP spaces are located away from the main lot, next to comfort station.

Trails

Nickerson includes a mixture of paved trails and formal and informal gravel or natural surface trails. The number of miles of official trails, by condition, is presented in table 7.5.4. There is an additional 7.56 miles of pave bike path.

Table 7.5.4. Condition and length of official trails at Nickerson state park.

Trail Condition	Length (Miles)
Good	22.40
Fair	10.31
Poor	1.94
Total	34.65

The Robert B. Hooper Memorial Bicycle Trail is a paved 6.08 mile bike path within the park. It does not connect to the CCRT or the Flax Pond day use area. The Nickerson Healthy Heart Trail overlaps portions of the Hooper Trail; some overlapping segments are closed for repair.

The park's trails network includes loop trails around Flax, Cliff, and Little Cliff Ponds. An extensive network of braided trails has developed to connect these pond loops to nearby campgrounds; especially between Camping Area 4 and Cliff Pond. Erosion associated with these trails is causing sedimentation along pond shores (Water Resource Services, Inc. 2014).



Area 4 campers have created a braided network of trails (identified in yellow) to Cliff Pond. This network creates confusion for trail users and promotes erosion into the pond. (See Appendix G for photo information.)

An unmapped network of unauthorized trails cuts through the dunes along Cape Cod Bay, destabilizing dunes and creating channels for storm surge.



Numerous unauthorized dune crossings are visible in this image of Nickerson's barrier beach. The paved area in the center of the image is the town of Brewster's municipal parking lot on Crosby Lane; the main beach access immediately north of this lot is on town of Brewster property. (See Appendix G for photo information.)

Namskaket Sea Path, the first intertidal hiking trail in Massachusetts, extends from Nickerson's bayside beach in Brewster to the town-owned Skaket Beach in Orleans. It is passable only at low tide, and requires wading across Skaket Creek and walking across at least 1,000 feet of flats. It lacks suitable markers.

Kiosks and Signs

Three kiosks are located near the park entrance. Bulletin boards are located in the entrances to the shower buildings and on the front of the camp store. New England Orienteering Club maps of the park are laminated and posted along the Hooper trail. There are no signs at the Cape Cod Repertory Theater, Crosby Mansion, along Cape Cod Bay, or at the former Gavigan property to identify these areas and facilities as part of Nickerson State Park.

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are two markers, and four memorial benches. An ornamental stone bearing a metal plaque commemorating Johnny Kelly's fiftieth Boston Marathon is located near the Amphitheater. A metal plaque honoring a past president of the Friends of Nickerson State Park is attached to a rock in the Flax Pond day use area. Memorial benches are located in the playground, Flax Pond picnic area, adjacent to

the Flax Pond bathhouse, and near the Little Cliff Pond boat ramp.

Chapter 235 of the Acts of 2000 named the paved bicycle trail within Nickerson the “Robert B. Hooper Memorial Bicycle Path”, and mandated the erection and maintenance “of suitable markers bearing said designation.” No markers were ever established.

7.6. INTERPRETATION

Nickerson has a long-term seasonal Park Interpreter who prepares and presents a variety of interpretive programs. The following programs were offered during the 2014 camping season.

- Barrier Beach Ecology
- Coastal Erosion
- Creature Feature: Flax Pond Beach
- Creature Teachers (Friends of Nickerson State Park)
- Crosby Mansion Open House (Friends of the Crosby Mansion)
- Early Birding
- Explore NSP; including: Higgins Pond, and NSP: Secret Side
- Finding Your Way with Orienteering
- Geocaching Nickerson State Park
- Junior Rangers; including: Animal Detectives; Animal Tracking; Geology; Orienteering; Trees and Forestry; and Watershed Wisdom
- Kiddleiscope, including: All About Butterflies; Animals of the Forest; Awesome Owls; Don’t Bug Me; Fabulous Fish; and Together with Turtles
- Land Navigation Adventures
- Mammals of Nickerson
- Nature Exploration, including: Cliff Pond; Critical Watersheds; Forest Discovery; Grassy Nook Pond; Grassy Nook Vernal Pool; Little Cliff Pond; Nickerson State Park Watershed; and Wildlife Discovery
- Night Walk
- Off the Beaten Path Hike, including: Cliff Pond; Higgins Pond; Nature Center; and Secret Side of Nickerson State Park
- Stroll by the Bay

- Tracking Walk

Programs are presented for all ages, with Kiddleiscope programs intended for ages 3-6, Junior Ranger programs intended for ages 8-12, and Nature Exploration and Off the Beaten Path programs for the entire family. Programming is offered throughout the park, at the Nature Center, and at the amphitheater.

Off-season programs are offered by the Regional Interpretive Coordinator. In 2014 this included a naturalist-led hike in March and the Becoming an Outdoors Family program was offered during the April school vacation week.

7.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

Nickerson is managed by MassParks Staff; there are four year-round personnel and one vacant position. (Table 7.7.1) Seasonal employees provide additional staffing from Memorial Day through Columbus Day.

Table 7.7.1. Mass Parks personnel assigned to Nickerson state park; current and past.

Job Title	Number of Positions 2014	Number of Positions 1992 ^a
<i>Year-round Personnel</i>		
Bookkeeper II	1	0
Forest and Park Regional Coordinator	1	0
Forest and Park Supervisor I	0.5	1
Forest and Park Supervisor II ^b	1	0
Forest and Park Supervisor III	0	1
Laborer II	1.5	3
<i>Seasonal Personnel</i>		
Forest and Park Supervisor I	4	1
Laborer I (Short-term) ^c	4	7
Laborer I (Long-term) ^c	4	7
Laborer II (Short-term)	1	0
Park Interpreter (Long-term)	1	0
Recreation Facility Repairer	1	0
Recreation Facility Supervisor I (Short-term)	1	0
Recreation Facility Supervisor IV	1	0

- a. Information from GOALS Plan (DEM 1993); these 1992 staffing levels did not meet minimum recommended staffing.
- b. This position is currently vacant; its duties are being performed by a Laborer II.
- c. The GOALS plan (DEM 1993) identifies a total of seven Laborer I positions for 1991-1992, but does not distinguish between short-term and long-term seasonal positions.

Partnerships and Volunteers

Several partner groups expand public recreation opportunities at Nickerson and help maintain and enhance its resources.

The Friends of Nickerson State Park sponsor park programming, administer the Adopt-A-Trail program, and volunteer at the Crosby Mansion. They are supported through membership and donations, and raise funds through pancake breakfasts, an annual yard sale, and an annual kayak raffle.

The Cape Rep maintains buildings and grounds within their control and offers six to eight plays per year. Their activities are supported by ticket sales, donations, and grants.

The Friends of Crosby Mansion sub-lease the mansion and associated buildings and grounds from the town of Brewster, which leases the property from the DCR. Six open houses are offered annually. They fund their efforts by renting the mansion for weddings and other functions, through fees associated with the weekly rental of cottages at 222 and 235 Weathervanes Way, and through donations.

The Truro Conservation Commission manages the High Head Conservation Area on behalf of the Town, DCR, and MassDOT.

Public Safety

Brewster Fire Department provides fire response and emergency services.

Funding

Conservation Trust Fund

There are no Nickerson-related funding sources.

Retained Revenue

The summer 2013 camping season generated approximately \$633,016 in revenue which counted toward DCR's retained revenue cap. The park store generates \$6,700 and the boat concession \$3,050 in annual revenues.

7.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs (e.g., Table 7.3.2), legal agreements, and institutional knowledge. This section describes those practices unique to the management of Nickerson. Legal

agreements unique to the forest are listed in Table 7.8.1.

Table 7.8.1. Key legal agreements for Nickerson state park.

Party and Subject of Agreement	Type^a	Expiration Date^b
Department of Youth Services Lease agreement between the DEM and DYS for youth services facility. <i>Authorized by Chapter 765 of the Acts of 1977</i>	L	2007 ^c
John Ferreira; Jack's Boat Rental Concession Permit for a boat rental.	P	2008 ^d
Richard Brown Concession Permit for a camp store.	P	2011 ^d
Cape Cod Repertory Theater Lease agreement by and between the Cape Cod Repertory Theater Company and The Commonwealth of Massachusetts for certain structures and adjacent land within Nickerson State Park. <i>Authorized by Chapter 518 of the Acts of 1991</i>	L	2016 ^e
Dream Day on Cape Cod; Camp Nan-Ke-Rafe MOU to establish a process to charge for electricity use by private abutters. (In development)	U	2018
Town of Brewster Lease agreement by and between the town of Brewster and The Commonwealth of Massachusetts for the Crosby Mansion properties. <i>Authorized by Chapter 127 of the Acts of 1999</i>	L	2028

- Agreement types include: L = Lease; P = Permit; S = Special Use Permit; U=Memorandum of Understanding.
- Year that agreement was signed.
- Initial term of 30 years; renewable upon agreement of both parties. This agreement has been renewed.
- These agreements have been extended on an annual basis.
- Option for 30-year renewal.

Key management and guidance documents are identified in Table 7.8.2.

Table 7.8.2. Key management and guidance documents for Nickerson state park and associated properties.

Author and Document	Year
Truro Conservation Commission, The Truro Conservation Trust, and Massachusetts Coastal Zone Management Office. High Head Conservation Area management plan.	1989
Massachusetts Department of Environmental Management Guidelines for Operations and Land Stewardship: Roland C. Nickerson State Park.	1993
Gannett Fleming, Inc. Environmental Audit Report. Cape Cod Bay property, Brewster, Massachusetts.	1998 ^e
Natural Heritage and Endangered Species Program Biodiversity of Nickerson State Park and Hawksnest State Park.	2008
Massachusetts Department of Environmental Protection. Groundwater Discharge Permit 862-0.	2009
Massachusetts Department of Conservation and Recreation. Fire District # 1, Nickerson state park, 2013 fire road improvement plan.	2013
French, T. Nickerson State Park; Brewster. Fire Road Improvement Plan. NHESP Tracking No. 13-32131.	2013

Management guidance for the town of Brewster’s surface and ground waters, including those in and under Nickerson, may be found in Horsley Witten Group, Inc. (2013).

Annual Maintenance

Ongoing management practices typically follow a regular schedule. Common activities, and the desired frequency with which they occur, are identified in Table 7.8.3.

Table 7.8.3. Annual cycle of management activities at Nickerson state park.

Activity	Spring ^a	Summer ^a	Fall ^a	Winter ^a
Bathroom-Open for season	A	N/A	N/A	N/A
Bathroom-Winterize	N/A	N/A	A	N/A
Cleaning - Bathroom(s)	E1	E1	E1	N/A
Cleaning - Catch basin, drains/culverts	AN	AN	AN	N/A
Cleaning-Campsites	AN	AN	AN	N/A
Cleaning - Walkways	A/N	AN	AN	N/A
Litter removal-Recreation areas	N/A	E1	AN	AN
Litter removal - Trails	AN	AN	AN	AN
Maintenance - Picnic sites, fences, etc.	AN	AN	AN	N/A
Mowing and trimming	AN	E14	AN	N/A
Mulching and Fertilizing	N/A	AN	N/A	N/A
Playground inspection	AN	AN	AN	N/A
Pruning - Trees and shrubs	AN	AN	AN	AN
Sweeping - Walkways	AN	E1	AN	AN
Trash - Empty - Barrels	AN	AN	AN	N/A
Trash – Empty - bathroom	E1	E1	E1	N/A
Weeding - Flower beds and grassy areas	N/A	AN	N/A	N/A
Weeding - Paved areas	N/A	N/A	N/A	N/A

a. Frequency codes are: A = Annually; AN = As needed; D = Daily, # times; E = Every # days; N/A = Not applicable.

Natural Resources

Water Resources

Water Resources. The Groundwater Discharge Permit (#862-0) for the park covers 31 Subsurface Sewage Disposal Systems (SSDSs) that serve a 403 site campground, three cottages, four staff buildings, the Cape Rep Theater, Cape Rep Crosby Cape House, Crosby Mansion, and the Stephen L. French Youth Forestry Camp. This permit specifies a variety of monitoring and reporting activities, including: pumping and formally inspecting all septic tanks at least once every three years and sampling and analyzing groundwater from up- and down-gradient monitoring wells on a quarterly basis. These activities are performed under contract for the

DCR. The current Groundwater Discharge Permit, which has an expiration date of June 9, 2014, was automatically extended four years under the Permit Extension Act (Section 173 of Chapter 240 of the Acts of 2010).

Septage accumulated in the dumping station's tight tank is transported off-site for treatment and disposal. This takes place approximately 12-15 times during the peak camping season.

The Flax Pond comfort station's composting toilets are maintained and serviced by a contractor on an as needed basis.

Phosphorous inactivation and oxygenation have been proposed to reduce or eliminate algal blooms in Cliff Pond (Water Resource Services, inc. 2014) Inactivation through the addition of a phosphorous binding aluminum compound is recommended, followed by oxygenation on an as needed basis.

Neither the town of Brewster nor Orleans has promulgated or approved local fertilizer regulations under the Fertilizer Management DCPC.

Rare Species

Beach-nesting birds protected under MESA are monitored and managed by MassAudubon under contract to the DCR.

The NHESP (2008) divided rare species habitats at Nickerson into five management units. Two of these, the Coastal Plain Pondshore Management Unit and the Coastal Shore and Dune Management Unit, are considered the highest priority for management. Specific recommendations are identified in NHESP (2008); they have not yet been implemented.

Invasive Species

There are no monitoring or management activities.

Vegetation

Fire break management is performed in accordance with an approved Habitat Management Plan. (Gregory 2013).

There is one CFI plot (#3864); it is located on the edge of an Atlantic white cedar swamp.

Wildlife

MassWildlife stocks brook and rainbow trout in Cliff, Little Cliff, Flax, and Higgins Pond; brown

trout in Cliff, Little Cliff, and Flax ponds; tiger trout in Higgins Pond; and broodstock Atlantic salmon in Cliff Pond (MassWildlife 2005, 2006a, 2006b, 2006c).

Cultural Resources

Portions of the park are within the Old Kings Highway Regional Historic District. Changes in the exterior of buildings, structures, fences; new construction; and demolition are subject to review by the Old King's Highway Historic District Committee. See the Committee's web page for additional information. (<http://www.townofbarnstable.us/OldKingsHighway>)

Recreation Resources

The Camp Store and boat rental concession are operated in accordance with terms identified in annual permit agreements between the DCR and concessionaires. (Table 7.8.1)

Hunting and trapping at Nickerson are specifically prohibited under DCR's Parks and Regulation Rules (302 CMR 12.11(3)).

The use of watercraft in Nickerson's ponds is also specifically addressed in DCR's Parks and Recreation Rules. Only car top boats may be used in Flax, Little Cliff, and Higgins ponds (302 CMR 12.07(10)). Car top boats and motorized watercraft with electric motors may be used in Cliff Pond (302 CMR 12.07(11)).

Camper-generated recyclables are sorted and bundled by a host camper, with the assistance of the Friends. Recycling is transported to the Brewster transfer station as needed.

Brewster Day Camp brings campers to Cliff and Little Cliff Ponds for sailing lessons. They provide camp staff on the sailboats and also provide a staffed chase boat for safety. These activities are covered under an annual recreation permit. The Camp has expanded its facilities at 3570 Main Street into the park, including a function tent, yurt, athletic field, and archery range. There is no agreement for this.

Hunting is not allowed on Nickerson. Those hunting on adjacent lands do not always recognize the park's boundary, resulting in reports of hunters within the park.

Infrastructure

Buildings

Maintenance and repairs to Cape Rep buildings, and Crosby Mansion and associated buildings are performed in accordance with the terms of their respective agreements.

Roads

Fire roads, including Ober Road and roads near Higgins and Eel ponds, are managed in accordance with an approved fire road improvement plan (DCR 2013). This plan was developed to increase access for recreational users, fire suppression resources, and medical emergency equipment. Mowing is restricted to the use of a boom mower, which is to remain on the road, and brush may only be cut to a height of “no less than six (6) inches” (French 2013).

Camp Nan-Ke-Rafe, which is operated by Dream Day on Cape Cod, is located between Route 6 and Nickerson’s southern border; access is solely through the park. A 2008 MOU allows access through the park. (Table 7.8.1) The Camp obtains its electricity from the park; the memorandum establishes a mechanism for DCR to charge for this. In order to access the electric meter, the DCR plows snow along Deer Park Road and Nook Road from the park entrance to Nan-Ke-Rafe path.

The Division of Youth Services plows snow on Flax Pond Road from its intersection with Deer Park Road to the Stephen L. French Youth Forestry Camp.

The Town of Brewster holds a permanent easement for a 16-inch water main and underground power lines under Silas Road.

A 3-year Special Use Permit was issued in 1999 to allow the Christian and Missionary Alliance Church, to use a 42-foot wide strip of DCR land to access their property from Route 6A. Approximately 0.18 acres of the park were paved to create a driveway to the church, which is now the Cape Cod Bible Alliance Camp. There is no current agreement for its use.

Parking Areas

There are no activities unique to this park.

Trails

Trails are maintained by volunteers, including members of the Friends.

Kiosks and Signs

Park employees are responsible for updating the content of kiosks and bulletin boards.

7.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of Roland C. Nickerson State Park. Applied Land Stewardship Zoning recommendations provide general guidance for managing Nickerson. Future activities and projects should be checked against the zoning map (Figure 7.2) for consistency. Management recommendations for Nickerson are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 7.2)

The following Land Stewardship Zoning is recommended.

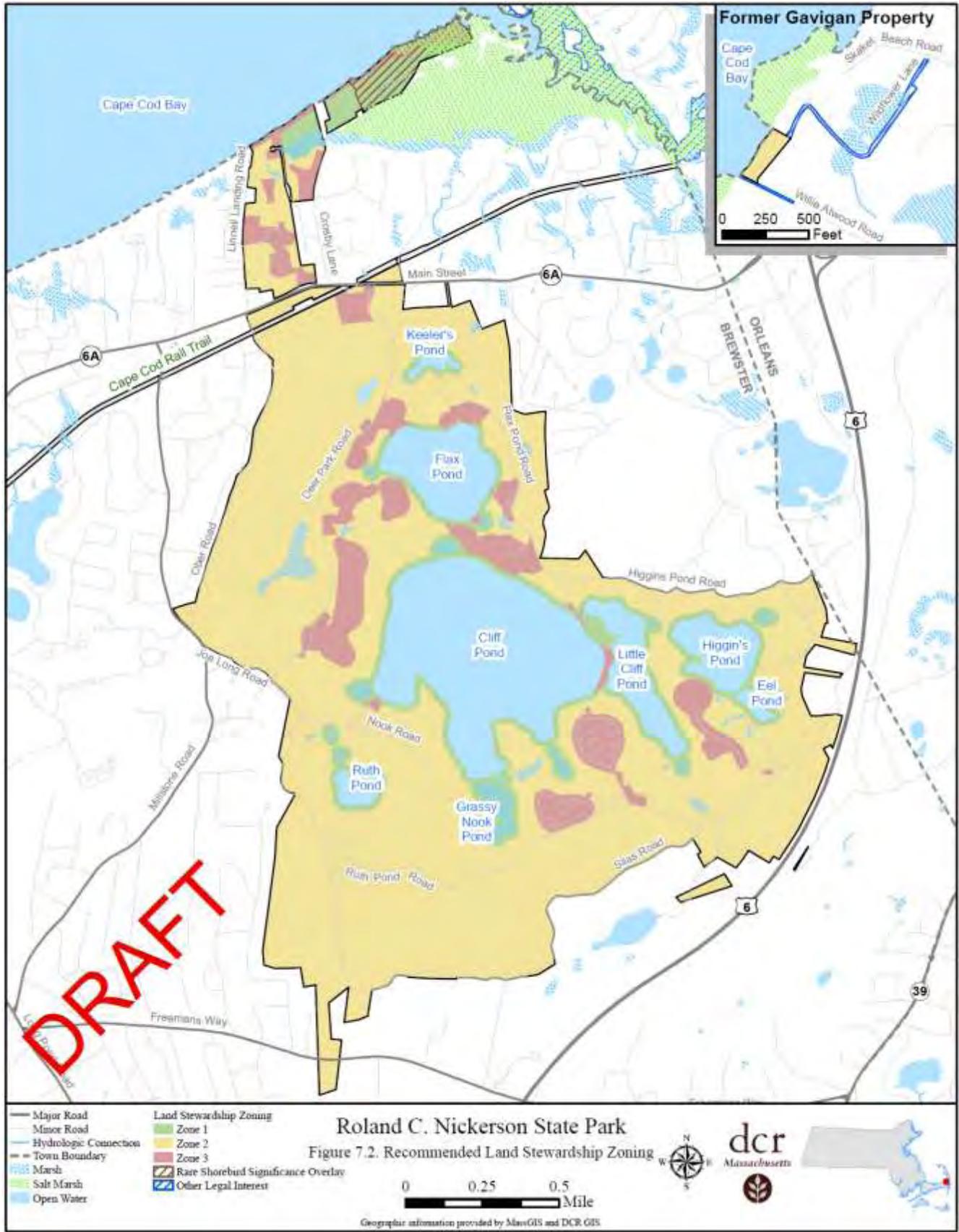
Zone 1

The following sections of Nickerson have been designated Zone 1.

- The shores of Keeler, Flax, Cliff, Ruth, Grassy Nook, Little Cliff, Higgins, and Eel ponds and associated unnamed wetlands, with the exception of existing, formally developed recreation facilities. (See Zone 3 description, below, for specific exceptions.) This area extends from the water line to a point 100 feet landward of the water line. The extent of this zone varies with water levels.
- The entire barrier beach dune system (i.e., Br-1) landward of the beach.
- The High Head parcel, Truro.

Zone 2

- All areas not specifically designated as Zones 1 or 3.
- The former Gavigan property, Orleans.



Zone 3

The following portions of Nickerson are currently developed, appropriate for potential future development, or intensively used for recreation. They have been designated Zone 3.

- The Entrance and Headquarters/Operations areas, including the contact station, day use parking, adjacent comfort station and picnic area, park headquarters, workshop, associated sheds, and the Nature Center.
- Camping Area 1, including the parking area west of Deer Park Road.
- Camping Areas 2, 3, and 4; including the playground, camp store, parking area, fire tower area, and dump station.
- Camping Areas 6 and 6X, including the shower building and parking area.
- Camping Area 7 and Camping Area 7 parking lot.
- Camping Area 5.
- Flax Pond Day Use Area; including picnic area, parking lots, comfort station, and existing beach.
- Boat concessions on Flax and Cliff ponds, with immediate shoreline.
- The Stephen L. French Youth Forestry Camp.
- Office of Fishing and Boating Access boat ramps at Cliff and Little Cliff ponds, including adjacent parking.
- The Cape Rep area and contiguous developed areas.
- The Crosby Mansion lease area and contiguous developed areas.
- Existing paved and developed areas at former Camp Monomoy, outside of the Cape Rep area.

- DCR-owned residential lots on Weathervane Way.
- The coastal beach, from the foredune to the low tide line. This area is intensively used for swimming and sunbathing.

Significant Feature Overlay

The following Significant Feature Overlay was developed to protect resources.

- ***Rare Shorebird Significance Overlay, with NHESP management guidelines.*** This overlay covers piping plover nesting and foraging areas, and common and least tern nesting areas. Beach and dune closures within this overlay area may occur as needed and may expand or contract over time.

Management Recommendations

Twenty-one priority management recommendations were developed for Roland C. Nickerson State Park. (Table 7.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

Table 7.9.1. Priority recommendations for Nickerson state park and associated properties.

Recommendation	Implementation ^a
Implement Cliff Pond management recommendations to control algal blooms.	C, O, R
Prepare a barrier beach management plan.	P
Continue the existing management and monitoring of state-listed beach-nesting birds; expand management area as potential habitat increases.	C, P, R
Assess loop trails around Cliff, Flax, Higgins, and Little Cliff ponds for impacts to examples of the Coastal Plain Pondshore community type. Close or reroute trails, as necessary, to eliminate or prevent trampling. Install signs indicating “Globally Rare Natural Community; Please Stay on Trail.” Provide interpretive information to campers at check-in.	P, R, V
Reduce the number of trails from camping areas to ponds; eliminate eroding trails on steep slopes. Designate and sign official connector trails from camping areas to ponds.	R, V
Survey Coastal Shore and Dune Management Unit (NHESP 2008) for presence of historically occurring state-listed plants. Use findings to inform locations of dune crossings and closures.	P
Convert two dune crossings to well-defined corridors; close and restore all other informal dune crossings. Limit travel behind dunes to the existing road bed. Use post and rope fencing and signs, as employed at South Cape Beach State Park, to define visitor access corridors.	P, R, V
Erect a kiosk adjacent to the Crosby Lane parking area that identifies the DCR-owned portions of the beach and lists park rules.	R, V
Remove temporary stump piles containing debris from 2005 storm cleanup; transfer to permitted solid waste facility or use for ecological restoration.	F
Apply the design standard of the park’s comfort stations to any proposed new construction, and repair of existing buildings should be done in kind according to the same template, in consultation with the Office of Cultural Resources.	E, P, R
Conduct a comprehensive survey to assess the significance of Camp Monomoy, the condition of the existing buildings, and the potential for archaeological resources. This assessment should be done before any decisions are made regarding demolition or reuse of the site.	P
Assess and document Flax Pond pump house. Perform additional background research to determine whether the building dates from the CCC period. If the structure cannot be repaired, and if no DCR reuse can be identified, it should be photo documented and removed.	E, P, R
Perform a comprehensive conditions assessment on the four CCC-built pavilions and prioritize repair projects. Identify those projects that can be done by staff and those that will require a specialized contractor.	E, P, R, C
Install accessible picnic tables and cooking rings at 21 or more campsites, including all yurt campsites. Work with Reserve America to identify these sites as accessible in reservation system.	R, U
Rehabilitate comfort station in day-use lot at park entrance to make accessible.	C, E, P
Post the former Gavigan property as DCR property and erect a small signboard with park rules.	R
Create van accessible parking spaces at the day-use lot at the park entrance (two spaces), shower buildings (two spaces each), and the park store (one space). Install proper van accessible pavement markings and signs at the playground and at the Flax Pond day-use area comfort station.	C, E, U
Establish markers identifying the bicycle path within the park as the Robert B. Hooper Memorial Bicycle Path, in accordance with Chapter 235 of the Acts of 2000.	R
Post boundaries with adjacent conservation and municipal lands to inform hunters of the park’s location and hunting policy.	R

Recommendation	Implementation ^a
Fill vacant Forest and park Supervisor II position.	O, R
Establish agreement with Brewster Day Camp for recreation facilities constructed on Nickerson in 2013.	L, R

- a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

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Hawksnest Pond, as viewed from beach. (See Appendix G for photo information.)

SECTION 8. HAWKSNEST STATE PARK

8.1 INTRODUCTION

Hawksnest State Park is located in the town of Harwich, southwest of the intersection of Routes 6 and 137. (Figure 8.1) It is accessed via Spruce or Round Cove roads.

The park is a hidden jewel. There are no signs to inform you of its presence or direct you to its entrance. If you are aware of the park, and can travel the dirt entrance road, you will be rewarded with a near private beach on one of Cape Cod’s least developed ponds. This differs markedly from what had originally been proposed for this park.

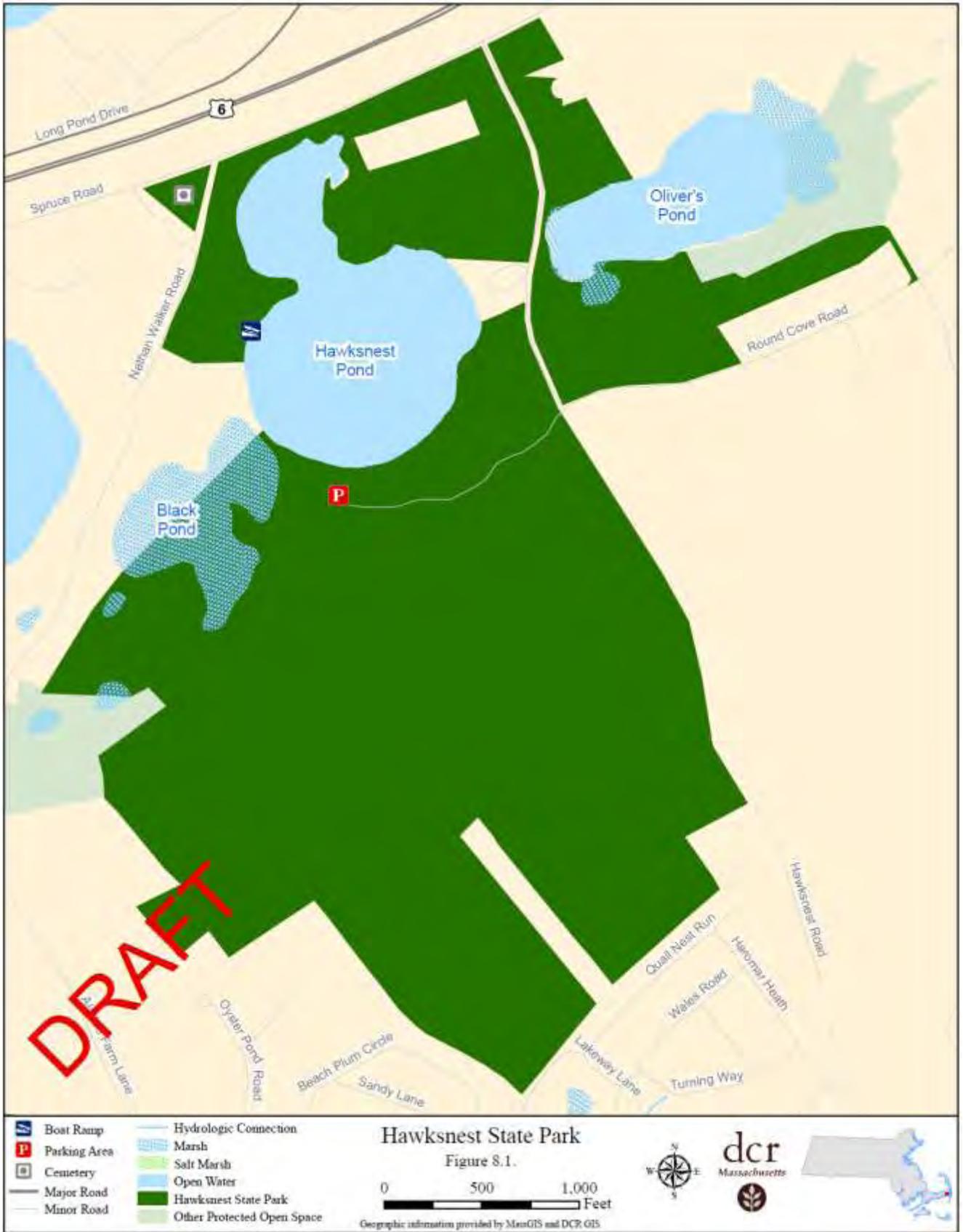
Hawksnest was established in the early 1970s in response to “the critical need for additional public camping facilities on the Cape” (DNR 1970). A two-phased approach to acquisition and development was planned. The first was to include acquisition of 218 acres and the creation of 163 campsites, two swimming beaches, a recreation hall, parking lots, and two beaches on Hawksnest Pond. The second phase was to add 482 acres and construct 406 campsites, a 120-car parking lot, picnic sites, and a beach that could accommodate 500 people. This vision was never implemented.

Today, Hawksnest is the core of a broad, multi-partner conservation landscape that protects globally rare coastal plain pondshores and other natural resources. Its physical, political, and regulatory attributes are summarized below. (Table 8.1.1)

Table 8.1.1. Physical, political, and regulatory settings of Hawksnest State Park.

Setting	Name or Metric
Location:	Harwich
Area (acres)^a:	236.09
Perimeter (miles)^a:	6.70
Landscape Designation(s)^b:	Woodland
Legislative Districts:	
House	Fourth Barnstable
Senate	Cape and Islands
Regulatory Designations:	Priority Habitat
	Fertilizer Management
	DCPC
	Six Ponds DCPC

- a. Calculated using a Geographic Information System (GIS).
- b. For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.



Associated Properties. Hawksnest is a satellite of Nickerson state park. See Section 7 for additional information.

8.2 NATURAL RESOURCES

Physical Features

Hawksnest is located on the same glacial outwash plain that underlies most of Nickerson. As a result, its physical features are similar to those of Nickerson, and include a series of ponds located in kettle holes. Elevations range from approximately 30 feet at the ponds to 80 feet in adjacent uplands.

Water Resources

Hawksnest’s most prominent features are its ponds, all of which are located in the northern half of the park. Its wetlands are associated with Black and Oliver’s ponds. The only flowing water is an approximately 40-foot-long channel, possibly man-made, that connects Black and Hawksnest ponds. A summary of Hawksnest’s water resources is presented in Table 8.2.1.

Table 8.2.1. Water resources of Hawksnest State Park.

Water Resource	Name or Metric
Watershed:	Cape Cod
Aquifer:	Cape Cod SSA
 Lens	Monomoy
Rivers and Streams (miles)	0.00
Vernal Pools	
Certified (#)	3
Potential (#)	1
Wetlands (acres)	8.17
Lakes and Ponds (acres)^a	2.13

a. Includes overlap with adjacent water bodies.

The town of Harwich annually monitors water quality in many of its ponds, including Hawksnest. It was the only pond to fully meet ecoregional criteria for pond health (i.e., chlorophyll- α , nitrogen, and phosphorous) in 2009 and 2010 (Moran and Thurston 2011). Analysis of year 2000–2010 data revealed a statistically significant increase in total nitrogen and a statistically significant decrease in chlorophyll- α .

The park’s pondshores and adjacent low-lying uplands are within the 500-year flood zone; there is no critical infrastructure in these areas. Due to its distance from the coast, there are no projected

impacts of storm surge or anticipated sea-level rise. (Table 8.2.2)

Table 8.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to Hawksnest State Park.

Type of Impact	Acres	%
Flooding:		
100-year Storm	0.00	0.00
500-year Storm ^a	16.62	7.04
Hurricane Inundation:		
Category 1 Storm	0.00	0.00
Category 2 Storm ^b	0.00	0.00
Category 3 Storm ^b	0.00	0.00
Category 4 Storm ^b	0.00	0.00
Sea Level Rise	0.00	0.00

a. Cumulative value; includes 100-year storm impacts.

b. Cumulative value; includes impacts of all lower category storms.

Rare Species

State-listed Species

Eight state-listed species are known from Hawksnest (Table 8.2.3); seven are associated with coastal plain ponds.

Table 8.2.3. State-listed species of Hawksnest State Park, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d
Eastern box turtle	R	SC
Long-beaked bald-sedge	P	SC
Pine barrens bluet	I	T
Plymouth gentian	P	SC
Pondshore knotweed	P	SC
Redroot	P	SC
Scarlet bluet	I	T
Terete arrowhead	P	SC

a. Presented alphabetically, by common name.

b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.

c. Types of state-listed species include: I = Insect; P = Plant; and R = Reptile.

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

Priority Habitat

Approximately 76.42% of Hawksnest has been designated Priority Habitat; it is entirely associated with the park’s ponds and adjacent uplands.

Vegetation

There is no comprehensive floristic information.

Invasive Species

There have been no surveys of invasive plants; only one species is currently known to occur (Table 8.2.4); there are likely more.

Table 8.2.4. Known invasive and likely invasive plants of Hawksnest State Park.

Species ^a	Status ^b
Oriental bittersweet	I

a. Presented alphabetically, by common name.

b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).

Natural Communities

Five natural communities are currently known from the park. (Table 8.2.5) The Coastal Plain Pondshore, which is uncommon in Massachusetts, contains globally rare plants.

Table 8.2.5. Known natural communities of Hawksnest State Park.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Coastal Plain Pondshore	T	S2	1
Cultural Grassland (cemetery)	T	-	2
Pitch Pine - Oak Forest	T	S5	2
Red Maple Swamp	P	S5	3
Shrub Swamp	P	S5	3

a. Classified according to Swain and Kearsley (2011).

b. E = Estuarine, P = Palustrine, T = Terrestrial.

c. The NHESP ranks communities from most rare (S1) to the most common (S5).

d. Information contained in this table was obtained from the following sources:
 1. NHESP (2008).
 2. Incidentally observed by RMP Planner during site visits.
 3. DEP Wetlands (1:12,000) data layer.

Forests

Most of Hawksnest (95.43%) is forested; roads and parking areas are located beneath tree canopy.

CFI data provide insight into the park's vegetation. The forest canopy is characterized by pitch pine and a mixture of black, scarlet, and white oaks. The understory includes young examples of canopy species, as well as lowbush blueberry, black huckleberry, sheep laurel, Canadian serviceberry, and sedges. Major causes of tree loss include leaf feeders and heart rot.

Wildlife

With the exception of birds, the park's wildlife is largely undocumented. As of November 2014, 89 species of birds have been reported on eBird (www.ebird.org). The most abundant species are those common on Cape Cod, such as black-capped chickadee, mourning dove, blue jay, American crow, northern cardinal, and song sparrow.

8.3 CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic landscapes, buildings, structures, and objects. An overview of significant events in the history of Hawksnest State Park is presented in Table 8.3.1. The park's known cultural resources are identified in Table 8.3.2.

Archaeological Resources

No archaeological surveys have been conducted in or adjacent to the park. The closest recorded pre-Contact site to Hawksnest State Park is over a mile away; it is a stone-tool making workshop that dated to the Late Archaic Period. Like all undeveloped areas on the Cape, there is a high archaeological potential for pre-Contact sites in Hawksnest State Park.

Table 8.3.1. Significant events in the history of Hawksnest State Park.

Year(s)	Events
1968	Initial review of the suitability of the Hawksnest Pond area for camping and other recreational facilities.
1971	Major park acquisitions take place, with partial funding from the Land and Water Conservation Fund.
1982	Hawksnest Cemetery parcel acquired.
1989-1991	Park expands to include smaller parcels along north end of Hawksnest Road.
2000	Harwich Six Ponds District of Critical Planning Concern is established, it includes all of Hawksnest State Park.
2003	A 4.3 acre parcel adjacent to Oliver’s Pond Natural Heritage Area and Hawksnest State Park is added to the park.

Remnants of cottages, including a chimney and a foundation, are in located in the southwest corner of the pond, west of the beach.



A collapsed chimney near the junction of Hawksnest and Black ponds marks the former location of a duck hunting camp. (See Appendix G for photo information.)

Historic Resources

Like in other areas of Cape Cod, it has traditionally been the fishing and whaling opportunities of the coast that has drawn human settlement to the area and not the soils, which are sandy and not conducive to substantial agricultural activity. Through the 18th and 19th centuries, lands in the vicinity of what is now Hawksnest State Park were used for growing trees for firewood, hunting and cranberry harvesting. A handful of foundations, cellar holes and road depressions are scattered within the park.

The pond was a popular duck hunting location, and remnants of some of these camps survive at the park today, including the chimney located between the ponds.

In the mid-20th century, the Thomson and Bell families, who had purchased a number of undeveloped parcels and former duck hunting camps around the ponds, approached the state with the interest in establishing a state park to protect the natural integrity of the ponds.

Historic Landscapes

There is one confirmed historic landscape, Hawksnest Cemetery. This cemetery, also known as End of the Pond Cemetery, contains seven grave markers dating to between 1825 and 1870. Those interred at this site are primarily members of the Eldredge family, although members of the Dunham and Cahoon families are also buried here. A wooden split rail fence surrounds the graveyard. A modern engraved stone bearing the legend “Hawks Nest Cemetery Est. 1825” is located adjacent to the entrance path.



Hawksnest Cemetery is a small family plot, dating from the early to late 1800s; it is located in the park’s northwest corner. (See Appendix G for photo information.)

Table 8.3.2. Cultural resources of Hawksnest State Park.

Location and Resource^a	Type^b	Date^c	Condition^d	Integrity^e	In Use^f	Utilities^g	MHC #^h	Guidanceⁱ
Round Cove Road								
Chimney – former duck hunting camp	AR	-	-	L	-	-	-	1
Foundation – Round Cover Road – former Thompson cottage	AR	-	-	L	-	-	-	1
Nathan Walker Road								
Hawksnest Cemetery (End of the Pond Cemetery)	LA	1825-1870	-	H	-	-	HRW.803	2
Foundation – Walker Road area – former Bell property.	AR	-	-	L	-	-	-	1
Cement boundary markers (multiple)	OB	-	-	M	-	-	-	3
Additional Resources^j								
<i>Multiple house sites/cellar hole^k</i>	AR	-	-	U	-	-	-	1
<i>Historic roads/cart paths^j</i>	LA	-	-	U	-	-	-	4
<i>Bell property^j</i>	AR	-	-	U	-	-	-	1
<i>Rod and gun club site^j</i>	AR	-	-	U	-	-	-	1
<i>Signs of former settlements (e.g., roads, furrows, cellar holes)^k</i>	AR	-	-	U	-	-	-	1

- a. Roads are identified in Figure 8.1.
- b. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- c. Date of construction provided, when known.
- d. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- e. Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- f. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- g. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- h. Massachusetts Historical Commission inventory number.
- i. The following guidance is offered for the ongoing maintenance of these cultural resources:
1. Refer to Archaeological Features BMP (DCR n.d.k).
 2. Refer to Cemeteries and Burial Grounds BMP (DCR n.d.l).
 3. Refer to Historic Landscapes - Built Features BMP (DCR n.d.g).
 4. Refer to Vegetation in Historic Landscapes BMP (DCR n.d.h).
- j. Documented through the 1984/1985 Cultural Resources Evaluation Project but not yet field verified or confirmed.
- k. Referenced on Friends of Hawksnest web page (friendsofhawksnest.blogspot.com/2009/10/history-at-hawksnest-start-park.html).

Buildings

There are no historic buildings located within the park.

Structures

There are no historic structures located within the park.

Objects

The concrete boundary markers referred to in the table are the only historic objects in this park not associated with the cemetery.

8.4 RECREATION RESOURCES

The following authorized activities take place at Hawksnest:

- Biking, mountain
- Boating (power and paddle)
- Dog walking (on leash)
- Fishing
- Geocaching (3 caches as of October 2014)
- Hiking
- Horseback riding
- Hunting
- Nature study
- Swimming

The most popular activities are likely swimming, hiking, and fishing; there are no empirical data on visitor numbers or activities.

A dirt road leading into the eastern edge of Hawksnest Pond serves as a ramp for small boats and a launch point for canoes and kayaks. There is a small gravel parking lot. (See Parking, below.) The ramp serves as a conduit for sediments transported by stormwater. An unguarded beach, on the pond's south shore is used for swimming and also for the launching of canoes and kayaks.



The informal boat ramp on Hawksnest Pond; plans have been developed to correct the erosion associated with this ramp. (See Appendix G for photo information.)

A variety of unauthorized recreation activities take place, including camping and the use of OHVs. A Kayak and Walk Cape Cod MeetUp group (<http://cape-cod.meetup.com/>) holds events that encourage visitors to run their dogs off leash, in violation of DCR regulations.

An abutter has converted part of the western shore of Hawksnest Pond into a personal recreation area. They have cleared vegetation, constructed steps to the water, and installed a glider swing.

8.5 INFRASTRUCTURE

Property Boundary

The park's boundary is irregularly shaped, bordering municipal roads; private, municipal, and state conservation lands; residences; and undeveloped privately-owned land. It is not marked.

Buildings and Structures

There are no buildings or structures.

Roads

Two municipal roads, Nathan Walker and Hawksnest, pass through portions of the park. Two others, Spruce and Round Cove, border the park. West of its intersection with Hawksnest Road, Round Cove Road becomes an internal park road. Its condition is poor, with loose, sandy soils and deep depressions that fill with rain. As a result, access to the park is largely restricted to vehicles with high ground-clearance. One additional internal road

extends from Nathan Walker Road into Hawksnest Pond, where it becomes a boat ramp.



Nathan Walker Road is a municipal road that crosses through Hawksnest, providing access to Hawksnest Cemetery and the road to the boat ramp. (See Appendix G for photo information.)

There is only one road, the portion of Round Cove Road within the park, its condition is summarized in Table 8.5.2.

Table 8.5.1. Condition and length of roads at Hawksnest State Park.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	0.0	0.00
Fair	0.0	0.27
Poor	0.0	0.00
Total	0.0	0.27

a. Based on field assessment; all distances calculated using GIS.

Parking

Parking is limited, with most spaces along Round Cove Road. (Table 8.5.2) An unofficial parking lot is located at the west end of Round Cove Road, adjacent to the pondshore. Additional internal parking is located at the cemetery and boat ramp on Nathan Walker Road. Access to all of these spaces requires driving on dirt roads in various states of repair. Visitors wishing to avoid dirt roads park on the south shoulder of Spruce Road, adjacent to the park.

Table 8.5.2. Number of public parking spaces, by location and type, at Hawksnest State Park.

Location	HP	Other	Total
Round Cove Road – pull off ^a	0	2	2
Round Cove Road, at Hawksnest Pond ^a	0	12	12
Hawksnest Cemetery ^a	0	3	3
“Boat Ramp” area – Nathan Walker Road ^a	0	2	2
Total	0	19	19

a. Number of spaces is based on the number of potential 9-foot-wide spaces.



Visitors park among the trees and in a small opening at the west end of Round Cove Road; the park’s main parking area. Vehicles and pedestrians have created eroding pathways between this area and the beach. (See Appendix G for photo information.)

The remoteness of the lots on Round Cove Road, coupled with the lack of a gated entrance, contribute to illegal and undesirable activities.

Trails

A limited trail system provides access to Hawksnest Pond and connects the park to adjacent municipal conservation land. There is no forest-wide trail map, nor trail signs to help navigate the property. The numbers of miles of trails, by condition, are presented in table 8.5.3. Unauthorized trail segments across private lands and the Oliver’s Pond Natural Heritage Area provide access to Oliver’s Pond.

Table 8.5.3. Condition and length of official trails at Hawksnest State Park.

Trail Condition	Length (Miles)
Good	1.40
Fair	0.43
Poor	0.0
Total	1.83

Kiosks and Signs

There are no kiosks; park rules are not presented to visitors. There are no lead-in signs directing people to the park, or a main identification sign at the park's main entrance. There are no DCR trail signs or blazes.

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are no known memorials or markers.

8.6. INTERPRETATION

There are no DCR-led interpretive programs offered at Hawksnest. In recent years, the Harwich Conservation Trust (HCT) has offered *Turkey Talk Walk*, a "seasonal ramble" through Hawksnest that touches on the park's natural and cultural histories, as well as those of adjacent properties.

8.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

Hawksnest is managed by MassParks staff based at Nickerson. (See Table 7.7.1) There are no employees based at Hawksnest. Visits to the park are usually in response to public comments.

Partnerships and Volunteers

The Friends of Hawksnest State Park (FOH) is an informal volunteer group "organized to conserve the natural and historic resources of the park" (<http://friendsofhawksnest.blogspot.com/>). There is no Volunteer/Stewardship Agreement for this group, nor are their activities coordinated with Nickerson staff.

The Hawksnest Cemetery is being maintained by an unknown individual or group.

Safety

Harwich Fire Department provides fire response and emergency services. The Harwich Police Department, Massachusetts Environmental Police, and Massachusetts State Police provide law enforcement.

Funding

Conservation Trust Fund

There are no trust funds.

Retained Revenue

The park does not generate or retain revenue.

Other Revenues

There are no other revenues.

8.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs, legal agreements, and institutional knowledge. This section describes those practices unique to the management of Hawksnest.

There are no legal agreements unique to the management of Hawksnest. Because acquisition of was partially funded by the Land and Water Conservation Fund, use and management of this park are subject to that program's requirements (NPS 2008).

Key management and guidance documents are identified in Table 8.8.1.

Table 8.8.1. Key management and guidance documents for Hawksnest State Park.

Author and Document	Year
Massachusetts Department of Environmental Management. Roland C. Nickerson State Park. GOALS plan.	1993
Gannett Fleming, Inc. Environmental Audit Report: Hawksnest State Park, Harwich, Massachusetts.	1998 ^f
Gannett Fleming, Inc. Environmental Audit Report: Black Pond, Harwich, Massachusetts.	1998 ^g
National Park Service Land and Water Conservation Fund State Assistance Program. Federal Financial Assistance Manual.	2008
Natural Heritage and Endangered Species Program Biodiversity of Nickerson State Park and Hawksnest State Park	2008

The planning document prepared at the time of acquisition (DNR 1970) is no longer applicable to the management of this property.

Copies of Land and Water Conservation Fund inspection reports were not located during the preparation of this RMP.

Annual Maintenance

There are no regular activities; all maintenance is performed on an as needed basis.

Natural Resources

Water Resources

The entire park is located within the Harwich Six Ponds District of Critical Planning Concern. Among the District's goals and interests are protecting key natural resources (e.g., coastal plain pondshores); and enhancing recreational opportunities compatible with resource protection. Protection of the DCPC's interests is through Harwich ordinances.

Rare Species

There are no activities unique to this property.

Invasive Species

There are no monitoring or management activities.

Vegetation

There are no vegetation management activities, nor are there currently plans for future activities.

Cultural Resources

The town of Harwich Cemetery Department maintains Hawksnest Cemetery, including periodic mowing to prevent encroachment by woody vegetation. There is no agreement with the Town for this service.

Recreation Resources

Improvements have been proposed for the canoe and kayak launch that would eliminate runoff from the road into the pond and create a small gravel lot with five spaces (New England Environmental, Inc. 2010). These improvements have not been funded

Infrastructure

Buildings

The absence of buildings from this park results in no management activities related to buildings.

Roads

The portion of Round Cove Road within the park is repaired when it becomes impassable to DCR and emergency vehicles.

Parking Areas

DCR and members of the FOH have attempted small-scale corrections to erosion associated with run-off from the parking lot and social trails from the parking lot to the beach.

Trails

The Harwich Trails Committee has created, and maintains, some trails within the park.

Kiosks and Signs

There are no kiosks or signs to manage.

8.9. RECOMMENDATIONS

Introduction

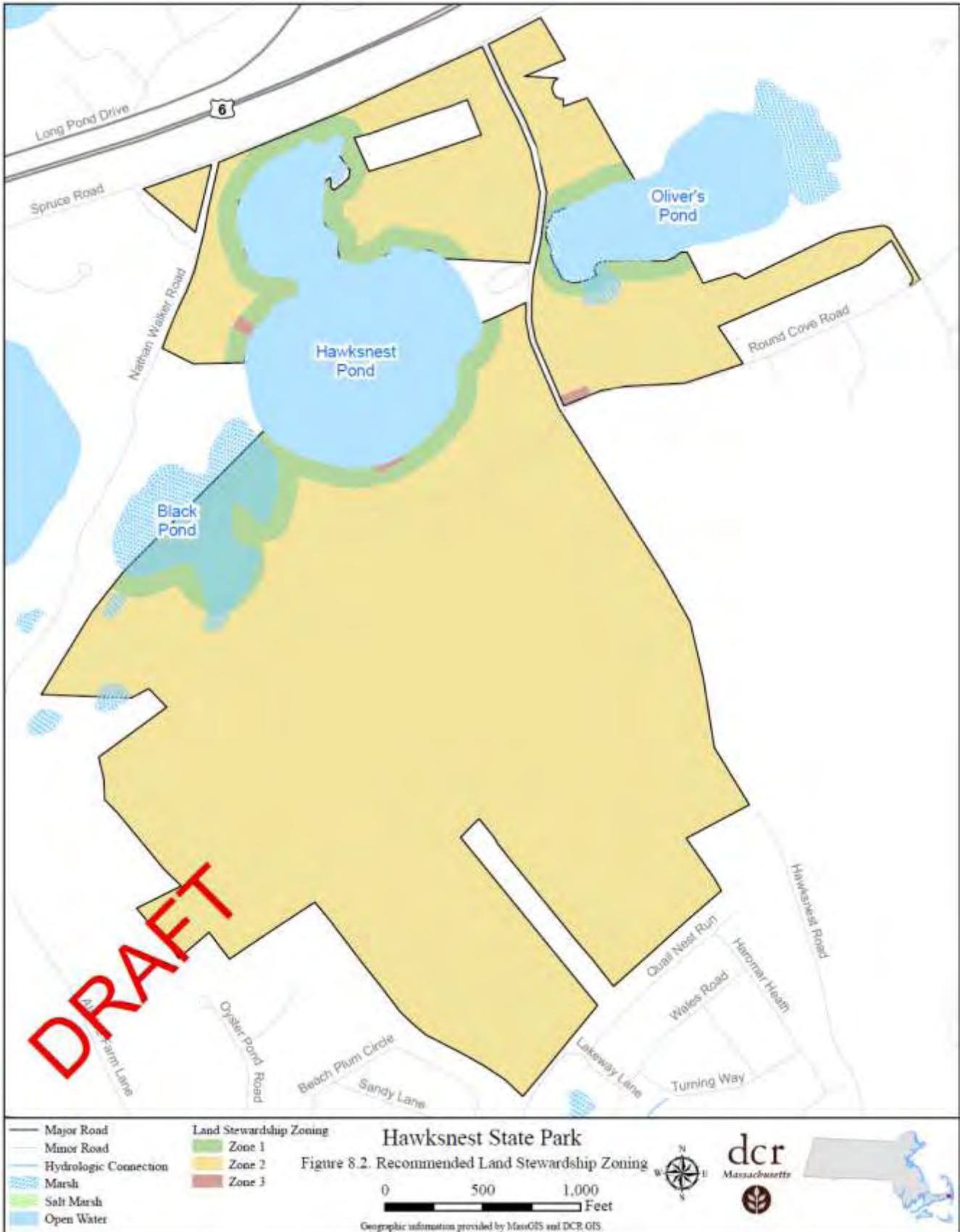
This section provides recommendations for the near- and long-term management of Hawksnest State Park. Applied Land Stewardship Zoning recommendations provide general guidance for managing Hawksnest. Future activities and projects should be checked against the zoning map (Figure 8.2) for consistency. Management recommendations for Hawksnest are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 8.2)

The following Land Stewardship Zoning is recommended.

Zone 1

- The shores of Black, Hawksnest, and Oliver's ponds, extending from the water line to a point 100 feet landward of the water line. The extent of this zone varies with water levels.



Zone 2

- All portions of the park not designated Zone 1.

Zone 3

- Existing beach
- Boat ramp/canoe and kayak launch area on west side of Hawksnest Pond, within the existing footprint.
- An approximately 150 x 50 foot area on the northeast corner of the intersection of Hawksnest and Round Cove roads.

Significant Feature Overlay

There are no Significant Feature Overlays.

Management Recommendations

Twelve priority management recommendations were developed for Hawksnest. (Table 8.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

Table 8.9.1. Priority recommendations for Hawksnest State Park.

Recommendation	Implementation^a
Gate Round Cove Road at its intersection with Hawksnest Road to decrease depreciative behaviors in the park.	R
Create a gravel parking lot in the northeast corner of the intersection of Round Cove and Hawksnest roads.	R
Install lead-in signs from Route 137 to main parking lot.	R
Assess trails around Black, Hawksnest, and Oliver’s ponds for impacts to examples of the Coastal Plain Pondshore community type. Close or reroute trails, as necessary, to eliminate or prevent trampling. Install signs indicating “Globally Rare Natural Community; Please Stay on Trail.”	P, R, V
Install trail signs, kiosks, and reassurance blazes in a manner consistent with Trail Guidelines and Best Practices Manual (DCR 2012). GPS trails and produce and distribute trails map.	P, R, V
Install kiosks at the main parking area and near entrance to beach; they should display park rules and acknowledge Land and Water Conservation Fund funding.	R
Post park regulations at canoe and kayak launch.	R
Notify abutter to remove private recreation infrastructure from park property, and to cease altering vegetation in wetland buffer.	L, R
Establish a formal agreement with the town of Harwich for the maintenance of Hawksnest Cemetery.	L, P, R, X
Increase DCR’s presence in the park.	B, R
Establish formal agreements with the Friends of Hawksnest, Harwich Conservation Trust, and the Harwich Trails Committee for interpretive programming and trails work in park.	L, R, X
Implement proposed improvements to canoe and kayak launch.	C, O

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning and Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.



Cyclists on the Cape Cod Rail Trail, near Long Pond, Harwich. (See Appendix G for photo information.)

SECTION 9. CAPE COD RAIL TRAIL

9.1. INTRODUCTION

The Cape Cod Rail Trail (CCRT) is one of DCR's most popular parks. Each year it attracts an estimated 400,000 visitors (NPS and CCC 2010) who bicycle, walk, run, skate, ride horses, and cross-country ski. This linear park extends approximately 21.9 miles, from Route 134 in Dennis to LeCount Hollow Road in Wellfleet, atop a former railroad bed that once carried trains travelling between Boston and Provincetown. (Figures 9.1 and 9.2) A paved multi-use path extends down the center of the park. The CCRT passes by wetlands, cranberry bogs, salt marshes, pond shores, power line corridors, forests, residential neighborhoods, motels and rental cottages, cemeteries, retail districts, and industrial areas. Visitors travelling the length of the park are introduced to the many faces of Cape Cod.

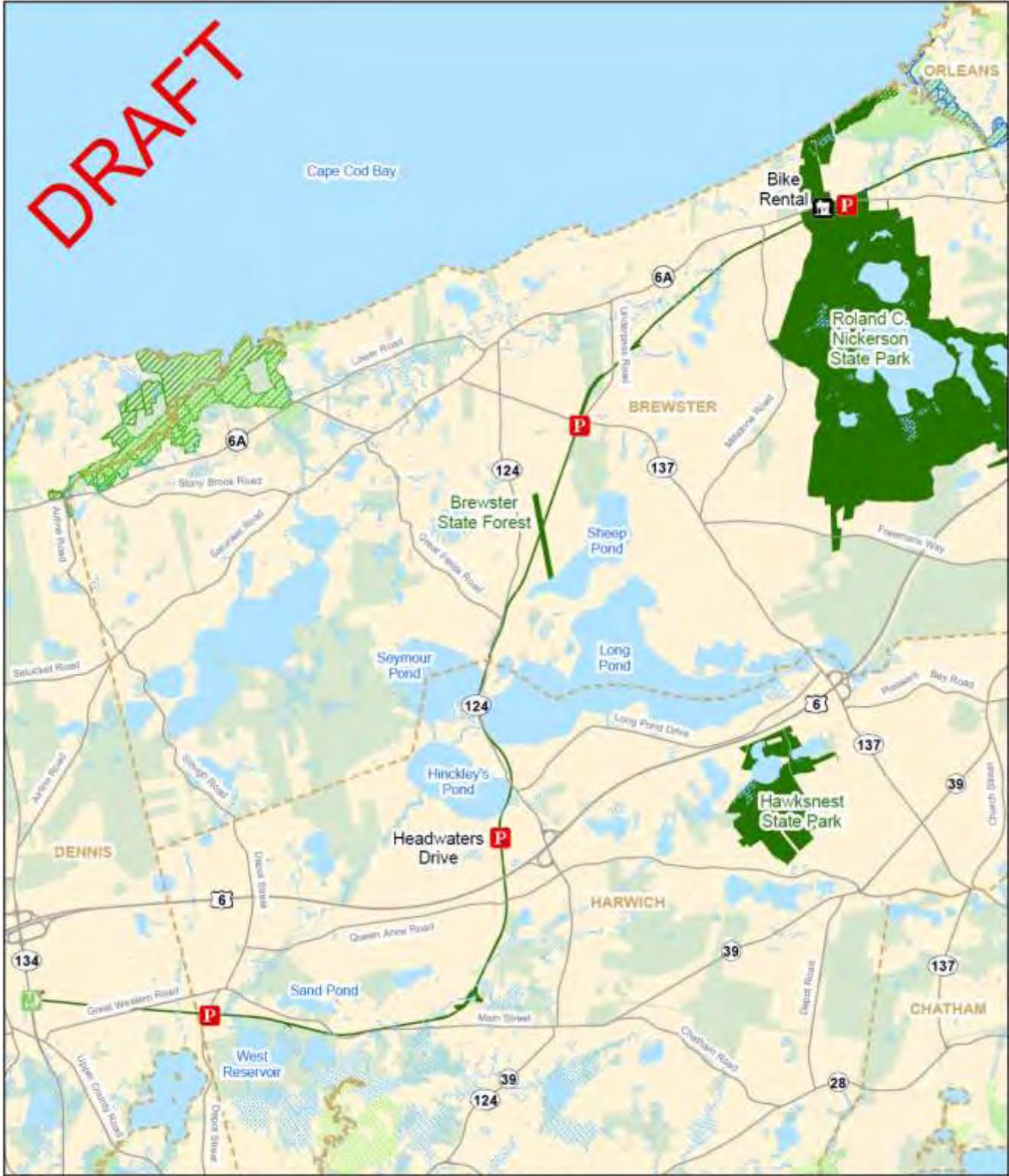
The park's land is owned by three governmental entities. The town of Orleans owns all of the railroad bed within its municipal boundaries. Similarly, the National Park Service owns the railroad bed within the Cape Cod National Seashore (CCNS). The majority of the rail trail is owned by the DCR, which

is responsible for managing the entire park. In addition, the DCR also owns 10,600 feet of railroad bed beyond the CCRT's current northern terminus in Wellfleet, and several parcels, ranging in size from 0.3 to 3.9 acres, along the CCRT in Dennis, Harwich, and Brewster.

This section considers DCR-owned portions of the CCRT, and the DCR's management responsibilities for the entire trail. Information is presented for the DCR-owned portions of the CCRT and, when available, also for the town of Orleans and CCNS owned portions of the CCRT. The 3.7 mile rail trail extension into Dennis and Yarmouth is not included in this section, nor is the Old Colony Rail Trail, which is often misidentified as an extension of the Cape Cod Rail Trail. The CCRT's physical, political, and regulatory attributes are summarized in Table 9.1.1.

Associated Properties. The CCRT serves as a greenway that passes through, and connects, two other DCR properties: Nickerson state park (Section 7) and Brewster State Forest (Section 14). It is managed by the staff of Nickerson state park.

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Cape Cod Rail Trail (South)
 Figure 9.1.

Building	Salt Marsh
Trailhead	Open Water
Parking Area	Other Protected Open Space
Major Roads	Nickerson Complex
Hydrologic Connection	Fee Interest
Town Boundary	Conservation Restriction
Marsh	Easement

0 0.5 1 Mile

Geographic information provided by MassGIS and DCR GIS.

dcr
 Massachusetts

DRAFT



	Composting Toilet		Salt Marsh
	Trailhead		Open Water
	Parking Area		Other Protected Open Space
	Major Roads		Cape Cod Rail Trail
	Hydrologic Connection		Fee Interest
	Town Boundary		Easement
	Marsh		

Cape Cod Rail Trail (North)
Figure 9.2

0 0.5 1
Mile

Geographic information provided by MassGIS and DCR GIS

Table 9.1.1. Physical, political, and regulatory settings of the Cape Cod Rail Trail.

Setting	Name or Metric
Location:	Dennis, Harwich, Brewster, Orleans, Eastham, Wellfleet
Area (acres)^{a,b}:	
DCR-owned	201.63
Town of Orleans	18.53
Perimeter (miles)^{a,b}:	
DCR-owned	40.35
Town of Orleans	4.01
Landscape Designation(s)^c:	Parkland
Legislative Districts:	
House	1st Barnstable 4th Barnstable
Senate	Cape and Islands
Regulatory Designations:	Priority Habitat Inner Cape Cod Bay ACEC Outstanding Resource Waters – Inner Cape Cod Bay ACEC Fertilizer Management DCPC ^c Old Kings Highway Regional Historic District

- a. Calculated using a Geographic Information System (GIS).
- b. Existing GIS data do not differentiate the rail bed from adjacent portions of the CCNS. Because of this, metrics are unavailable for the CCNS portion of the rail trail.
- c. For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.
- d. Chapter 716 of the Acts of 1989 established the Cape Cod Commission and allowed for the creation of Districts of Critical Planning Concern (DCPC).

9.2. NATURAL RESOURCES

The CCRT is a linear park that was originally a railroad corridor. Its narrowness, approximately 80-foot wide at most locations, means that the park shares resources with abutting properties. Historic and current land uses on these properties influenced, and continue to influence, the park’s natural resources.

Physical Features

Due to its past use as a railroad bed, the topography of the CCRT typically ranges from level to a gentle incline. The trail begins in Dennis at an elevation of approximately 40 feet, drops to approximately 10 feet near Namskaket Creek in Brewster and Orleans,

and rises to approximately 60 feet at its terminus in Wellfleet. The sharpest changes in topography are man-made, and associated with the bridges over Route 6 in Harwich and Orleans, and the Route 6 underpass in Eastham.

Water Resources

Although the CCRT has few of its own water resources (Table 9.2.1), such resources are common on abutting properties.

Table 9.2.1. Water resources of the Cape Cod Rail Trail.

Water Resource	Name or Metric
Watershed:	Cape Cod
Aquifer:	Cape Cod SSA
Lens	Monomoy Nauset Chequesset
Rivers and Streams (miles)^{a,b}	
DCR-owned	0.34
Town of Orleans	0.10
Vernal Pools	
Certified (#)	0
Potential (#)	0
Wetlands (acres)^{a,b}	
DCR-owned	3.95
Town of Orleans	1.83
Lakes and Ponds (acres)^{a,b,c}	
DCR-owned	0.50
Town of Orleans	0.00

- a. Calculated using a Geographic Information System (GIS).
- b. Existing GIS data do not differentiate the rail bed from adjacent portions of the CCNS. Because of this, metrics are unavailable for the CCNS portion of the rail trail.
- c. Includes overlap with adjacent water bodies.

Limited portions of the park are susceptible to flooding and storm surge. (Table 9.2.2) However, flooding in even limited segments may result in trail closure, disrupting park use and rerouting recreationists onto public roads.

One hundred year flood zones associated with rivers, streams, ponds, and saltmarshes often extend onto the CCRT. (Table 9.2.2) The greatest threat occurs where the trail passes near saltmarshes. For example, over 3,000 linear feet of paved multi-use path are within the 100-year flood zone in Orleans. Portions of the CCRT within 500-year flood zone tend to be adjacent to large, freshwater ponds.

Table 9.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise on the Cape Cod Rail Trail.

Type of Impact	DCR-owned Acres (%) ^a	Town of Orleans Acres (%) ^a
Flooding:		
100-year Storm	8.76 (4.34)	4.70 (25.34)
500-year Storm ^b	9.95 (4.93)	4.83 (26.02)
Hurricane Inundation:		
Category 1 Storm	0.73 (0.36)	0.24 (1.29)
Category 2 Storm ^c	2.47 (1.22)	0.67 (3.61)
Category 3 Storm ^c	7.30 (3.62)	3.04 (16.41)
Category 4 Storm ^c	10.15 (5.03)	4.59 (24.77)
Sea Level Rise	0.09 (0.04)	0.06 (0.31)

- a. Existing GIS data do not differentiate the CCRT from adjacent portions of the CCNS. Because of this, metrics are unavailable for the CCNS portion of the rail trail.
- b. Cumulative value; includes 100-year storm impacts.
- c. Cumulative value; includes impacts of all lower category storms.

Those sections of the trail most likely inundated by hurricane surge are generally the same as those affected by a 100-year flood. This includes Blackfish Creek in Wellfleet, Boat Meadow River and Rock Harbor Creek in Orleans, and Namskaket Creek in Brewster and Orleans; all of which are predicted to be affected by a Category 1 or greater storm. Approximately 8,800 linear feet of rail trail are predicted to be inundated by Category 4 storms at these locations. Category 4 storms are also predicted to inundate portions of the CCRT near Herring, Great, and Depot ponds in Eastham, and Swan Pond River, Herring River, and Coy’s Brook in Harwich.

Projected sea level rise (Church et al. 2013) will minimally impact the rail trail. (Table 9.2.2)

In 2002, a 15-inch culvert beneath the CCRT was replaced with twin 60-inch culverts in order to improve the flow of salt water into Namskaket Marsh south of the rail trail. Concerns that increased tidal flow might flood adjacent private properties and infrastructure resulted in partial restrictions being placed on the culverts; they were removed in 2014. Preliminary hydrological data suggest that adjacent infrastructure is safe under normal tide conditions but storm impacts are unknown (Ingelfinger 2014).

Rare Species

State-listed Species. Fourteen state-listed species are known. (Table 9.2.4) Many are associated with adjacent properties, others may pass along or across the path, and still others may incorporate portions of the CCRT into their habitats. As of this writing, the spatterdock darner has been proposed for delisting under MESA.

Table 9.2.3. State-listed species of the Cape Cod Rail Trail, as identified by the NHESP.

Species ^{a, b}	Type ^c	MESA ^d
Bushy rockrose	P	SC
Common’s panic grass	P	SC
Diamond-backed terrapin	R	T
Eastern box turtle	R	SC
Eastern spadefoot	A	T
Eastern whip-poor-will	B	SC
Gerhard’s underwing	I	SC
Mitchell’s sedge	P	T
Pink sallow moth	I	SC
Pondshore knotweed	P	SC
Salt reedgrass	P	T
Sandplain euchlaena	I	SC
Spatterdock darner	I	SC
Terete arrowhead	P	SC

- a. Presented alphabetically, by common name.
- b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.
- c. Types of state-listed species include: A = Amphibian; B = Bird; I = Insect; P = Plant; and R = Reptile.
- d. Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.

Priority Habitat

Slightly less than two-thirds of the DCR-owned portion of the CCRT (63.31%) has been designated Priority Habitat under MESA. In contrast, 36.76% of the CCRT in Orleans is in Priority Habitat. The portion of the trail within the CCNS is entirely within Priority Habitat.

Vegetation

There have been no comprehensive surveys.

Invasive Species

There have been no surveys; two invasive plants have been incidentally observed. (Table 9.2.4) Given the CCRT’s history, and the common practice of abutters dumping yard waste along its margins, additional invasives are likely to be present.

Table 9.2.4. Known invasive and likely invasive plants of the Cape Cod Rail Trail.

Species ^a	Status ^b
Black locust	I
Oriental bittersweet	I

- a. Presented alphabetically, by common name.
- b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).



The CCRT passes by several active cranberry bogs, such as Jenkins Cranberry Bog, Harwich. (See Appendix G for photo information.)

Natural Communities

The historic railroad bed and adjacent shoulders were highly modified for railroad use. As a result, most of the CCRT is dominated by culturally derived mixtures of vegetation, rather than natural communities. Exceptions include undeveloped parcels abutting the trail; these parcels have not been surveyed for natural communities.

The CCRT’s narrowness means that the park intersects natural communities from adjacent properties. Community types through which the CCRT passes are identified in Table 9.2.5. A variety of cultural landscapes, such as cranberry bogs, power line corridors, and residential yards also abut the trail.

Table 9.2.5. Known natural communities of the Cape Cod Rail Trail.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Coastal Plain Pondshore	P	S3	1
Deep Emergent Marsh	P	S4	2
Red Maple Swamp	P	S5	2
Salt Marsh	E	S3	2
Shrub Swamp	P	S5	2

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from the following sources:
 1. Harper (2013).
 2. DEP Wetlands (1:12,000) data layer.

Forests

There is no information on this park’s forests, nor is there any forest monitoring.

Wildlife

The trail’s wildlife has not been surveyed. It is anticipated that those species present will be representative of the larger forest, wetland, and developed areas through which it passes.

9.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic buildings, structures, and landscapes. An overview of significant events in the history of the CCRT is presented in Table 9.3.1. Its cultural resources are identified in Table 9.3.2.

Table 9.3.1. Significant events in the history of the Cape Cod Rail Trail.

Year(s)	Events
Late 1970s	Railroad rights-of-way purchased in Dennis, Harwich, Brewster, and Eastham; construction begins.
1992	Town of Orleans grants an easement to the DEM for recreational purposes over seven former railroad parcels.
1994	Legislature authorizes funds for numerous upgrades to the rail trail, including a bike path linking Chatham and Harwich to the CCRT, linking Dennis to the CCRT, a bridge in Orleans, and the extension of the rail trail to Wellfleet. (Chapter 273 of the Acts of 1994)
1995	Trail extended from Eastham to its current terminus at Lecount Hollow Road in Wellfleet.
2005-2007	Major renovations to rail trail conducted in two phases: Phase 1(2005) – Dennis to Nickerson state park; and Phase 2 (2007) – Nickerson state park to South Wellfleet.
2008	Three million dollars authorized for rail trail extensions westward in Denis and Yarmouth (Chapter 303 of the Acts of 2008).
2015	Construction begins on 3.7 mile extension through Dennis into Yarmouth.

Table 9.3.2. Cultural resources of the Cape Cod Rail Trail.

Location and Resource ^a	Type ^b	Date ^c	Condition ^d	Integrity ^e	In Use ^f	Utilities ^g	MHC # ^h	Guidance ⁱ
Park-wide								
Granite posts	OB	Late 1800s	-	M	-	-	-	1
Harwich								
Pleasant Lake Residential District	MHCA	1850-1930	-	-	-	-	HRW.G	-
Brewster								
Old King’s Highway Regional Historic District	NRHD	17 th -19 th c.	-	-	-	-	BRE.G	-
South Brewster	MHCA	1750-1885	-	-	-	-	BRE.D	-
East Brewster	MHCA	1795-1900	-	-	-	-	BRE.A	-
Orleans								
Orleans Town Center	MHCA	1880-1981	-	-	-	-	ORL.C	-
Old King’s Highway Regional Historic District	NRHD	17 th -19 th c.	-	-	-	-	ORL.E	-
Wellfleet								
Blackfish Creek Residential District	MHCA	1700-1900	-	-	-	-	WLF.O	-

a. By town, from Dennis trailhead to Wellfleet trailhead.

b. Resource types include: MHCA – Massachusetts Historical Commission Area; NRHD = National Register Historic District; OB = Object.

c. Date of construction provided, when known.

d. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.

e. Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.

f. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.

g. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

h. Massachusetts Historical Commission inventory number.

i. The following guidance is offered for the ongoing maintenance of these cultural resources:

1. Refer to Historic Landscapes-Built Features BMP (DCR n.d.g).

Archaeological Resources

Many pre-Contact sites are recorded in close proximity to the CCRT. Over 50 systematic archaeological surveys have been conducted over the last four decades near or adjacent to the trail. The CCRT in its entirety passes through ecosystems that provided favorable resource bases that attracted Native Americans for thousands of years and numerous clusters of sites are located close to the trail corridor. Despite its proximity to known and potentially existing pre-contact sites, the existing 10-foot wide paved multi-use path, coincides with the Old Colony Railroad rail road bed, which by the 1870s linked Boston with Provincetown. Future work confined to existing built and hardened features would pose no threat to archaeological resources. However, because of its proximity to highly sensitive pre-contact sites including multiple burials associated with the Contact Period, any intrusive work proposed adjacent to or near the trail needs to be assessed for archaeological sensitivity, especially in undeveloped areas.

Historic Resources

Prior to the mid-nineteenth century, geography had isolated Cape Cod from the rest of Massachusetts, with Old King's Highway (Rt. 6a) as the only major ground transportation route connecting the peninsula's towns to the mainland. By 1848, the Old Colony Railroad Company railroad had connected Boston to Sandwich. By 1873, the route was extended the length of the Cape to Provincetown, shortening the journey from Boston to five hours. The railroad was a significant factor in the growth of the Cape as a vacation destination, drawing visitors from Boston, New York and beyond. Improvements to Route 6 and the construction of the canal bridges in the late 1930s brought the end of passenger service. The creation of the CCRT in the 1970s introduced a new mode of transportation to Cape Cod, and in the process preserved the memory of the path's railroad heritage.

Historic Landscapes

Rail Trail Right of Way. While much has changed along the route of the Rail Trail since its use a railroad corridor, the maintained linear continuity of the route continues to possess integrity as a unique type of historic landscape. The trail passes by a number of protected and preserved historical and

cultural sites and landscapes, however, most of these areas are outside of DCR's management boundary. The path, however, allows visitors to experience a good portion of a route traveled by visitors to the Cape for decades. The integrity of the open corridor and low grade slope preserves the memory of the railway travel experience, and the recalls the transportation backbone of the area's late nineteenth and twentieth century development.

Buildings

There are no DCR-owned historic buildings located along the Rail Trail.

Structures

There are no DCR-owned historic structures located along the Rail Trail.

Objects

All historic objects are associated with the Rail Trail Right of Way historic landscape.

9.4. RECREATION RESOURCES

The CCRT is a linear park with a paved multi-use path running from end to end. Recreation activities primarily involve use of this path, with fewer activities taking place off path. The following recreation activities are known to take place in the park.

- Bicycling, road
- Dog walking
- Geocaching (27 caches as of November 2014)
- Horseback riding
- In-line skating
- Nature study (e.g., bird watching)
- Picnicking
- Running/Jogging
- Skiing, cross-country
- Walking

The DCR solicits concessionaires along the CCRT to enhance visitors' experiences. Currently there is only one concession, a bike rental shop (i.e., Barb's Bike Rental) located in the Route 6A parking lot in Brewster. Bikes are available to rent on an hourly, daily, three-day, or weekly basis between July 4th and Labor Day on days when there is no rain, and on

weekends after Labor Day. Patrons are not provided any information about the park or its regulations.

A second concession, a food cart, was formerly located in the Route 137 parking lot. The previous concessionaire chose to not renew their concession permit in 2014; DCR anticipates soliciting a new concessionaire for this location.

In addition to recreation activities that take place in the park, the CCRT also serves as a connector to other recreation resources in the mid and lower Cape, such as Nickerson state park, Old Colony Rail Trail, beaches, and municipal and non-profit conservation lands.

9.5. INFRASTRUCTURE

Property Boundary

The CCRT has parallel linear or curvilinear boundaries with adjacent properties. These boundaries with private properties are not obviously marked; several encroachments were observed in the fall of 2013.

The DCR owns approximately 17.8 linear miles of the CCRT, several small parcels of land adjacent to the park, and 2.0 miles of undeveloped railroad bed. The town of Orleans owns approximately 1.8 miles of the park, and Cape Cod National Seashore 2.3 miles.

The planned 3.7 mile westward extension of the current CCRT will not be built on DCR lands. DCR

will acquire ownership of portions of the extension following completion of construction.

Buildings and Structures

There are only three buildings in the park. Two are associated with composting toilets, and the third is used as a bike rental concession. (Table 9.5.1) A comfort station is located in the Nickerson day use lot along adjacent to the CCRT; it is covered in Section 8.



Bike rental concession along the CCRT, Route 6A, Brewster. (See Appendix G for photo information.)

Table 9.5.1. Non-historic buildings and structures of the Cape Cod Rail Trail.

Location and Infrastructure ^a	Date ^c	Condition ^b	In Use ^d	Utilities ^e
Brewster				
Bike rental building	1982	3	Y	T
Eastham				
Composting toilet building	-	3	Y	E ^f
Wellfleet				
Composting toilet building	-	3	Y	E ^f

a. By town, from Dennis trailhead to Wellfleet trailhead.

b. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.

c. Date of construction provided, when known.

d. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.

e. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

f. Self-contained composting toilet building with solar-powered vent fan; no other electricity.

Roads

The CCRT has no internal park roads. One municipal road (Gulls Way, Brewster) runs approximately 400 feet through the DCR parking lot at Route 137.

The CCRT passes over, under, and across a variety of public roads. There are 34 road crossings, 29 of which are on DCR-owned portions of the trail. Several road crossings have been identified as having inadequate designs, and design treatments inconsistent with current standards (NPS and CCC 2010). The CCRT also passes over a number of private drives.

Two bridges carry trail users over Route 6, and three underpasses carry them beneath high volume roads. One of these underpasses, at Route 6 in Eastham, requires riders to cycle downhill before making a turn into a tunnel. At least 17 accidents have occurred in this underpass since 2010 (Myers 2014). Stop lines, stop signs, and message boards were installed at both entrances in the fall of 2014 in an effort to increase safety by decreasing the speed of cyclists entering the tunnel. In addition the inside of the underpass was painted white and lighting was added to improve visibility.



Safety issues at the Eastham underpass are currently being evaluated; efforts to increase cyclist awareness to improve safety have been implemented. (See Appendix G for photo information.)

In Orleans, where the CCRT is discontinuous, recreationists must travel approximately 2,000 feet over Salty Ridge and West roads between CCRT segments.

Parking

Parking is extremely limited, with fewer than 200 spaces on the DCR-owned portion of the CCRT. (Table 9.5.2) Designated accessible parking is provided at paved lots in Dennis, Brewster, and Wellfleet. Only the Route 6A lot in Brewster is a pay for parking lot. The number and the width of spaces in these lots meet current ADA and Massachusetts Architectural Access Board requirements; however, access aisles between these spaces do not meet requirements for van accessible spaces (i.e., 64 inches wide versus the required 96 inches).

Table 9.5.2. Number of public parking spaces, by location and type, at DCR-owned portions of the Cape Cod Rail Trail.^a

Location	HP	Other	Total
Dennis trailhead ^b	4	62	66
Depot Street, Harwich ^c	0	8	8
Headwaters Drive, Harwich ^c	0	22	22
Route 137 lot, Brewster ^{b, d}	2	24	26
Route 6A lot, Brewster ^{c, e} (Bike rental lot)	0	20	20
Samoset Road, Eastham ^c	0	4	4
Nauset Road, Eastham ^c	0	9	9
Wellfleet trailhead ^b	2	30	32
Total	8	179	187

- Does not include municipal, MassDOT, or National Park Service parking spaces.
- Number of spaces is based on pavement markings.
- Number of spaces is based on the number of potential 9-foot-wide spaces.
- One additional space, posted “No Parking: Reserved for Vendor,” is also present in the lot but is not included in this table.
- As of 2014 there is a \$5/day parking fee for this lot.

Overflow parking at the Wellfleet trailhead makes it difficult to access marked spaces. The Wellfleet lot is long and narrow, with perpendicular parking on its western side and the travel lane along its eastern side. When the marked spaces are full, visitors parallel park along the eastern side of the lot. This makes movement into and out of available marked spaces difficult, especially designated accessible spaces.



Illegal parking (right) at the Wellfleet trailhead lot makes access to marked spaces difficult. (See Appendix G for photo information.)

Additional parking is available in municipal lots in Orleans at Depot Square and at 251 Rock Harbor Road, and also at the Cape Cod National Seashore’s Salt Pond Visitor Center and Marconi Area. However, parking spaces at the Seashore are unavailable to rail trail users during periods of peak use, as there is currently “inadequate capacity to handle the volume of traffic visiting the Seashore with many visitors unable to access the park safely or conveniently” (NPS and CCC 2010). Pay parking is available at nearby Nickerson State Park, in the day use lot near the park’s entrance.

Trails

The park’s primary trail is a 10-foot-wide paved multi-use path extends through the approximate center of the CCRT along its entire length. It is 17.20 miles long on the DCR-own portion of the rail trail, 1.75 miles long in the town of Orleans, and approximately 2.30 miles long in the CCNS. The width of this path is a DCR design standard intended to provide a recreation travel corridor while maintaining visitors’ park experience.

In late 2014, \$210,000 in repairs and improvements were made to the CCRT. Among the repairs were repaving 43 damaged segments of multi-use path, totaling 4,380 linear feet and restriping road crossings. Both repairs were made to enhance the safety of multi-use path users.

Additional natural surface trails. Connecting the CCRT to adjacent properties, are also present. The extent and condition of these trails is presented in Table 9.5.3.

Table 9.5.3. Condition and length of official trails at the Cape Cod Rail Trail.

Trail Condition	DCR-owned (Miles)	Town of Orleans (Miles)
Good	1.61	0.03
Fair	0.01	0.0
Poor	0.12	0.0
Total	1.74	0.03

- Calculated using a Geographic Information System (GIS).
- Existing GIS data do not differentiate the rail bed from adjacent portions of the CCNS. Because of this, metrics are unavailable for the CCNS portion of the rail trail.

Adjacent to the multi-use path is a grassy shoulder intended for use as a bridle trail; it is not regularly maintained. As a result, equestrians and their horses need to travel along the paved multi-use trail for portions of the CCRT.



The CCRT’s paved multi-use path provides a hardened surface for runners and cyclists, while the grassy shoulders function as bridle trails. (See Appendix G for photo information.)

The CCRT’s trailheads have a unique and stylized design. A red brick walkway connects the parking lot to the path, providing both a visual and tactile transition from lot to path. Multiple seven-foot-long rectangular granite blocks are located to each side of the path, where they both direct riders into the path and serve as benches. A carved granite stone, bearing the inscription “Cape Cod Rail Trail” is located on the right side of each path entrance. Bicycle racks are located near the entrance. Each trailhead also has a kiosk that differs structurally from the DCR standard (see Kiosks and Signs, below).



Standard CCRT trailhead features include a brick apron, stone benches, and engraved stones. (See Appendix G for photo information.)

Kiosks and Signs

There are two types of kiosks; those associated with paved parking lots and those at other locations along the CCRT. Kiosks at paved parking lots are constructed of logs and have wood shingle roofs, creating a rustic appearance. This design is employed at both trailheads and the Route 137 lot in Brewster. Elsewhere on the CCRT kiosks are constructed of standard dimensional lumber and have fiberglass roofing shingles. These are located at the Harwich bike rotary, Nickerson state park trailhead, and the Route 6 overpass in Orleans adjacent to the court house. The Harwich Conservation Trust has a kiosk, similar in appearance to DCR standards, at the Depot Street parking lot in Harwich.



Log-framed kiosk at Wellfleet trailhead; this rustic design is used at paved parking lots along the CCRT. (See Appendix G for photo information.)

In late 2014, 20 “destination and distance” signs were installed along the CCRT.

Iron Ranger

There are no iron rangers.

Memorials and Markers

Mile markers occur along the entire length of the CCRT. These are granite posts with the distance from the trail’s origin (i.e., the Dennis trailhead) and municipality carved into them. As indicated above, carved stones bearing the park’s name are located at both the Dennis and Wellfleet trailheads.

9.6. INTERPRETATION

There is no interpretive programming. The following interpretive waysides are located along the CCRT:

- *Welcome*; Dennis trailhead.
- *River Herring*; Herring River, Harwich.
- *Namskaket Creek*; Brewster-Orleans town line.
- *100 Miles from Boston*; Eastham.
- *Welcome*; Wellfleet trailhead.

These waysides are attached to granite blocks similar in appearance to those used for benches at trailheads.



River Herring interpretive panel along the CCRT, at Herring River, Harwich. The panel’s design and stone mount are characteristic of interpretive materials along the CCRT. (See Appendix G for photo information.)

9.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

The CCRT is managed by MassParks employees from Nickerson on an as available basis. (See Table 7.7.1) There are no employees whose responsibilities are limited to the CCRT.

Partnerships and Volunteers

There are no formal partnerships or volunteer programs. However, the municipalities of Harwich, Eastham, and Wellfleet informally help maintain the CCRT. The Garden Club of Brewster designed and maintains ornamental plantings at the Route 137 lot.

Public Safety

Emergency response services are provided by municipal fire and police department in the towns in which the rail trail is located. National Park Service rangers provide emergency response within the Cape Cod National Seashore.

Funding

Conservation Trust Fund

There are no trust funds.

Retained Revenue

The concession fee associated with the bike rental concession in Brewster contributes toward DCR's overall retained revenues. In the past, additional revenue was generated from a food concession along the trail; it no longer exists.

Other Revenues

This park does not generate other revenues.

9.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs (e.g., Table 9.3.2), legal agreements, and institutional knowledge. This section describes those practices unique to the management of the Cape Cod Rail Trail.

There is no overarching management agreement for the rail trail; nor are there agreements with individual municipalities regarding its management.

Legal agreements relevant to the CCRT are listed in Table 9.8.1.

Table 9.8.1. Key legal agreements for the Cape Cod Rail Trail.

Party and Subject of Agreement	Type^a	Expiration Date^b
Barnstable County Commissioners Easement for access path to CCRT through county courthouse property in Orleans.	E	None
Town of Orleans Easement to allow for construction of bike path retaining wall on Town property.	E	None
National Park Service Operation of the CCRT within the Cape Cod National Seashore.	U	2025
Rob Slavin dba Cobies Restaurant Erection of advertising sign and split rail fence.	U	2011
Harwich Conservation Trust Create and maintain access to CCRT at Hacker sanctuary.	U	2011

- Agreement types include: A=Memorandum of Agreement; E=Easement; L=Lease; and U=Memorandum of Understanding.
- Year that agreement expires. Permanent agreements are indicated by an expiration date of "None."

Key management and guidance documents are identified in Table 9.8.2.

Table 9.8.2. Key management and guidance documents for the Cape Cod Rail Trail.

Author and Document	Year
Massachusetts Department of Environmental Management. Roland C. Nickerson State Park. GOALS plan.	1993
Gannett Fleming, Inc. Environmental Audit Report: Cape Cod Rail Trail, Dennis to Wellfleet, Massachusetts.	2000

Non-DCR guidance documents related to the CCRT include the following:

- Bicycle Feasibility Study (NPS and CCC 2010)
- Regional Transportation Plan (CCC 2013)
- The towns of Dennis and Yarmouth Cape Cod Rail Trail extension (Vanasse Hangen Brustlin, Inc. and Camp Dresser & McKee, Inc. 2007)

Annual Maintenance

Ongoing management practices typically follow a regular schedule. Common activities, and the desired frequency with which they occur, are identified in Table 9.8.3. Performance of these activities is dependent on staff availability. Because maintenance of the CCRT is performed by the staff of Nickerson on an as available basis, deviations from this schedule occur.

Table 9.8.3. Annual cycle of management activities for the Cape Cod Rail Trail.

Activity	Spring ^a	Summer ^a	Fall ^a	Winter ^a
Cleaning - Walkways	AN	AN	AN	N/A
Litter removal - Recreation areas	AN	AN	AN	AN
Litter removal - Trails	AN	AN	AN	AN
Maintenance - Picnic sites, fences, etc.	AN	AN	AN	N/A
Mowing and trimming	AN	AN	AN	N/A
Pruning - Trees and shrubs	AN	AN	AN	AN
Sweeping - Walkways	AN	AN	AN	AN
Trash - Empty - Barrels	AN	AN	AN	AN
Weeding - Flower beds and grassy areas	N/A	N/A	N/A	N/A
Weeding - Paved areas	N/A	AN	N/A	N/A

a. Frequency codes are: AN = As needed; D = Daily, # times; E = Every # days; N/A = Not applicable.

Natural Resources

Water Resources

The Massachusetts Division of Ecological Restoration monitored water levels in Namskaket Marsh from July through October, 2013 in order to assess if and when tidal flow through two culverts should be regulated. Insufficient information was generated to develop management guidance; additional data collection may occur.

The USGS has installed at least eight monitoring wells along the south side of the trail, in the vicinity of Namskaket Creek and marsh. These wells are used to monitor the movement of a plume of nitrogen through the groundwater beneath this section of the trail (Weiskel 2011, Weiskel et al. 1996).

Rare Species

Although construction projects in Priority Habitat have been reviewed by NHESP, ongoing operation and maintenance activities have not.

Similarly, potential impacts to rare species have been assessed for construction of the 3.7 mile westward extension of the CCRT (NHESP File No. 10-280-11), but potential impacts of future operation and maintenance activities have not.

Invasive Species

There are no monitoring or management activities.

Vegetation

Edges of the paved multi-use path are mowed by Nickerson personnel as staffing and resources allow. The town of Harwich mows the path edges around the bike rotary, adjacent portions of the CCRT, and the Old Colony Rail Trail. They also empty trash barrels at the bike rotary.

Cultural Resources

Portions of the CCRT in Brewster and Orleans are within the Old Kings Highway Regional Historic District. Changes in the exterior of buildings, structures, fences; new construction; and demolition are subject to review by the Old King's Highway Historic District Committee.

Recreation Resources

There are no regular patrols to monitor recreation on the CCRT.

Hunting and trapping are specifically prohibited under DCR's Parks and Regulation Rules (302 CMR 12.11(3)).

Infrastructure

Buildings

Minor maintenance of the bike rental concession building is provided by the concessionaire. Ongoing maintenance and management of composting toilet buildings is provided by employees of the municipalities in which the buildings are located (e.g., Eastham or Wellfleet).

Roads

There are no internal park roads to manage.

Parking Areas

Parking areas are not plowed in the winter.

Trails

The multi-use path is not plowed in the winter.

Kiosks and Signs

There is no active management of DCR kiosks. This has led to their use as public bulletin boards for advertising local businesses and civic events.

9.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of the CCRT. Applied Land Stewardship Zoning recommendations provide general guidance for management. Future activities and projects should be checked against these recommendations for consistency. Management recommendations are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning

The following Land Stewardship Zoning is recommended for the Cape Cod Rail Trail. Due to the linear nature of the CCRT and the scale of maps used in this RMP, there is no Land Stewardship Zoning map for this park.

Zone 1

No sections of the CCRT have been designated Zone 1.

Zone 2

Areas designated Zone 2 include:

- The CCRT, excluding existing and potential parking areas, has been designated Zone 2.
- Former railroad right of way in Wellfleet, from the Lecount Hollow Road, north to Route 6 for the possible northward extension of the CCRT.

Zone 3

Most areas designated Zone 3 are currently developed and in use. This includes:

- 0 Rail Trail Siding, off Route 134, Dennis; existing trailhead parking lot.

- 0 Bike Path, off Headwaters Drive, Harwich; existing parking lot.
- 0 South of Lecount Hollow Road, Wellfleet; existing trailhead parking lot.

Existing parking lots with the *potential* for expansion have also been designated Zone 3. This includes:

- 493 Depot Street, Harwich. This parcel contains an existing gravel lot. The entire parcel is designated Zone 3.
- 0 Long Pond Road, Brewster, south of Route 137. The entire parcel is designated Zone 3.
- 0 Main Street, Brewster. This is the location of the bike rental building. The building, existing lot, and undeveloped areas adjacent to the existing lot have been designated Zone 3.
- Nauset Road, Eastham. This includes a road shoulder, approximately 30-feet by 200-feet, for the possible expansion of an existing gravel lot.

Finally, the following areas may be appropriate for future development; they have also been designated Zone 3:

- 0 Long Pond Road, Brewster, north of Route 137; for the possible creation of a parking lot.
- 0 LeCount Hollow Road, Wellfleet, north of the existing Wellfleet trailhead; for the possible creation of a parking lot.
- 2516 State Highway, Route 6, Wellfleet. This is the northernmost piece of DCR-owned rail bed; for the possible creation of a parking lot if the CCRT is extended to Route 6.

None of the potential expansions of existing facilities or potential future developments, as indicated above, are proposed at this time. Full regulatory review, including public input, will occur if specific additional development is proposed.

Significant Feature Overlay

The following Significant Feature Overlay was developed:

- **Multi-Use Path Significant Feature Overlay**. This overlay includes the existing multi-use path and adjacent vegetation within 10-feet of either side of that path. Areas within this overlay are managed for recreation purposes. In contrast, areas outside of this

overlay are primarily managed for their cultural and natural resource values, in order to protect and promote a park aesthetic and visitor experience.

Management Recommendations

Thirteen priority management recommendations were developed for the Cape Cod Rail Trail. (Table 9.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.

- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

Table 9.9.1. Priority recommendations for the Cape Cod Rail Trail.

Recommendation	Implementation ^a
Obtain data needed to regulate Namskaket Creek culverts in order to balance marsh management with prevention of damage to real and personal property. Develop management guidelines, submit for regulatory review, and implement.	C, O, P, R
Submit ongoing maintenance activities to NHESP for regulatory review under the Massachusetts Endangered Species Act; include proposed maintenance activities for the 3.7 mile Dennis-Yarmouth extension.	P, R
Assess all intrusive work proposed adjacent to or near the multi-use trail for potential impacts to archaeological resources, especially in undeveloped areas.	C, P
Re-establish and maintain bridle trail along the edge of the entire multi-use path to minimize equestrian's need to enter the path.	R
Investigate potential encroachment along the CCRT and resolve with abutters, if warranted.	L, R
Repaint HP spaces and associated aisles in the Dennis, Wellfleet, and Route 137 parking lots in order to meet current standards for van accessible spaces.	C, R, U
Paint pavement and post No Parking signs opposite accessible spaces in the Wellfleet trailhead parking lot.	C, R, U
Identify options for expanding authorized parking at existing lots, and the potential creation of new parking lots.	C, P, R
Inventory road crossing markings and signs; install or update to meet current safety standards.	C, E, P, O
Implement recommended safety measures at the Eastham underpass and elsewhere along the trail.	C, E, R
Actively promote trail user etiquette and safety.	B, R, V
Following completion of the Dennis to Yarmouth extension, prepare a master plan for the entire CCRT.	C, P
Re-establish lapsed MOUs with abutters.	L, R

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning and Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.



Artist Todd McGrain's heath hen sculpture; located along the bike path at Manuel F. Correllus State Forest. (See Appendix G for photo information.)

SECTION 10. MANUEL F. CORRELLUS STATE FOREST

10.1. INTRODUCTION

Manuel F. Correllus State Forest is located in the towns of Edgartown, Tisbury, and West Tisbury, in the center of Martha's Vineyard. (Figure 10.1) It is accessed from a variety of roads, with its headquarters located off Sanderson Road, Edgartown.

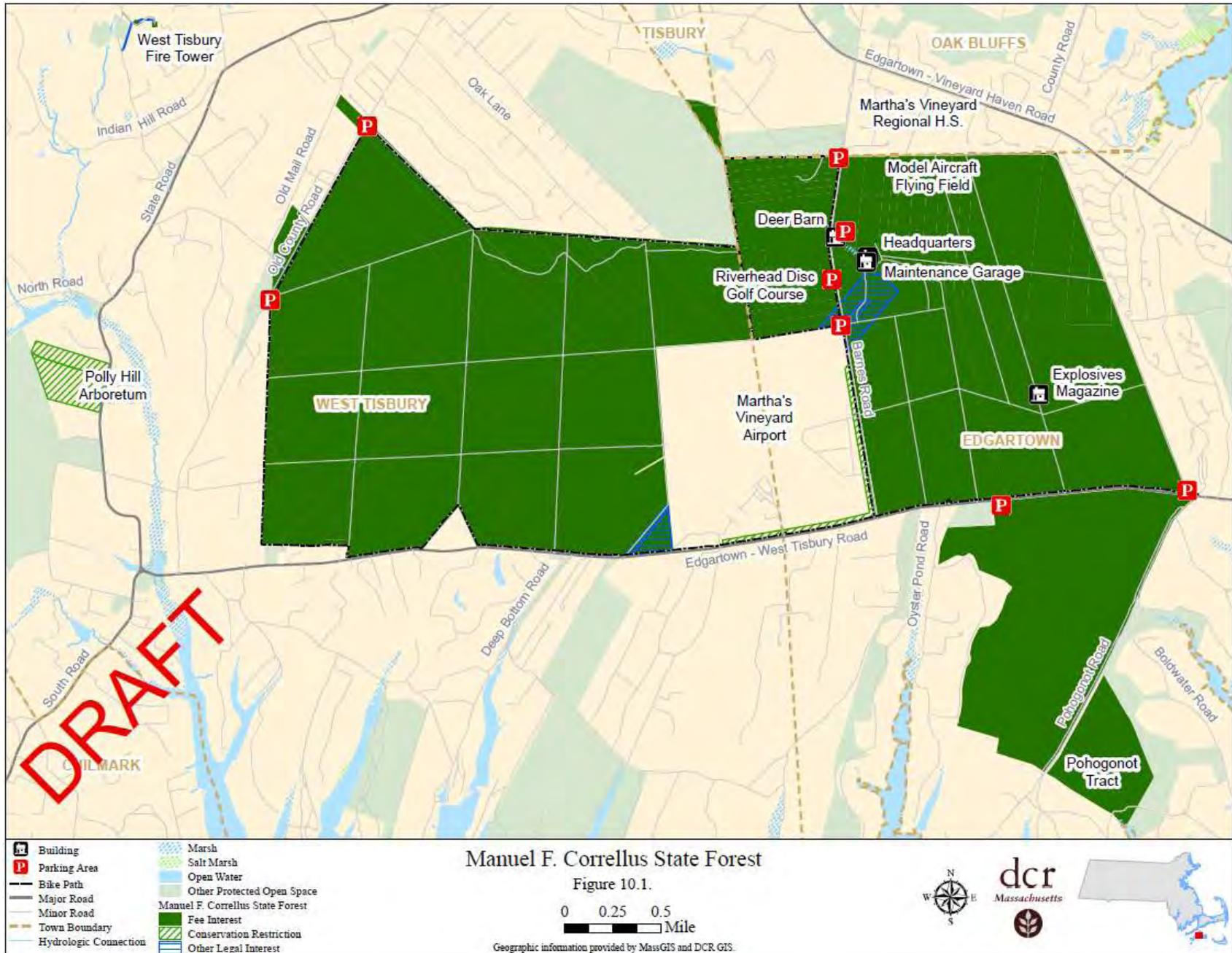
Today's Correllus began as two separate properties, each managed by a different state agency. In 1908 the Massachusetts Fish and Game Commission acquired 612 acres to create a reservation for the heath hen, a native prairie chicken on the verge of extinction. Eight years later, the Division of Forestry acquired 15 acres north of the reservation. Over the next decade Martha's Vineyard State Forest, as it was then called, expanded to approximately 4,000 acres. In 1939, seven years after the last observation of a heath hen, the reserve was incorporated into the state forest. In 1987 Martha's Vineyard State Forest was renamed in honor of Manuel F. Correllus, who worked there from the 1920s through 1980s, including 39 years as forest supervisor.

Forest management at Correllus traditionally focused on growing marketable timber and reducing

the risk of wildfire. A variety of native and non-native conifers were planted from the 1920s through 1990. In 1991, Hurricane Bob caused extensive damage to over 400 forested acres, mostly conifer plantations, greatly increasing the potential for a catastrophic fire. This led to a reexamination of forest resources and management goals. Instead of marketable timber, emphasis was placed on ecosystem management; reduction of fire risk was to be achieved by removing conifer plantations and maintaining firebreaks in a manner consistent with protecting rare species.

Correllus is one of the DCR's most significant properties for rare species conservation (NHESP 2008). It is also the single largest tract of undeveloped land on Martha's Vineyard, and a key part of the Island's conservation network. The emphasis on conservation that began with the heath hen continues today with protection of the forest's coastal sandplain communities and associated rare plants and animals.

Although significant to rare species conservation, the forest is perhaps better known for its bike path, hunting, and disc golf.



The forest’s physical, political, and regulatory attributes are summarized below. (Table 10.1.1)

Table 10.1.1. Physical, political, and regulatory settings of Manuel F. Correllus State Forest.

Setting	Name or Metric
Location:	Edgartown, Tisbury, West Tisbury
Area (acres)^a:	5,192.41
Perimeter (miles)^a:	26.73
Landscape Designation(s)^b:	Reserve, Parkland
Legislative Districts:	
House	Barnstable, Dukes, and Nantucket
Senate	Cape and Islands
Regulatory Designations:	Priority Habitat
	Martha’s Vineyard State Forest DCPC ^c
	Island Harbors and Highways DCPC ^c
	Island Road DCPC ^c
	Martha’s Vineyard Lawn Fertilizer Control DCPC ^c

- a. Calculated using a Geographic Information System (GIS).
- b. For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.
- c. Chapter 831 of the Acts of 1977 established the Martha’s Vineyard Commission and allowed for the creation of Districts of Critical Planning Concern (DCPC).

Associated Properties. The Correllus Forest and Park Supervisor manages all MassParks properties on The Islands. This creates an operational connection between Correllus and Sylvia State Beach (Section 11), South Beach (Section 12), and Nantucket State Forest (Section 13). Correllus staff also assists Bureau of Fire Control and Forestry personnel with their management of the West Tisbury Fire Tower property (Section 15).

10.2. Natural Resources

Physical Features

Correllus is located atop a glacial outwash plain. Because this plain formed south of the farthest reach of ice, no ice blocks were stranded on the plain, and no kettle hole ponds formed (Skehan 2001). In general, there is a trend of decreasing elevation from north to south. Elevations range from approximately 80 feet along portions of the parks northern boundary to sea level at Jobs Neck Cove.

A series of north-south oriented depressions, referred to as “bottoms,” straddle Edgartown-West Tisbury Road. All terminate in coastal ponds or coves. The physical structure of these bottoms produces microclimates different from the rest of the forest.

Water Resources

Surface water resources are nearly absent from Correllus, with only one pond (i.e., Little Pond) and no flowing waters. (Table 10.2.1)

Table 10.2.1. Water resources of Manuel F. Correllus State Forest.

Water Resource	Name or Metric
Watershed:	Islands
Aquifer:	Martha’s Vineyard SSA
Lens	N/A
Rivers and Streams (miles)	0.00
Vernal Pools	
Certified (#)	0
Potential (#)	1
Wetlands (acres)^a	1.38
Lakes and Ponds (acres)^a	0.00

- a. MassDEP classifies Little Pond as a wetland and not as open water. These metrics reflect that classification.

Its elevation and distance from the ocean generally results in low susceptibility to flooding, storm surge, and anticipated sea-level rise. (Table 10.2.2) The exception to this is the southeast corner of the Pohogonot Tract, where the forest contacts Jobs Neck Cove. Portions of Jacob’s Neck Road, a municipal road that passes through the Pohogonot Tract, are within the 100 and 500 year flood zones. There is no DCR infrastructure at this location.

Table 10.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise on Manuel F. Correllus State Forest.

Type of Impact	Acres	%
Flooding:		
100-year Storm	2.47	0.05
500-year Storm ^a	5.15	0.10
Hurricane Inundation:		
Category 1 Storm	1.18	0.02
Category 2 Storm ^b	7.16	0.14
Category 3 Storm ^b	16.51	0.32
Category 4 Storm ^b	27.00	0.52
Sea Level Rise	0.00	0.00

- a. Cumulative value; includes 100-year storm impacts.
- b. Cumulative value; includes impacts of all lower category storms.

Most Vineyard residents, and all municipal wells, draw their water from the Outwash Plain Aquifer, a portion of the Martha's Vineyard SSA (MVC 2010). The forest serves as a recharge area for this aquifer, and is part of the Zone II wellhead protection areas associated with several municipal wells in Oak Bluffs and Edgartown

Rare Species

State-listed Species

Thirty-four state-listed species are known from the state forest; one is also federally listed. (Table 10.2.3) Many of the rare plants are associated with the forest's fire breaks, and rare moths with the pine barrens communities.

Priority Habitat

Most of the forest (90.07%) has been designated Priority Habitat under MESA. Exceptions include the forest headquarters area, a portion of the disc golf course, and areas of conifer plantations.

Vegetation

Despite its significance as rare species habitat and its repeated use as a site of ecological research, there has been no comprehensive floristic inventory specific to Correllus. Several researchers have documented vegetation associated with specific field studies. For example, Clarke (2006) listed 144 plant taxa encountered while researching associations between rare plants and disturbance in the forest.

An overview of the Island's flora is presented in Spongberg (2008).

Invasive Species

Five species of invasive plants, and one likely invasive plant, have been incidentally observed (Table 10.2.4). An unidentified species of honeysuckle, with the potential to be invasive, has also been observed (Patterson et al. 2005). The occurrence of invasive plants at Correllus is "strongly related to fire lane management practices and proximity to the exterior of the forest acting in concert" (Patterson et al. 2005).

Table 10.2.3. State-listed species of Manuel F. Correllus State Forest, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d
Barrens buckmoth	I	SC
Barrens daggermoth	I	T
Barrens metarranthis	I	E
Bayard's green adder-mouth	I	E
Chain dot geometer	I	SC
Coastal heathland cutworm	I	SC
Coastal swamp metarranthis	I	SC
Common tern	B	SC
Cow path tiger beetle	I	SC
Data-sensitive plant ^{e, f}	P	E
Dune noctuid moth	I	SC
Eastern whip-poor-will	B	SC
Faded gray geometer	I	T
Gerhard's underwing	I	SC
Grasshopper sparrow	B	T
Grass-leaved ladies'-tresses	P	T
Imperial moth	I	T
Lion's foot	P	E
Melsheimer's sack bearer	I	T
Northern harrier	B	T
Papillose nut sedge	P	E
Pine barrens lycia	I	T
Pine barrens speranza	I	SC
Pine barrens zale	I	SC
Pink sallow moth	I	SC
Purple needlegrass	P	T
Sandplain blue-eyed grass	P	SC
Sandplain euchlaena	I	SC
Sandplain flax	P	SC
Sandplain heterocampa	I	T
Slender clearwing sphinx moth	I	SC
Southern ptichodis	I	T
Unexpected cynnia	I	T
Waxed sallow moth	I	SC

a. Presented alphabetically, by common name.

b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.

c. Types of state-listed species include: B = Bird; I = Insect; and P = Plant.

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

e. This species is also federally listed.

f. The name of this species is not released in accordance with NHESP's policy of not revealing in site-specific documents the name or location of rare species susceptible to collection.

A 2003-2004 survey of firebreaks found invasive plants to occur in fire lanes that had not undergone recent management and forested areas near the perimeter, “especially at points of entry to the forest” (e.g., along roads and bike paths, and near the forest headquarters) (Patterson et al. 2005). Invasives are also associated with areas of soil disturbance due to storm damage and salvage logging (Foster and Motzkin 1999). A list of known Invasive and Likely Invasive plants is provided in Table 10.2.4. In addition, chee reedgrass and a non-native heather have also been observed in the forest. These species were not evaluated by MIPAG (2005), but have life history traits consistent with invasive plants.

Table 10.2.4. Known invasive and likely invasive plants of Manuel F. Correllus State Forest.

Species	Status ^a	Source ^b
Autumn olive	I	1
Black locust	I	1
Multiflora rose	I	1
Norway Maple	I	2
Oriental bittersweet	I	1
Spotted knapweed	L	3

- a. Presented alphabetically, by common name.
- b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).
- c. Information contained in this table was obtained from the following sources:
 1. Patterson et al. (2005)
 2. P. Gregory, personal communication.
 3. Simmons (2014)

Natural Communities

There has been no comprehensive survey of natural communities. However, some community types have been identified. (Table 10.2.5)

The Island’s vegetation differs from that elsewhere in the Complex, and Correllus may contain natural communities not yet described for Massachusetts (Swain 2014, personal communication). For example, the Pohogonot section contains a scrub oak shrubland with a tree oak canopy that does not fit any currently described community type (Swain and Kearsley 2011).

Table 10.2.5. Known natural communities of Manuel F. Correllus State Forest.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Cultural Grassland ^e	T	-	1
Pitch Pine – Scrub Oak	T	S2	1
Sandplain Grassland	T	S1	2
Sandplain Heathland	T	S1	2
Scrub Oak Shrubland	T	S1	2
Shrub Swamp	P	S5	3

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from the following sources:
 1. RMP Planner.
 2. Clarke (2006)
 3. DEP Wetlands (1:12,000) data layer.



The vegetation at the Pohogonot tract may represent a natural community as yet unclassified by the NHESP. (See Appendix G for photo information.)

Several efforts have been made to classify the forest’s vegetation. Mouw (2002) used seven categories, including two types of plantations. Neill et al. (2007; Table 1) used six categories. Neither described their classifications as natural communities. Spongberg (2008) classified all of the vegetation on Martha’s Vineyard into 27 plant communities: 13 terrestrial, seven palustrine, four estuarine, and three aquatic. Most recently, The Nature Conservancy (TNC) has mapped the “General Habitats” of the Vineyard as part of its Vineyard Habitat Network (TNC 2014). Some are equivalent to natural communities as described by Swain and Kearsley (2011), others are not.

Forests

Much of Correllus (49.56%) is forested. Tree oaks, including white, black, and post oak, are the most common forest cover type. Other common stand types include pitch pine, white pine, and scrub oak. Approximately 716 acres of white and Norway spruce, white and Scot's pine, and Japanese larch plantations remain from past forestry activities. Non-forested areas are shrublands, heathlands, or grasslands; many of which are associated with fire breaks.

Information on the historic land uses and management practices that have shaped today's forest is presented in Foster and Motzkin (1999).

Wildlife

Information on the forest's birds and mammals was included in Whiting (1976); this information should be considered historic and may not represent current species diversity.

White-tailed deer were the "major game species found in the state forest" in 1976 (Whiting 1976); they remain so today.

Only 28 species of birds were reported in eBird (www.ebird.org) as of November 2014. This includes ring-necked pheasant, which are stocked by the DFG for hunting.

The species of wildlife most closely associated with the forest, the heath hen, went extinct in 1932. Preservation efforts and the ultimate extinction of this species have been well documented in both the scientific and popular literature (e.g., Field 1908, Forbush 1912, Edey 1998). A memorial and statue commemorate this species' connection to the forest and Martha's Vineyard.

Information on the forest's rare insects may be found in Goldstein (1992, 1994).

Information on the Island's wildlife, not specific to Correllus, is presented in Keith and Spongberg (2008).

10.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic landscapes, buildings, structures, and objects. An overview of significant events in the history of

Correllus is presented in Table 10.3.1. Information on the forest's cultural resources is presented in Table 10.3.2.

Archaeological Resources

Three archaeological surveys have been conducted in or adjacent to Correllus. Although no freshwater sources were immediately adjacent to the forest, Native Americans could have used the area for short term habitation or resource collecting. No cultural materials were recovered during any of the surveys, however the forest must be considered moderately sensitive for pre-Contact sites.

Historic Resources

The land comprising the park was sparsely settled or farmed by Europeans from the 17th century onward due to the poor quality of the soil. In 1908, much of the area was incorporated into a Heath Hen Reserve, a sanctuary created to prevent that species' extinction. Unfortunately, by 1932 the last heath hen, "Booming Ben," had disappeared from the forest and the species was officially classified as extinct. CCC Camp S-57 (Co. # 106) was established at the forest in 1933 and closed in 1934. During that year the CCC continued the conifer planting that had started on the property in the 1920s and would continue into the mid-20th century. The evidence of the plantation roads and firebreaks survive to the present and define the character of the park with its transposed grid of uniform plantation units.

Historic Landscapes

Forest Headquarters. The forest headquarters is located in the northeastern quarter of the facility at a clearing at the intersection of Barnes Road, the main north-south road through the park, and Dr. Fisher Road, a historic main east-west cross island route. The centerpiece is the farmhouse (Headquarters), built between 1886 and 1900. A wooden shed is located adjacent to the house, is associated with the management of the Heath Hen Reserve and once served as the office of Manuel F. Correllus. Stone piers flank the east entry drive to the farmhouse, however, only the shed remains of the former farmstead's outbuildings. A drive leading to the house from the northeast appears to be purposefully planted with conifers; more research is required to determine when the approach was established. The

Table 10.3.1. Significant events in the history of Manuel F. Correllus State Forest.

Year(s)	Events
1908	Heath hen reservation established with the purchase of 612 acres. (Chapter 132 of the Acts of 1907)
1916	Division of Forestry purchases 16 acres northwest of heath hen reservation and constructs a fire tower. The tower was dismantled in 1928 and replaced in 1930.
1925	Division of Forestry takes 1,040 acres of land abutting the heath hen reservation through eminent domain. An additional 2,832 acres are added the following year.
1933-1934	Civilian Conservation Corps (CCC) is active in forest, building barracks, planting trees, and performing release cuttings. By 1939 all CCC buildings have been taken down.
1939	Heath hen reservation turned over to the Bureau of Forestry. (Chapter 132 of the Acts of 1939)
1942	U.S. Navy takes 683 acres of the forest to create Naval Auxiliary Air Facility Martha's Vineyard, now the Martha's Vineyard Airport.
1946	Fire tower declared a hazard to navigation and ordered dismantled by the U.S. Navy.
1954	Portion of forest transferred to the Martha's Vineyard Regional School District. (Chapter 483 of the Acts of 1954)
1962	Two and one-half miles of nature trails opened.
1970	The County of Dukes County is granted two easements, 4.2 and 44.2 acres in area, to allow for "the unobstructed and unrestricted flight of aircraft to and from the airport." (Chapter 762 of the Acts of 1970) An additional easement was granted in 1977 for the installation, construction, maintenance, and operation of a Medium Approach Light System. (Chapter 901 of the Acts of 1977)
1973-1974	Bike paths constructed.
1974	Eight hundred and one acre Pohogonot tract (i.e., Hazy Acres) acquired. In 1995, a 25-year Cooperative Management Agreement is developed with The Nature Conservancy to manage this property.
1986	DEM conveys the Greenlands Parcel (2.2. acres) to the town of West Tisbury in exchange for a 13 acre parcel of municipal land.
1987	Martha's Vineyard State Forest is renamed Manuel F. Correllus State Forest.
1996	Conservation Restriction acquired on Polly Hill Arboretum.

Table 10.3.2. Cultural resources of Manuel F. Correllus State Forest.

Location and Resource ^a	Type ^b	Date ^c	Condition ^d	Integrity ^e	In Use ^f	Utilities ^g	MHC # ^h	Guidance ⁱ
Four town bound (boundary marker)	OB	After 1880	-	H	-	-	-	1
Headquarters Area								
Headquarters landscape	LA	ca. 1900	-	M	-	-	-	1, 2
Forest headquarters	BU	1886	3	H	Y	E, H, I, S, T, W	-	3
Shed (heath hen)	BU	ca. 1908	5	H	N	-	-	3, 4
Deer barn	BU	1896	4	H	Y	E	-	3
CCC Camp	AR	1936-1940	-	L	-	-	-	1, 5
Additional Resources^j								
<i>Historic roads/cart paths</i>	RD	-	-	U	-	-	-	1
<i>Farmhouse sites (multiple)</i>	AR	-	-	U	-	-	-	5

- a. Geographic sub-regions of the forest are identified in Figure. 10.1.
- b. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- c. Date of construction provided, when known.
- d. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- e. Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- f. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- g. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- h. Massachusetts Historical Commission inventory number.
- i. The following guidance is offered for the ongoing maintenance of these cultural resources:
 1. Refer to Historic Landscapes - Built Features BMP (DCR n.d.g).
 2. Refer to Vegetation in Historic Landscapes BMP (DCR n.d.h).
 3. Refer to Historic Building Maintenance BMP (DCF n.d.i).
 4. Refer to Mothballing Historic Buildings BMP (DCR n.d.j).
 5. Refer to Archaeological Features BMP (DCR n.d.k).
- j. Documented through the 1984/1985 Cultural Resources Evaluation Project but not yet field verified or confirmed.

area retains its integrity as an administrative center of the Reserve and later the State Park.



The forest headquarters building is the center of a historic landscape dating to the late 1800s. (See Appendix G for photo information.)

Buildings

A storage barn, currently used in season as a deer check station, is located west of the Headquarters landscape and may be associated with the farmhouse.

Structures

There are no historic structures located in the park.

Objects

A unique stone four-town boundary marker, the “four town bound,” is located in the northeast corner of the park. The marker notes the intersection of Tisbury, West Tisbury, Edgartown, and Oak Bluffs. The boundary was placed during or after 1892, the year West Tisbury became the last of the four towns to be incorporated.

10.4. RECREATION RESOURCES

The following recreation activities take place at Correllus:

- Bicycling, mountain
- Bicycling, street (bike path)
- Cross-country skiing
- Disc Golf
- Dog walking
- Flying model airplanes
- Geocaching (2 caches as of November 2014)
- Hiking

- Horseback riding
- Hunting
- Nature study
- Walking/Running

There are three developed recreation facilities, they are:

- Bike (i.e., multi-use) path
- Martha’s Vineyard Riverhead Disc Golf Course
- Model aircraft flying field

See Trails, below, for information on the bike path.

The disc golf course covers approximately 42 acres. It is located west of Barnes Road, north of the airport. (Figure 10.1) It was constructed in 1997.



Riverhead Field Disc Golf Course at Correllus. (See Appendix G for photo information.)

A model aircraft field occupies 3.8 acres of fire break (Fire Lane A, Gate 8) immediately south of the Martha’s Vineyard Regional High School’s (MVRHS) athletic fields. It was established in 2006.

There are no user statistics for any of these facilities.

The Martha’s Vineyard Horse Council has expressed interest in establishing an “equine cross-country course” along the fire roads in the southwest corner of the forest. As of this writing, the request remains under consideration.

10.5. INFRASTRUCTURE

Property Boundary

The main portion of the forest is bounded on the south by Edgartown-West Tisbury Road; and on all other sides by firebreaks and/or a paved bike path. These boundaries are easily identifiable.

The Pohogonot Tract is bounded on the north by Edgartown-West Tisbury Road and by Pohogonot Road along a portion of its eastern boundary. Most of the tract borders private lands. All boundaries have been marked.

The portion of the forest in Tisbury is bounded on the north by Checamo Path, municipal lands, and private lands. Its boundaries have not been marked.

Buildings and Structures

There are relatively few recent buildings and structures; most are historic (Table 10.3.2). The only two non-historic buildings on the property are a garage and storage shed (Table 10.5.1) A 42 foot by 72 foot, 3-bay garage is located south of forest headquarters. It is sheathed in untreated cedar shingles to match the nearby historic buildings. The garage includes an office, bathroom, shop, storage loft, and three vehicle bays. One vehicle bay and the office are used by Bureau of Fire Control and

Forestry staff; the rest of the building is used by the Forest and Park Supervisor. This building is infrequently used for forest-related public meetings. A 10-foot by 12 foot metal storage shed abuts the garage's south side.



Correllus' maintenance garage is used for forest operations and fire control. (See Appendix G for photo information.)

The Massachusetts Department of Transportation has expressed interest in locating a maintenance facility within the forest, in or near the headquarters area. As of this writing, the request is under consideration.

Table 10.5.1. Non-historic buildings and structures of Manuel F. Correllus State Forest.

Location and Infrastructure	Date ^a	Condition ^b	In Use ^c	Utilities ^d
Headquarters Area				
Maintenance garage	2003	2	Y	E, H, S, T, W
Metal shed	-	2	Y	-
Barnes Road				
Airport navigation lights and towers (6) ^e	1980	-	Y	E
Gate 3				
Explosive magazine ^e	2009	-	Y	E ^f

a. Date of construction, if known.

b. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.

c. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.

d. The following codes are used to identify utilities associated with buildings: E = Electric; H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

e. Infrastructure located on DCR property, but not owned or controlled by the DCR. Its condition is not assessed.

f. Solar derived electricity.

The forest's other non-historic infrastructure is not owned by the DCR. Airport navigation lights, belonging to the Martha's Vineyard Airport Commission are located south of the forest headquarters, in line with Runway 24. The other privately owned structure is an explosives magazine owned by UXB International, Inc., of Blacksburg, Virginia (UXB International, Inc. 2010). It is used to store explosives associated with detonating ordnance identified during the cleanup of South Beach State Park. (See Section 12 for additional information.) This magazine has a total maximum net explosive weight of 100 pounds.



Magazine used to store explosives associated with the cleanup of military ordnance from South Beach. (See Appendix G for photo information.)

Roads

There are approximately 34 miles of roads. The conditions of these roads are summarized in Table 10.5.2.

Table 10.5.2. Condition and length of roads at Manuel F. Correllus State Forest.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	0.75	3.17
Fair	0.00	29.53
Poor	0.00	0.45
Total	0.75	33.15

a. Based on field assessment; all distances calculated using GIS.

Paved roads are limited to the forest entrance and headquarters area. Two municipal roads, Barnes Road and Edgartown-West Tisbury Road, pass through the forest.

Parking

There are eight public parking lots. (Table 10.5.3) Five are associated with the bike trail; they are located on Barnes Road, Old County, and Edgartown-West Tisbury roads. (Figure 10.1) These paved lots have a combined capacity of 52 vehicles; there are no accessible spaces. Gravel lots are located at the deer barn, disc golf course, and on the Pohogonot Tract. The latter, although within the forest, provides access to The Nature Conservancy's David H. Smith Preserve. There is no accessible parking at these lots.

Table 10.5.3. Number of public parking spaces, by location and type, at Manuel F. Correllus State Forest.

Location	HP	Other	Total
Barnes Road - North ^a	0	12	12
Deer Barn ^a	0	4	4
Barnes Road – Dr. Fisher Road ^a	0	9	9
Riverhead Disc Golf Course ^a	0	30	30
Old County Road – North ^a	0	12	12
Old County Road – South ^a	0	8	0
Edgartown – West Tisbury Road ^a	0	11	11
David H. Smith Preserve ⁱ	0	6	6
Edgartown – West Tisbury Road ^a			
Total	0	84	84

a. Number of spaces is based on the number of potential 9-foot-wide spaces.

Employees park adjacent to the forest headquarters or garage.

Recreationists using the model airplane flying field park off-property, in a lot associated with the MVRHS athletic fields.

Trails

There are three types of recreational trails: paved bike path; fire lanes, and natural surface single- and double-track trails.

There is a total of 13.63 miles of paved bike path in the forest. The initial path was constructed in 1973 and 1974. It follows the perimeter of the portion of the forest west of Barnes Road. A spur along Edgartown-West Tisbury Road, constructed in 1996 connects it to the municipal bike path in Edgartown.

The fire lanes and single and double track trails are both unpaved. Fire lanes vary in width from approximately 15 to 200 feet; all have vehicle travel lanes useful for recreation. The extent and condition

of the forests' trails, not including the bike path, are identified in Table 10.5.4.

Table 10.5.4. Condition and length of official trails at Manuel F. Correllus State Forest.

Trail Condition	Length (Miles)
Good	6.90
Fair	15.10
Poor	0.63
Total	22.63

a. Based on field assessment; all distances calculated using GIS.

A “Fire Interpretive Trail” is located on the TNC’s David H. Smith Preserve; it originates at the parking lot on DCR’s Pohognot Tract.

Kiosks and Signs

Kiosks are located at the deer barn, Riverhead Field Disk Golf Course, and the David H. Smith Preserve; all are adjacent to parking lots. Only the first is a DCR kiosk; the latter two are privately owned and maintained. A Main Identification Sign is located at the intersection of Barnes Road and Sanderson Ave. It is the “suitable marker” required by Chapter 41 of the Acts of 1987.

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are two known memorials; both in honor of the heath hen. A stone bearing a metal plaque that describes the bird’s path to extinction is located along the bike path at Gate 18. A “human-scale” bronze heath hen statue is located along the bike path between Gates 18 and 19. Part of sculptor Todd McGrain’s Lost Bird Project, the statue was intended to “capture the presence of the birds, to make them personal and palpable, and to remind us of their absence.” Additional information on this sculpture, and the Lost Bird Project, is available at <http://www.lostbirdproject.org/>.

10.6. INTERPRETATION

There is currently no interpretive programming, guides, or trails. The following interpretive panel is located adjacent to the heath hen statue.

- The Heath Hen’s Lasting Legacy.

Temporary interpretive signs are placed along trails in areas where forest management has taken place.

These signs explain the type of management activity that took place, and the associated ecological goals.



Example of temporary interpretive sign used to inform the public about forest management at Correllus. (See Appendix G for photo information.)

The David H. Smith Preserve has five interpretive display panels along its fire interpretive trail; one is located within the state forest.

10.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

Correllus is managed by MassParks staff; there is one year-round personnel. (Table 10.7.1) There were no seasonal personnel in 2013 or 2014.

Table 10.7.1. Mass Parks personnel assigned to Manuel F. Correllus State Forest.

Job Title	Number of Positions ^a
<i>Year-round Personnel</i>	
Forest and Park Supervisor III	1

a. Number of position is based on 2014 staffing levels.

In 2014, a mechanic from the South Region office in Carver periodically worked in the forest mowing firebreaks.

One Bureau of Fire Control and Forestry personnel, a Patrolman, is based at Correllus on a seasonal basis. Their duties are primarily associated with fire break maintenance and staffing the West Tisbury Fire Tower. (See Section 15.)

Staffing at the forest in the mid 1970s was “two and one half people” (Whiting 1976). Job titles were not identified, nor were park staff differentiated from Bureau of Fire Control and Forestry staff (Whiting 1976).

Partnerships and Volunteers

There is no friends group.

A partnership exists between the DCR and TNC for the management of the Pohogonot Tract. (See 10.8. Management Practices for additional information.)

The Martha’s Vineyard Model Flying Club and the Martha’s Vineyard Disc Golf Club are partners with the DCR, due to their development and use of recreation facilities in the forest.

Intermittent volunteer support comes from members of youth groups performing community service projects.

MassWildlife personnel staff the deer check station during much of hunting season.

Public Safety

Edgartown, Tisbury, and West Tisbury fire and police departments provide fire response, law enforcement, and emergency services.

Funding

Conservation Trust Fund

There are no Conservation Trust Funds for this park.

Retained Revenue

Correllus does not generate revenue, and does not contribute towards DCR’s retained revenue.

Other Revenues

There are no other known revenues.

10.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs (e.g., Table 10.3.2), legal agreements, and institutional knowledge. This section describes those practices unique to the management of Correllus. Legal agreements unique to the forest are presented in Table 10.8.1.

Table 10.8.1. Key legal agreements for Manuel F. Correllus State Forest assets.

Party and Subject of Agreement	Type^a	Expiration Date^b
<i>Existing Agreements</i>		
Department of Environmental Management and the Pohogonot Trust Agreement by and between...for the coastal sandplain addition to the Manuel F. Correllus State Forest.	A	N/A
Department of Environmental Management and the Town of Edgartown Layout, construction and maintenance of bicycle paths within Manuel F. Correllus State Forest.	S	N/A
Martha’s Vineyard Riverhead Disc Golf Course	R	2013
Martha’s Vineyard Model Flying Club	R	2013
Department of Environmental Management and The Nature Conservancy Cooperative Management Agreement for the coastal sandplain addition to the Manuel F. Correllus State Forest. (Renewable)	A	2020
<i>Unknown Status^c</i>		
UXB International and U.S. Army Engineering Support Center Huntsville (USAESCH). Placement of explosives magazine in state forest.	-	-

- a. Agreement types include: A=Memorandum of Agreement; E=Easement; L=Lease; R = Recreation Permit; S = Special Use Permit; and U=Memorandum of Understanding.
- b. Year that agreement expires. Permanent agreements are indicated by an expiration date of “None.”
- c. Unknown status includes uses for which there is no agreement and uses for which an agreement exists but was not located during the preparation of this RMP.

Key management and guidance documents are identified in Table 10.8.2.

Table 10.8.2. Key management and guidance documents for Manuel F. Correllus State Forest.

Author and Document	Year
Department of Environmental Management and The Nature Conservancy Operating principles (for Hazy Acres). Draft	n.d.
Whiting, S. B. Management plan for Martha’s Vineyard State Forest, Martha’s Vineyard, Massachusetts.	1976
Department of Environmental Management An ecosystem management plan for the Manuel F. Correllus State Forest. Draft.	1994
Department of Environmental Management and The Nature Conservancy Management and Maintenance Plan. Preliminary.	1998
Gannet and Fleming, Inc. Environmental Audit Report: Manuel F. Correllus State Forest, Vineyard Haven (sic), Massachusetts.	1998 ^h
Department of Environmental Management Environmental Notification Form. Rehabilitation and maintenance of existing firebreaks – Manuel F. Correllus State Forest.	2001
Patterson et al. Wildland fuel management options for the central plains of Martha’s Vineyard: Impacts on fuel loads, fire behavior and rare plant and insect species.	2005
Whiddon, A. J. Prescribed Fire Plan. Administrative Unit(s): Manuel Correllus State Forest. Prescribed Fire Name: Northwest Tract-Edgartown.	2011 ^a
Whiddon, A. J. Prescribed Fire Plan. Administrative Unit(s): Manuel Correllus State Forest. Prescribed Fire Name: Northeast Tract.	2011 ^b
Whiddon, A. J. Prescribed Fire Plan. Administrative Unit(s): Manuel Correllus State Forest. Prescribed Fire Name: Pohogonot Tract.	2012 ^b

Two external planning documents contain recommendations specific to the management of Correllus. Neither was prepared by the DCR or its

predecessor agency; their contents do not necessarily reflect DCR policy.

The Island Plan recognizes the interconnectedness of the forest and life on the Vineyard (MVC 2010). It offers the following eight strategies relevant to the forest.

- **NI-6.** Assist the Commonwealth in the restoration of Manuel F. Correllus State Forest as a preeminent center for biodiversity, recreation, and natural character.
- **NI-8.** Cultivate a “culture of stewardship,” a Vineyard community that understands the benefits of open spaces and a healthy ecosystem, and acts on behalf of its restoration. [This strategy proposes using Correllus as a teaching laboratory.]
- **N2-3.** Increase the use of specialized management techniques such as prescribed burning and wildlife underpasses.
- **N4-1.** Extend the greenway/trail network from Gay Head (i.e., Aquinnah) to Chappaquiddick with cross connections to the north and south shores. [This strategy uses Correllus as the hub of the network.]
- **N9-1.** Accommodate the homegrown lumber industry.
- **E5-4.** Explore renewable energy generation with site specific sources. [This strategy proposes exploring biomass fueled energy production partially sourced from Correllus.]
- **T4-1.** Extend the network of off-road bike paths and improve safety of existing ones. [This strategy uses Correllus’ bike paths as the hub of the network.]
- **WI-2.** Plan for and protect future public well sites.

The second external document includes recommendations for restoring a functioning sandplain landscape (Foster and Motzkin 1999). Information on these recommendations is provided in Natural Resources, below.

Annual Maintenance

Ongoing management practices typically follow a regular schedule. Common activities, and the desired frequency with which they occur, are identified in Table 10.8.3.

Table 10.8.3. Annual cycle of management activities at Manuel F. Correllus State Forest.

Activity	Spring ^a	Summer ^a	Fall ^a	Winter ^a
Cleaning - Bathroom(s)	N/A	N/A	N/A	N/A
Litter removal- Recreation areas	N/A	E1	AN	AN
Litter removal - Trails	AN	E1	AN	AN
Maintenance - Picnic sites, fences, etc.	AN	AN	AN	N/A
Mowing and trimming	E7/AN	E7/AN	E7/AN	N/A
Pruning - Trees and shrubs	AN	AN	AN	AN
Sweeping - Walkways	AN	AN	AN	AN

a. Frequency codes are: AN = As needed; D = Daily, # times; E = Every # days; N/A = Not applicable.

Natural Resources

Two management activities affect multiple resource types in the forest; these activities are maintenance of firebreaks and management of the Pohogonot Tract.

The configuration and management of Correllus’ 32 miles of firebreaks were developed during a 2001 through 2005 project entitled *Rehabilitation and Maintenance of Existing Firebreaks – Manuel F. Correllus State Forest* (EEA #12592). In 2001 a Conservation Permit (#01.012.DFW) was issued; it authorized the taking of 28 state-listed species and the alteration of 216 acres of their habitat. A number of conditions were associated with this permit, including preparation of a “comprehensive five-year firebreak management plan.” This plan, which was to be provided to the NHESP by January 1, 2002, was not on file with that agency as of August 2014 (Harper 2014). Because the Conservation Permit remains in force until all required actions have been completed, current firebreak maintenance activities at Correllus must comply with all of the permit’s terms.

In past years, the mowing of firebreaks was conducted by the Forest and Parks Supervisor. In 2014, responsibility for mowing was reassigned to the Bureau of Fire Control and Forestry, under the direction of the Forest Supervisor.

Management of the Pohogonot Tract and the adjacent 15.4 acre TNC David H. Smith Preserve is

governed by a Cooperative Management Agreement between the DEM and TNC (1996). Its key points are:

- The Pohogonot Tract and Smith Preserve “shall be managed and maintained as a single unit.”
- The unit is to be managed in accordance with a jointly developed Management and Maintenance Plan for the purposes of:
 - Open space conservation;
 - Ecological preservation and restoration;
 - Environmental education and research; and
 - Low impact compatible recreational uses.

A preliminary Management and Maintenance Plan was developed; it has not been revised. The Conservancy’s parking lot and trail on the Pohogonot Tract are identified in this plan.

Water Resources

There are no activities unique to this property.

Rare Species

Under the terms of standing Conservation Permit, DCR is to conduct an annual survey and monitoring effort to document all state-listed rare plant occurrences. It is unknown if this activity was performed by the previous Forest and Park Supervisor.

The entire model aircraft flying field and approximately half the Riverhead Disc Golf Course are within Priority Habitat. Maintenance activities in these areas require review under MESA. There is no documentation that this has occurred.

The NHESP has identified Correllus as “key site” for habitat restoration in Massachusetts (Regosin 2013). The DCR and DFG are working cooperatively to restore and manage rare species habitat in the forest.

Invasive Species

Under the terms of standing Conservation Permit, DCR must monitor firebreaks on an annual basis for the appearance of non-native invasive plants. It is unknown if this activity was performed by the previous Forest and Park Supervisor.

Vegetation

A prescribed fire plan exists for the Pohogonot Tract (Whiddon 2012*b*). Its goals include reduction of hazardous fuel loads; enhancing rare species habitat; and restoring and maintaining fire-dependent habitat. Implementation of this plan is the responsibility of the Bureau of Forest Fire Control and Forestry, in coordination with the Correllus Forest and Park Supervisor. Because the Pohogonot Tract is cooperatively managed by the DCR and TNC, planning and implementation of prescribed fire is done in coordination with TNC.

Two additional fire plans exist (Whiddon 2011*a*, 2011*b*). The first for 160 acres west of Barnes Road and north of the airport, and the second for 370 acres along the forest's northern border, between headquarters and the property's eastern boundary. The goals of these plans are to: reduce the risk of wildfire to life, property, and resources; conserve, enhance, and protect rare species habitat; restore the natural fire regime to the sandplains community; and wildfire training. Implementation of this plan is the responsibility of the Bureau of Forest Fire Control and Forestry, in coordination with the Correllus Forest and Park Supervisor. Additional public safety and conservation agency and organization personnel assist with implementation of these plans.

A five acre experimental forestry plot is located in the forest's northwest corner. It was planted by the USDA Forest Service ca. 1964 and contains pitch pine x loblolly pine hybrids. This research plot, one of many in the northeastern U.S., is a potentially valuable repository of genetic information (Birdsey 2010). Active forest management (e.g., thinning) that maintains "some of the original trees" may be applied (Birdsey 2010).

Two experimental forestry plots, totaling approximately 4.10 acres, are located north of the Martha's Vineyard Airport. These plots, which were established by researchers from Yale University, contain pitch pine originating from multiple locations in Massachusetts, New Jersey, and New York. It is unknown if the growth of these pines is still being monitored.

The County Commissioners hold three deeded easements, for unobstructed and unrestricted flight of aircraft, on portions of the forest northeast of Runway 24 and southwest of Runway 6. These

easements allow the Commissioners to remove any growth that "may interfere with the unobstructed flight of aircraft." Vegetation around the navigation lights located in the forest on one of these easements is maintained by the County.

Vegetation in and around the fenced-in area associated with the explosives magazine is maintained by UXB International.

Cultural Resources

There are no management activities unique to this property.

Recreation Resources

In support of hunting at the forest, MassWildlife stocks approximately 130 non-native ring-necked pheasants each fall, and operates an on-site deer check station during peak hunting periods.

The Riverhead Disc Golf Course was constructed under an annual Recreation Permit, and its ongoing maintenance is performed by the Martha's Vineyard Disc Golf Association under a Recreation Permit. Maintenance largely involves mowing, pruning tree limbs, and repairing tees and baskets. These activities have not been reviewed by the NHESP for their potential impacts to rare species and their habitats.

Similar to the disc golf course, the model plane airfield was established under a Recreation Permit without the required review under MESA. It is maintained by members of the Martha's Vineyard Model Flying Club. Maintenance involves mowing vegetation on approximately 0.6 acres of runways and 0.1 acres of associated firebreak.

The County Commissioners hold deeded easements to two parcels of forest in West Tisbury (15.93 and 4.21 acres; Book 292, Page 562), for unobstructed and unrestricted flight of aircraft, on portions of the forest south of Runway 6. They restrict the types of recreation that can take place. These easements require that DCR "shall not use or allow...to be used by any assembly of persons or in such a manner as may attract or bring together an assembly of persons thereon." Parcels included in this easement are within the airport's security fence. The Commissioners also hold a similar easement on 3.1 acres of the forest in Edgartown, opposite Runway 24 (Book 373, Page 159). This easement is

associated with the airport navigation lights located within the forest.



Navigation lighting and safety zones extend from Martha’s Vineyard Airport into the state forest. (See Appendix G for photo information.)

A 1958 agreement between the Commonwealth and the County of Dukes County further restricts recreational use of the forest. It allows for unobstructed and unrestricted flight of aircraft at any altitude; prohibits the construction or maintenance of any building, structure or object; and prohibits the assembly of people, on 44.22 acres of state forest north of Runway 24.

Infrastructure

Buildings

Partial funding for the garage was provided by the Bureau of Fire Control and Forestry. This has resulted in one bay being dedicated to Fire Control vehicles and equipment and the other two bays dedicated to state forest vehicles and equipment.

Access to, and maintenance of the explosives magazine northeast of the intersection of fire roads D and 11 is the responsibility of UXB International, Inc.

The County Commissioners hold three deeded easements, for unobstructed and unrestricted flight of aircraft, on portions of the forest northeast of Runway 24 and southwest of Runway 6. These easements prohibit DCR from erecting, maintaining, or allowing any buildings, structures, or objects within the easements, and authorize the County to remove such infrastructure.

Roads

The paved driveway to the headquarters and garage are plowed by the park staff. Fire roads associated with fire breaks are not plowed.

Responsibility for maintaining Pohogonot and Coast Guard roads, and the sharing of maintenance costs, is specified in a 1995 agreement between the DEM and The Pohogonot Trust.

Parking Areas

Parking lots are not plowed in the winter.

Trails

The DCR holds a conservation restriction (Book 373, Page 158) on the southern and eastern portions of the Martha’s Vineyard Airport, along Edgartown-West Tisbury and Barnes roads. Associated with this is a covenant that permits the use of a 100-foot wide strip of land along these roads, within the CR, for the construction and maintenance of trails and bicycle paths.

The forest’s paved bike path is maintained by Correllus staff. The edges of the path are mowed on an as needed basis, as resources allow. Leaves and pine needles are blown from the path on the same schedule. Although most of the bike path is within Priority Habitat, these maintenance activities have not been reviewed by NHESP.

The town of Edgartown is “solely responsible for the management, condition, maintenance and repair of” the two bicycle paths that they constructed along Barnes Road and Edgartown-West Tisbury Road, within the state forest (DEM 1995b).

The Smith preserve’s interpretive trail is maintained by TNC.

Kiosks and Signs

Forest staff manages the contents of the kiosk at the park entrance, Martha’s Vineyard Disc Golf Club is responsible for maintaining the kiosk at the golf course, and TNC is responsible for maintaining its kiosk at the Smith Preserve parking lot.

10.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of Manuel F. Correllus State Forest. Applied Land Stewardship Zoning recommendations provide general guidance for managing Correllus. Future activities and projects should be checked against the zoning map (Figure 10.2) for consistency. Management recommendations for Correllus are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 10.2)

The following Land Stewardship Zoning is recommended for Manuel F. Correllus State Forest.

Zone 1

- Most of Correllus has been designated Zone 1; this includes all undeveloped areas and fire breaks.

Zone 2

- No sections of Correllus have been designated Zone 2.

Zone 3

- Forest headquarters landscape
- Forest entrance and deer barn
- Parking lots
- Riverhead Field Disc Golf Course

Significant Feature Overlay

The following Significant Feature Overlays are recommended:

- ***Airport Restriction Significant Feature Overlay.*** This overlay coincides with the boundaries of Martha's Vineyard Airport's deeded easements and the 1958 agreement with the County Commissioners that restrict development and group assembly. The terms of the easements and agreement are to be implemented within this overlay.

- ***Multi-Use Path Significant Feature Overlay.*** This overlay includes the multi-use path and adjacent vegetation within 2-feet of the existing paved path. Areas within this overlay are managed for recreation purposes. In contrast, areas outside of this overlay are managed for their cultural and natural resource values

Management Recommendations

Eight priority management recommendations were developed for Manuel F. Correllus State Forest. (Table 10.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

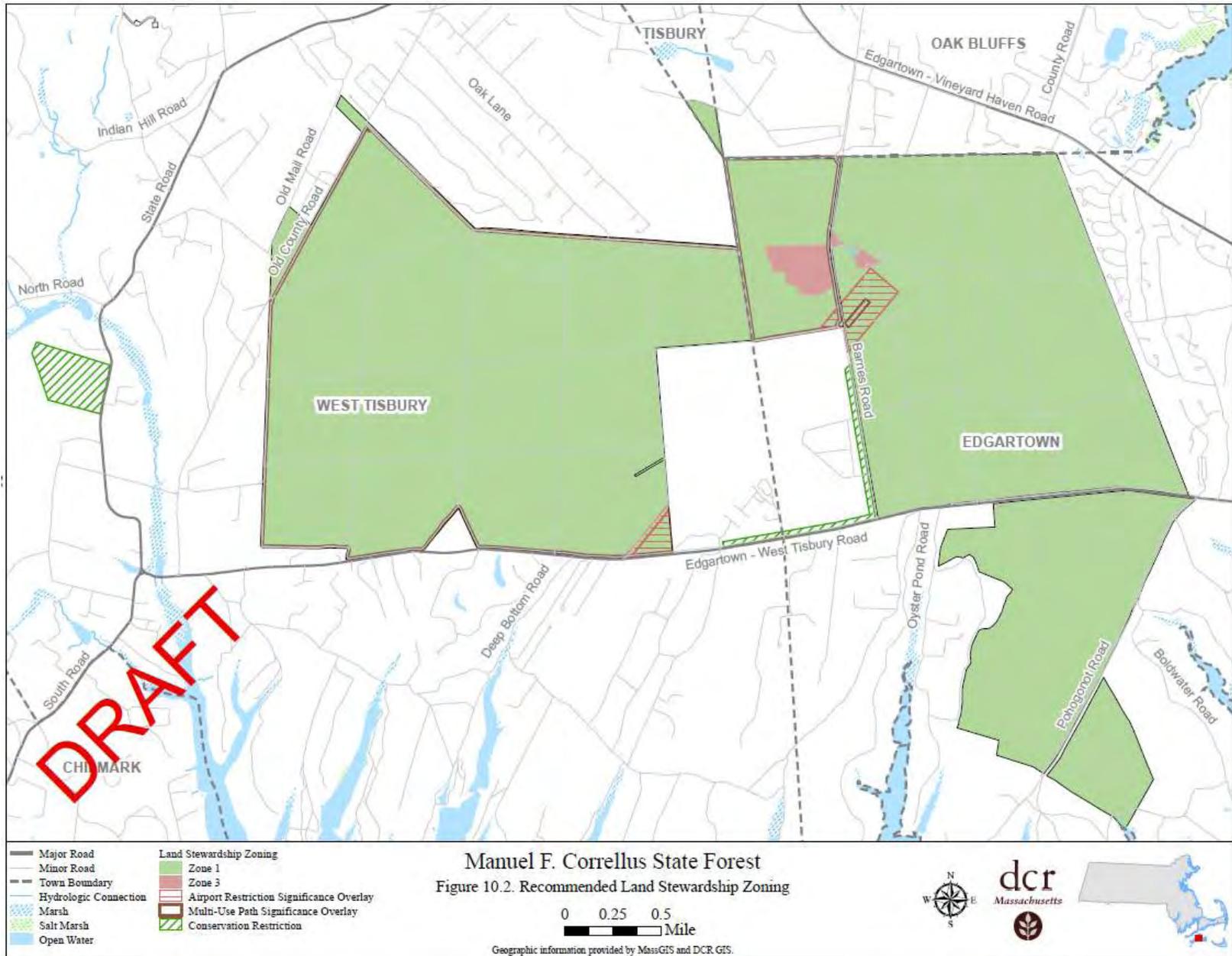


Table 10.9.1. Priority recommendations for Manuel F. Correllus State Forest.

Recommendation	Implementation ^a
Add one designated van accessible parking space to each paved parking lot along the bike path.	R, U
Prepare an updated firebreak management plan and submit to NHESP to close out Conservation Permit #01.012.DFW. In accordance with the permit, annually monitor state-listed rare plant and invasive species occurrences in firebreaks until the plan is completed and the conservation permit is closed out.	C, F, R
Prepare and implement a comprehensive fire management plan to promote populations of rare species, their habitats, and native natural communities; and to decrease the risk of fire to the forest and abutting properties. Integrate the updated fire break management plan (see recommendation above) and ongoing efforts to remove remnant non-native conifer plantations into the comprehensive fire management plan.	C, F, P, R, V
Working with The Nature Conservancy, prepare an updated Management and Maintenance Plan for the combined Pohogonot Tract and Smith Preserve.	F, R, V
Require Martha’s Vineyard Disc Golf Club to document management practices and submit to NHESP for after-the-fact review under MESA before issuing future recreation permits.	R
Require Martha’s Vineyard Model Flying Club to document management practices and submit to NHESP for after-the-fact review under MESA before issuing future recreation permits.	R
Conduct an expanded document review to locate agreement with UXB International, Inc. and USAESCH to place explosives magazine in the state forest.	L
Document bike path management practices and submit to NHESP for review under MESA.	R

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.



Looking north along Sylvia state beach; Sengekontacket Pond is on the left and Nantucket Sound is on the right side of photo. (See Appendix G for photo information.)

SECTION 11. JOSEPH A. SYLVIA STATE BEACH

11.1. INTRODUCTION

Joseph A. Sylvia State Beach is located in the towns of Oak Bluffs and Edgartown. (Figure 11.1) Access is via a state highway called Beach Road in Oak Bluffs, and Edgartown-Oak Bluffs Road in Edgartown.

Sylvia is situated on an approximately 2.2 mile long stretch of barrier beach that ranges in width from approximately 200 to 1,050 feet. The state highway runs the entire length of the park, effectively dividing it into two sections. East of the highway is the high-use side, with roadside parking, dunes, and a bathing beach. To the west are the more protected back dunes, salt marsh, and the shore of Sengekontacket Pond, a protected embayment with rich shellfish beds.

State Beach, as Sylvia was originally known, was established in 1946 when the Massachusetts Legislature authorized the Commissioner of Conservation to “take by eminent domain...or acquire by purchase or otherwise” 100 acres in Oak Bluffs and Edgartown for public beach purposes. (Chapter 510 of the Acts of 1946) This enabling legislation specified that the Commissioners of the

County of Dukes County were “authorized and directed to manage and maintain all property acquired hereunder, and the cost of said management and maintenance shall be borne by said county.” Legislation authorizing expansion of the park also had this provision. (Chapter 631 of the Acts of 1954) As a result, Sylvia has always been a state park managed by the County.

In 1968, State Beach was renamed in honor of Joseph A. Sylvia, a former member of the Massachusetts House of Representatives who was instrumental in having the Commonwealth acquire the property.

In 1975 the park was used as a filming location for the movie *Jaws*; the beach and South Inlet to Sengekontacket Pond were featured prominently in that film. Big Bridge, which links Edgartown to Oak Bluffs, remains known as “*Jaws Bridge*.”

Today, Sylvia is best known for its sandy beach on the relatively warm and calm waters of Vineyard Sound. Its physical, political, and regulatory attributes are summarized below. (Table 11.1.1)



Joseph A. Sylvia State Beach

Figure 11.1.

Table 11.1.1. Physical, political, and regulatory settings of Joseph A. Sylvia State Beach.

Setting	Name or Metric
Location:	Edgartown, Oak Bluffs
Area (acres)^a:	112.50
Perimeter (miles)^a:	9.19
Landscape Designation(s)^b:	Parkland
Legislative Districts:	
House	Barnstable, Dukes, and Nantucket
Senate	Cape and Islands
Regulatory Designations:	Priority Habitat Coastal DCPC ^c Island Harbors and Highways DCPC ^c Island Road DCPC ^c Martha's Vineyard Lawn Fertilizer Control DCPC ^c

- a. Calculated using a Geographic Information System (GIS).
- b. For a summary of DCR's landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.
- c. Chapter 831 of the Acts of 1977 established the Martha's Vineyard Commission and allowed for the creation of Districts of Critical Planning Concern (DCPC).

Associated Properties. A disjunct parcel of Sylvia state beach is located opposite Farm Pond at 174 Sea View Way, Edgartown; it is almost entirely sub-tidal.

There are operational connections between Sylvia and all DCR properties on Martha's Vineyard and Nantucket. The staff of Correllus serves as the point of contact for the County of Dukes County's operation of Sylvia state beach. They are also responsible for Correllus (Section 10), South Beach State Park (Section 12), and Nantucket State Forest (Section 13), and assisting Bureau of Fire Control and Forestry personnel with the management of the West Tisbury Fire Tower property (Section 15).

11.2. NATURAL RESOURCES

Physical Features

Elevations range from sea level at Vineyard Sound and Sengekontacket Pond to approximately 10 feet above sea level. Erosion rates have been estimated as ranging between 3 to 10 feet per year (MassHighway 1997). Information on sediment transport is presented in MassHighway (1997).

Water Resources

Sylvia has extensive salt and brackish water resources, with approximately 11,000 feet of frontage on Vineyard Sound and 14,000 feet of frontage on Sengekontacket Pond, a tidally dominated embayment with two openings into Nantucket Sound. It lacks freshwater resources. (Table 11.2.1)

Table 11.2.1. Water resources of Joseph A. Sylvia State Beach.

Water Resource	Name or Metric
Watershed:	Islands
Aquifer:	Martha's Vineyard SSA
Lens	N/A
Rivers and Streams (miles)	0.0
Vernal Pools	
Certified (#)	0
Potential (#)	0
Wetlands (acres)	19.29
Lakes and Ponds (acres)^a	15.07

- a. This metric includes portions of Sengekontacket Pond and Nantucket Sound.

Sengekontacket Pond is impaired by wastewater based nitrogen loading. An assessment of the amount of nitrogen contributed to the pond, by source, is presented in Howes et al. (2011). The Sylvia state beach sub-watershed contributes approximately 0.115 kg of nitrogen per day, about 0.3% of the daily total, to the Sengekontacket Pond system. Additional information on the ecology of this pond may be found in Gaines (1995).



View across Sengekontacket Pond. (See Appendix G for photo information.)

Sylvia is highly susceptible to flooding, storm surge, and sea-level rise. The entire property is within the 100-year flood zone. A Category 1 hurricane is predicted to inundate much of the property, closing the road. (Table 11.2.2) A Category 3 storm would inundate everything but the bridges. Although a one foot rise in sea-level is predicted to impact all of the shoreline, the greatest flooding is predicted to occur in the marsh and other low-lying areas near Bran Point.

Table 11.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to Joseph A. Sylvia State Beach.

Type of Impact	Acres	%
Flooding:		
100-year Storm	112.50	100.0
500-year Storm	0.00	0.00
Hurricane Inundation:		
Category 1 Storm	67.42	59.93
Category 2 Storm	24.78	22.03
Category 3 Storm	3.07	2.73
Category 4 Storm	0.01	0.01
Sea Level Rise	44.23	39.31



Predicted hurricane inundation of Sylvia state beach. Areas predicted to be inundated by Category 1 storms are represented in light green; Category 2 storms in dark green; Category 3 storms in yellow; and Category 4 storms in red. (See Appendix G for photo information.)

There are two barrier beaches; Ob-1 in Oak Bluffs, and Et-1 in Edgartown. These barrier beaches run the entire length of the park.

Rare Species

State-listed Species

Five state-listed species are known from the state beach. (Table 11.2.3)

Table 11.2.3. State-listed species of Joseph A. Sylvia State Beach, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d
Barn owl	B	SC
Common tern	B	SC
Least tern	B	SC
Piping plover	B	T
Roseate tern ^e	B	E

- a. Presented alphabetically, by common name.
- b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.
- c. Types of state-listed species include: B = Bird.
- d. Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.
- e. This species is also federally endangered.

One federally threatened species, the red knot, has been recorded on nearby Sarson Island, within Sengekontacket Pond (www.ebird.org). They likely also use the shoreline of Sylvia state beach. This species is not yet listed under MESA.

Priority Habitat

Nearly the entire property (95.64%) has been designated Priority Habitat under MESA.

Vegetation

There have been no comprehensive surveys of the flora of Sylvia. However, studies of Sengekontacket Pond and Edgartown-Oak Bluffs Road have provided generalized descriptions of the vegetation.

The park's dunes are characterized by American beach grass, beach pea, dusty miller, seaside goldenrod, poison ivy, beach heather, and evening primrose (MassHighway 1997, Woods Hole Group 2008). Shrubs including northern bayberry, beach plum, rugosa rose, and eastern red cedar are present in the more sheltered, landward sections of the dunes (Woods Hole Group, Inc. 2008).

The saltmarsh portion of the park is characterized by saltwater cordgrass and salt meadow hay (MassHighway 1997).

Hollow green weed, sea lettuce, rockweed, green fleece, and hollow-stemmed kelp are present on hard substrates, such as the stone groins (MassHighway 1997).

Invasive Species

Only one invasive species has been documented. (Table 11.2.4)

Table 11.2.4. Known invasive and likely invasive plants of Joseph A. Sylvia State Beach.

Species ^a	Status ^b
Spotted knapweed	I

- a. Presented alphabetically, by common name.
- b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).

Natural Communities

There have been no formal surveys of natural communities. However, preliminary identification has been made of some community types. (Table 11.2.5)

Table 11.2.5. Known natural communities of Joseph A. Sylvia State Beach.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Saline/Brackish Flats	E	S3	1
Maritime Beach Strand	T	S3	1
Maritime Dune	T	S2	1
Gravel/Sand Beach	E	S4	1
Salt Marsh	E	S3	2

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from the following sources:
 1. RMP Planner.
 2. DEP Wetlands (1:12,000) data layer.

A portion of the upland area between the State highway and Sengekontacket Pond has sparse stands of eastern red cedar that resemble a Maritime

Juniper Woodland/Shrubland. However, the presence of this S1 community type has not been confirmed.

Forests

Only 2.09% of the park is classified as forested.

Wildlife

No formal surveys have been conducted; as a result, there is little information specific to Sylvia. However, some information on the park’s wildlife may be inferred from wildlife observed in nearby uplands and waters.

As of October, 2014, 134 species of birds were reported for Mass Audubon’s Felix Neck Sanctuary, on the western shore of Sengekontacket Pond (eBird). Although many of the songbirds observed at Felix Neck likely don’t occur at Sylvia, due to differences in vegetation, the herons, gulls, shorebirds, and waterfowl reported reflect both locations.

Fish in Sengekontacket Pond include silversides, sand eels, cunner, tautog, sea robin, toadfish, scaup, eels, bluefish, striped bass, and summer and winter flounder (MassHighway 1997). The pond is a “rich, productive habitat” for shellfish including bay scallops, soft-shell clams, and quahogs (MassHighway 1997). In 2013 the towns of Edgartown and Oak Bluffs established an oyster propagation program for the dual purposes of oyster production and nitrogen reduction in the pond’s waters (Brown 2013). Surf clams and northern lobster occur offshore.

11.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic landscapes, buildings, structures, and objects. An overview of significant events in the history of Joseph A. Sylvia State Beach is presented in Table 11.3.1. The beach’s cultural resources are identified in Table 11.3.2.

Table 11.3.1. Significant events in the history of Joseph A. Sylvania State Beach.

Year(s)	Events
1946	Initial acquisition of a State Beach began with the Commissioner of Conservation receiving authorization to “take by eminent domain...or acquire by purchase or otherwise” approximately 100 acres of land in Edgartown and Oak Bluffs at a maximum cost of \$38,000.
1947	additional land acquisitions authorized using balance of \$38,000. (Chapter 642 of the Acts of 1947)
1954	Sylvania state beach expanded, with the addition of 52 acres in Edgartown. Ownership goes to the state and management to the county. (Chapter 631 of the Acts of 1954)
1968	State Beach in the towns of Oak Bluffs and Edgartown is designated the Joseph A. Sylvania State Beach in honor of a former member of the Massachusetts House of Representatives. (Chapter 150 of the Acts of 1968)
1971	Commissioners of the County of Dukes County are authorized to establish rules and regulations relative to the care and maintenance of beaches. (Chapter 161 of the Acts of 1971)
1974	Eight foot-wide multi-use path constructed through park.
1991-1992	Winter storms damage section of the State highway through park; emergency repairs are implemented.
1997	Three wooden groins constructed south of existing stone groins in order to mitigate ongoing erosion.

Table 11.3.2. Cultural resources of Joseph A. Sylvania State Beach.

Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance ^h
Nantucket Sound	NRDOE	-	-	-	-	-	OAK.902	-

a. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; NRDOE = National Register Determination of Eligibility; NRHD = National Register Historic District; OB = Object; and ST = Structure.

b. Date of construction provided, when known.

c. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.

d. Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.

e. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.

f. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

g. Massachusetts Historical Commission inventory number.

Archaeological Resources

Although no pre-Contact sites have been recorded within the limits of Sylvania, many are recorded in the immediate vicinity. The high concentrations of pre-Contact sites in this area are along brackish water ponds and date from the Middle Archaic Period through the Contact Period. The types of recorded archaeological sites include burial sites, habitation sites, camp sites, and shell middens. Sylvania state beach has a moderate sensitivity for pre-Contact sites.

Historic Resources

The distinctive shape of Sylvania state beach would be familiar to the Island's native inhabitants as well as its earliest English Settlers. The beach has retained its barrier character despite tidal erosion and the growth of coastal development in the nineteenth and twentieth centuries. Little recorded development and permanent occupation has taken place at the beach over the past centuries and as a result, no extant historic resources can be found today.

The only designated historic resource within or adjacent to the property is Nantucket Sound, which has been determined eligible for the National Register of Historic Places by the Massachusetts Historical Commission and the U.S. Department of the Interior. Projects at the facility may have to be reviewed for impacts on the Sound. Contact OCR regarding any projects that might impact this resource.



The train between Edgartown and Oak Bluffs once ran the entire length of what is now Sylvania state beach; no traces remain of the rail bed. (See Appendix G for photo information.)

11.4. RECREATION RESOURCES

The park's recreation activities are largely beach dependent, including:

- Boating (ramp partially within park boundaries)
- Fishing, fin fish
- Fishing, shellfish
- Kite boarding (in season)
- Kite flying (in season)
- Nature study
- Sunbathing
- Swimming

Sylvania's greatest recreational asset is its beach, which is unguarded. The designated swimming area extends 300 yards from the shore into Vineyard Sound. Water quality is tested monthly during the beach season at three locations: approximately halfway between Little and Big Bridges; Big Bridge; and at Bend in the Road Beach. There have been no exceedances of Enterococcus bacteria standards recorded since 2007, the first year for which data are available for all three sampling locations.

A boat ramp is located on the south side of North Inlet; it is partially within the park and partially on town of Edgartown property. A commercial kayak rental business (i.e., Island Spirit Kayaks) operates on town of Oak Bluffs property adjacent to the boat ramp. An associated food concession is believed to be located in the park. There is no DCR or County permit for this commercial activity.

One recreational feature commonly associated with the park is actually not in the park. A multi-use path runs the entire length of the park on the west side of the State highway. This path, which is used for bicycling, walking, and running, is located within the road's right-of-way and not the park.



A multi-use path, located on MassDOT property, runs through the park. It is popular with cyclists and runners. (See Appendix G for photo information.)



Example of boardwalk at Sylvia state beach; these are constructed and maintained by the County. (See Appendix G for photo information.)

11.5. INFRASTRUCTURE

Property Boundary

The park’s eastern and western boundaries are clearly identifiable by the adjacent bodies of water. Its northern boundary lies near the south side of North Inlet. However, between the inlet and the park is a variable-width strip of land owned by the town of Oak Bluffs. The boundary between the park and the Oak Bluffs parcel is unmarked, making it difficult to determine if commercial activities intended for the Oak Bluffs property are taking place within the park. The park’s southern boundary is easily identifiable west of Edgartown-Oak Bluffs Road; it is the north side of the channel between Sengekontacket and Trapps ponds. To the east of the road the southern boundary is unmarked and indistinguishable from the town of Edgartown’s Bend in the Road Beach.

Buildings and Structures

There are no buildings; structures are limited to groins and boardwalks. (Table 11.5.1) Although boardwalks are universally accessible, and some include wheelchair pull off areas, they do not provide access all the way to the shore.

Roads

There are no paved roads within the park. (Table 11.5.2) The State Highway runs north-south through the center of the park, on land owned by MassDOT. In 2005, the most recent year for which data are available, this road had an average daily summer traffic volume of 7,007 vehicles (<http://www.mvcommission.org/>).

Table 11.5.2. Condition and length of roads at Joseph A. Sylvia State Beach.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	0.00	0.03
Fair	0.00	0.11
Poor	0.00	0.0
Total	0.00	0.14

a. Based on field assessment; all distances calculated using GIS.

Licensed shell fisherman may drive along the shoreline of Sengekontacket Pond; it is accessed via three dirt roads to the west of the State Highway. (Table 11.5.2) Regulations governing vehicle access by shell fisherman may be found in the Beach Rules and Regulations for Joseph Sylvia State Beach. (http://www.dukescounty.org/Pages/DukesCountyMA_NaturalResources/sylvia%20rules)

Table 11.5.1. Non-historic buildings and structures of Joseph A. Sylvia State Beach.

Location and Infrastructure ^a	Date ^b	Condition ^c	In Use ^d	Utilities ^e
Oak Bluffs				
Boardwalks (3)	1998	-	-	-
Groin – Stone (4)	1964	-	-	-
Groin – Wood (4)	1996	-	-	-
Edgartown				
Boardwalks (5)	-	-	-	-

- a. Information presented by town.
- b. Date of construction provided, when known.
- c. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- d. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.
- e. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- f. Infrastructure located on DCR property, but not owned or controlled by the DCR. Its condition is not assessed.

Parking

Most parking takes place along the shoulder of Edgartown-Oak Bluffs Road. There is only one off-road parking area; a gravel lot adjacent to Little Bridge. There is no employee parking. Public transportation is available.

Table 11.5.3. Number of public parking spaces, by location and type, at Joseph A. Sylvia State Beach.

Location	HP	Other	Total
North Inlet-Little Bridge ^a	0	49	49
Edgartown-Oak Bluffs Road-Oak Bluffs-marked spaces ^b	7	0	7
Edgartown-Oak Bluffs Road - Oak Bluffs-parallel parking ^c	0	218	218
Edgartown-Oak Bluffs Road-Edgartown-parallel parking ^c	3	155	158
Total	10	422	432

- a. This is the only lot on DCR property. The number of spaces is based on the number of potential 9-foot-wide spaces.
- b. There are 22 marked HP spaces. However, 15 are reserved for Camp Jaberwocky and are unavailable to members of the public with HP plates or placards.
- c. Number of spaces based on the number of potential 8 by 24-foot parallel spaces.



Parking area at North Inlet – Little Bridge; the only off-street parking in the park. (See Appendix G for photo information.)

Trails

A series of trails extend from the road eastward to Vineyard Sound; eight have boardwalks for all or a portion of their length. The condition and extent of these trails are identified in Table 11.5.4.

Table 11.5.4. Condition and length of official trails at Joseph A. Sylvia State Beach.

Trail Condition	Length (Miles)
Good	1.57
Fair	0.00
Poor	0.00
Total	1.57

Kiosks and Signs

There are no signs that identify the property as a DCR park; only a metal plaque identifies the park. (See Memorials and Markers, below.) There are no kiosks.

Iron Ranger

There is no iron ranger.

Memorials and Markers

A stone marker bearing a metal dedication plaque is located north of Big Bridge. There are no other known markers.



This stone marker and metal plaque are the only indicators of the park's name or ownership. (See Appendix G for photo information.)

11.6. INTERPRETATION

There is no formal interpretive programming by the DCR or County. The Friends of Sengekontacket Pond (FOS) sponsors "Saturdays on the Sengekontacket," an interpretive program for children four and up, led by a Mass Audubon naturalist. These one hour programs are conducted on Saturday mornings in July and August.

There are two interpretive signs, they are:

- Caution: Endangered Birds Ahead
- What is a Barrier Beach?

The former is a DCR interpretive panel located adjacent to the Joseph A. Sylvia marker and plaque. The second is a two-panel sign located at the southern edge of the parking lot at North Inlet; it was constructed by MassDOT. This sign is currently in need of maintenance and the information presented needs updating.



MassDOT interpretive sign located at the entrance to the North Inlet parking area. (See Appendix G for photo information.)

11.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

The Forest and Park Supervisor III at Correllus serves as the point of contact with the County of Dukes County for issues related to the management of Sylvia.

Partnerships and Volunteers

The Dukes County Natural Resources Department is responsible for the management of this park.

The FOS is a non-profit organization "dedicated to the preservation of Sengekontacket Pond and the barrier beach." Among their objectives are to: initiate, support, and fund research and activities that will benefit the Sengekontacket Pond system and Joseph Sylvia state beach; and collaborate with watershed residents, recreational and commercial pond and beach users, and all levels of government in developing and implementing conservation strategies for the protection of Sengekontacket and Trapp's ponds and Joseph A. Sylvia State Beach.

The FOS is a partner to the County of Dukes County. They conduct annual spring beach cleanups at Sylvia and participate in the Barrier Beach Task Force (BBTF).

The BBTF seeks “a balance between the need to maintain Beach Road and the need to preserve as healthy ecosystems, the Joseph Sylvia state beach and Sengekontacket Pond.” They “work to bring together all the various interests to formulate a practical, affordable, environmentally sound management plan for the barrier beach.” The BBTF is co-chaired by the County Manager and an FOS Advisory Board member; it is composed of members from the towns of Oak Bluffs and Edgartown, County Officials, MassDOT; state and federal environmental agencies, FOS, Senior Environmental Corps, and DCR. The BBTF helped bring about the Beach Management Plan for Sylvia State Beach (Woods Hole Group, Inc., 2008).

Public Safety

The Oak Bluffs and Edgartown Fire Departments provide fire response and emergency services. Law enforcement is provided by municipal police departments and the Massachusetts State Police.

Park rules are enforced by the Dukes County Sheriff’s Department.

Funding

Conservation Trust Fund

There are no Conservation Trust Funds.

Retained Revenue

This property does not generate revenues.

Other Revenues

The DCR’s Waterways Program provides an annual grant of \$30,000 to the County for projects such as beach nourishment, dune restoration, and universal access

(http://www.dukescounty.org/Pages/DukesCountyMA_NaturalResources/Sylvia).

11.8. MANAGEMENT PRACTICES

The park that is now Sylvia state beach was acquired through three Acts of the Legislature (i.e., Chapter 510 of the Acts of 1946, Chapter 642 of the Acts of 1947, and Chapter 631 of the Acts of 1954. The first

and last of these acts specified management responsibilities as follows:

“The county commissioners of the County of Dukes County are hereby authorized and directed to manage and maintain the property acquired hereunder, and the cost of said management and maintenance shall be borne by said county.”

There is no additional management guidance, and no agreements between the DCR and the County. The Acts are silent about such issues as whether or not the County has the authority to regulate commercial enterprises (e.g., concessions). This is an issue of increasing importance to the County as it is looking for sources of revenue to help offset the costs of park operations and maintenance.

The DCR only has one agreement pertaining to the management of this property (Table 11.8.1).

Table 11.8.1. Key legal agreements for Joseph A. Sylvia State Beach.

Party and Subject of Agreement	Type^a	Expiration Date^b
Massachusetts Highway Department (i.e., MassDOT) Barrier beach sign, Beach Road, Oak Bluffs.	U	N/A
a. Agreement types include: A=Memorandum of Agreement; E=Easement; L=Lease; and U=Memorandum of Understanding. b. Year that agreement expires. Permanent agreements are indicated by an expiration date of “None.”		

Because Sylvia is not directly managed by the DCR, little DCR guidance has been developed for the management of this property. (Table 11.8.2)

Table 11.8.2. Key management and guidance documents for Joseph A. Sylvia State Beach.

Author and Document	Year
Gannett Fleming, Inc. Environmental audit report: Joseph Sylvia state reservation (sic), Martha’s Vineyard, Massachusetts.	1998 <i>i</i>

A beach management plan was developed for the County by Woods Hole Group, Inc. (2008). This plan covers planning, monitoring, routine maintenance, restoration, and education and

outreach activities. It serves as the main guidance document for Sylvania.

The County has developed rules and regulations for Sylvania state beach. (See http://www.dukescounty.org/pages/dukescountyma_naturalresources/sylvia.)

Annual Maintenance

Because this park is managed by the County of Dukes County, there is no DCR annual maintenance schedule.

Natural Resources

Water Resources

The towns of Edgartown and Oak Bluffs are jointly performing a 10-year comprehensive maintenance dredge and beach nourishment project (EEA Project No. 14425). Between 2009 and 2019, the towns will dredge up to 78,000 cubic yards of soils from Sengekontacket Pond and deposit it at the following three locations: Sylvania state beach, between North and South inlets; Bend in the Road Beach; and on privately owned dunes east of Bend in the Road Beach.

The town of Oak Bluffs maintains the channel beneath Little Bridge. It was most recently dredged in 2015.

Although a current beach management plan exists (Woods Hole Group, Inc. 2008), it is not consistent with Executive Order (E.O.) Number 181. Under this Executive Order, management plans must be developed for all “state-owned barrier beach property.” They must be consistent with state wetland policy and undergo review under the Massachusetts Environmental Policy Act (MEPA). Although the plan is consistent with state wetland policy, it did not undergo MEPA review. Because of this, a management plan for Sylvania is still required under E.O. 181.

Rare Species

State-listed shorebirds are monitored and managed by the Massachusetts Audubon Society under a system-wide agreement between that organization and the DCR. This agreement is used for similar activities elsewhere in the Nickerson Management Complex.

Areas used by rare beach-nesting birds are off-limits April 1–August 31, or until the nesting season ends.

Invasive Species

The BBTF monitors spotted knapweed; experimental control began in 2014.

Vegetation

In 2013, the County with the aid of volunteers planted 20,000 square feet of American beach grass, rugosa rose, and beach plum to stabilize dredge spoils placed on the beach. Additional planting of beach grass occurs on an as needed basis in areas overwashed by winter storms or damaged by vehicles.

The Acts of the Legislature that created and expanded Sylvania include a provision that the County may not make rules or regulations to “prohibit farmers from taking...kelp...or from operating vehicles thereon for the purpose of removing seaweed” (Chapter 510 of the Acts of 1946 and Chapter 631 of the Acts of 1954).

Cultural Resources

There are no cultural resource management practices unique to this property.

Recreation Resources

Recreation activities are solely managed by the County of Dukes County. The County has promulgated beach regulations and established a permitting system for parties and other special events. The most current version of this information is available on its web page (http://www.dukescounty.org/pages/dukescountyma_naturalresources/sylvia).

Kite flying and kite boarding are prohibited April 1–August 31; dogs and other pets are also prohibited from the beach during this period.

Infrastructure

Buildings and Structures

The County, with the assistance of volunteers, maintains the boardwalks.

Roads

Maintenance of Edgartown-Oak Bluffs Road is the responsibility of MassDOT.

Parking Areas

Maintenance of the North Inlet-Little Bridge parking lot is the responsibility of the County. The remaining parking spaces are located on MassDOT property.

Trails

Trails to the beach are maintained by the County with the assistance of volunteers.

Maintenance of the multi-use path, which is located on MassDOT property, is the responsibility of that agency.

Kiosks and Signs

There is no kiosk to update. Maintenance of the Barrier Beach interpretive sign is the responsibility of MassDOT.

11.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of Joseph A. Sylvania State Beach. Applied Land Stewardship Zoning recommendations provide general guidance for managing Sylvania. Future DCR activities and projects should be checked against the zoning map (Figure 11.2) for consistency. Management recommendations for Sylvania are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 11.2)

The following Land Stewardship Zoning is recommended for Joseph A. Sylvania State Beach. It is included for consistency among properties and among the Sections of this RMP. However, because stewardship of Sylvania is the responsibility of the County of Dukes County, the applicability of these recommendations to management is at the County's discretion.

Zone 1

The following sections of Sylvania have been designated Zone 1.

- Barrier beaches Ob-1 and Et-1.
- All salt marsh.

Zone 2

- Two small upland areas located in the southwest section of the park are designated Zone 2.

Zone 3

- The North Inlet – Little Bridge parking lot.
- The beach along Vineyard Sound, from the foredune to the low tide line. This area is intensively used for swimming and sunbathing.

Significant Feature Overlay

The following Significant Feature Overlay was developed to protect state listed beach-nesting birds.

- **Rare Shorebird Significance Overlay**, with NHESP management guidelines. This overlay covers piping plover nesting and foraging areas, and common and least tern nesting areas. Beach and dune closures within this overlay area may occur as needed and may expand or contract over time to protect resources.

Management Recommendations

Four priority management recommendations were developed for Joseph A. Sylvania State Beach. (Table 11.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.



Table 11.9.1. Priority recommendations for Joseph A. Sylvia State Beach.

Recommendation	Implementation ^a
Work with the Barrier Beach Task Force to ensure that future versions of the beach management plan meet the review requirements of E.O. No. 181.	P, R, X
Continue ongoing rare shorebird monitoring and management activities.	P, R
Survey the park's north boundary and establish permanent bounds to ensure that concessions permitted for outside the park are not situated in the park.	C, E
Work with the County of Dukes County to clarify issues regarding concessions in the park.	L

- a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

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Life Guard House and dunes of South Beach State Park. (See Appendix G for photo information.)

SECTION 12. SOUTH BEACH STATE PARK

12.1. INTRODUCTION

South Beach State Park is located in Edgartown, along Martha's Vineyard's south shore. (Figure 12.1) Access is via Katama and Herring Creek roads.

The park has approximately one mile of white sand beach on the Atlantic Ocean. This beach, its scenic wind-sculpted dunes and high-energy waves, easy public access, and absence of residency requirement or fees make South Beach popular with beachgoers. The same waves that attract recreationists are rapidly eroding the shore.

South Beach has long been a destination for recreation. In the 1870s, the area's natural grandeur was promoted to draw tourists to Edgartown (Martha's Vineyard Commission 1996). In the 1920s and 1930s the County acquired Norton Point Beach, which lies immediately east of today's state park. During the early 1940s, recreational use of the area was interrupted by World War II, which saw South Beach used as a naval gunnery range for aerial machine gun and rocket firing practice. Recreational use of the area resumed after the war, and in the 1970s the town of Edgartown began leasing portions of the beach for recreation purposes, while working to permanently protect the property. From 1983–

1988, with the support of the Town, the DEM acquired the parcels that constitute South Beach State Park.

In 1988, shortly after the park's establishment, the beach's past military use became an issue as erosion revealed unexploded ordnance (UXO) in the dunes and nearshore waters. Much of the property was temporarily fenced off from the public and more than 1,000 pieces of munitions debris and UXO were removed (Delbonis 1989); a process that involved the removal, reconstruction, and revegetation of some of the park's dunes. Wind and wave actions continued to reveal munitions debris. In 2009, the U.S. Army Corps of Engineers undertook surface and underwater operations to remove additional materials.

Since its establishment, the operation and management of South Beach State Park has been a cooperative effort between the DCR and the town of Edgartown, with the Town responsible for the day to day management and operation of the park.

South Beach's physical, political, and regulatory attributes are summarized below. (Table 12.1.1)



Table 12.1.1. Physical, political, and regulatory settings of South Beach State Park.

Setting	Name or Metric
Location:	Edgartown
Area (acres)^a:	104.53
Perimeter (miles)^a:	2.59
Landscape Designation(s)^b:	Parkland
Legislative Districts:	
House	Barnstable, Dukes, and Nantucket
Senate	Cape and Islands
Regulatory Designations:	Priority Habitat Coastal DCPC ^c Katama Airport DCPC Island Harbors and Highways DCPC ^c Island Road DCPC ^c Martha's Vineyard Lawn Fertilizer Control DCPC ^c

- a. Calculated using a Geographic Information System (GIS).
- b. For a summary of DCR's landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.
- c. Chapter 831 of the Acts of 1977 established the Martha's Vineyard Commission and allowed for the creation of Districts of Critical Planning Concern (DCPC).

Associated Properties. There are operational connections between South Beach and all DCR properties on Martha's Vineyard and Nantucket. The staff of Correllus serves as the point of contact for the town of Edgartown's operation of South Beach. They are also responsible for Correllus (Section 10), Sylvia state beach (Section 11), and Nantucket State Forest (Section 13), and assists Bureau of Fire Control and Forestry personnel with the management of the West Tisbury Fire Tower property (Section 15).

12.2. Natural Resources

Physical Features

South Beach is located on the Vineyard's south shore, atop the margin of the Martha's Vineyard outwash plain and coastal deposits. Interior portions of the park are located atop the former, and the southern portion of the park atop the latter, soils. An east-west oriented row of dunes parallels the shore.

Elevation changes quickly as you head northward, away from the shore. From sea-level, elevation rises to approximately 20 feet atop the row of primary

dunes. It then drops to approximately 10 feet behind the dunes and along Atlantic Drive. As you continue northward, up Herring Creek Road, the topography is nearly flat, with elevations reaching 18 feet at the adjacent Katama Air Park.

Between the mid-1800s and 1984, erosion along the south shore of Martha's Vineyard occurred at an estimated rate of 5.6 feet per year (Brouillette-Jacobson 2008). The open ocean continues to eat away at the park.

Water Resources

South Beach has abundant saltwater resources and no fresh water resources. There is approximately 5,100 feet of ocean frontage. The park's western boundary partially borders Crackatuxet Cove; it is here that South Beach's limited wetlands are located. Mattakeset Herring Creek originates at the Cove and flows eastward through the park. The creek allows for limited tidal exchange with Katama Bay, and the passage of anadromous fish (Robert L. Fultz & Associates 2002). A control structure on Town property at Herring Creek Road regulates the creek's water flow. The park's water resources are summarized in Table 12.2.1.

Table 12.2.1. Water resources of South Beach State Park.

Water Resource	Name or Metric
Watershed:	Islands
Aquifer:	Martha's Vineyard SSA
Lens	N/A
Rivers and Streams (miles)^a	0.56
Vernal Pools	
Certified (#)	0
Potential (#)	0
Wetlands (acres)^a	0.49
Lakes and Ponds (acres)^{a,b}	32.59

- a. Calculated using a Geographic Information System (GIS).
- b. Metric includes portions of Crackatuxet Cove and the ocean.

South Beach is susceptible to flooding, storm surge, and sea-level rise. (Table 12.2.2) The area adjacent to Crackatuxet Cove is susceptible to both 100 and 500-year floods, as is all of Mattakeset Herring Creek. Inundation associated with low-category hurricanes is predicted to come from Crackatuxet Cove to the west and Katama Bay to the east, rather than directly from the Atlantic Ocean. A Category 1 storm will flood the Mud Hole parking area, and a

Category 2 storm will flood all infrastructure except for one boardwalk and the central changing station. A Category 3 storm is predicted to flood all infrastructure, with only the crests of tall dunes and limited portions of Atlantic Drive above the water. A one foot rise in sea-level is predicted to impact only that portion of the park adjacent to Crackatuxet Cove.

Table 12.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to South Beach State Park.

Type of Impact	Acres	%
Flooding:		
100-year Storm	99.04	94.75
500-year Storm ^a	101.19	96.81
Hurricane Inundation:		
Category 1 Storm	11.94	11.42
Category 2 Storm ^b	42.23	40.39
Category 3 Storm ^b	68.95	65.95
Category 4 Storm ^b	73.23	70.05
Sea Level Rise	37.57	35.94

a. Cumulative value; includes 100-year storm impacts.

b. Cumulative value; includes impacts of all lower category storms.



Predicted hurricane inundation at South Beach State Park. Areas predicted to be inundated by Category 1 storms are represented in light green; additional areas inundated by Category 2, 3, and 4 storms are represented in dark green, yellow, and red, respectively. (See Appendix G for photo information.)

There are no barrier beaches.

Rare Species

State-listed Species

Twenty state-listed species are known from this park (Table 12.2.3); most are associated with the Katama Plains.

Table 12.2.3. State-listed species of South Beach State Park, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d
Bushy rockrose	P	SC
Chain dot geometer	I	SC
Coastal heathland cutworm	I	SC
Coastal swamp metarranthis	I	SC
Common tern	B	SC
Data-sensitive plant ^e	P	E
Grasshopper sparrow	B	T
Least tern	B	SC
Melsheimer's sack bearer	I	T
New England blazing star	P	SC
Northern harrier	B	T
Pink swallow moth	I	SC
Pink streak	I	T
Piping plover	B	T
Sandplain blue-eyed grass	P	SC
Sandplain euchlaena	I	SC
Sandplain flax	P	SC
Sandplain heterocampa	I	T
Seabeach knotweed	P	SC
Roseate tern ^e	B	E
Waxed swallow moth	I	SC

a. Presented alphabetically, by common name.

b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.

c. Types of state-listed species include: B = Bird; I = Insect; and P = Plant.

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

e. This species is also federally endangered.



South Beach and the adjacent Katama Plain provide habitat for state-listed species, such as this northern harrier. (See Appendix G for photo information.)

Priority Habitat

The entire property (100.0%) has been designated Priority Habitat under MESA.

Vegetation

There have been no comprehensive surveys of the flora of South Beach. In general, the dunes are dominated by American beach grass with other herbaceous plants (e.g., seaside goldenrod) present. In protected areas along the back dunes are clusters of trees and shrubs, such as pitch pine, eastern red cedar, northern bayberry, and rugosa rose.

Vegetation along the shore of Crackatuxet Cove was identified and described in Rizzo Associates, Inc. (1988). It includes a mixture of brackish and freshwater plants, such as prairie cordgrass, broadleaf cattail, and crimson eyed rosemallow.

Invasive Species

This property has not been surveyed; only two invasive plants are currently documented.

Table 12.2.4. Known invasive and likely invasive plants of South Beach State Park.

Species ^a	Status ^b	Source ^c
Japanese knotweed	I	1
Spotted knapweed	I	2

- Presented alphabetically, by common name.
- Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).
- Information contained in this table was obtained from the following sources:
 - Martha's Vineyard Commission (1996)
 - Dautreuil (2014)

Natural Communities

South Beach's natural communities extend from the Katama Plain southward to the open ocean. Along the way they transition from sandplain communities, to communities associated dunes, and finally to marine communities. Known community types are identified in Table 12.2.4.

Table 12.2.5. Known natural communities of South Beach State Park.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Maritime Beach Strand	T	S3	1
Maritime Dune	T	S2	1
Marine Intertidal: Gravel/Sand Beach	E	S4	1
Sandplain Grassland	T	S1	2
Sandplain Heathland	T	S1	2

- Classified according to Swain and Kearsley (2011).
- E = Estuarine, P = Palustrine, T = Terrestrial.
- The NHESP ranks communities from most rare (S1) to the most common (S5).
- Information contained in this table was obtained from the following sources:
 - Swain and Kearsley (2011).
 - Barbour (1993).

Katama Plains is considered to be one of the largest and best examples of the sandplain grassland community type in Massachusetts. It extends both westward and southward from the Katama Air Park into South Beach.

One or more additional community types occur in the park. A palustrine community occurs along the western edge of the park, where Mattakesett Herring Creek enters Crackatuxet Cove; this community has not been classified. Shrub communities commonly associated with protected areas on barrier beaches, such as Maritime Shrubland or Maritime Juniper Woodland/Shrubland, may be developing between Atlantic Drive and the dunes. One or more forested community types may be present adjacent to Garden Cove Road.

Forests

A limited amount of the park (23.22%) is forested; it is located west of Herring Creek Road and North of Atlantic Drive.

Wildlife

No formal surveys have been conducted. However the beach and associated sandplain grassland and heathlands are popular birding sites. As a result, good information exists on the birds of the South Beach area. As of November 2014, eBird (www.ebird.org) lists 55 species of birds for South Beach State Park and 103 for the adjacent Katama Airport. Observations at the park are primarily of sea

ducks, gulls, and other water birds; while observations from the airport include both resident and migrant seabirds, shorebirds, raptors, and songbirds.

12.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic landscapes, buildings, structures, and objects. An overview of significant events in the history of South Beach State Park is presented in Table 12.3.1. The park’s cultural resources are identified in Table 12.3.2.

Archaeological Resources

One pre-Contact site, a shell midden, is documented within the limits of the park. Only one systematic archaeological survey has been conducted in the area, a town-wide reconnaissance reported as MHC# 1957. South Beach has a moderate sensitivity for pre-Contact sites.

Historic Resources

South Beach has been largely undeveloped throughout the pre- and post-contact history of the island and little evidence of human impact remains. The beach became a recreational attraction in the mid- to late-nineteenth century as the island developed as a summer resort. In the 1940s the U.S. Navy developed the area as a gunnery range for aerial machine gun and rocket firing practice. A target car shelter, oval shaped target track, and other support features were developed within a few yards of the shore (UXB International, Inc. 2010). Most of the former range has been lost to erosion. A faint imprint of a small section of the oval target can be detected in aerial photos. However, no extant remains have been discovered from this period. The area has returned to its pre-war function as a popular recreational beach.

Table 12.3.1. Significant events in the history of South Beach State Park.

Year(s)	Events
1928	County commissioners are authorized to” take by eminent domain...or acquire by purchase, certain land at South Beach” for park purposes. (Chapter 68 of the Acts of 1928, Chapter 124 of the Acts of 1929, and Chapter 192 of the Acts of 1936). This land is now Norton Point Park, to the east of the state park.
1943	U.S. Navy leased approximately 264 acres for machine gun and rocket firing practice. An observation bunker, targets, and other support features were constructed within yards of the ocean.
1959	Observation bunker undermined by ocean.
1977	Town of Edgartown begins leasing western half of beach for park purposes.
1981	Edgartown town meeting approves the Commonwealth’s use of eminent domain to acquire South Beach properties.
1983	DEM acquires approximately 24 acres of beach, additional acquisitions and takings follow.
1985	DEM and town of Edgartown establish a Management Agreement for the park; this agreement is still in place.
1988	DEM acquires 53 acres of beach and portions of Katama Plain through an eminent domain taking.
1988	UXO exposed on shore and under water; a removal action follows. Dunes are restored and revegetated.
2000	Woods Hole Oceanographic Institution establishes the Martha’s Vineyard Coastal Observatory, portions of which are in the park.
2009	U.S. Army Corps of Engineers conducts a surface and underwater action to remove additional UXO and munitions debris.

Table 12.3.2. Cultural resources of South Beach State Park.

Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance ^h
Life Guard House	BU	-	4	M	S	E	-	1
Mattakesett Herring Creek Foundation	LA	ca. 1890	-	L	Y	-	-	2
	AR	-	6	L	N	-	-	3

- Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- Date of construction provided, when known.
- Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- Massachusetts Historical Commission inventory number.
- The following guidance is offered for the ongoing maintenance of these cultural resources:
 - Refer to Historic Building Maintenance BMP (DCR n.d.i).
 - Refer to Historic Landscapes - Built Features BMP (DCR n.d.g).
 - Refer to Archaeological Features BMP (n.d.k).

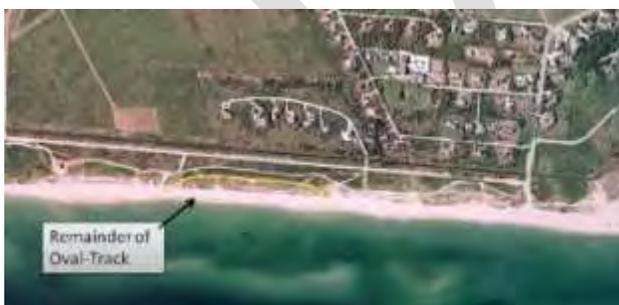
Historic Landscapes

The only historic landscape at South Beach is Mattakesett Herring Creek, which was dug in the 1890s in order to provide spawning herring passage to Great Pond (Robert L. Fultz and Associates 2002). It allowed for the continuation of a herring fishery which had existed since the earliest years of European settlement on the island. The distinctly straight line of the creek maintains its integrity of shape and form. Culverts under Herring Creek and Katama roads were replaced in 2002 as part of a project to restore the hydrological connection between Katama Bay and Edgartown Great Pond.

Buildings

A cinderblock and concrete foundation is located near the Mattakesett Herring Creek as it enters Crackatuxet Cove. The building was most likely constructed in the mid-twentieth century; however more research is required to determine its origin and purpose.

The only intact historic building at South Beach is the Life Guard House. The simple gable-front shingled building was built after 1952; more research is required to determine whether the



Aerial images of South Beach in 1952 (top) and 2010 (bottom). The oval target system from the naval gunnery range is intact and visible in the top photo; much of it had washed away by 2010. From Funk et al. (2011). (See Appendix G for photo information.)

building could have been possibly moved from another location.

Structures

There are no historic structures.

Objects

There are no historic objects.

12.4. RECREATION RESOURCES

The park's recreation activities are largely beach dependent, including:

- Fishing, fin fish
- Kite flying (in designated areas)
- Nature study
- Sunbathing
- Surfing
- Swimming

South Beach's greatest recreational asset is its beach, which is guarded seasonally. Water quality is tested monthly during the beach season at three locations: West (i.e., the southern extension of Herring Creek Drive); East (i.e., the southern extension of Katama Road), and Middle (i.e., approximately halfway between the other two sampling points). There have been no exceedances of Enterococcus bacteria standards recorded since monthly sampling began.



A surfer rides the high-energy waves off South Beach. (See Appendix G for photo information.)

12.5. INFRASTRUCTURE

Property Boundary

South Beach's southern and eastern boundaries are readily identifiable. The former is the ocean, and the latter is the southern extension of Katama Road. (Figure 12.1) A portion of the northern boundary is located along the south shoulder of Atlantic Drive, and is readily identifiable by the presence of a split-rail fence. However, as the property line shifts north of Atlantic Drive the fence does not, giving a false impression of the park's boundary. The western boundary abuts private property, municipal land, and MassWildlife land; it is not posted or otherwise identifiable on the ground.

Buildings and Structures

The park's buildings and structures are primarily associated with recreation. (Table 12.5.1) The changing stations are universally accessible, and contain areas for the seasonal placement of portable toilets.



Example of changing stations used at the east and west entrances to South Beach. (See Appendix G for photo information.)

Non-recreation-related infrastructure includes a shed and mast associated with the Martha's Vineyard Coastal Observatory. The shed contains equipment and fiber optic cables that link two offshore sub-sea sensor platforms to an unmanned shore laboratory located at the Katama Air Park; the mast supports a variety of meteorological equipment (Austin et al. 2000). They are located in the park because it is a convenient location for the cables to come ashore, and for placement of the observatory's meteorological sensors. They have neither a positive nor negative impact on the park or its use.

Table 12.5.1. Non-historic buildings and structures of South Beach State Park.

Location and Infrastructure	Date ^a	Condition ^b	In Use ^c	Utilities ^d
Changing Building – West	ca. 2013	1	S	-
Martha’s Vineyard Coastal Observatory - Shed	ca. 2000	-	Y	E
Martha’s Vineyard Coastal Observatory - Mast (10 m)	ca. 2000	-	Y	-
Boardwalk	1995	3	S	-
Changing Building - Central	1996	4	S	-
Boardwalk	1995	3	S	-
Changing Building - East	ca. 2013	1	S	-

- a. Date of construction provided, when known.
- b. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- c. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.
- d. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- e. Infrastructure located on DCR property, but not owned or controlled by the DCR. Its condition is not assessed.

Roads

Three paved municipal roads border, and are partially located in, the park: Herring Creek Road; Atlantic Drive, and Katama Road. All three have dirt extensions into the park. Additional dirt roads are associated with the Life Guard House; an old military roadway north of and parallel to the dunes; and the Herring Creek Road parking lot. The extent and condition of paved and unpaved roads are identified in Table 12.5.2.

In the winter of 2004, the average daily traffic volume for Katama Road at South Beach was 832 vehicles; the following summer it was 1,726 vehicles. This is the most recent time period for which data are available (<http://www.mvcommission.org/>).

Table 12.5.2. Condition and length of roads at South Beach State Park.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	0.05	0.60
Fair	0.00	0.26
Poor	0.00	0.00
Total	0.05	0.86

- a. Based on field assessment; all distances calculated using GIS.

Parking

There is parking for 462 vehicles; most (59.3%) in designated lots. (Table 12.5.3) There are two main lots, the “Mud Hole” and a grass lot located off Herring Creek Road. A seven-space, accessible lot is located adjacent to the east changing station. Although the number of accessible spaces is correct for the total number of spaces in the park, there are no accessible aisles or van accessible spaces. All roadside parking is along the north side of Atlantic Drive. Four bicycle racks are located near the intersection of Atlantic Drive and Herring Creek Road, and an additional rack is located in the park approximately halfway between the central and east changing buildings.

In the past, additional parking was allowed in the park, along road shoulders near South Beach, and off-site at Katama Farm. This information is included in Table 12.5.3 to allow for comparison between current conditions and conditions at the time of the 1996 Management Plan (Martha’s Vineyard Commission 1996). Since then, park goers have been encouraged to use alternative forms of transportation. Martha’s Vineyard Transit Authority bus stops are located near both the east and west changing buildings.

Seasonal employee parking is located adjacent to the Life Guard House; there is no formal lot or designated spaces.

Table 12.5.3. Number of public parking spaces, by location and type, at South Beach State Park in 2014 and 1996.

Location			2104	1996
	HP	Other	Total	Total ^a
Within Park				
The "Mud Hole" ^b	0	73	73	131
Left Fork lot ^c	7	0	7	35
Right Fork lot ^d	0	0	0	25
Herring Creek Road – south ^{e, f}	0	0	0	28
Grass lot – off Herring Creek Road ^b	0	194	194	200
<i>Sub-total</i>	7	267	274	419
Roadside and Municipal				
Herring Creek Road – north of Atlantic Drive ^f	0	0	00	156
North side Atlantic Drive – parallel parking ^e	0	150	150	189
North side Atlantic Drive – angled parking ^g	0	38	38	38
Katama Road – shoulder parking, both sides ^f	0	0	0	104
Katama Farm ^f	0	0	0	300
<i>Sub-total</i>	0	188	188	787
Total	7	455	462	1,206

- a. From Martha's Vineyard Commission (1996).
- b. Number of spaces based on 9 by 18-foot spaces with 24-foot aisles between rows.
- c. Number of spaces based on posted HP signs and 9 by 18-foot spaces with 8-foot access aisle.
- d. Lot currently unmarked and unsigned for any use.
- e. Based on 8 by 24-foot parallel parking space dimensions.
- f. Parking is no longer allowed at this location (Wortman 2014).
- g. Based on 60° angled parking with 10.5 by 21-foot spaces.



HP parking at Left Fork lot; note the absence of pavement markings, access aisles, and signs identifying van accessible spaces. (See Appendix G for photo information.)

Trails

Multiple trails extend from Atlantic Drive to the shore. The condition and extent of these trails are identified in Table 12.5.4.

Table 12.5.4. Condition and length of official trails at South Beach State Park.

Trail Condition	Length (Miles)
Good	0.37
Fair	0.44
Poor	0.25
Total	1.06

Kiosks and Signs

There are no signs that identify the park's name or that it is owned by the DCR and operated by the town of Edgartown. There are also no kiosks.

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are no known memorials or markers.

12.6. INTERPRETATION

There is no interpretive programming.

Three different interpretive signs are displayed at various entrance points, they are:

- Caution: Endangered Birds Ahead (2 locations)
- Former Moving Target Machine Gun Range at South Beach (4 locations)
- Please Help Protect the Dunes (5 locations)

The Endangered Birds and Dune signs are used elsewhere in the Complex. The Former Moving Target sign is unique to South Beach. It explains the site's past military use, includes photos of the types of ordnance encountered in the area, and identifies what to do if you find unexploded ordnance.



Interpretive panels inform the public of South Beach’s past use as an aerial target range, and identify what to do in the event that they encounter unexploded ordnance. (See Appendix G for photo information.)



Ordnance, such as this rocket motor, has been removed from much of the park and adjacent sub-tidal areas. However, the potential exists for additional ordnance to still be present. (See Appendix G for photo information.)

The town of Edgartown also posts information on what to do if you get caught in a rip current; these signs are temporary.

12.7. MANAGEMENT RESOURCES

South Beach is owned by the DCR and managed by the town of Edgartown. It is the Town’s Park and Recreation Commissioners that are responsible for the management of this park.

Staffing

DCR Personnel

The Forest and Park Supervisor III at Correllus serves as the point of contact for the town of Edgartown for issues related to the management of South Beach.

Partnerships and Volunteers

The town of Edgartown and DCR are partners for the maintenance and operation of this park. There is no friends group.

Public Safety

The Edgartown Fire Department provides fire response and emergency services. Law enforcement is provided by the Edgartown Police Department.

The U.S. Army Corps of Engineers has conducted a series of “Time Critical Removal Actions” for military ordnance at the former Moving Target Machine Gun Range at South Beach.

Funding

Conservation Trust Fund

There are no Conservation Trust Funds.

Retained Revenue

This property does not generate revenues.

Other Revenues

A 1985 Management Agreement between the town of Edgartown and the DEM allows the collection of a daily parking fee. Revenues in excess of the Town’s annual operating expenses for the beach, are payable to the Commonwealth’s General Fund. The Town has never collected a parking fee.

12.8. MANAGEMENT PRACTICES

The Town manages the park under the terms of a nearly 30-year old annual, self-renewing management agreement (Table 12.8.1). In this agreement, the DCR “agrees, at its own expense” to provide:

- Essential capital improvements to the beach, such as, but not limited to, well-defined parking areas, rest room facilities, and first aid stations.
- Staff consulting services to the Town, when requested, in the areas of management, maintenance, interpretive programming, planning and design.
- Current salary schedules, park rules and regulations, and user fee schedules to the Town.

In addition, the DCR provides \$5,000 to the Town to defray the costs of leasing and maintaining portable toilets at the beach. This amount covered approximately half the cost of portable toilets in 1985; today it covers less than twenty percent of the cost. An updated agreement was drafted in 2007; it has not been endorsed.

Table 12.8.1. Key legal agreements for South Beach State Park.

Party and Subject of Agreement	Type^a	Expiration Date^b
Town of Edgartown Management Agreement (1980)	A	N/A
Town of Edgartown Management Agreement (1985)	A	N/A
Town of Edgartown 2007 Draft; not signed by either party.	U	-

- a. Agreement types include: A=Memorandum of Agreement; E=Easement; L=Lease; and U=Memorandum of Understanding.
 b. Year that agreement expires. Permanent agreements are indicated by an expiration date of "None."

Only one management plan has been developed for the park (Table 12.8.2); it was never formally adopted. It is unclear how much of this plan was implemented and remains in effect.

Table 12.8.2. Key management and guidance documents for South Beach State Park.

Author and Document	Year
Martha's Vineyard Commission 1996 Management Plan for South Beach, Edgartown, Massachusetts.	1996

Annual Maintenance

An annual maintenance schedule is unavailable for this park.

Natural Resources

Water Resources

The Town is responsible for the maintenance of Mattakesett Herring Creek, and culverts and water control structures beneath Herring Creek Road.

Rare Species

State-listed shorebirds are monitored and managed by the Massachusetts Audubon Society under a

system-wide agreement between that organization and the DCR. Audubon field personnel periodically monitor South Beach for the presence of piping plovers and terns, which are known to nest on private land immediately west of the park.

Invasive Species

There are no known monitoring or management activities.

Vegetation

The town of Edgartown manages vegetation along the shoulders of Atlantic Drive, and Herring Brook and Katama roads.

Because the entire park is Priority Habitat, all vegetation management not occurring within 10-feet of a paved road (e.g., mowing the grass parking lot west of Herring Creek Road) requires review under MESA.

Cultural Resources

There are no cultural resource management practices unique to this property.

Recreation Resources

The town of Edgartown promulgates and posts rules and regulations for the operation of all public park and beach areas under its jurisdiction, including South Beach. The following regulations were in effect during the 2014 beach season:

- No wood, paper, or fibrous fires are permitted.
- No child under the age of 12 may use the beach unless accompanied by a person 16 years or older who will be responsible.
- Surfing and sailing shall be permitted in designated areas.
- Two-wheel vehicles, motorcycles, minibikes, mopeds, ATVs and ATCs are absolutely prohibited on all beach and park areas. No towing of paragliders is permitted. [This rule does not apply to beach operations; lifeguards use ATVs to patrol the beach.]
- The consumption of alcoholic beverages is prohibited.
- Fishing or surfcasting in patrolled beach areas is permitted only in those sections so designated.

- Dogs or other pets are not allowed on beach areas.
- Interfering with the duties of any park employee is not permitted.
- The landing and launching of boats within swimming areas is prohibited.
- Kite flying, ball playing, and related activities will be permitted in designated areas only.
- All Park Department properties close at 12 A.M.
- All appropriate Town Bylaws will be enforced.

South Beach is staffed from late June through Labor Day. The beaches are guarded, and beach wheelchairs and portable toilets are available during this time period. Organized events are not allowed.

Infrastructure

Under the 1985 Management Agreement, the DEM is responsible for providing “essential capital improvements, such as, but not limited to, well defined parking areas, rest room facilities, and first aid stations, to the beach before and during its opening *as may be provided by appropriation.*” The town of Edgartown has “complete responsibility for the year round management, operation, and maintenance of” South Beach, and is to provide, *subject to appropriation*, all equipment, materials, and supplies necessary for the proper management, operation, and maintenance of” South Beach. Among the Town’s infrastructure-related responsibilities specified in the agreement is providing “public toilet facilities during the swimming season.”

Buildings and Structures

The construction and maintenance of structures is a cooperative effort between the Town and the DCR. Boardwalks and changing buildings were constructed with DCR-purchased materials and a combination of Town and DCR labor.

Roads

Maintenance of Herring Creek Road, Atlantic Drive, and Katama Road is the responsibility of the Edgartown Highway Department. The Town also rebuilds the dunes at the southern end of Katama and Herring Creek Roads after the beach season, in anticipation of winter storms.

Parking Areas

Capital improvements to “well defined parking areas” are the responsibility of the DCR, ongoing maintenance is the responsibility of the Town.

Trails

Maintenance of trails and walkways is performed by the Town.

Kiosks and Signs

There is no kiosk to update. The Town posts and maintains beach regulation signs and rip current warning signs. The 1985 Management Agreement is silent on who is responsible for maintaining interpretive signs.

12.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of South Beach State Park. Applied Land Stewardship Zoning recommendations provide general guidance for managing the park. Future activities and projects should be checked against the zoning map (Figure 12.2) for consistency. Management recommendations for South Beach are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning (Figure 12.2)

The following Land Stewardship Zoning is recommended for South Beach State Park.

Zone 1

The following sections of South Beach have been designated Zone 1.

- All dune areas from the foredune northward to Atlantic Drive.



Zone 2

- Portions of the park north of Atlantic Drive.

Zone 3

- The beach, from the foredune to the low tide line. This area is intensively used for swimming and sunbathing.
- The Life Guard House and adjacent altered areas.
- Formal parking areas, including the Mud Hole and paved areas adjacent to the east and west Changing Buildings.

Significant Feature Overlay

There are no Significant Feature Overlays.

Management Recommendations

Three priority management recommendations were developed for South Beach State Park. (Table 12.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

Table 12.9.1. Priority recommendations for South Beach State Park.

Recommendation	Implementation^a
Work with the town of Edgartown to prepare and submit a Habitat Management Plan, for mowing the parking area west of Herring Creek Road, to the NHESP for review.	P, R
Work with the town of Edgartown to develop an updated Memorandum of Understanding for the operation and management of South Beach State Park.	L, R, V
Add pavement markings and “Van Accessible” signs to accessible spaces in the lot adjacent to the East changing building.	C, R, V

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

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Disc golf course at Nantucket State Forest's South Pasture. (See Appendix G for photo information.)

SECTION 13. NANTUCKET STATE FOREST

13.1. INTRODUCTION

Nantucket State Forest is located in the center of the town, and island, of Nantucket. (Figure 13.1) It was acquired from the Nantucket Civic League as two separate reforestation lots; the South Pasture parcel in 1913 and the North Pasture parcel in 1919 (Mason 2003). The South Pasture is accessed via Rugged Road, Ticcoma Way, and Lovers Lane; and the North Pasture via Polpis, Milestone, and Hinsdale roads.

Forest management, including the establishment of pine plantations began in the late 1920s or early 1930s (Mason 2003). It was believed that softwoods would be economically viable to produce, and additional plantations were established in the 1950s or 1960s. However, storm and insect damage, disease, and weak local markets for the forest's wood made commercial forestry unfeasible. In 1980, consideration was given to converting the forest's pine plantations to hardwoods and red cedar in order to meet local demand for firewood, fence posts, and pilings. This was not done. Instead, forest management shifted toward passive recreation, forest aesthetics, the protection and enhancement of

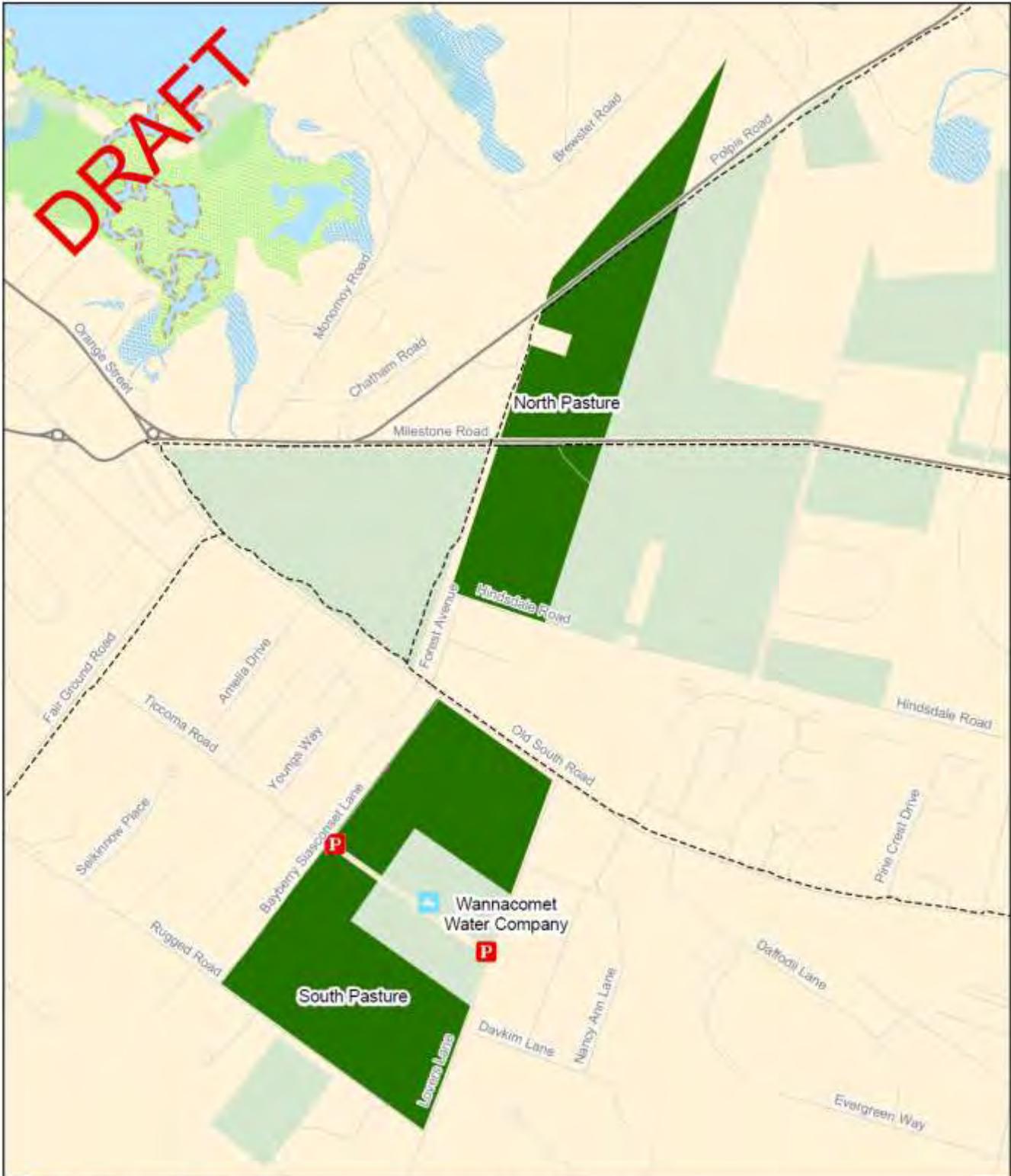
wildlife habitat, and the protection of rare plants (Mason and McNamara 1980).

The 1980s and 1990s saw a municipal presence in the forest. In 1980 the town of Nantucket and the DEM entered into a joint management agreement for the forest, allowing municipal departments to help implement the 1980 Management Plan (Mason and McNamara 1980). In 1991, municipal bike paths were extended through the forest. Five years later, 17.07 acres were sold to the town for the creation of a public water supply system; this was the first change in the size of the forest since acquisition of the North Pasture parcel.

In 2010, the forest once again underwent a major transformation when construction began on an 18-hole disc golf course. The course, which opened in 2012, covers nearly all of the South Pasture and adjacent municipal water supply land. Disc golf is perhaps the most popular and best known recreation activity in the forest, and has become emblematic of Nantucket State Forest.

Nantucket State Forest's physical, political, and regulatory attributes are summarized below. (Table 13.1.1)

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Nantucket State Forest

Figure 13.1.

0 500 1,000
Feet

Geographic information provided by MassGIS and DCR GIS.



Table 13.1.1. Physical, political, and regulatory settings of Nantucket State Forest.

Setting	Name or Metric
Location:	Nantucket
Area (acres)^a:	117.91
Perimeter (miles)^a:	4.67
Landscape Designation(s)^b:	Parkland
Legislative Districts:	
House	Barnstable, Dukes, and Nantucket
Senate	Cape and Islands
Regulatory Designations:	Priority Habitat

- a. Calculated using a Geographic Information System (GIS).
 b. For a summary of DCR’s landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>.

Associated Properties There are operational connections between Nantucket State Forest and DCR properties on Martha’s Vineyard. The Forest and Park Supervisor III at Correllus is responsible for the management and operation of Nantucket State Forest. They are also responsible for Correllus (Section 10), Sylvia state beach (Section 11), South Beach (Section 12), and assisting Bureau of Fire Control and Forestry personnel with the management of the West Tisbury Fire Tower property (Section 15).

13.2. NATURAL RESOURCES

Physical Features

The forest is located atop a glacial outwash plain. Elevations range from 29 to 48 feet for the South Pasture, to approximately 40 to 50 feet for the North Pasture.

Water Resources

Nantucket State Forest is entirely uplands; there are no surficial water resources. (Table 13.2.1)

Table 13.2.1. Water resources of Nantucket State Forest.

Water Resource	Name or Metric
Watershed:	Islands
Aquifer:	Nantucket SSA
Lens	N/A
Rivers and Streams (miles)	0.00
Vernal Pools	
Certified (#)	0
Potential (#)	0
Wetlands (acres)	0.00
Lakes and Ponds (acres)	0.00

The absence of water resources, combined with the forest’s location more than 2,200 feet from the ocean, result in low susceptibility to flooding, storm surge, and sea-level rise. There are no predicted impacts. (Table 13.2.2)

Table 13.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to Nantucket State Forest.

Type of Impact	Acres	%
Flooding:		
100-year Storm	0.00	0.00
500-year Storm ^a	0.00	0.00
Hurricane Inundation:		
Category 1 Storm	0.00	0.00
Category 2 Storm ^b	0.00	0.00
Category 3 Storm ^b	0.00	0.00
Category 4 Storm ^b	0.00	0.00
Sea Level Rise	0.00	0.00

- a. Cumulative value; includes 100-year storm impacts.
 b. Cumulative value; includes impacts of all lower category storms.

Rare Species

State-listed Species

Nine state-listed species are known from the state forest. (Table 13.2.3)

Table 13.2.3. State-listed species of Nantucket State Forest, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d
Barrens buckmoth	I	SC
Barrens daggermoth	I	T
Chain dot geometer	I	SC
Coastal swamp metarranthus	I	SC
Long-eared owl	B	SC
Melsheimer's sack bearer	I	T
Pink sallow moth	I	SC
Sandplain heterocampa	I	T
Waxed sallow moth	I	SC

- a. Presented alphabetically, by common name.
- b. Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.
- c. Types of state-listed species include: B = Bird; and I = Insect.
- d. Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.

Priority Habitat

Approximately one-third of the forest (36.24%) has been designated Priority Habitat under MESA. This in the southern end of South Pasture, all of North Pasture between Hinsdale and Milestone roads, and a small portion of the North Pasture north of Milestone Road.

Vegetation

There have been no comprehensive surveys of the flora of Nantucket State Forest.

The forest's vegetation is a mixture of native and non-native species that reflects its management history. Plantations of non-native white, Scots, and red pine were established in the 1920s and 1930s (Mason 2003). Japanese black pine, Scots pine, and larch were planted in the 1960s. Many of these non-native pines are now dead or dying, creating a fire hazard. The 1970s saw experimental plantings of hardwood species, such as sycamore maple. The more natural areas of the forest are dominated by pitch pine and black oak, with an understory of scrub oak, viburnums, black huckleberry, and lowbush blueberry (Mason 2003, Freeman 2012). The creation of a disc golf course in 2011, and its subsequent maintenance, has further modified the forest's vegetation.

Invasive Species

Only two invasive plants have been documented (Table 13.2.4); other invasives are likely. In 1983, 100 black locust and 100 Norway maples were planted in the forest (Mason 1983), the status of these invasive trees is undetermined at this time. Two potentially invasive plants, a honeysuckle and an olive, have also been observed.

Table 13.2.4. Known invasive and likely invasive plants of Nantucket State Forest.

Species ^a	Status ^b
Oriental bittersweet	I
Sycamore maple	I

- a. From Mason, (2003); presented alphabetically, by common name.
- b. Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).

Natural Communities

There have been no formal surveys of natural communities. Only one community type has been identified; it is uncommon in Massachusetts. (Table 13.2.5)

Table 13.2.5. Known natural communities of Nantucket State Forest.

Community Type ^a	System ^b	State Rank ^c	Source ^d
Pitch Pine-Scrub Oak	T	S2	1

- a. Classified according to Swain and Kearsley (2011).
- b. E = Estuarine, P = Palustrine, T = Terrestrial.
- c. The NHESP ranks communities from most rare (S1) to the most common (S5).
- d. Information contained in this table was obtained from:
 1. Mason (2003).

Forests

Nantucket State Forest is 81.58% forested. See Vegetation, above, for additional information.

Wildlife

No formal surveys have been conducted; however, information is available on the forest's birds. As of November 2014, e-Bird (www.ebird.org) reported 52 species.

13.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic landscapes, buildings, structures, and objects. An overview of significant events in the history of Nantucket State Forest is presented in Table 13.3.1. The forest’s cultural resources are identified in Table 13.3.2

Archaeological Resources

The Massachusetts Historical Commission’s Historic Inventory of Nantucket has not been completed. The summary/assessment below is based on archaeological surveys undertaken in the area of the forest.

For a landform as small as Nantucket there are a remarkably high number of Pre-Contact sites. Over 150 sites have been discovered by collectors and professional archaeologists. For most of these sites little more than location is known, but it is apparent from the collections that people were here from Early Archaic times (ca 9,000 years ago) right up until present. Sites tend to be clustered around the coastal fringes of the island and around the margins of many ponds, some are burials, many are isolated artifacts found within areas of poor integrity.

Four pre-Contact sites have been recorded within the Nantucket State Forest however many additional sites abut or are in close proximity, and five systematic archaeological surveys have been conducted within portions of the forest. In the South Pasture an intensive locational archaeological survey was undertaken in 2009 in advance of building the disc golf range. This survey uncovered no significant intact sites because of its’ previous agricultural land-use and associated history of cultivation.

Because the occupation of Nantucket spans over 9,000 years, there is no doubt that the forest was traversed or frequented by Native Americans during that time. The forest is considered to have moderate to high archaeological sensitivity. Except for areas that have been developed or disturbed, there are few places on Nantucket that would not meet this threshold of sensitivity.

Historic Resources

Access to Nantucket Sound fisheries has drawn settlers to Nantucket from pre-Contact through the twentieth century; however poor soils made the island a less than ideal location for agricultural development. The area comprising Nantucket State Forest was used for centuries as pastureland, and no permanent evidence remains of human activity except for the trees planted in the twentieth century

Table 13.3.1. Significant events in the history of Nantucket State Forest.

Year(s)	Events
1913	South Pasture parcel acquired.
1919	North Pasture parcel acquired.
1920s-1930s	White, Scots, and red pines planted. This was followed in the 1960s by plantings of Japanese black pine, larch, and additional Scots pine. Experimental planting of hardwoods follows in the late 1970s.
1955	Legislature directs the Division of Forests and Parks to remove fire hazards from, and replant trees in, Nantucket State Forest. (Chapter 319 of the Acts of 1955)
1980	DEM assigns the care of Nantucket State Forest to the town of Nantucket on an annual renewable basis. After several years, this assignment is not renewed.
1991	Agreement to expand municipal bike paths through forest is formalized.
1992	Legislature authorizes conveyance of a portion of Nantucket State Forest to the town of Nantucket for public water supply purposes. In return, the town is to provide at least one hydrant for fire suppression purposes and provide necessary pipe and hook-up equipment to provide management and recreational facilities within the forest with potable water free of cost. (Chapter 355 of the Acts of 1992)
1996	Approximately 17 acres of forest sold to the town of Nantucket for water supply purposes.
2009	Nantucket Disc Golf, Inc. is established.

Table 13.3.2. Cultural resources of Nantucket State Forest.

Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance ^h
Nantucket Historic Landmark District	NRHD	17 th -20 th c.	-	-	-	-	NAN.D	-
Nantucket Local Historic District	LHD	17 th -20 th c.	-	-	-	-	NAN.C	-
<i>Additional Resourcesⁱ</i>								
<i>Mr. Hall's summer cottage</i>	AR	-	-	U	-	-	-	I

- a. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; NRHD = National Register Historic District; OB = Object; and ST = Structure.
- b. Date of construction provided, when known.
- c. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- d. Integrity is a relative assessment of the condition of a resource's retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- e. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- f. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- g. Massachusetts Historical Commission inventory number.
- h. The following guidance is offered for the ongoing maintenance of these cultural resources:
 1. Refer to Historic Landscapes - Built Features BMP (DCR n.d.g).
- i. Documented through the 1984/1985 Cultural Resources Evaluation Project but not yet field verified or confirmed.

Buildings

There are no historic buildings, landscapes, objects or structures located within Nantucket State Forest. Only modern disc-golf course related objects (i.e., signs, benches, baskets, and tee boxes) are present.

The forest is located entirely within the Nantucket Historic District, which is both a National Register District and a locally designated district. Review of any projects by MHC and the Nantucket Historic Districts Commission should be coordinated through OCR.

13.4. RECREATION RESOURCES

The South Pasture is home to the Nantucket Disc Golf Course. This course is located on both DCR and Wannacomet Water Company land to both the north and south of Ticcoma Way. It is used year-round, weather permitting, and is promoted as “always open, always free.” The Nantucket Disc Golf Open, held each June, attracts approximately 75 professional and amateur players and has a purse of \$5,000.

Municipal bike paths run on, and adjacent to, the North Pasture. Approximately 2,800 feet of paved bike path (i.e., Polpis Bike Path and Milestone Connector) is located in the forest. An additional 750 feet of bike path abut the forest (i.e., Milestone Bike Path).



Portions of the Island's municipal bike path pass through the forest. (See Appendix G for photo information.)

The following authorized recreation activities known to occur in the forest.

- Bicycling, street (bike path only)
- Bicycling, mountain
- Disc golf (18 holes)
- Dog walking
- Geocaching (1 cache as of November 2014)
- Hiking/walking
- Hunting
- In-line skating (Bike path only)
- Nature study
- Running/jogging



A disc golfer tees off at Nantucket State Forest. (See Appendix G for photo information.)

13.5. INFRASTRUCTURE

The forest has little infrastructure.

Property Boundary

The North Pasture property is bounded on the west and south by roads; on the east by protected open space; and on the north by residential properties. The South Pasture is bounded by public and private roads. Both sections have government inholdings; the U.S. Government in the North Pasture and the Wannacomet Water Company in the South Pasture.

Buildings and Structures

There are no non-historic buildings or structures.

Roads

There are no internal park roads. (Table 13.5.1) However, a private driveway for Nantucket Islands Land Bank's Holdgate Field and Trails property passes through the North Pasture. In addition, two municipal roads (i.e., Milestone and Polpis) pass through the North Pasture. Ticcoma Way, a municipal road passes through the South Pasture; it is gated at each end.

Table 13.5.1. Condition and length of roads at Nantucket State Forest.^a

Road Condition	Paved (Miles)	Unpaved (Miles)
Good	0.00	0.00
Fair	0.00	0.04
Poor	0.00	0.00
Total	0.00	0.04

a. Based on field assessment; all distances calculated using GIS.

Parking

Two parking lots are located off Ticcoma Way. (Table 13.5.2). They are not in the state forest, but are located within the road's right of way. The western lot is unimproved and located beside an entry gate; it is used primarily by dog walkers. The eastern lot is constructed of maintained gravel; it is surrounded by a formal split-rail fence. The eastern lot it is the main parking area for forest visitors and is used primarily by disc golfers.

Table 13.5.2. Number of public parking spaces, by location and type, adjacent to Nantucket State Forest.

Location	HP	Other	Total
Ticcoma Way – West ^{a, b}	0	3	3
Ticcoma Way – East ^{a, b}	0	17	17
Total	0	20	20

a. Number of spaces based on the number of potential 9-foot wide spaces.

A 16-bike bicycle rack is located on Wannacomet Water Company property north of Ticcoma Way. It was placed there by Nantucket Disc Golf, Inc. (NDGI).

Trails

Nantucket State Forest lacks a formal trail system, but trails are present in some portions of the park. A segment of Nantucket Islands Land Bank's

Milestone Trail extends from land bank property westward into the North Pasture. A series of trails are present in the South Pasture nearly all are associated with the disc golf course. The condition and extent of the forest's trails are identified in Table 13.5.4.

Table 13.5.3. Condition and length of official trails at Nantucket State Forest.^a

Trail Condition	Length (Miles)
Good	1.66
Fair	0.29
Poor	0.00
Total	1.95

a. Trails between disc golf course holes were not included in this assessment.

Kiosks and Signs

There are no kiosks. A kiosk for the Nantucket Disc Golf Course is located in the Ticcoma Way – East parking lot, off DCR property.

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are no known memorials or markers in the forest. An engraved stone marker for the Nantucket Disc Golf Course is located at the entrance to the Ticcoma Way – East parking lot, off DCR property.

13.6. INTERPRETATION

No interpretive programming is offered at Nantucket State Forest.

13.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

The Forest and Parks Supervisor III at Correllus is responsible for the management of Nantucket State Forest.

Partnerships and Volunteers

NDGI is responsible for maintaining the disc golf course. As of November 2014, NDGI has a paid, part-time (10 hours/week) employee on site to maintain the course.

Town of Nantucket municipal personnel are responsible for maintaining the municipal bike path that runs through the forest.

Public Safety

The Nantucket Fire Department provides fire response and emergency services. Law enforcement is provided by the Massachusetts Environmental Police, Nantucket Police Department, and the Massachusetts State Police.

Funding

Conservation Trust Fund

There are no Conservation Trust Funds.

Retained Revenue

This property does not generate retained revenues.

Other Revenues

NDGI is a non-profit organization that raises funds through donations and tournament and mini-tournament fees. A portion of the fees go to course upkeep.

13.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs (e.g., Table 13.3.2), legal agreements, and institutional knowledge. This section describes those practices unique to the management of Nantucket State Forest.

Legal agreements unique to the forest are presented in Table 13.8.1.

Table 13.8.1. Key legal agreements for Nantucket State Forest.

Party and Subject of Agreement	Type^a	Expiration Date^b
Town of Nantucket Assigned care of Nantucket State Forest to the town on an annual renewable basis.	A	1980
Town of Nantucket Amendment #1- Allowed construction of a paved 8-foot wide municipal bike path in the state forest.	A	1991
Town of Nantucket Amendment #2- Allowed construction of a paved 10-foot wide municipal bike path in the state forest.	A	2004
Nantucket Disc Golf, Inc. Development and maintenance of a disc golf course.	U	2011

a. Agreement types include: A: Memorandum of Agreement; and U=Memorandum of Understanding.

b. Year that agreement was signed.

The town of Nantucket is responsible for providing “the necessary hook-up equipment to provide management and recreational facilities within Nantucket State Forest with potable water free of cost.” (Chapter 355 of the Acts of 1992) This has been provided by the Wannacomet Water Company.

Key park management documents are identified in Table 13.8.2.

Table 13.8.2. Key management and guidance documents for Nantucket State Forest.

Author and Document	Year
Gannett Fleming, Inc. Environmental Audit Report: Nantucket State Forest, Nantucket, Massachusetts.	1998 ^j
Mason, A. Forest Management Plan for the Nantucket State Forest.	2003
Rassman, J. RE: Proposed restoration project on Nantucket State Forest.	2006 ^b
French, T. W. File # 06-16393; Project name: Restoration of Nantucket State Forest.	2006
Department of Conservation and Recreation, and Nantucket Disc Golf, Inc. Construction & Maintenance Guidelines for Nantucket Disc Golf (NDG) Course.	2011 ^a
Freeman, R. South Pasture, Nantucket State Forest Habitat Management Plan. NHESP Tracking No. 09-27018.	2012

Annual Maintenance

No DCR annual maintenance schedule is available for this park.

Natural Resources

Water Resources

Due to the absence of surficial water resources, there are no management or maintenance activities for this park.

Rare Species

The disc golf course is managed by NDGI in accordance with the terms of an NHESP approved Habitat Management Plan (HMP; Freeman 2012).

Invasive Species

Under the terms of the Construction and Maintenance Guidelines, invasive honeysuckles are to be removed by NDGI (DCR and NDGI 2011^a). Small honeysuckles are to be hand pulled, and larger plants are to be cut and their stumps treated with a 25% glyphosate solution.

Vegetation

A management plan exists for the forest (Mason 2003); its objectives are passive recreation, vegetation management, prevention of uncontrolled forest fires, and aesthetics. Active forest management is largely restricted to fire prevention, removal of storm damaged trees, and maintenance of the disc golf course.

In 2006, approximately 10 acres of “low quality pitch pine” in the North Pasture was cleared to create savannah-open woodland conditions (Rassman 2006*b*). In approving this project, the NHESP two conditions on the DCR’s activities. First, the DCR is to provide the NHESP a written description of “activities planned to meet management goals” on an annual basis (French 2006). Second, the DCR is required to supply the NHESP with copies of any reports generated by the project, including all monitoring results (French 2006). These conditions remain in effect.

In accordance with the HMP (Freeman 2012), vegetation in portions of South Pasture are to be managed as rare species habitat as mitigation for habitat alteration within the golf course’s fairways. To ensure that the management benefits rare species, host plants for state-listed Lepidoptera are to be monitored two and five years after treatment. This monitoring is performed by a consultant hired by NDGI.

NDGI maintains the playing condition of the course by mowing vegetation with a tractor-mounted cutting deck, in accordance with the HMP (Freeman 2012). DCR’s Bureau of Fire Control and Forestry maintains fire breaks around the southern and eastern perimeter of South Pasture.

The town is responsible for vegetation maintenance along its bike paths in the forest.

Cultural Resources

The color of disc golf baskets, color and number of informational signs, color of tee pads, location of parking, presence of a kiosk, and trash policy for the disc golf course were finalized following Nantucket Historic District Commission review.

Recreation Resources

Under the second amendment to the 1985 agreement between the DCR and the town of Nantucket, the

town is “fully responsible for the funding, design, construction and any future reconstruction of said path along with the perpetual maintenance of the same, plus the remainder of the aforementioned 20 foot wide strip of land.”

The MOU for the creation and maintenance of the disc golf course establishes a variety of responsibilities for both parties (DEM and NDG 2011*b*). Highlights include: NGDI is responsible for maintaining the course; DCR will ensure that forest management activities are coordinated with NDGI and minimize impacts to the course; and both parties agree to meet annually in April to review the annual workplan. Readers are directed to the original agreement for a full listing of each party’s responsibilities.

Associated with the MOU are formal construction and maintenance guidelines (DCR and NDGI 2011*a*). They identify “sensitive” plants to avoid cutting, provide guidance on the creation of brush piles, and identify poison ivy and deer ticks. This guidance is to be used by volunteers and NDGI hired staff when maintaining the course.

Infrastructure

Buildings and Structures

There are no DCR buildings to maintain. The MOU with NDGI specifically prohibits the construction of buildings (e.g., storage sheds).

Roads

There are no internal park roads to maintain.

Parking Areas

Existing parking is off state forest property; the DCR does not maintain these lots.

Trails

The DCR does not maintain trails within the forest.

Kiosks and Signs

NDGI is responsible for maintaining all signs associated with the disc golf course.

13.9. RECOMMENDATIONS

Zone 3

Introduction

This section provides recommendations for the near- and long-term management of Nantucket State Forest. Applied Land Stewardship Zoning recommendations provide general guidance for managing the forest; future activities and projects should be checked against these recommendations for consistency. Management recommendations for Nantucket State Forest are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning

The following Land Stewardship Zoning is recommended for Nantucket State Forest. Because the entire forest is recommended for inclusion in a single zone, there is no zoning map for this property.

Zone 1

- No sections of the forest have been designated Zone 1.

Zone 2

- All of the forest has been designated Zone 2.

- No sections of the forest have been designated Zone 3

Significant Feature Overlay

There are no Significant Feature Overlays.

Management Recommendations

Three priority management recommendations were developed for Nantucket State Forest. (Table 13.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

Table 13.9.1. Priority recommendations for Nantucket State Forest.

Recommendation	Implementation ^a
Remove remnant non-native conifer plantations to promote native vegetation and to decrease the risk of fire to the forest and abutting properties.	F, R
Continue working with NDGI to ensure that Habitat Management Plan for the disc golf course is fully implemented.	F, R, V
Provide the NHESP with annual written notification of “activities planned to meet management goals” for the savannah-open woodland project area in the North Pasture.	F, R

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

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Interior view of the Falmouth Reforestation Lot. (See Appendix G for photo information.)

SECTION 14. REFORESTATION LOTS

14.1. INTRODUCTION

By the mid-1800s much of Cape Cod had been deforested. Renowned naturalist Henry David Thoreau travelled across the Cape by stage coach and offered the following description of what he saw.

“The country was, for the most part, bare, or with only a little scrubby wood left on the hills. We noticed in Yarmouth – and, if I do not mistake, Dennis – large tracts where pitch pines were planted four or five years before. ... This, we were told, was the only use to which such tracts could be profitably put.”

“That part of Dennis which we saw was an exceedingly barren and desolate country...covered with poverty grass, there was hardly a tree in sight...” (Thoreau 1908)

More than three hundred years of “rapid clearing for settlement and agriculture reduced the extent of woodlands across Cape Cod and altered the composition and structure of remaining woodlands through repeated grazing, burning, harvesting, and other activities” (Motzkin et al. 2002). By the mid-

nineteenth century, around the time of Thoreau’s visit, only 41% of the region was forested (Motzkin et al. 2002). These remaining woodlands “were frequently and heavily cut for wood products” (Motzkin et al. 2002).

By the early 1900s, efforts were underway to reforest these areas. The Commonwealth acquired a number of properties with the intent of creating commercially viable forests. These were referred to as reforestation lots. There were two types of reforestation lots. The first “is land purchased outright by the State, which it is probable it will hold as a permanent investment, and the second is land which private owners have deeded to the State without cost, for the purpose of having the State Forester plant and care for it for a period not to exceed 10 years...” (Rane 1915). Reforestation of both types of lots largely consisted of planting trees and cutting brush.

Over the years, several reforestation lots were acquired on Cape Cod and Nantucket. Most have returned to private ownership; some were incorporated into Shawme-Crowell and Nantucket State Forest. Only the following five reforestation

lots are known to remain in public ownership. (See Figure 1.1 for locations of these lots.)

- **Sandwich Reforestation Lot.** Historically referred to as the Weeks Lot. It is located at 496 Route 6A, near its intersection with Pine Terrace.
- **Falmouth Reforestation Lot.** Historically referred to as the Perry Lot. It is bisected by Fire Tower Road, and is located north of Old Campus Drive.
- **Barnstable State Forest; Route 132 Parcel.** Historically referred to as the Shoot Flying Hill Lot. It is located northwest of the intersection of Routes 132 and 6, behind Barnstable County YMCA. Collectively, this parcel and the Old Stage Road parcel comprise Barnstable State Forest.

- **Barnstable State Forest; Old Stage Road Parcel.** Historically referred to as the Eben Smith Lot. It is located southwest of the intersection of Old Stage and Skunknet roads.
- **Brewster State Forest.** This lot borders Sheep Pond to the south and Proprietor’s Cartway to the North. The CCRT (Section 9) and Gulls Way, a residential road, pass through this lot.

The physical, political, and regulatory attributes of these lots are summarized below. (Table 14.1.1)

Associated Properties. The Sandwich lot, Falmouth lot, and both parcels of Barnstable State Forest are associated with Shawme-Crowell. Brewster State Forest is associated with Nickerson state park.

Table 14.1.1. Physical, political, and regulatory settings of reforestation lots in the Nickerson Management Complex.

	Sandwich	Falmouth	Barnstable Route 132	Barnstable Old Stage Road	Brewster
Area (acres)^a:	20.88	16.59	30.50	18.65	16.13
Perimeter (miles)^a:	0.97	0.72	1.19	0.97	1.48
Landscape Designation(s)^b:	Woodland	Parkland	Woodland	Woodland	Woodland
Legislative Districts:					
House	5 th Barnstable	Barnstable, Dukes, & Nantucket	1 st Barnstable	2 nd Barnstable	4 th Barnstable
Senate	Plymouth & Barnstable	Plymouth & Barnstable	Cape & Islands	Cape & Islands	Cape & Islands
Regulatory Designations:					
Priority Habitat	Yes	No	No	No	Yes
Old King’s Highway Regional Historic District	Yes	No	Yes	No	No
Old Stage Road Residential District	No	No	No	Yes	No
Fertilizer Management DCPC ^c	Yes	Yes	Yes	Yes	Yes

a. Land areas calculated using a Geographic Information System (GIS).

b. For a summary of landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>

c. Chapter 716 of the Acts of 1989 established the Cape Cod Commission and allowed for the creation of Districts of Critical Planning Concern (DCPC).

14.2. Natural Resources

Physical Features

Two reforestation lots, Falmouth and the Route 132 parcel of Barnstable State Forest are located on moraines. Their topography consists of a mixture of hills and depressions. Elevations range from approximately 100–180 feet in Falmouth, to 130–160 feet at the Route 132 parcel.

The topography of the other three reforestation lots is essentially flat. The Old Stage Road parcel gently rises from an elevation of about 30 feet at its northern end to 50 feet at its southern end. Most of the Sandwich lot is approximately 10 feet above sea level. Brewster State Forest is at an average

elevation of approximately 90 feet, but sharply drops approximately 50 feet at its southern end, to meet the shore of Sheep Pond.

Water Resources

Water resources are absent, or nearly absent, from most reforestation lots. (Table 14.2.1) The Sandwich Reforestation Lot has approximately 400 feet of stream passing through it, the only stream on any of these properties. Both this lot and Brewster State Forest abut water; a salt marsh and pond, respectively. The Sandwich Reforestation Lot's proximity to the salt marsh makes it susceptible to floods and hurricane inundation. (Table 14.2.2)

Table 14.2.1. Water resources of reforestation lots in the Nickerson Management Complex.

Water Resource	Sandwich	Falmouth	Barnstable Route 132	Barnstable Old Stage Road	Brewster
Watershed:	Cape Cod	Cape Cod	Cape Cod	Cape Cod	Cape Cod
Aquifer:	Cape Cod	Cape Cod	Cape Cod	Cape Cod	Cape Cod
Lens	Sagamore	Sagamore	Sagamore	Sagamore	Monomoy
Rivers and Streams (miles)	0.08	0.00	0.00	0.00	0.00
Vernal Pools					
Certified (#)	0	0	0	0	0
Potential (#)	0	0	0	0	0
Wetlands (acres)	0.00	0.00	0.00	0.00	0.00
Lakes and Ponds (acres)	0.00	0.00	0.00	0.00	0.00

Table 14.2.2. Potential impacts of flooding, hurricane inundation, and sea-level rise to reforestation lots in the Nickerson Management Complex.

Type of Impact	Sandwich Acres (%)	Falmouth Acres (%)	Barnstable Route 132 Acres (%)	Barnstable Old Stage Road Acres (%)	Brewster Acres (%)
Flooding:					
100-year Storm	1.56 (7.47)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.10 (0.62)
500-year Storm ^a	1.56 (7.47)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.10 (0.62)
Hurricane Inundation:					
Category 1 Storm	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Category 2 Storm ^b	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Category 3 Storm ^b	0.23 (1.10)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Category 4 Storm ^b	1.39 (6.68)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Sea Level Rise	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)

a. Cumulative value; includes 100-year storm impacts.

b. Cumulative value; includes impacts of all lower category storms.

Rare Species

State-listed Species

Two state-listed species are known from the reforestation lots. (Table 14.2.3)

Table 14.2.3. State-listed species of reforestation lots in the Nickerson Management Complex, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d	Reforestation Lot ^e
Eastern box turtle	R	SC	BA-O, BR, FA
Water-willow stem-borer	I	T	SA

- Presented alphabetically, by common name.
- Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.
- Types of state-listed species include: I = Insect; and R = Reptile.
- Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.
- Reforestation lot codes are: BA-O = Barnstable (Old Stage Road); BR = Brewster; FA = Falmouth; SA = Sandwich.

Priority Habitat

Portions of the Sandwich Reforestation Lot (28.91%) and Brewster State Forest (5.32%) have been identified as Priority Habitat; there is no Priority Habitat in the other reforestation lots.

Vegetation

There have been no comprehensive surveys of the flora of reforestation lots. However, historic plot plans, CFI data, and forest cutting plans provide some information on species present. A 1923 plan of the Route 132 lot identifies Austrian, pitch, and red pines; black huckleberry, and greenbrier. An undated plan of the Sandwich Reforestation Lot, believed to date to the 1920s, indicates Austrian, Jack, pitch, Scots, and white pines; black locust; and catalpa.

The Old Stage Road parcel of Barnstable State Forest has an overstory of red and white pines, and an understory of blueberry, winterberry, red maple, brackenfern, and black, white, and northern red oaks.

Invasive Species

There have been no formal surveys; species incidentally observed are identified in Table 14.2.4. The fate of the black locust planted in the Sandwich

Reforestation Lot in the 1920s is unconfirmed. Given the species' abundance elsewhere on Cape Cod, it is likely persists on that property.

Table 14.2.4. Known invasive and likely invasive plants of reforestation lots in the Nickerson Management Complex.

Species ^a	Status ^b	Reforestation Lot ^c
Autumn olive	I	BA
European buckthorn	I	BA-O
Japanese knotweed	I	BA
Oriental bittersweet	I	BA-O, BR, SA
Spotted knapweed	L	BA

- Presented alphabetically, by common name.
- Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).
- Reforestation lot codes are: BA = Barnstable – Route 132; BA-O = Barnstable State Forest – Old Stage Road; BR = Brewster; FA = Falmouth; SA = Sandwich.

Natural Communities

There have been no assessments of natural communities on these properties. In general, those lots previously planted and harvested (e.g., Sandwich, Barnstable, and Brewster) have been modified to the point that they are not natural communities. Exceptions to this include the Falmouth reforestation lot and the western side of the Barnstable State Forest parcel along Route 132.

Forests

All plots are forested; values range a low of 93.76 % at the Barnstable State Forest's Route 132 lot to a high of 100.00% at the Falmouth and Sandwich lots.

Only one reforestation lot, the Old Stage Road parcel of Barnstable State Forest, has an ongoing forest inventory. There are four CFI plots; three are in native forest. Common trees in these plots include pitch pine, black oak, white oak, and sassafras. Common understory and shrub species include teaberry, black huckleberry, sheep laurel, low-bush blueberry, northern arrowwood, and greenbrier. The fourth plot is located in a remnant plantation of non-native Norway spruce; no regeneration is occurring in this plot. In addition to the spruce plantations, remnant stands of Scott's pine and red pine also remain in the forest. Major causes of tree loss observed in CFI plots include borers, winter moth, bark beetles, white pine weevil, and heart rot.

Dead and dying red pine plantations in both Barnstable State Forest lots constitute a fire hazard.

Wildlife

No formal surveys have been conducted; as a result, there is little information specific to these reforestation lots. An exception to this is information on birds. The web site e-Bird (www.ebird.org) identifies 58 species recorded in Brewster State Forest and 118 species recorded in the East Sandwich Game Farm, which is adjacent to the Sandwich Reforestation Lot, as of December 2014.

14.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic buildings, structures, and landscapes. An overview of significant events in the history of the Complex's reforestation lots is presented in Table 14.3.1. Their cultural resources are identified in Table 14.3.2

ARCHAEOLOGICAL RESOURCES

Sandwich Reforestation Lot. There are no recorded pre-Contact sites within, adjacent to, or nearby this lot. However, no systematic archaeological surveys have been conducted. This lot has a high archaeological potential.

Falmouth Reforestation Lot. There are no recorded pre-Contact sites within, adjacent to, or nearby this lot. However, no systematic archaeological surveys have been conducted. This lot has a high archaeological potential.

Barnstable State Forest. Although no pre-Contact sites are recorded in either parcel, archaeological sites in Barnstable date from the Paleo Indian Period through to the Contact Period. Both parcels are near Wequaquet Lake, which is located between the Great Marshes to the north and Nantucket Sound to the south. The many estuarine creeks and ponds in the area have an unusually high archaeological potential. Any slightly elevated terrace or hummock near these resources would have been attractive for habitation purposes. Many pre-Contact sites cluster around these resources elsewhere in Barnstable. A Contact Period habitation site associated with Wampanoag occupation is located adjacent to, and southwest of, the Old Stage Road parcel. MHC Reports # 1664, 2414, 2951, 3253, 2676, and 2969

contain the results of the systematic archaeological surveys conducted in the area within the last 30 years. Barnstable State Forest has a high potential for archaeological resources.

Brewster State Forest. Although Brewster State Forest has not been archaeologically surveyed and contains no recorded pre-Contact sites, it has high archaeological potential. The adjacent and nearby ecosystems provided ideal resource bases for Native Americans.

HISTORIC RESOURCES

Although the five lots included in this chapter do not contain any known or previously identified historic resources, the historic significance of the state's early efforts at forest conservation and the attempt to reverse centuries of deforestation on Cape Cod should be noted in any discussion of the properties. Three of the parcels, however are located in or adjacent to historic areas, including National Register listed districts as well as Massachusetts Historical Commission inventoried historic areas.

14.4. RECREATION RESOURCES

Recreation activities are neither promoted nor discouraged; there is no recreation infrastructure in these properties. Only passive recreation, including walking, running, dog walking, and birding are known to occur. They take place along forest roads and informal trails.

The following recreation activities take place in reforestation lots:

- Dog walking
- Geocaching (Brewster State Forest only; 2 caches as of September 2014)
- Hiking (Falmouth Reforestation Lot)
- Hunting (Falmouth lot and the Route 132 parcel of Barnstable State Forest)
- Nature study
- Walking/Running

Table 14.3.1. Significant events in the history of reforestation lots in the Nickerson Management Complex.

Year(s)	Events
1913	Barnstable State Forest’s Old Stage Road parcel is acquired.
1917	Perry lot (Falmouth) and the Route 132 parcel of Barnstable State Forest are acquired.
1918	Brewster State Forest parcels are acquired.
1992	Salvage logging of red and white pine trees damaged by Hurricane Bob takes place at the Sandwich Reforestation Lot (2 acres) and the Old Stage Road parcel of Barnstable State Forest (7 acres).
2007	Dead and dying non-native red pines are removed from a portion of Brewster State Forest, between the CCRT and Gulls Way.

Table 14.3.2. Cultural resources of reforestation lots in the Nickerson Management Complex.

Location and Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance
Sandwich Reforestation Lot								
Old King’s Highway Regional Historic District	NRHD	17 th –19 th c.	-	M	-	-	SDW.R	-
Route 6A East – Scorton Marsh	MHCA	1705–1993	-	M	-	-	SDW.N	-
Barnstable State Forest – Route 132 Parcel								
Old King’s Highway Regional Historic District ^h	NRHD	17 th –19 th c.	-	M	-	-	BRN.O	-
Barnstable State Forest – Old Stage Road Parcel								
Old Stage Road Residential District ^h	MHCA	1750–1850	-	M	-	-	BRN.Z	-

- a. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; NRHD = National Register Historic District; MHCA = Massachusetts Historic Commission Area; OB = Object; RD = Residential District; and ST = Structure.
- b. Date of construction provided, when known.
- c. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- d. Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- e. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- f. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- g. Massachusetts Historical Commission inventory number.
- h. Reforestation lot abuts, and shares a boundary with, this district.

14.5. INFRASTRUCTURE

Infrastructure is largely absent from these properties.

Property Boundary

The property boundaries are generally indistinct. Site specific information is provided below.

- **Sandwich Reforestation Lot.** Roads define the northern, and much of the western boundary. The remainder of the parcel is contiguous with private lands and MassWildlife property. The parcel's boundaries are not posted.
- **Falmouth Reforestation Lot.** Municipal and private conservation lands border this property on three sides; private lands border the fourth. The parcel's boundaries are not posted.
- **Barnstable State Forest; Route 132 Parcel.** This parcel is largely bounded by private properties; municipal conservation lands border its southwest corner. The boundaries are marked.
- **Barnstable State Forest; Old Stage Road Parcel.** The northern and eastern sides of this property are bound by municipal roads; the other two sides abut private residences. The boundaries are marked. Despite being marked, multiple abutters use this property to dispose of yard waste.
- **Brewster State Forest.** The southern boundary is the shore of Sheep Pond; all other boundaries are indistinct and unmarked. Potential encroachment was observed along Gull Way.

The town of Brewster's Select Board has expressed interest in acquiring the northern half of Brewster State Forest in order to expand the municipal cemetery.

Buildings and Structures

There are no buildings. Only one authorized structure, a cable anchor system for a 387 foot tall lattice communications tower, is known to occur. This anchor is located on the western boundary of the Route 132 parcel of Barnstable State Forest. (Table 14.5.1) Unapproved appurtenances associated with an adjacent residence, including a mailbox and driveway lights, appear to be located on Brewster State Forest.



This cable anchor system is located on the Route 132 parcel of Barnstable State Forest. The commercial radio tower, located off DCR property, is visible at back of photo. (See Appendix G for photo information.)

Table 14.5.1. Non-historic buildings and structures of reforestation lots in the Nickerson Complex.

Location and Infrastructure	Date ^a	Condition ^b	In Use ^c	Utilities ^d
Barnstable State Forest – Route 132				
Concrete pad and anchor ^e – For tower located at 749 Oak Street	1997	2	Y	E

a. Date of construction, if known.

b. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.

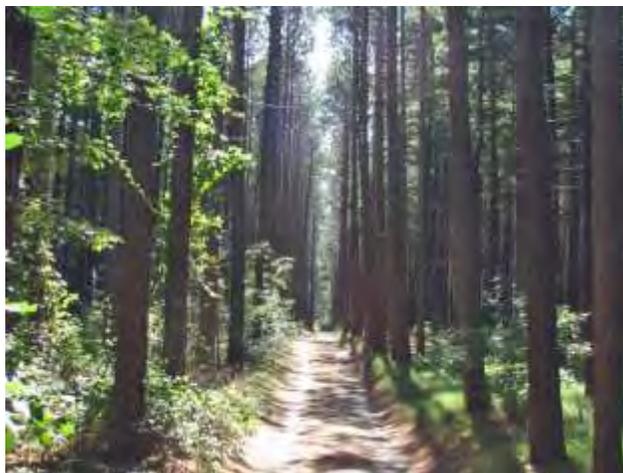
c. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.

d. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

e. Infrastructure located on DCR property, but not owned or controlled by the DCR. Its condition is not assessed.

Roads

Only two reforestation lots have internal roads. The Sandwich lot has a maintained forest road while the Route 132 parcel of Barnstable State Forest is overgrown. The former is accessible from Route 6A and the latter is only accessible from adjacent private property. Both forest roads are classified as trails; their extent and conditions are identified in Table 14.5.2.



Road through Sandwich reforestation lot. (See Appendix G for photo information.)

Municipal dirt roads pass through both the Falmouth Reforestation Lot and Brewster State Forest.

Parking

There are no parking lots. Roadside parking is available for the Sandwich and Falmouth lots; parking is unavailable at either Barnstable State Forest parcel and at Brewster State Forest.

Trails

There are no formal trail systems within most of these lots. However, the Cape Cod Rail Trail passes through Brewster State Forest, and trails from adjoining conservation areas pass through the northwest corner of the Falmouth Reforestation Lot. The Sandwich Reforestation lot and both parcels of Barnstable State Forest have trails, but they are not part of a designed system of recreational trails.

The condition and extent of trails in reforestation lots in the Nickerson Management Complex are summarized in Table 14.5.2.

Kiosks and Signs

There are no kiosks or identifying signs. The boundary of the Route 132 parcel of Barnstable State Forest has been posted.

Iron Ranger

There is no iron ranger.

Memorials and Markers

There are no known memorials or markers.

Table 14.5.2. Condition and length of official trails at reforestation lots in the Nickerson Management Complex.

Trail Condition	Sandwich (Miles)	Falmouth (Miles)	Barnstable Route 132 (Miles)	Barnstable Old Stage Road (Miles)	Brewster (Miles)
Good	0.44	0.08	0.31	0.34	0.33
Fair	0.00	0.00	0.14	0.00	0.02
Poor	0.00	0.00	0.00	0.00	0.00
Total for Lot	0.44	0.08	0.45	0.34	0.35

14.6. INTERPRETATION

No interpretive programming takes place at these reforestation lots.

14.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

Reforestation lots in Sandwich, Falmouth, and Barnstable are managed by staff from Shawme-Crowell. Brewster State Forest is managed by Nickerson staff. Forestry activities on these parcels, and all other properties in the Complex, are managed by the Regional Forester, who is based at Myles Standish State Forest in Carver.

Partnerships and Volunteers

There are no DCR friends groups or volunteer activities.

Public Safety

Fire, police, and other public safety and emergency services are provided by municipal departments in the communities in which the reforestation lots occur.

Funding

Conservation Trust Fund

There are no Conservation Trust Funds for these properties.

Retained Revenue

These reforestation lots do not currently generate revenue. Should harvesting occur, all funds generated are retained revenue.

Other Revenues

In the past, DCR has received an annual payment for the presence of a commercial antenna cable anchor in the Route 132 parcel of Barnstable State Forest. A current permit for the location of this structure within the forest was not located during the preparation of this RMP.

14.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs, legal agreements, and institutional knowledge. This section describes those practices unique to the management of reforestation lots. Legal agreements unique to these properties are presented in Table 14.8.1.

Table 14.8.1. Key legal agreements for reforestation lots in the Nickerson Management Complex.

Party and Subject of Agreement	Type^a	Expiration Date^b
AirComm of Avon L.L.C. Shawme-Crowell State Forest, Oak Street Parcel, Barnstable, Massachusetts	S	2002

- Agreement types include: A=Memorandum of Agreement; E=Easement; L=Lease; R = Recreation Permit; S = Special Use Permit; and U=Memorandum of Understanding.
- Year that agreement expires. Permanent agreements are indicated by an expiration date of "None."

Key management and guidance documents are identified in Table 14.8.2. Only forestry-related documents are available for these properties.

Table 14.8.2. Key management and guidance documents for reforestation lots in the Nickerson Management Complex

Author and Document	Year
Mason, A. Notice of Intent/Forest Cutting Plan. Town: Sandwich, Barnstable. Road: Various areas. <i>Note: This plan includes portions of the Sandwich reforestation lot, Barnstable State Forest – Old Stage Road parcel, and Shawme-Crowell State Forest.</i>	1996
Rassman, J. Forest Cutting Plan. Town: Brewster. Road: Flax Pond/Fisherman’s Landing. <i>Note: This plan also includes Brewster State Forest.</i>	1996a
Gannet and Fleming, Inc. Environmental Audit Report: Falmouth State Forest (sic), Falmouth, Massachusetts. <i>Note: This audit covers Falmouth municipal property, and not the Falmouth reforestation lot.</i>	1998k
Gannet and Fleming, Inc. Environmental Audit Report: Sandwich State Forest lands, Sandwich, Massachusetts. <i>Note: This audit covers several privately-owned parcels and not the Sandwich reforestation lot, as the document title suggests.</i>	1998l
Gannet and Fleming, Inc. Environmental Audit Report: Sheep Pond, Brewster, Massachusetts. <i>Note: This audit covers only the pond itself, and not the adjacent Brewster State Forest.</i>	1998m
Gregory, P. Emergency Forest Management Proposal. Name: Barnstable red pine salvage.	2013

Annual Maintenance

There are no annual maintenance schedules for these properties. With the exception of periodic forest monitoring and harvesting, these lots are not managed.

Natural Resources

Water Resources

There are no activities unique to these properties.

Rare Species

There are no activities unique to these properties.

Invasive Species

There are no monitoring or management activities.

Vegetation

The primary management activity at reforestation lots is forest management. Recent activities have focused on collecting CFI data and the removal of dead and dying red pine. In 2006, salvage logging was used to remove such pines from Brewster State Forest. A similar harvest has been proposed for the Old Stage Road parcel of Barnstable State Forest (Gregory 2013). Due to low market value and long distance to markets, the operation will require funding.

Cultural Resources

There are no management activities unique to these properties.

Recreation Resources

There are no recreation resources to manage.

Infrastructure

Given the general lack of infrastructure at these properties, there are no unique management activities.

Buildings

There are no buildings to maintain.

Roads

The interior park road at the Sandwich reforestation lot is maintained by Shawme-Crowell personnel on an as needed basis.

Fire Tower Road is maintained by the town of Falmouth.

Parking Areas

There are no parking areas to maintain.

Trails

The section of CCRT in Brewster State Forest is maintained by Nickerson state park staff. Municipal trails within the Falmouth Reforestation Lot are maintained by volunteers from The 300 Committee, Falmouth’s land trust. There are no other formal trails to maintain.

Kiosks and Signs

There are no kiosks to maintain.

14.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of reforestation lots within the Nickerson Management Complex. Applied Land Stewardship Zoning recommendations provide general guidance for managing these lots. Future activities and projects should be checked against the zoning map for consistency. Management recommendations for these lots are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning

The following Land Stewardship Zoning is recommended for the reforestation lots. Because all portions of all lots are recommended for inclusion in a single zone, there is no zoning map for this property.

Zone 1

- No portions of the reforestation lots have been designated Zone 1.

Zone 2

- All portions of all reforestation lots have been designated Zone 2.

Zone 3

- No portions of the reforestation lots have been designated Zone 3.

Significant Feature Overlay

- There are no Significant Feature Overlays.

Management Recommendations

Three priority management recommendations were developed for reforestation lots within the Nickerson Management Complex. (Table 14.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority.

Table 14.9.1. Priority recommendations for reforestation lots in the Nickerson Management Complex.

Recommendation	Implementation^a
Remove remnant non-native conifer plantations from both Barnstable State Forest lots to promote native vegetation and to decrease fire risk to the forest and abutting properties.	F, R
Investigate potential encroachment along Gull Way and resolve with abutters, if warranted.	L, R
Conduct an expanded file review to determine if a current permit exists for the communications tower anchor in Barnstable State Forest.	L

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

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The Elizabeth Islands and Woods Hole as viewed from inside the West Tisbury Fire Tower. . (See Appendix G for photo information.)

SECTION 15. FIRE OBSERVATION TOWERS

15.1. INTRODUCTION

Fire has been part of the Cape Cod landscape for more than a thousand years (Motzkin et al. 2002), fueled in part by barrens vegetation that “produces abundant, flammable fuel which decomposes slowly creating the potential for wildfires” (Patterson et al. 2005). As human populations increased on the Cape and Islands and the landscape was developed, fire represented an increasing threat to public safety and property. From the mid-1800s through the early 1900s “fires were common across Cape Cod” (Motzkin et al. 2002). In response, a variety of laws were enacted to decrease the incidence of wildfires.

In 1882, statewide penalties were established for “wantonly and recklessly” setting fires that “cause the destruction or injury of any growing wood.” (Chapter 163 of the Acts of 1882) Four years later, the Massachusetts legislature directed cities and towns to create the position of “Forest Fireward” to “investigate all cases of fires in woodlands.” (Chapter 296 of the Acts of 1886) As the 20th century dawned, legislative focus shifted from fire prevention to fire suppression, with municipalities having responsibility for fighting forest fires. Each town’s forester was made “chief forest fireward,”

and given the authority to conscript males between the ages of 18 and 50 “to assist in suppressing or preventing” fire. (Chapter 254 of the Acts of 1897) The authority of firewards continued to increase into the early 1900s, at which time the responsibility for preventing and suppressing forest fires began to shift to the state.

In 1911 the position of State Fire Warden was created to “aid and advise” municipal officials “in preventing and extinguishing forest fires and in enforcing the laws relative to forest fires.” (Chapter 722 of the Acts of 1911) In 1922 the State Forester was authorized to acquire land for the purpose of constructing fire observation towers. (Chapter 185 of the Acts of 1922) Fire towers were soon constructed across the state, including on Cape Cod and Martha’s Vineyard.

There are currently seven active fire observation towers in the same geographic area as the Nickerson Management Complex (i.e., the Cape and Islands). They are:

- ***Sandwich Fire Observation Tower.*** Located on Telegraph Hill at 402 Route 130, within Shawme-Crowell State Forest.

- **Falmouth Fire Observation Tower.** Located atop Howlands Park Hill at 181 Fire Tower Road, on town of Falmouth property.
- **Barnstable Fire Observation Tower.** Located atop Clay Hill at 576 Oak Street, on DCR property.
- **Dennis Fire Observation Tower.** Located atop Signal Hill at 68 Hokum Rock Road, on DCR property. A second parcel of DCR-owned land, 48 Hokum Rock Road, is contiguous with the tower parcel and provides utility access.
- **Brewster Fire Observation Tower.** Located atop Deer Park Hill, on Deer Park Road, within Nickerson state park.
- **Wellfleet Fire Observation Tower.** This tower is located on a small rise of land at 1947 State Highway (Route 6), on DCR property. Vehicular access to the tower is across private property.
- **West Tisbury Fire Observation Tower.** This tower is located atop an unnamed hill at 51 Fire Tower Road, on DCR property. An associated utility line easement crosses five abutting residential properties.

These towers' physical, political, and regulatory attributes are summarized in Table 15.1.1.

Associated Properties. There are eight fire observation towers in Fire Control District One. Only seven are located within the Nickerson Management Complex. The eighth is located in Bourne, within the Myles Standish Management Complex.

15.2. Natural Resources

Physical Features

Five of the seven towers are located on hilltops along glacial moraines; two, Brewster and Wellfleet, are not located on hills. Elevations range from 76 feet in Wellfleet to 292 feet in Sandwich.



Brewster fire observation tower. (See Appendix G for photo information.)

Water Resources

Surface waters are absent from fire observation tower lots. (Table 15.2.1) Because of this, there are no predicted flooding impacts associated with 100-year storms, 500-year storms, hurricanes, or sea-level rise.

Table 15.1.1. Physical, political, and regulatory settings of fire observation towers on the Cape and Islands.

	Sandwich	Falmouth	Barnstable	Dennis	Brewster	Wellfleet	West Tisbury
Area (acres)^a:							
Parcel (Acres)	N/A ^a	N/A ^b	0.43	6.30	N/A ^c	0.23	1.59
Fenced-in Area (Feet ²)	60 x 50	60 x 50	60 x 50	70 x 40	40 x 30	40 x 40	ca. 40 x 35
Perimeter (miles)^a:	N/A	N/A	0.10	0.42	N/A	0.08	0.57
Landscape Designation(s)^b:	Woodland	N/A	N/A	N/A	Parkland	N/A	N/A
Legislative Districts:							
House	5 th Barnstable	Barnstable, Dukes, & Nantucket	5 th Barnstable	1 st Barnstable	4 th Barnstable	4 th Barnstable	Barnstable, Dukes, & Nantucket
Senate	Plymouth & Barnstable	Plymouth & Barnstable	Cape & Islands				
Regulatory Designations:							
Priority Habitat	Yes	No	No	No	Yes	Yes	Yes
Old King's Highway Regional Historic District	No	No	Yes	Yes	No	No	No
Dogtown Residential District	No	No	No	No	No	Yes	No
Fertilizer Management DCPC ^c	Yes	Yes	Yes	Yes	Yes	Yes	No

- a. Located in Shawme-Crowell State Forest; acreage included in that park's metrics.
- b. Located on municipal property.
- c. Located in Nickerson state park; acreage included in that park's metrics.
- d. Land areas calculated using a Geographic Information System (GIS).
- e. For a summary of landscape designations, see <http://www.mass.gov/eea/docs/dcr/ld/ld-factsheet-final.pdf>

Table 15.2.1. Water resources of fire observation tower lots on the Cape and Islands.

Water Resource	Sandwich	Falmouth	Barnstable	Dennis	Brewster	Wellfleet	West Tisbury
Watershed:	Cape Cod	Cape Cod	Cape Cod	Cape Cod	Cape Cod	Cape Cod	Islands
Aquifer:							Martha's Vineyard
Lens	Cape Cod Sagamore	Cape Cod Sagamore	Cape Cod Sagamore	Cape Cod Monomoy	Cape Cod Monomoy	Cape Cod Chequesset	N/A
Rivers and Streams (miles)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vernal Pools							
Certified (#)	0	0	0	0	0	0	0
Potential (#)	0	0	0	0	0	0	0
Wetlands (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lakes and Ponds (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rare Species

State-listed Species

Four state-listed species are known from the towers. (Table 15.2.2) The moths are only known from the West Tisbury fire tower property, where they are associated with both scrub oak and tree oaks. The eastern box turtle is known from all fire towers on the Cape and Islands.

Table 15.2.2. State-listed species of fire observation tower lots on the Cape and Islands, as identified by the NHESP.^{a,b}

Species ^{a, b}	Type ^c	MESA ^d	Tower ^e
Barren's daggermoth	I	T	WT
Eastern box turtle	R	SC	BA, BR, DE, FA, SA, WE, WT
Faded gray geometer	I	T	WT
Gerhard's underwing	I	SC	WT

- Presented alphabetically, by common name.
- Fact sheets are available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/ mesa-list/list-of-rare-species-in-massachusetts.html>.
- Types of state-listed species include: I = Insect; and R = Reptile.
- Status of species listed under the Massachusetts Endangered Species Act (MESA): E = Endangered, SC = Special Concern; and T = Threatened.
- Fire observation tower codes are: BA = Barnstable; BR = Brewster; DE = Dennis; FA = Falmouth; SA = Sandwich; WE = Wellfleet; and WT = West Tisbury.

Priority Habitat

Four fire towers are located in Priority Habitat. Two, Sandwich and Brewster, are located in Priority Habitat within larger DCR parks. Information on Priority Habitat in these parks was presented in Sections 2 and 7, respectively. Two other towers, in Wellfleet and West Tisbury, are located on parcels entirely designated Priority Habitat. Projects in these areas are subject to review under MESA.

Vegetation

There have been no formal vegetation surveys at these fire towers.

Invasive Species

There have been no formal surveys; species incidentally observed are identified in Table 15.2.3.

Table 15.2.3. Known invasive and likely invasive plants on fire observation tower lots on the Cape and Islands.

Species ^a	Status ^b	Tower ^c
Japanese knotweed	I	BA
Oriental bittersweet	I	BA, BR, DE, FA, SA

- Presented alphabetically, by common name.
- Plants are classified as being either Invasive (I) or Likely Invasive (L) according to MIPAG (2005).
- Fire observation tower codes are: BA = Barnstable; BR = Brewster; DE = Dennis; FA = Falmouth; SA = Sandwich; and WE = Wellfleet. The West Tisbury fire tower was not visited.

Natural Communities

The fenced-in area beneath a fire tower tends to be highly developed, and the vegetation highly artificial. Because of this, those towers with land limited to only the area beneath the tower (i.e., Sandwich, Falmouth, Brewster, and Wellfleet) have no natural communities. In contrast, towers located on larger parcels may have natural communities associated with them.

There are three fire towers on parcels larger than the footprint of the fenced-in area; they are Barnstable, Dennis, and West Tisbury. The area outside the fence at Barnstable has been previously altered to create parking and access to the tower; there are no natural communities present. One community type has been incidentally observed at the Dennis tower. (Table 15.2.4) Natural communities associated with the West Tisbury fire tower have not been assessed.

Table 15.2.4. Known natural communities of fire observation tower lots on the Cape and Islands.

Community Type ^a	System ^b	State Rank ^c	Tower ^d	Source ^e
Black Oak-Scarlet Oak Forest/Woodland	T	S3/S4	DE	1

- Classified according to Swain and Kearsley (2011).
- E = Estuarine, P = Palustrine, T = Terrestrial.
- The NHESP ranks communities from most rare (S1) to the most common (S5).
- Fire observation tower codes are: BA = Barnstable; BR = Brewster; DE = Dennis; FA = Falmouth; SA = Sandwich; WE = Wellfleet; and WT = West Tisbury.
- Information contained in this table was obtained from the following sources:
 - Incidentally observed by RMP Planner.

Forests

Land associated with the Sandwich, Falmouth, Brewster, and Wellfleet towers is not forested. The Barnstable tower lot is partially forested (34.52%). The Dennis and West Tisbury towers are almost entirely forested; 93.19% and 83.82%, respectively.

Wildlife

There is no information available.

15.3. CULTURAL RESOURCES

This section describes the known and potential cultural resource areas, including pre-Contact and post-Contact archaeological resources, and historic buildings, structures, and landscapes. An overview of significant events in the history of fire observation towers on the Cape and Islands is presented in Table 15.3.1. Their cultural resources are identified in Table 15.3.2.

ARCHAEOLOGICAL RESOURCES

Sandwich Fire Observation Tower. This tower is located within Shawme-Crowell. See Section 2.3 for information on the Archaeological Resources of Shawme-Crowell.

Falmouth Fire Observation Tower. No archaeological surveys were undertaken prior to building or updating the tower or associated building and utilities. Any below-ground cultural resources would have been destroyed by these activities. Because of this, the entire area within the fenced-in yard has disturbed soils, and is considered to have low archaeological potential.

Barnstable Fire Observation Tower. No systematic archaeological survey work has been conducted on site. Undisturbed portions of his parcel, like the nearby Barnstable State Forest Route 132 parcel (Section 14.3), should be considered to have a high archaeological potential.

Table 15.3.1. Significant events in the history of fire observation towers on the Cape and Islands.

Year(s)	Events
1914	Iron observation tower erected atop Howland's Park Hill, Falmouth on town owned land.
1917	Iron fire tower erected on Martha's Vineyard on 15 acres of land purchased for this purpose.
1927	State acquires a 10,000 square foot parcel in Wellfleet and erects and iron forest fire observation tower.
1930	Martha's Vineyard fire tower replaced with galvanized tower.
1934	Members of CCC Camp 58 erect a fire tower in Shawme State Forest, Sandwich.
1946	Falmouth fire tower replaced with a galvanized steel tower.
1946	U.S. Navy declares Martha's Vineyard fire tower a hazard to aviation; the tower is dismantled.
1947	New metal towers constructed atop Clay Hill, Barnstable and Signal Hill, Dennis on land purchased specifically for this purpose.
1949	Galvanized steel fire observation tower erected in Nickerson state park. This replaces a lookout station located in the Exchange Building in Harwich Center.
1950	Land and pole line easement taken for a fire tower on Indian Hill, West Tisbury; a galvanized steel tower is erected.
1960	Wellfleet fire tower replaced with a galvanized steel tower.
1966	Original Sandwich fire tower replaced.
ca. 1969	Barnstable tower upgraded with a new aluminum cabin.
1972	West Tisbury tower upgraded with a new aluminum cabin.
1974	Dennis tower upgraded with a new aluminum cabin.
1984	Cabin of Falmouth fire tower upgraded with a new aluminum cabin.
1987	Cabin of Brewster fire tower upgraded with a new aluminum cabin.
2001	Cabin of Wellfleet fire tower upgraded with a new aluminum cabin.

Table 15.3.2. Cultural resources of fire observation towers on the Cape and Islands.

Location and Resource	Type ^a	Date ^b	Condition ^c	Integrity ^d	In Use ^e	Utilities ^f	MHC # ^g	Guidance ^h
Sandwich Fire Observation Tower	ST	1966	3	M	Y	E	-	1
Falmouth Fire Observation Tower	ST	1946	3	M	Y	E	-	1
Barnstable Fire Observation Tower								
Old King’s Highway Regional Historic District ⁱ	NRHD	17 th –19 th c.	-	M	-	-	BRN.O	-
Barnstable Fire Tower	ST	1947	3	M	Y	E	-	1
Dennis Fire Observation Tower								
Old King’s Highway Regional Historic District ⁱ	NRHD	17 th –19 th c.	-	M	-	-	DEN.D	-
Dennis Fire Tower	ST	1947	3	M	Y	E	-	1
State Police building	BU	-	5	M	N	-	-	1
Brewster Fire Observation Tower	ST	1949	3	M	-	E	-	1
Wellfleet Fire Observation Tower								
Dogtown Residential District	RD	18 th –20 th c.	-	-	-	-	WLF.N	-
Wellfleet State Fire Tower	ST	1960	3	M	Y	E	WLF.911	1
West Tisbury Fire Observation Tower	ST	1950	3	M	Y	E	-	1

- a. Resource types include the following: AR = Archaeological; BU = Building; LA = Landscape; NRHD = National Register Historic District; OB = Object; RD = Residential District; and ST = Structure.
- b. Date of construction provided, when known.
- c. Preliminary condition assessment using the building system and equipment condition codes as used in the Massachusetts Capital Asset management Information System (CAMIS). The following codes are used: 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.
- d. Integrity is a relative assessment of the condition of a resource’s retention of its historic character-defining features; H = High; L = Low; M = Medium; and U = Unknown.
- e. Use categories include N = No, building is not in use; S = Building is used on a seasonal basis; and Y = Yes, building is in use year-round.
- f. The following codes are used to identify utilities associated with buildings: E = Electric, H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.
- g. Massachusetts Historical Commission inventory number.
- h. The following guidance is offered for the ongoing maintenance of these cultural resources:
 1. Refer to Historic Building Maintenance BMP (DCR n.d.i).

Dennis Fire Observation Tower. No archaeological surveys were undertaken prior to building or updating the tower or associated building and utilities. Any below-ground cultural resources would have been destroyed by these activities. Because of this, the entire area within the fenced-in yard has disturbed soils and is considered to have low archaeological potential. The area within the fenced-in yard at the State Police building is similarly disturbed and is also considered to have low archaeological potential. The remainder of the property on which the tower is located is considered to have a moderate archaeological potential.

Brewster Fire Observation Tower. This tower is located within Nickerson. See Section 7.3 for information on the Archaeological Resources of Nickerson.

Wellfleet Fire Observation Tower. No archaeological surveys were undertaken prior to building or updating the tower or associated building and utilities. Any below-ground cultural resources would have been destroyed by these activities. Because of this, the entire area within the fenced-in yard has disturbed soils, and is considered to have low archaeological potential.

West Tisbury Fire Observation Tower. No documented archaeological sites have been recorded on or near the West Tisbury fire tower parcel. The closest known site is less than one mile northeast of the tower, and has been identified as a Late Archaic stone tool workshop. The area within the fenced-in yard has been highly disturbed and any below-ground cultural resources would have been destroyed by this disturbance. However, undisturbed

areas outside the fenced-in yard and access road have largely escaped disturbance and are considered to have a moderate archaeological potential.

HISTORIC RESOURCES

The seven historic fire towers in the Nickerson Complex have significance as evidence of an important statewide effort, beginning in the early twentieth century, to protect forest resource and prevent the loss of life and property through the active monitoring and suppression of wildfires. None of the towers has retained their original cabin, but the replacement cabins are in most cases a similar design – an enclosed square cabin with an uninterrupted band of windows to allow a 360 degree view of the surrounding area. The galvanized steel towers replaced iron and wooden versions, but the general design of the replacements are similar in most cases to the original, featuring open stairways returning at platforms spaced equidistantly. This utilitarian construction technique is shared by all existing towers. More research of the construction of fire towers across the Commonwealth is required to better understand the context of the tower planning, design, and construction. In the meantime, any comprehensive planning involving the future of the towers must consider their historic significance to the history of the agency and the state.

Some of the towers are located in or adjacent to historic districts or inventoried areas (see Table 15.3.2). Anyone planning projects that may impact these resources must consult first with the Office of Cultural Resources to determine whether review by the Massachusetts Historical Commission or another pertinent review authority is required.

Landscapes

There are no historic landscapes associated with these resources.

Buildings

One building, believed to be owned by the Massachusetts State Police, is associated with the Dennis fire tower. This masonry block building is believed to have formerly contained radio equipment.



State Police building located on property of the Dennis fire observation tower. (See Appendix G for photo information.)

Structures

Aside from the seven fire towers, there are no historic structures associated with these resources.

Objects

There are no historic objects associated with these resources.

15.4. RECREATION RESOURCES

Because fire observation towers are not open to the general public or intended for recreation, there are no associated recreation facilities or resources. The parcels of land associated with the Dennis Fire Tower are large enough for some forms of passive recreation (e.g., birding, geocaching); none are known from this site.

15.5. INFRASTRUCTURE

Property Boundary

The property boundaries are generally indistinct. Site specific information is provided below.

- ***Sandwich Fire Observation Tower.*** This tower is surrounded on all sides by Shawme-Crowell. A fenced-in area around the base of the tower clearly differentiates it from the rest of the state forest.
- ***Falmouth Fire Observation Tower.*** This tower is surrounded on all sides by Falmouth municipal land. A fenced-in area beneath the tower identifies the area used by DCR.

- **Barnstable Fire Observation Tower.** This parcel is bounded on the south by the Route 6 right-of-way and on all other sides by private lands. There are no signs identifying the parcel's boundaries.
- **Dennis Fire Observation Tower.** The tower is located on two contiguous parcels of DCR land; both border Hokum Rock Road. Private property, much of which is undeveloped, borders the rest of this property. There are no signs identifying the boundaries.
- **Brewster Fire Observation Tower.** This tower is surrounded on all sides by Nickerson. A fenced-in area around the base of the tower clearly differentiates it from the rest of the state park.
- **Wellfleet Fire Observation Tower.** The property on which this tower is located is bounded on the north by Route 6, on the east and south by a condominium development, and on the west by a developed residence. The only access to the tower is through the condominium development, and the only access to several of the condominiums is through the fire tower parcel. The parcel's boundaries are not posted.
- **West Tisbury Fire Observation Tower.** The fire tower is located on the east side of a narrow, serpentine parcel. Approximately 55 feet of the parcel borders Christiantown Road; the remainder borders private residences and undeveloped house lots. These boundaries are not posted.

Buildings and Structures

Fire observation towers were constructed for a single purpose, and those on the Cape and Islands have similar infrastructure associated with them. (Table 15.5.1) Each fire observation tower consists of two parts: a tower, which elevates and supports the cabin; and the cabin, which is the workspace for the fire observer. All towers are historic structures; none of the cabins are non-historic. (Tables 15.3.1 and 15.5.1)

Below the towers, within fenced-in yards, is additional infrastructure. Four towers have equipment shelters that contain telecommunications equipment; most are owned by the Massachusetts State Police who share space with the DCR. Propane-fueled emergency generators and their associated fuel tanks are associated with police

equipment shelters. Additional telecommunications equipment is often located on metal racks beneath the tower; this is most prevalent at Wellfleet and West Tisbury. A knock box is located on the entry gate to each tower, so that emergency responders have access to the fenced-in yard and cabin.



Typical infrastructure beneath fire observation tower; telecommunications shed is visible at back of photo. (See Appendix G for photo information.)

Because fire observation towers are tall structures typically located on hilltops, they are often used to support communications antennas and associated equipment. A variety of governmental and commercial communications equipment is present on all of the Cape and Islands' towers. There is no current, comprehensive listing of this equipment.



Typical fire observation tower cabin; note the telecommunications equipment mounted on the cabin and top of the tower. (See Appendix G for photo information.)

Occasionally, additional buildings are located beneath, or near, the base of a tower. A masonry block building, formerly used by the U.S. Coast Guard is located beneath the Sandwich Tower. In Dennis, a wooden shed belonging to the Barnstable Repeater Association is located at the base of the tower, and an abandoned State Police building is located in its own fenced-in yard, approximately 210 feet from the tower. Written agreements for these buildings were not located during the preparation of this RMP.



Barnstable Repeater Association shed located beneath the Dennis Fire Tower. (See Appendix G for photo information.)

Table 15.5.1. Non-historic buildings and structures associated with fire observation towers on the Cape and Islands.

Infrastructure	Date ^a	Condition ^b	In Use ^c	Utilities ^d
Sandwich Fire Observation Tower				
Observation cabin	-	3	Y	E
State Police equipment shelter	-	2	Y	E
Concrete block building (“Coast Guard” building)	-	3	N	-
Falmouth Fire Observation Tower				
Observation cabin	1984	3	Y	E
State Police equipment shelter	-	2	Y	E
Barnstable Fire Observation Tower				
Observation cabin	1969	3	Y	E
State Police equipment shelter ^e	-	2	Y	E
Dennis Fire Observation Tower				
Observation cabin	1974	2	Y	E
Shed – Barnstable Repeater Association	1998	-	Y	E
Brewster Fire Observation Tower				
Observation cabin	1987	3	Y	E
Concrete block building	-	3	U	E
Wellfleet Fire Observation Tower				
Observation cabin	1987	3	Y	E
West Tisbury Fire Observation Tower				
Observation cabin	1972	3	Y	E
NStar equipment shelter	-	2	Y	E

a. Date of construction provided, when known.

b. Building system and equipment condition codes as used in the Massachusetts Capital Asset Management Information System (CAMIS): 1 = Excellent-easily restorable to like new condition; 2 = Good-routine maintenance required; 3 = Adequate-some corrective and preventative maintenance required; 4 = Fair-excessive corrective maintenance and repair required; 5 = Poor-renovation needed; and 6 = Fail.

c. N = No; S = On a seasonal basis; U = Unknown; and Y = Yes.

d. The following codes are used to identify utilities associated with buildings: E = Electric; H = Heat; I = Internet; S = Septic system; T = Telephone; W = Water; and W(S) = Water is available on a seasonal basis. This information is included for all buildings.

e. Building is not owned by the DCR, but is located on DCR property.

Roads

Roads at the Barnstable, Dennis, and West Tisbury towers are on DCR-owned lands; only Dennis is paved, all others are dirt. The condition and length of these roads are identified in Table 15.5.2.

A dirt drive, approximately 125 feet in length connects the Falmouth fire tower to Fire Tower Road. This drive is not on DCR property.

The Brewster tower is accessed via Deer Park Road, an internal park road in Nickerson. Information on Nickerson's roads was previously presented in Section 7.

Access to the Wellfleet fire tower has been across private property since at least 1928. As a result, there are no DCR roads at this location.

Table 15.5.2. Condition and length of roads associated with fire observation towers on the Cape and Islands.^{a,b}

Location and Road Condition	Length (Miles)
Barnstable Fire Observation Tower	
Good	0.02
Fair	0.01
Poor	0.00
Sub-total	0.03
Dennis Fire Observation Tower	
Good	0.00
Fair	0.06
Poor	0.00
Sub-total	0.06
West Tisbury Fire Observation Tower	
Good	0.00
Fair	0.23
Poor	0.00
Sub-total	0.23
Total	0.32

a. Based on field assessment; all distances calculated using GIS.

b. Includes both paved and unpaved roads.

Parking

Parking is restricted to Bureau of Fire Control and Forestry staff, and others needing to access equipment on and below these towers (e.g., telecommunication providers). There is no public parking.

Trails

Fire tower parcels are generally too small to support a trail system. Only one tower, Dennis, has a lot large enough to support a trail system; none exists.

Kiosks and Signs

There are no kiosks. All towers have signs that identify their name and elevation; most also identify the name of the hill upon which they are located. Only the Brewster fire tower's sign meets DCR graphic standards (DCR n.d.e).

Iron Ranger

There are no iron rangers.

Memorials and Markers

There are no known memorials or markers.

15.6. INTERPRETATION

There is no interpretive programming at fire observation towers.

15.7. MANAGEMENT RESOURCES

Staffing

DCR Personnel

All towers are managed by Bureau of Forest Fire Control and Forestry personnel. (Table 15.7.1) Historical staffing levels, from 1983, are included for comparison to current staffing.

There are two year-round personnel; they are supplemented by five seasonal personnel during the summer. One seasonal patrolman is assigned to the West Tisbury fire observation tower. The other four are rotated among the remaining towers on an as needed basis.

Table 15.7.1. Personnel with direct responsibility for the operation and management of fire observation towers on the Cape and Islands; current and past.

Job Title	Number of Positions 2014 ^a	Number of Positions 1983 ^a
<i>Year-round Personnel</i>		
Fire Fighter III - District Fire Warden	1	1
Fire Fighter II - Patrolman	1	3
Fire Fighter I - Truck Operator	0	3
Fire Fighter I - Tower Operator	0	1
<i>Seasonal Personnel</i>		
Fire Fighter I - Patrolman ^b	5	0
Fire Fighter I - Truck Operator	0	3
Fire Fighter I - Tower Operator	0	12

a. Includes staffing for Bourne Fire Observation Tower, which is not in the Nickerson Complex.

b. Seasonal patrolmen perform duties once performed by seasonal Tower Operators.

Partnerships and Volunteers

The Barnstable Repeater Association maintains their shed and equipment at the Dennis fire observation tower.

Public Safety

Fire, police, and other public safety and emergency services are provided by municipal departments in the communities in which the towers are located.

Funding

Conservation Trust Fund

There are no conservation Trust Funds for these properties.

Retained Revenue

There are no retained revenues.

Other Revenues

Revenues are generated through the leasing of antenna space on towers; these funds are not dedicated to the towers.

15.8. MANAGEMENT PRACTICES

Management of DCR properties is guided by a variety of regulations, policies, BMPs (e.g., Table 15.3.2), legal agreements, and institutional knowledge. This section describes those practices

unique to the management of the Cape and Islands' fire observation towers.

Some legal agreements unique to these properties are presented in Table 15.8.1. Because a current inventory of communications equipment attached to DCR fire observation towers was unavailable during the preparation of this RMP, legal agreements for communications equipment are not included in Table 15.8.1.

Table 15.8.1. Key legal agreements for fire observation towers on the Cape and Islands.

Party and Subject of Agreement	Type ^a	Expiration Date ^b
United States Coast Guard Use of Sandwich fire observation tower by the Coast Guard for a radio transmission facility for the safety of the boating public.	A	2012
Department of State Police High Ground Special Use Permit...for use of multiple fire and radio towers.	HG	2017
John C. and Joan A. Marshall Access agreement for 1947 State Highway, Wellfleet, MA.	AC	None
Unknown Status^c NStar (formerly Commonwealth Electric) Siting of equipment shelter at West Tisbury fire observation tower.	-	-

a. Agreement types include: A=Memorandum of Agreement; AC = Access Agreement; E=Easement; L=Lease; R = Recreation Permit; S = Special Use Permit; and U=Memorandum of Understanding.

b. Year that agreement expires. Permanent agreements are indicated by an expiration date of "None."

c. Unknown status includes uses for which there is no agreement and uses for which an agreement exists but was not located during the preparation of this RMP.

There are no key management or guidance documents for the fire observation towers.

Annual Maintenance

There are no annual maintenance schedules for these properties.

Natural Resources

Water Resources

All towers on Cape Cod are within the Fertilizer Management DCPC; only the town of Falmouth has implemented the required local bylaw. This DCPC

and Falmouth's bylaw have no effect on tower operations and management, which do not involve the use of fertilizers.

Rare Species

Because the access road to the West Tisbury Fire Tower is located within Priority Habitat, road maintenance and other activities along this road (e.g., pruning tree limbs, mowing) are subject to NHESP review. Activities at the three other towers in Priority Habitat (i.e., Sandwich, Brewster, and Wellfleet) are also subject to review.

Invasive Species

There are no monitoring or management activities.

Vegetation

Fire Control District 1 personnel are responsible for maintaining vegetation along the utility lines from Hokum Rock Road to the Dennis tower.

Cultural Resources

The Barnstable and Dennis fire towers are within the Old King's Highway Regional Historic District. Changes in the exterior of buildings, structures, fences; new construction; and demolition are subject to review by the Old King's Highway Historic District Committee. See the Committee's web page for additional information. (<http://www.townofbarnstable.us/OldKingsHighway>)

Recreation Resources

There are no recreation management activities.

Infrastructure

Buildings

Major cabin repairs are performed by contractors; minor repairs are performed by district fire control personnel.

The High Ground Special Use Permit with the Department of State Police includes a provision that they provide DCR approximately 40% of the space within their equipment shelter's at fire observation towers in Falmouth, Sandwich, and Barnstable.

Under the terms of a 2007 Memorandum of Agreement between the DCR and the U.S. Coast Guard, all Coast Guard assets remaining on DCR

property after the dissolution of the agreement are transferred to the DCR. It is likely that this is how the "Coast Guard" building at the Sandwich fire observation tower came under DCR's control.

The Barnstable Repeater Association's equipment shed at the Dennis fire observation tower was constructed in 1998 following verbal approval of a verbal request; there was no written agreement. Because of this, there is no formal assignment of responsibility for the operation, maintenance, or repair of this building.

Roads

The road to the West Tisbury Fire tower is maintained by Bureau of Fire Control and Forestry staff. Roads to the Barnstable and Dennis towers are infrequently repaired and require no ongoing maintenance.

A 1999 Access Agreement allows DCR personnel and vehicles to use a private driveway to cross private land (1937 State Highway) in order to access the Wellfleet fire tower. In return, the adjacent property owners and their guests are allowed to drive across DCR property.

Parking Areas

There are no public parking areas to maintain.

Trails

There are no formal trails to maintain.

Kiosks and Signs

Signs are maintained by Fire Control District 1 personnel.

15.9. RECOMMENDATIONS

Introduction

This section provides recommendations for the near- and long-term management of fire control towers on the Cape and Islands. Applied Land Stewardship Zoning recommendations provide general guidance for managing these towers. Future activities and projects should be checked against the recommended Land Stewardship Zoning, below, for consistency. Management recommendations for the towers are all high-priority, and should be addressed as soon as resources become available.

Applied Land Stewardship Zoning

The following Land Stewardship Zoning is recommended for fire observation towers on the Cape and Islands. There is no map associated with this zoning.

Zone 1

- No land associated with fire observation towers has been designated Zone 1.

Zone 2

- All portions of the Dennis and West Tisbury fire observation tower parcels outside of the fenced-in yards beneath the towers are designated Zone 2.

Zone 3

- The area beneath all fire observation towers, within the fenced-in yard, has been designated Zone 3.
- All additional portions of the Barnstable and Wellfleet fire observation tower parcels.

Significant Feature Overlay

- There are no Significant Feature Overlays.

Management Recommendations

Seven priority management recommendations were developed for fire observation towers on the Cape and Islands. (Table 15.9.1) For a recommendation to be considered priority it must address one or more of the following criteria:

- Regulatory compliance or compliance with legal agreements.
- Threats to the health and safety of park visitors and employees.
- The imminent loss of a natural, cultural, or recreation resource.

Additional maintenance and management needs observed during the preparation of this RMP, but not meeting one or more of the above criteria, are not included in this plan.

The following recommendations are of equal priority

Table 15.9.1. Priority recommendations for fire observation towers on the Cape and Islands.

Recommendation	Implementation^a
Submit ongoing vegetation and road maintenance activities at the Sandwich, Brewster, Wellfleet, and West Tisbury fire observation towers to NHESP for review under MESA.	F
Conduct a state-wide survey of the condition and cultural significance of all fire observation towers in Massachusetts; develop management guidelines as warranted.	C, F, P
Determine ownership of the State Police building at the Dennis fire tower. If owned by the DCR, stabilize and mothball in accordance with Mothballing BMP (DCR n.d.i).	F, P
Determine if an agreement exists for the presence of the fire observation tower on Falmouth municipal land; establish an agreement with the town if warranted.	L
Conduct an expanded file review to determine the current status of the permit for the NStar equipment shelter at the West Tisbury fire observation tower.	P, R
Establish a formal agreement with Barnstable Repeater Association for siting of shed at Dennis fire observation tower.	L
Conduct an inventory of all antennas and communication equipment on fire observation towers, compare against existing legal agreements, and establish new agreements as warranted.	F, L

a. The following codes identify the party or parties responsible for implementing the recommendations: B = Bureau of Ranger Services; C = Contractor; E = Division of Engineering; F = Bureau of Forest Fire Control and Forestry; L = Legal Services; O = Other; P = Bureau of Planning, Design & Resource Protection; R = Regional and district staff; U = Universal Access Program; V = Volunteer or partner; and X = Office of External Affairs and Partnerships.

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