

# World's End Management Plan



The Trustees  
of Reservations

*Conserving the  
Massachusetts Landscape  
Since 1891*

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## Section 1: Introduction and Acknowledgments

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*Between Hingham Harbor and the Historic Weir River lies a peninsula known as World's End [see Map 1]. Its dramatic topography and magnificent landscaping have been admired for more than half a century. Shaped and sculptured by glacial action, the land rises into two tall drumlins joined by a narrow beach of rough sand. To the south, Planter's Hill (121 feet) and Rocky Neck, and to the north, World's End itself (90 feet) look out across Hull to the islands of Boston Harbor. The hillsides are rolling pasture where once a prize herd of Jersey Cattle grazed. Scores of tall red cedars stand guard on Rocky Neck, and gravel drives, lined with shade trees of English oak, beech, elm and maple, follow the contours of the land in perfect symmetry.<sup>1</sup>*



Map 1: World's End locus map

Since 1891, The Trustees of Reservations has worked to protect special places in Massachusetts. These protection efforts have relied upon the generosity of private individuals and the collaborative efforts of volunteers, local communities, professionals, and other conservation organizations. This management plan for World's End is the product of just such a successful partnership.

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<sup>1</sup> Calhoun, S.F., J.G. Braun and K.I. Helphand. 1971. World's End Reservation, Hingham, Massachusetts: A master plan. The Trustees of Reservations.

Thirty-three years have passed since The Trustees worked with members of the local community to raise the funds to purchase World's End, saving it from major development. Since then, the property has stood out as one of The Trustees' hallmark properties, and while management has evolved, the overall feel of the property has remained fairly constant.

Thirty years have passed since the first, and only, management plan was developed for the property. While management is well-established, The Trustees of Reservations felt it was important to reaffirm what is special about World's End and to apply newly understood resource protection principles to ensure the continued protection and preservation of these special qualities. A program of careful planning and sound management is essential to fulfill these goals.

During the fall of 2000, The Trustees embarked on a process to develop a comprehensive management plan for World's End. The planning process has included:

- Forming a planning committee made up of individuals largely from the Hingham area who represent different property management perspectives. The group has met many times to review current management issues and to consider the future of the reservation.
- Conducting a visitor survey to help The Trustees learn how visitors are using the property and what changes they might like to see.
- Compiling a history of the property that describes historic land use and identifies the historic features of the property.
- Describing the site's natural resources and identifying management issues related to the protection of those resources.
- Providing opportunities for public and community input, including public forums and a site walk.

This planning process has sought to define the property's essential features and to articulate goals and guiding principles that will shape future decision-making. By outlining specific objectives, this framework is intended to guide conservation efforts at World's End.

Many people have contributed their valuable time, shared their expertise, and offered their advice and counsel during this lengthy process. Leading the way was a World's End Planning Committee that consisted of Trustees' members and volunteers as well as several Trustees' staff members. They are:

**Volunteers:**

Nick Noon, Chair, Cohasset  
Kathy Abbott, Cambridge  
Jay Hall, Hingham  
Bob Hidell, Hingham  
Maggie Merrill, Hingham  
Steve Oliver, Hingham  
Oliver Rodman, Hingham  
Samuel W. Wakeman, Cohasset

**Staff:**

Lisa Vernegaard, Project Manager  
Tom Foster, Regional Director  
Russ Hopping, Natural Resources Planner  
Michelle LoConte, Visitor Services Coordinator  
Al Yalenezian, Superintendent (1980 – 2001)

In turn, the committee drew upon the wisdom and experience of several other professionals and community members. Electa Kane Tritsch, Research Historian, researched and produced the land use history report and provided analysis of cultural resource management issues. Vin Antil, The Trustees' GIS Manager, prepared the maps included in the report; Sally Matkovich compiled and analyzed the data found in the Visitor Survey report; and Margaret D. Thompson, Professor of Geology at Wellesley College, co-authored the section on geology.

Thanks to the thoughtful participation of all of these individuals and to their many hours of work on behalf of the project, World's End will begin the 21<sup>st</sup> Century with the confidence that it will forever remain one of The Commonwealth's most special places.

Andy Kendall  
Executive Director  
January, 2002

## Section 2: Executive Summary

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### The Significance of World's End

World's End is a 251-acre peninsula of fields, tree-lined avenues, intertidal rocky shores, drumlins, and spectacular views set within Boston Harbor with easy visitor access. Graceful tree-lined roads and rolling fields testify that World's End is not a “wild” place, but one where people have actively manipulated the land for hundreds of years and where a lasting agricultural tradition and changes in aesthetic tastes have left their marks. The surrounding context of urban skyline and suburban development emphasizes the property's pastoral setting that offers a tranquil experience within a modern metropolitan landscape.

The importance of World's End extends beyond its singular beauty and rich history. As natural areas succumb to development, the ecological values associated with open land become even more significant. The property's fields, four-mile undeveloped coastline in Boston Harbor, and rare plant communities provide vitally important habitat for a myriad of plant and wildlife species. In particular, the one hundred acres of fields support many grassland-dependent plants and animals whose habitat is otherwise vanishing quickly in the immediate vicinity as well as the region beyond.

World's End is also a product of a conservation ethic. It is telling that no one has ever lived at World's End, reflecting the fact that this land has always been valued more for other things such as its rich agricultural soils and unspoiled vistas. In the late 19<sup>th</sup> century, John Brewer, guided by Frederic Law Olmsted's design, “enhanced” this special landscape, creating the World's End that we see today. Thus began an era, that continues today, in which World's End is prized as a place of great natural beauty and deserving of special protection. When the property was threatened by a proposed development in the 1960s, the local community joined forces with The Trustees of Reservations, which acquired World's End for conservation in 1967. Today, The Trustees works with community members and property visitors to continue this legacy of preservation and conservation.

### The Goal

From its scenic and historic landscape to its vitally important habitats, World's End presents significant opportunities and unique challenges. Three factors will guide The Trustees of Reservations in managing World's End. The first is The Trustees' mission, set forth by founder Charles Eliot in 1891:

*The Trustees of Reservations preserves, for public use and enjoyment, properties of exceptional scenic, historic, and ecological value throughout Massachusetts and protects special places across the state.*

Second, management will support goals outlined in The Trustees' strategic plan, *Trustees 2000*. This organizational plan highlights several initiatives, including:

- *Offer visitors a wide range of opportunities, including educational and interpretive programming, to enjoy and value our properties and to join us in assuring the preservation of their scenic, historic and ecological features.*
- *Adopt and implement statewide standards for the management and protection of each property.*
- *Engage and sustain active participation of a broad and diverse public in the enjoyment, appreciation and stewardship of the Massachusetts landscape.*
- *Increase opportunities for meaningful participation of volunteers.*

Third, management should be mindful of the intent of those who worked tirelessly to preserve World's End. In his 1967 letter to potential donors, Samuel Wakeman, the Chairman of the Committee to Preserve World's End declared the hope that World's End be preserved as

*...an island of beauty where we can still enjoy the satisfaction of lying in a field of warm grass and looking at the sky; where we can still watch wildlife undisturbed by the noise and confusion of the city; where we can still walk on beaches washed by the sea without seawalls and hot dog concessions; and where we can turn momentarily to simple pleasures such as seeing a child explore the mysteries of the coming spring.*

Guided by these three factors and a comprehensive study of the property's unique qualities, The Trustees will base the management of World's End on the following goal:

*The Trustees will manage World's End to protect its pastoral quality while assuring opportunities for visitors to enjoy and learn about the historic, scenic, and ecological features that contribute to its special character. In doing so, The Trustees will strive to instill in people a sense of stewardship for this special place and promote a conservation ethic for land in general.*

## Guiding Principles

- The Trustees will apply the best available management practices to preserve the scenic, historic and ecological features at World's End.
- Operations will be guided by an unswerving commitment to protect the property's outstanding scenic qualities. Management will ensure that the scenic quality of the landscape is preserved for the enjoyment of current and future generations.
- The Trustees will work to perpetuate the mosaic of scenic vistas, natural habitats, and cultural features that have characterized the property for at least the past 100 years.

- The Trustees will seek to accommodate a diversity of uses as long as a particular use does not significantly harm the property's resources or interfere with the quality of the visitor experience in general.
- Through good communication and collaboration, The Trustees will work to reinforce and confirm its partnership with the local community, its members and volunteers, and other conservation partners to achieve its long term goals for World's End.

## A Vision for the Future

Building on the organization's mission and property goals, and in keeping with the guiding principles laid out above, The Trustees' vision for World's End is that through active and thoughtful management the property be preserved in substantially its present form for the use and enjoyment of current and future generations. In order to achieve this vision the following key recommendations have been developed.

- Maintain World's End's open character. (9.2.1)
- Perpetuate the overall design intent of the Olmsted/Brewer plan. (9.2.2)
- Maintain a suite of long views and small-scale vignettes. (9.2.3)
- Maintain the textural diversity of the World's End landscape. (9.2.4)
- Maintain a diversity of grasslands that support species that depend on early successional habitats. Particular conservation targets shall include grassland nesting birds, native grasses, and invertebrates (especially butterflies). (9.3.1)
- Control non-native invasive species. (9.3.1)
- Maintain the unique natural features that distinguish World's End, including the regionally rare mature oak hickory forest, the state-listed rare maritime juniper woodland, and the red cedar woodland. (9.3.2, 9.3.3. & 9.3.4)
- Restore Damde Meadows to a functioning salt marsh ecosystem. (9.3.5)
- Maintain the Ice Pond as a unique vernal pool habitat and the sole source of semi-permanent fresh water at World's End. (9.3.6)
- Maintain prehistoric sites, complete with any artifacts, in an undisturbed state. (9.4.2)
- Maintain and document with photos the remains of the Nilson Camp. (9.4.3)
- Preserve the Sheepfold's tangible remains. (9.4.4)
- Maintain integrity of Damde Meadows' cultural features (9.4.5)
- Document the existing field boundaries as evidence of past land use and original lot lines. (9.4.6)
- Develop a comprehensive plan for the plantings associated with the Olmsted/Brewer plan (i.e. treed avenues). (9.4.7)

- Maintain the pre-Olmsted roadways as examples of human use at World's End prior to the Olmsted/Brewer alterations. (9.4.8)
- Maintain the stone pillars as entrance markers to World's End. (9.4.9)
- Maintain the Edwards Memorial, which provides a spiritual connection between World's End's past stewards and present visitors. (9.4.10)
- To ensure that visitor use is not degrading the property's special features or the quality of the visitor experience, implement a monitoring program that measures visitor impacts. (9.5.1)
- Continue to inform dog walkers about the leash rule and provide educational and interpretative information that explains rationale behind this rule. (9.5.1)
- Continue to monitor the degree of conflict that is occurring between visitors and the impact that dogs may be having on wildlife habitat. (9.5.1)
- If dog conflicts persist as a problem, outline a dog permit system and assess its feasibility based on cost and benefit. (9.5.1)
- Welcome visitors to World's End and provide opportunities for visitors to learn about The Trustees as a conservation organization. (9.5.3 & 9.5.6)
- Develop a 3-year education and interpretation programming plan. (9.5.6)
- Provide educational and interpretative material and/or programs about a variety of themes, including the interaction of people and the land over time. (9.5.6)
- Actively provide visitors with updates and explanations of current management. (9.5.6)
- Establish a full-time ranger position to supervise and train all rangers. (9.5.6)
- Construct a wildlife viewing station that interprets the ecology of Damde Meadows. (9.5.6)
- Ensure a high quality visitor experience by providing good information about the property, providing basic facilities, improving handicapped access, maintaining trails, and enforcing various regulations in order to minimize conflicts between visitors. (9.5)
- Evaluate the current entrance design and develop alternatives that may alleviate traffic congestion at the entrance. (9.5.3)
- Investigate a shuttle service that would provide visitors with alternative means of access to World's End. (9.5.3)
- Implement organization-wide initiatives for engaging volunteers. (9.5.6)

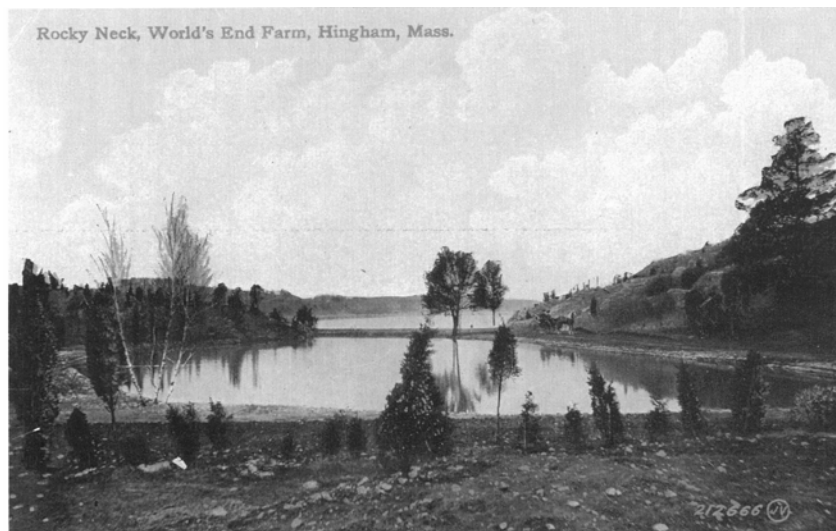
## Section 3: A History of World's End

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### 3.1 Overview

From the Archaic Period of prehistory eight thousand years ago to the mid-twentieth century, people have exploited the rich and varied resources of the drumlins that make up World's End. They have fished and hunted on and around it. During the last three thousand years they have cultivated its slopes and harvested its woodlands. But, in this entire time span, it appears that no one ever permanently inhabited World's End.

World's End went through several discrete periods of use and ownership, each one having an impact on the natural landscape. A summary of the history of World's End is presented here which draws upon several resources, including Walker and Walker's *A History of World's End*<sup>1</sup> and Tritsch's 2001 report, *A Delicate Balance: A History of Land Use in the World's End Reservation*.<sup>2</sup> The latter can be found in Appendix A.



**Figure 1:** Historic postcard of Ice Pond on Rocky Neck

### 3.2 Pre Settlement

Native Americans began hunting on what were wooded hills in the coastal plain as early as 8,000 years ago. They probably fished the rapids of the Weir River near Ringbolt Rock as well, if the evidence from later millennia is applicable. Between the last glacial retreat and the arrival of English settlers, groups of Native Americans visited and camped

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<sup>1</sup> Walker, W. H. C. and W. B. Walker (1984). *A History of World's End*, The Trustees of Reservations.

<sup>2</sup> Tritsch, E. K. (2001). *A delicate balance: A history of land use in the World's End Reservation, Hingham, Massachusetts: 73 + appendices.*

on World's End for extended periods between early spring and late fall. They used the site's wide variety of natural resources both for immediate needs and to take with them to inland winter camps. Archeological research on World's End has uncovered extensive shell middens from the soft-shell clams that were a dietary staple, together with evidence of fish and small mammals, nuts, berries and deer. Fish may have been smoked for long-term preservation.

In addition to the plants and animals that were hunted, gathered and dug at World's End, corn was cultivated by Woodland and Contact Period Indians. However, it is impossible to tell which of the slopes on the drumlins may have been cleared by prehistoric farmers. What is sure is that the drumlins, adjacent to the harbor that became colonial Hingham, were the first cultivated fields of the English town that was settled in 1634.

### 3.3 Post Settlement

Over the next hundred years, the "Old Planters" of Hingham cleared whatever woodland was left at World's End. They planted side-by-side lots to rye, barley and corn. They made three landing places on World's End for the barges that transported their grain to mill and storage, and built one long fence around the perimeter of the area to keep out hogs, deer and other undesirables.

By the 1700s World's End was a thoroughly agrarian landscape. Even the salt meadow that cut the drumlins off from the mainland had been dammed, the dams serving dual purposes. While controlling tidal flow through the meadow and thus improving the quality of its salt hay, the dams also provided overland access to the planting fields. Landing places were supplanted by rights-of-way leading from Martin's Lane through neighbors' fields and, eventually, over the World's End bar that tended to flood at high tide. The small fields of seventeenth-century planters were consolidated into larger holdings owned by a few families: Lincoln, Andrews, Thaxter, Cushing. With the exception of Rocky Neck where some grazing may have occurred, the fields were kept in cultivation, their rich soil maintained by regular application of rockweed from the World's End shores as well as manure from the mainland.

### 3.4 The Brewer Era

In 1855, wealthy Bostonian John R. Brewer bought two parcels of land on Martin's Lane with the intention of creating a farm and summer place for himself and his family. Over the next thirty years as his "farm" expanded, he purchased all the remaining World's End parcels except those belonging to the Barnes family and, on the mainland, the Loud family. Brewer continued to cultivate the inner drumlins, planting them to timothy, sugar beets and alfalfa, all fodder crops for the cattle, horses and sheep that filled his large barnyard and grazed from time to time on the drumlins beyond the bar. A stone-walled shed was built into the hillside on World's End, originally intended for sheep but shortly converted to use by cattle. Several areas of natural seepage around the drumlin perimeters were stone-lined for wells. The Damde Meadows engineering was elaborated by a network of tiled drainage ditches and installation of a flapper valve in the Martin's

Cove dam, so the east meadow land could be planted to fresh hay, a more nutritious and profitable crop than salt hay. Eventually Brewer's heirs would exploit the land on Rocky Neck as well, fencing it, damming a natural depression for use as an ice pond and watering hole, and turning the area over to summer grazing

### 3.5 A Designed Landscape

Brewer's greatest impact on World's End was aesthetic. With his son Frank, he set out to make the bare, open landscape a place of beauty through a tree-planting program begun in 1880. Soon after, they hired landscape architect Frederick Law Olmsted to design a comprehensive plan for the property, taking into consideration both the natural topography and the eventual disposition of the property.

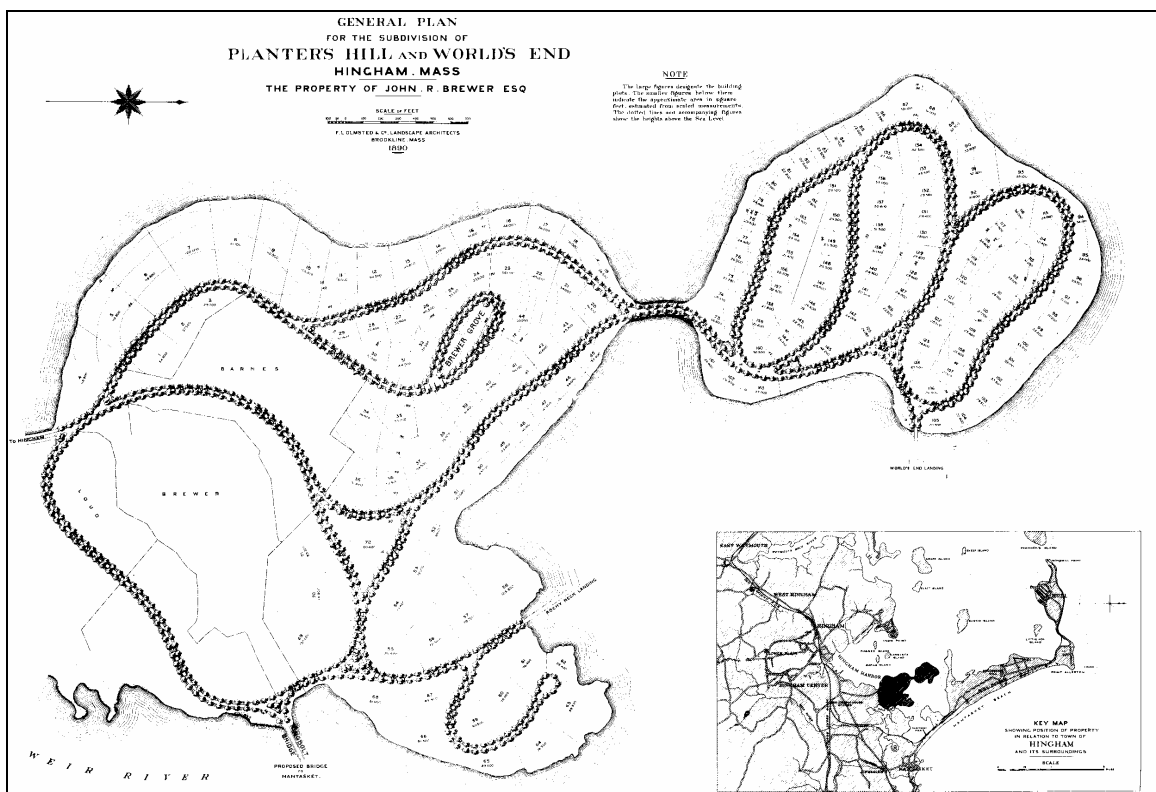


Figure 2: Original print of 1890 Olmsted subdivision plan for World's End

Olmsted's 1890 design is well-known. It incorporates a winding network of tree-lined roadways that was characteristic of his work, and it proposes drastic modification of the landscape in its intended use for house lots, complete with boat dock on Rocky Neck and a second shore road across to Nantasket. The house lots never came to be, but the roadways on World's End today largely resemble Olmsted's design. The Brewers worked on roads and tree planting slowly over the next twenty years. A few areas, such as the Loud Lot and Rocky Neck, never did receive designed treatment and their trails remain substantially as they were in the colonial period.

### 3.6 Conservation: The Trustees' Era

By the late 1960s, the Brewer-Walker family that had cared for World's End for a century was ready to end their tenure. Local and regional concern grew with rumors that the property might become the "World's End Estate" envisioned by Olmsted after all. This threat was particularly significant since World's End was one of only a handful of substantial open-space properties remaining in the coastal Boston basin. A determined local fund-raising committee worked with The Trustees of Reservations to purchase the 251 acres in 1967. Although there have been minor changes to the property since that time, The Trustees' basic policy has been one of preservation and maintenance of the historic landscape whose stewardship they inherited.

Today very few visible remains exist that testify to the extensive land use history of World's End. Fragmentary clam shells appear whenever the soil is turned over. A single sheep shed wall remains, as well as concrete footings from a later weekender's cottage. Old and not-so-old field and property boundaries are marked by stone walls, hedgerows and an occasional fence post. Rows of boulders at the dams, the Bar and the shoreline attest to centuries of flood and erosion control. Yet despite the scarcity of individual cultural features and artifacts, World's End is essentially a man-made landscape. Its open fields, successional growth and cultivated groves, and dammed salt meadow all testify to a piece of land so rich in natural resources it was well-used, well-worked, and appreciated for eight thousand years.

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## Section 4: Scenic Resources

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### 4.1 Introduction

World's End is arguably one of the state's most scenic landscapes. The open fields, tree-lined avenues, and hilltop vistas of the Boston skyline and the surrounding harbor combine to provide visitors with a unique and unforgettable experience. Because these vistas are clearly at the forefront of the visitor experience and because The Trustees' mission specifically recognizes exceptional scenery as a protection priority, it is important to address scenic resources in this plan.



**Figure 3:** View of Boston and Harbor Islands from World's End

When asked to describe World's End, visitors often use terms such as “wonderful vistas,” “openness,” and a “closeness to nature” when trying to describe the special feel of the property. These intangible characteristics are typically related to scenery, and reflect the managed natural and cultural features at World's End. Therefore, in most instances these intangible qualities will be managed through recommendations proposed for natural and cultural resources. For example, the maintenance of grasslands for ecological values will maintain the primary scenic vistas, sense of openness, and nature visitors have come to expect.

### 4.2 Important Scenic Elements at World's End

Identifying scenic resources is, for the most part, a subjective process that is based on personal likes and dislikes, which can vary from person to person. Still, it is possible to narrow these preferences through consensus. Comments from the planning committee, the 2000 visitor survey (Appendix B) and Hingham public identified the following

important scenic elements at World's End.

Pastoral/Open Character:

The openness encountered at World's End was the most frequently identified scenic characteristic. Critical to this element are the fields that occupy 40 percent of World's End. These fields not only echo the agricultural past of the property, they expose the contours of World's End itself and allow visitors to view landscapes both near and far.



**Figure 4:** View of "World's End" from the Bar

Designed Landscape:

The tree-lined avenues originally designed by Fredrick Law Olmsted that wind throughout World's End are among the features that most visitors immediately identify as characterizing the World's End landscape. These avenues are the primary access from which visitors encounter the scenery of World's End. Both the leisurely sinuousness of the roads and the regular spacing of large shade trees along each verge were designed with aesthetic effect in mind, a functional combination that is pleasing to the senses. To the visitor, it is simply satisfying.

Unusual and Expansive Views:

The vistas at World's End are too numerous to address individually but these views typically include both long views and smaller-scale vignettes, many of which are linked to the property's open character. Long views generally include views looking out from World's End over water and salt marsh, views of the Boston skyline, and views of the surrounding islands and shorelines. Examples of small-scale vignettes contained within the property include Ice Pond on Rocky Neck, large rock outcroppings by Damde Meadows, and the line of majestic black oaks on the south side of Pine Hill.

### Diversity of Landscape Texture:

The landscape character of World's End is diverse and unique. As visitors move through this landscape they encounter distinct habitats that often present new and different scenery or nature, especially with the changing seasons. Many times these habitats are small or nestled within larger ones. For example, within the larger expanse of fields, there are many types of grasslands: some that are mostly grass, some covered with wildflowers and some that contain boisterous birds during spring and summer. This variety of habitats and changing textures provides visitors with visual diversity and helps give World's End a feeling that it is larger than if it were a single homogeneous landscape.



**Figure 5:** Grassland on eastern slope of Planter's Hill

### **4.3 Significant Factors That Threaten or Could Diminish the Scenic Resources at World's End**

Just as scenic resources were identified, the planning committee and the visitor survey identified several real or potential threats to the scenic landscape. These are presented here with brief explanations.

- **Succession** of vegetation, especially of fields, field edges, treed avenues and other scenic habitats including Ice Pond, the red cedar woodland, and the maritime juniper community threatens to reduce the landscape diversity. If left unchecked succession will result in many vistas and other scenic elements described in section 4.2 being obscured, or worse, eliminated. *See also Sections 5 & 7.5.*
- **Maturation of trees** resulting in blocked vistas. Many trees along the margins of World's End have yet to fully mature. As they do, they will gradually interrupt some of the long views from World's End.

- **Aging and/or declining health of trees** along avenues. The trees along the avenues are a focal point for visitors. Since many of these trees are more than 100 years old, they are beginning to die. As a result, gaps are forming in what was a continuous row of mature trees. *See also Section 6.5.*
- **Management practices of grasslands** that reduces their diversity. The grassland mosaic is central to the observation by many that the World's End landscape has a unique texture. *See also Section 5.*
- **Memorials.** Many have observed the intrusion that memorials can have on the uncluttered World's End landscape and how this intrusion can negatively affect the visitor experience.
- **Signs and structures.** Too many signs can alter the visitor experience by intruding on an uncluttered landscape that is mostly free of signs and structures. *See also Section 7.5.*
- **Non-native invasive species** alter the unique texture of World's End by dominating whole areas of the landscape and reducing scenic variability. Some species (e.g. phragmites) can physically screen features from view. *See also Section 5.*

#### 4.4 Significant Opportunities Associated with Scenic Resources at World's End

- **Ongoing management** practices can demonstrate to visitors the challenges of and the solutions to managing conservation land for its scenic values as well as for other resource values (e.g. ecological and recreational).
- **The feeling of "openness"** as well as the landscape diversity can be enhanced through the implementation of a grassland management plan that addresses succession while maintaining a mosaic of grassland and early successional habitats.

## Section 5: Natural Resources

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### 5.1 Introduction and Methods

World's End contains significant natural resources. The purpose of this section is to describe the natural resources that characterize World's End and to describe the significance of and the threats to these resources. This section establishes the foundation for the recommended natural resource management actions found in Section 9. Existing ecological information was evaluated and augmented where necessary with fieldwork conducted in 2000 - 2001. The results of these efforts are summarized in this section. For more details on natural resources see Appendix C.

### 5.2 An Overview of the Natural Landscape

Nearly four centuries of active land use have created a diverse landscape that is far from "natural." Instead, designed and actively managed landscapes characterize World's End. Moreover, many of the common plant species are exotic, being native to Europe, Asia or other areas beyond Massachusetts. Many of these exotic species are considered invasive since they reproduce rapidly and outcompete less aggressive native species. However, regardless of World's End's degree of naturalness, the fields and woodland edges provide important habitat for many plants and animals including butterflies, wildflowers and grassland birds. The surrounding waters and intertidal zones support additional species and communities, including salt marsh.



**Figure 6:** A typical field and forest edge with abundant wildflowers at World's End.

### **5.3 Regional Context and Open Space Setting**

World's End lies within Boston Harbor at the northern end of the South Shore. This area is characterized by moderately dense development especially in coastal areas such as the Town of Hull, parts of Hingham and Weymouth (Map 2). The immediate vicinity of World's End is characterized by suburban neighborhoods with busy roads that act as barriers between World's End and less developed and more protected inland areas.

Although World's End is isolated from inland areas it still provides a transition between the mainland and harbor. As a result, World's End contains qualities of both the harbor islands and the mainland. The Boston Harbor National Park Area, which includes World's End, represents a significant open space in the heavily urban environment that is typical of the harbor. The nearest islands include Langlee, Ragged and Sarah Islands just to the west of World's End in Hingham Harbor. These relatively small islands are owned by the Town of Hingham and provide nesting and resting sites for seabirds and wading birds. The larger islands visible from World's End are owned by the Massachusetts Department of Environmental Management, the City of Boston and private non-profits and offer recreational opportunities. Bumpkin Island is the closest at just under a mile away.

### **5.4 Watershed Setting**

World's End is virtually surrounded by water. All water drains into Hingham Harbor and the Weir River directly as surface runoff or by way of two small watersheds within the property, Damde Meadows and Ice Pond. Damde Meadows includes a watershed of approximately 84 acres between Planter's Hill and Cushing Neck while Ice Pond's smaller watershed in the middle of Rocky Neck totals 6 acres. The Weir River Estuary, including Damde Meadows, has been designated as an Area of Critical Environmental Concern (ACEC). This designation subjects much of World's End to more stringent environmental regulation and review. For more information on the Weir River ACEC and the ACEC program see Appendix C.

### **5.5 Geology and Soils**

The main hills, including the lands beyond the Bar are drumlins, composed of unconsolidated sand, gravel and small stones left behind as the last glaciers retreated some 11,000 years ago. Soils on these drumlins are deep and well-drained. As a result they are considered among the better farming soils in the region. Other areas, such as Rocky Neck, have bedrock at or near the surface making them poorly suited for agriculture; instead, oaks and other plants that tolerate thin, droughty soils grow in these spots. The oldest rock at World's End is Dedham Granite, molten rock which cooled slowly underground allowing the formation of the coarse grained rock that underlies about one third of World's End. This granite can be recognized in many outcrops to the north and east of Damde Meadows by its pink feldspar and gray quartz. Fine grained rock types are also visible at the surface throughout Rocky Neck. These dark green

layered rocks formed by eruption of lava at the earth's surface where it cooled quickly preventing the formation of coarse grains like those found in the granite.

## 5.6 Climate

World's End experiences moderate summers, moderately cold winters, and ample, fairly evenly distributed precipitation throughout the year. Average annual rainfall is 38-48 inches, slightly drier by approximately 2 inches than inland sites. The nearby Boston Harbor and Atlantic Ocean moderate the climate at World's End in several ways and explain differences between World's End and other inland sites. For example, the moderating effects of the ocean result in half the snowfall (average is 20-30 inches) of inland sites. The average annual temperature is 50 degrees Fahrenheit while inland averages 45 degrees Fahrenheit. Onshore winds that carry cold air from the ocean retard spring growth, but relatively mild autumn winds extend the total number of frost-free days annually. This milder climate likely benefits plants and animals, especially those late season migrating species such as the monarch butterfly or late blooming plants. For more information on World's End's climate consult the 1971 Master Plan.

## 5.7 Natural Community Types

An unexpected variety of natural communities occurs at World's End considering its location near a large urban center and the long history of intensive agricultural and estate land use. The distribution and extent of community types at World's End are described on the accompanying community type map (Map 3). Several priority natural community types as defined by the Massachusetts Natural Heritage and Endangered Species Program have been documented. See Appendix C for more information on priority natural community types classification.

### **Grasslands and Early Successional:**

Grasslands are by far the most conspicuous communities and cover 40 percent of World's End. Large patches of grassland capable of supporting wildlife populations dependent on this habitat (e.g. birds and butterflies) are increasingly uncommon in the state and as a result, many of the dependent species are becoming rare. The World's End grasslands represent some of the best remaining grassland habitat in the South Shore area and support many uncommon and rare species including grassland birds, butterflies, moths and plants. In particular, showy goldenrod, a rare species in Massachusetts, is common at World's End. This population represents one of the largest in eastern Massachusetts and may be the only population in the greater Boston area.



**Figure 7:** Native grassland patch dominated by little bluestem grass on outer drumlin.

Plant diversity appears to be high and, as a result, butterflies and other insects are abundant. In turn, these invertebrates provide food for the many birds and other wildlife. Additionally, World's End supports patches of native grasses. These patches are important because they support species not typical of fields dominated by exotic grasses (e.g. hay fields). Woody plants are particularly numerous throughout all fields. Many of the smaller fields and margins of larger fields are dominated by small trees and shrubs. While these areas provide habitat for species that prefer early successional conditions (e.g. brown thrasher and cottontail rabbit), allowing all fields to become dominated by woody plants would likely threaten the plant and animal diversity at World's End. In addition, the planted avenues and other hedgerows fragment the grassland habitat at World's End into many smaller fields. Such fragmentation diminishes the habitat value for many species (e.g. grassland birds) that require large contiguous patches of grasslands.

#### **Wetlands:**

Wetlands are scarce and limited at World's End. Small pockets of salt marsh occur along the margins of the reservation. Salt marsh once characterized the 15 acre Damde Meadows area, but 300 years of human manipulation changed this site significantly. It is believed that early colonists constructed small stone dams at both ends of Damde Meadows, preventing tidal flow from reaching the marsh, in order to manage the marsh for hay. Further modifications were made to facilitate drainage and improve growing conditions. These modifications remained in place until the 1940s when much of the drainage infrastructure was removed or failed leading to the present conditions. The pond and associated band of non-native *Phragmites australis* provide little habitat value for wildlife and plants compared to an unrestricted salt marsh. As a result, The Trustees has consulted with a number of wetland ecologists, botanists, and wildlife biologists to

assess the ecological status of Damde Meadows. All have concluded that Damde Meadows is a good candidate for salt marsh restoration.

In addition to tidally influenced wetlands, a small semi-permanent pond, Ice Pond (which may not dry up completely in wet years), occurs at Rocky Neck. Its origin is unclear but historical documents indicate it was at least dammed and dredged in the past. Today this pond functions as vernal pool habitat, a priority community type. Based on its history and current condition it appears the pond is experiencing succession since little open water is present. No other vernal pool habitat occurs at World's End. Moreover, this pool represents the most significant source of fresh water for wildlife on the property.

### **Forests:**

Forest is mostly limited to Rocky Neck and the area east of Damde Meadows although small patches of forest surround many of the fields and occur between the outer drumlins. These forests are perhaps better described as wide hedgerows. In addition, the trees in these hedgerows were mostly planted and primarily contain non-native and invasive species.

The forest on Rocky Neck is a mix consisting of fairly young white pine, red cedar, oaks, hickories and red maple. This forest is in a state of transition from abandoned pasture to forest. The rare Maritime Juniper Woodland/Shrubland community occurs in a narrow band along the rocky headlands on Rocky Neck above the high tide line. Together with the red cedar woodland these communities provide food and nesting habitat for many species such as robins and bluebirds and provide winter cover for wildlife such as owls. The stands on Rocky Neck are experiencing overcrowding and competition from hardwoods and invasive species; thus habitat value is being diminished.



**Figure 8:** Windswept red cedars above high tide line on Rocky Neck.

The mature oak hickory forest growing just east of Damde Meadows stands out as one of World's End's more interesting forested areas. While oak hickory forests are common throughout eastern and central Massachusetts, this forest stands out because of its age, condition and location. For example, no similar forest occurs at World's End or on any Boston Harbor Island. While the exact age of the forest is unknown, evidence suggests it may be more than 150 years old. Archaeological evidence indicates hickories were present 700 years ago at World's End, suggesting that oak hickory forest likely represents an original community to World's End, if not the dominant community, prior to the arrival of Europeans. In addition, this forest has few invasive species.

### **Plant Diversity:**

Although not well documented, grassland inventories and general observations throughout the property suggest the plant diversity is high. Preliminary results from an effort by the National Park Service to document the natural resources of the Boston Harbor Islands support this observation (T. Elliman, personal communication)<sup>1</sup>. While exotic species are clearly abundant, native species also seem to be abundant. For example, 10 species of goldenrod were observed in September 2000 during a single brief visit. Grassland diversity coupled with the abundant edge and the limited, although important, wetland and forest habitats help explain why World's End supports abundant butterflies, several of which are rare or uncommon. The diversity of plants, due in part to the diversity of habitats, maintains nectar sources throughout the growing season in close proximity to host plants necessary for larval survival. The limited mowing of fields has undoubtedly contributed greatly to plant diversity and excellent wildlife habitat.

## **5.8 Wildlife**

The size and isolation of World's End limits its capacity to support wildlife, particularly the larger and/or more wide-ranging species (e.g. large birds and mammals). Furthermore, the lack of fresh water limits the range of wildlife that can occur at the reservation. For example, turtles and frogs are mostly absent. Even deer, which typically do well in suburban environments, appear to be rare with no resident population. Limited forest prohibits species dependent on forest interior habitat (e.g. broad-winged hawk and other neotropical migrant birds). However, World's End does provide habitat for a great variety of smaller and less area sensitive wildlife (e.g. butterflies and birds) that depend on open habitats and edge.

### **Birds:**

World's End's position along the coast within a highly developed setting and surrounded by water creates a "trap" for migrating birds. Open spaces within such settings typically serve as important habitat islands that attract migrating birds since much of the surrounding landscape offers little opportunity for food and shelter. As a result, World's End is a favorite destination for many birders.

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<sup>1</sup> Ted Elliman, Contract Botanist, Massachusetts Division of Fisheries and Wildlife



**Figure 9:** Eastern Bluebird

More important, World's End supports several regionally declining species dependent on grasslands. These species include bobolink and eastern meadowlark. The eastern bluebird is a common breeder at World's End that benefits from the grassland habitat. This watch-listed species is a familiar sight for visitors at World's End throughout the year. Five or more pairs typically breed at World's End.

### **Mammals:**

Little is known about the mammals at World's End but big animals are typically scarce. Red fox are resident and are frequently observed during daylight hours. Deer do not appear to be permanent residents and small mammals including moles, mice, squirrels and chipmunks are more common. The reservation's size and isolation limit its importance to mammals.

### **Amphibians and Reptiles:**

No amphibian and reptile surveys have been conducted but the lack of freshwater wetlands undoubtedly limits species diversity. Many frogs, toads, salamanders and turtles require fresh water resources. At least one spring peeper was heard during a field visit in April of 2001 to Rocky Neck and ecology staff have observed several garter snakes.

### **Invertebrates:**

While there is some limited knowledge of invertebrates at World's End, ongoing efforts by the National Park Service to inventory natural resources of the Harbor Islands should greatly improve our knowledge of invertebrates at World's End in the near future.

Existing knowledge of butterflies suggests World's End supports an outstanding diversity of butterflies within Massachusetts (see Appendix C for more details). Forty-eight species of butterflies have been documented at World's End, and based on habitat, experts estimate that an additional 28 species could be found at the property. Many of the species occur in record numbers. Several rare or uncommon species have been observed including pipevine swallowtail, hickory hairstreak, variegated fritillary and sagem. The fields and borders are the most significant habitat for butterflies at World's End because they support the grasses, wildflowers and other plants that are essential caterpillar food plants and adult nectaring plants. World's End's non-grassland communities provide habitat for yet additional species, such as the hickory hairstreak; thus the overall diversity of habitat types at World's End support the outstanding diversity of butterfly species at the property.



**Figure 10:** Little Wood Satyr, one of the most abundant butterflies at World's End.

The rarest invertebrate species at World's End is the spartina borer, a moth that feeds exclusively on freshwater cord-grass. This grass grows along the upper margins of salt marsh and in damp spots in several fields.

#### **Fish and Shellfish:**

Inventory efforts for Damde Meadows restoration have documented that American eel and mummichog utilize the salt marsh between the dikes at Martin's Cove. This same effort also revealed both mummichogs and inland silversides use Damde Meadows. Horseshoe and hermit crabs were also seen both within Damde Meadows and in Martin's Cove. Many additional species undoubtedly occur in the waters that surround World's End. Both the number and size of fish caught during the inventory suggest the productivity for fish is limited in Damde Meadows as a result of tidal restriction (see Appendix C for details).

## **5.9 Threats**

#### **Non-native Invasive Species:**

Non-native invasive plants are abundant at World's End. These plants dominate the landscape in most places. Many of these plants were introduced as landscape plantings, including most of the trees planted along roadways (see Appendix C for species list). Other species undoubtedly found their own way to World's End as a result of very successful means of dispersal. At least 21 species of invasive exotic plants have been observed commonly growing at World's End with many more likely.

Invasive plants can threaten native species, community types and wildlife habitat as they crowd out and replace existing species. This ability to outcompete other plants typically results in dramatic changes to the structural and species composition of the landscape. Fields are particularly threatened by invasives. Buckthorn, multiflora rose, honeysuckle, European turkey oak, English oak and black swallowwort currently represent the greatest

threat to fields and wildlife. Phragmites is the major invasive in Damde Meadows where the dense stands of this tall grass restrict plant diversity.

### **Succession:**

Much of the ecological significance of World's End is directly related to the fields and open lands, which are increasingly uncommon, both locally and statewide. The larger fields at World's End currently support grassland birds, but without regular management to control woody succession and fragmentation, the quality of grassland habitat will decline. Likewise, woody succession has the potential to reduce plant diversity by overshading and out-competing many of the wildflowers, including rare species (e.g. showy goldenrod) and grasses. A reduction in wildflowers can also reduce the number and diversity of butterflies and other invertebrates, noted above as a significant feature of World's End.

Woody plants currently cover 25 percent of the grasslands at World's End. It should be noted that woody cover is represented by both native and non-native species. Unless current management practices are changed, it seems likely that woody plants will continue to increase, threatening grassland habitat critical for butterflies, wildflowers and nesting birds. This is not to suggest that all fields at World's End should be managed to reduce or eliminate woody growth. Some woody growth is important and should be maintained to provide diversity of habitat.

### **Disturbance to Wildlife**

Unleashed dogs and visitors off of trails can disturb wildlife, especially ground nesting and grassland birds which are sensitive to frequent disturbance. In addition, house cats are frequently observed near the entrance area of World's End. Cats are effective predators on small mammals, birds and other wildlife and may pose a particular threat to the grassland nesting birds that are a significant feature at World's End.

## **5.10 Summary of Ecological Highlights**

Where possible, highlights have been identified as conservation targets on map 6 in Section 9.

- Grasslands exist that function as viable habitat for regionally rare and declining species (e.g. grassland birds, plants and invertebrates).
- There is a grassland mosaic that includes patches of native grasslands that support plant species and diversity not typically found in cultural or agricultural grasslands.
- Butterfly diversity is high and many species are abundant. Butterfly diversity likely serves as an indicator that invertebrate diversity in general is high.
- At least four rare species occur. One, the showy goldenrod, represents one of the largest populations in the state, especially for the eastern half.
- Plant diversity appears to be high. Brief assessments suggest that both the herbaceous and structural diversity may be important to wildlife.

- Several rare and uncommon community types occur including “quasi-old-growth” oak hickory forest, which may represent the original forest cover of World’s End.

### **5.11 Summary of Significant Threats**

- Invasive exotic plants are abundant and threaten several important communities and compromise habitat for several native plants and animals.
- Woody plant succession threatens the diversity and viability of the grasslands.
- Visitors and unleashed dogs walking through fields disturb wildlife, particularly grassland birds.
- Neighborhood cats likely poach ground-nesting birds and other wildlife.
- Hedgerows and treed avenues fragment existing grasslands and reduce the potential habitat value of the grasslands.
- Early mowing can threaten wildlife (e.g. birds).

### **5.12 Summary of Significant Opportunities**

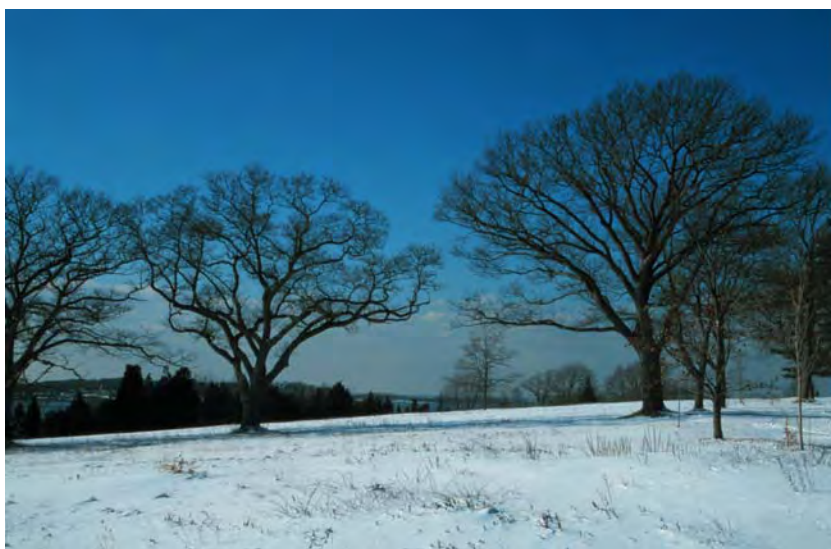
- Significant ecological opportunity to restore Damde Meadows to a productive and fully functioning salt marsh ecosystem.
- Opportunity to demonstrate and interpret grasslands habitat and management.

## Section 6: Cultural Resources

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### 6.1 Introduction and Methods

World's End's character-defining features include a significant number of cultural resources. Most of these resources, the results and evidence of people's interaction with their natural surroundings, are not immediately apparent to the casual visitor at World's End. A documentary study and site survey was commissioned by The Trustees in 2000-2001, which inventoried and evaluated the known cultural resources of the property (Map 4). That study's findings are fully detailed in Appendix A. A summary of the present state of cultural resources at World's End is presented here.



**Figure 11:** Line of old oaks between fields on Pine Hill

### 6.2 Significant Cultural Resources

The cultural resources of World's End fall into three categories distinguished by the extent of visibility in the landscape: prehistoric archeological sites and remains, historic archeological sites and remains, and cultural landscape features.

#### **Prehistoric Archeological Sites and Remains:**

At least twelve discrete prehistoric sites were identified on World's End during a 1990 reconnaissance survey. They are invisible to the property visitor, being wholly below ground, but they are a significant cultural resource on World's End because they contain information regarding seven thousand years of human use.

A moderate threat to the preservation of a number of sites is wave and tidal erosion. Erosion caused by run-off presents a lesser threat, as do any earth-moving maintenance

activities or unauthorized digging. Since prehistoric sites in this vicinity are characteristically located below the historic plow zone depth, normal landscape maintenance such as mowing, brush cutting or minor road grading should not affect site integrity.

The Trustees should regard all of World's End as having high archeological sensitivity. Because of the potential for vandalism or unauthorized digging, specific locations and contents of archeological sites are not detailed in the cultural resource inventory listing that follows.

### **Historic Archeological Sites and Remains:**

These are the remains of structures built between the time of English settlement in 1634 and the recent past. There are few on World's End, because of the area's consistent use for agricultural purposes.

Many structures can be identified only from the records, as there is presently no above-ground evidence of them remaining. Quincy Thaxter had a **barn** on Planter's Hill in the early 1800s. Four **wells** were constructed near the shoreline before 1880. Hans Nilson built a shack or "**camp house**" on the Weir River shore in the late 1800s. All of these features were razed before the end of the Brewer-Walker tenure at World's End. A **second camp** was apparently built by Nilson on the tiny island just offshore in the Weir River. Minimal concrete footings and associated piping still remain, but the structure, like the one onshore, was razed in the 1930s. Historically, a "**ringbolt**", existed on the large rock (i.e. Ringbolt Rock) in the water at the narrows on the Weir River. This iron ring was anchored into rock and used to assist boats up the river against the current. Despite efforts to locate this ringbolt, it was not found during a field reconnaissance in 2000.



**Figure 12:** Nilson's Island with foundation remains

There are remaining fieldstone walls that define Brewer's **sheep/cattle shed**, which stands on the outer drumlin's southwest shore. Although the structure played a minor

role in the property's history, it has since acquired both visual and associative significance. The only standing structure at World's End (other than the gate house), the sheep shed provides an interesting visual contrast to its natural surroundings. Visitor and neighborhood clam digger alike see it as a romantic ruin of a bygone era.

Likewise, two **field stone pillars** constructed by the Brewer family sometime after 1850 greet visitors to the reservation. These pillars once included decorative stone caps and were a part of two stone walls, but both the caps and walls were removed in 1968 and their appearance today is significantly different than what it once was. Together they marked the transition from Martin's Way, a public road, to a private estate and its designed roadways beyond. Today, in addition to still marking the entrance to World's End, these pillars also symbolize the transition of the property from a collective of private agricultural ownerships to a gateway of a single landholding that served as an estate.

### **Cultural Landscape Features:**

Cultural landscape features are resources that include both man-made (e.g. roads, stone walls and foundations) as well as "natural" elements created and maintained through human influences (e.g. fields and planted woodlands). In this regard, the entire World's End Reservation should be considered a macro-feature by this definition, as its present appearance consists of a "designed landscape" superimposed on a "vernacular landscape," (the cultural landscape that developed informally over time). People have touched virtually every part of World's End. Four cultural landscape features largely define the character of World's End.



**Figure 13:** World's End from the air showing the mosaic of fields and tree-lined avenues

**Damde Meadows** was created, maintained and improved over three hundred years for economic reasons. The natural resources of the meadow area are controlled by stone-faced earthen dams at each end of it, supplemented in the late nineteenth century by a third dam-with-culvert structure. The three earthen dams also served as raised

causeways, permanently linking World's End to the mainland despite high tides or flooded meadow.

**Hedge and wall-lined open fields** still remain as visible evidence of the property's long history of cultivation and, to a lesser extent, of use for grazing land. The fields themselves are significant cultural and aesthetic resources, giving visitors a glimpse of what the landscape has looked like for hundreds of years, and reminding them of the land's historic and practical function. In the coastal plain surrounding Boston, World's End's undisturbed agricultural fields are extremely rare as a landscape type. The fact that they are documentable as some of the oldest in continual use in the region simply adds to that rarity.

The presence of historic **hedge and wall lines** surrounding these fields is also significant, visually and legally defining the enclosed spaces. This is especially true on the inner drumlins where the Barnes lot and other *field* boundaries coincide with historic *property* boundaries.

The boundaries take a number of forms. There are a few fieldstone wall lines on the inner drumlins. More common are full-growth tree lines and/or hedgerows, likely remnants of long-gone wooden fences. At three points along the shore, boulder lines head out to the low tide level. These rocks were used to secure beach fencing for cattle or sheep herd control. Around the perimeter of Rocky Neck, a few wooden posts and pieces of barbed wire remain and, more common, ring bolts driven into rock or concrete to secure wire strands to the bedrock. Like the boulder lines, these are evidence of grazing activity and use of the Neck as twentieth-century pasture.



**Figure 14:** One of many tree-lined roadways at World's End

**Winding, tree-lined roadways** around World's End are the features that most visitors immediately identify as characterizing the landscape. The gravel or hard-packed roads, shaded on both sides along nearly all of their length, were designed by Frederick Law

Olmsted as a skeleton around which John Brewer could develop a “housing estate.” Both the leisurely sinuousness of the roads and the regular spacing of large shade trees along each verge were designed with aesthetic effect in mind, a functional combination that was, at the same time, pleasing to the senses. This network of roads is the only landscape element on World’s End that qualifies as *designed* rather than *vernacular*. Even so, it was based on pre-existing cart paths and rights-of-way, and it actually varies from the known Olmsted plan drawings. The resulting road system, therefore, is amusingly convoluted in design. The Brewers modified a plan by Olmsted which was, in of itself, a design that was based on existing conditions. To the visitor, it is simply satisfying.

**Pre-Olmsted roadways**, however, exist at two locations. The road that meanders from the current parking area to the east causeway of Damde Meadows appears not to have been altered in accordance with Olmsted’s plan for World’s End. Instead this narrow cart path bisects the oak hickory forest in its original location and, perhaps, condition. Its exact age is unknown but it certainly existed before 1850. The second early roadway begins at Martin’s Lane where it crosses over the first dike and curves along the west shore of Pine Hill. Today, this roadway serves as a walking path and is not accessible even for maintenance trucks.

### 6.3 Complete Listing of Cultural Resources

The following list enumerates all the known cultural resources on World’s End, with the exception of the prehistoric sites, discussed above.

#### **Historic Archeological Sites and Standing Structures**

References, including maps, mentioned in this section are explained in more detail in Appendix A

#### **Entrance Pillars** (entrance to World’s End)

- Round fieldstone pillars approximately 5 feet high
- Constructed after 1850 by Brewer family
- Stone walls and decorative caps removed in 1968
- Photo in Walker and Walker (1973) p. XII

#### **Sheepfold Foundation** (the first of the outer two drumlins)

- Constructed 1865; in use through 1880s
- Fieldstone, 3-sided, originally with superstructure of recycled barn timbers
- Photos in Walker and Walker (1973) pp. 4, 7; labeled COW SHED on 1882 Palfrey map

### **Nilson's Island (Weir River)**

- Island apparently adjunct to Loud property, purchased in twentieth century by Brewer family
- Concrete and conglomerate foundation, approx. 22' x 22' plus connected privy foundation, few associated artifacts and paraphernalia
- Probably evolved over time from ca. 1900 to 1935-6; torn down 1936
- Weekend/summer camp occupied by Hans R. Nilson, Norwegian-born Boston cigar maker

### **Camp House (on shore by Nilson's Island)**

- Appears on 1882 Palfrey map: CAMP HOUSE
- Lot apparently owned by Hans R. Nilson some time prior to 1923 (cf. plot plan filed with Walker to The Trustees deed, 1972)

### **Wells**

- All marked on 1882 Palfrey map
- One may be what Luedtke describes as a 'small, stone-lined hole' (2½' high; 3' across), near the shore between Pine and Planter's Hills

### **Barn (location not identified; vicinity of Planter's Hill)**

- Pre-1838 (Quincy Thaxter's inventory: "[acreage] at Planter's Hill with Barn")
- Probably same as the 'depression' that Luedtke speculates might be a cellarhole

### **Ringbolt**

- Marked on 1882 Palfrey map

## **Cultural Landscape Features**

### **Brewer Grove and Edwards Memorial (Planter's Hill)**

- Designed tree plantation labeled BREWER GROVE on 1890 Olmsted plan
- Site of metal flagpole erected, top of Planter's Hill, ca. 1900 – 1944
- F. Arthur Edwards, last caretaker of World's End before the property was acquired by The Trustees, buried nearby, 1967
- Commemorative stone erected, 1971

## **Damde Meadows**

- Evolutionary History:
  - pre- and during 17<sup>th</sup> century: salt marsh, no known dam
  - 18<sup>th</sup> century: salt meadow, dam at least at one end
  - by 19<sup>th</sup> century: salt meadow, dam both ends, ditching
  - late 19<sup>th</sup> century: fresh meadow east of causeway, causeway dam and drains
  - mid-20<sup>th</sup> century: partial flooding
  - late 20<sup>th</sup> century: silting, invasive species

### **Dam work, east end Damde Meadows**

- Channeling stonework extending NW from southern end of roadway approximately halfway across present swamp, terminating at large (natural?) boulder; probably part of drainage channel maintained by John Brewer post-1860s; construction date probably earlier
- present dam and roadway – by 1882 in some form (cf. Palfrey plan, Walker and Walker p. 32); apparently reconstructed 1920 (Johnson 1970 interview)

### **Pine Hill causeway**

- Constructed after 1882 (Walker and Walker reference to Palfrey p. 9)

### **Pumphouse foundation and well** (southeast side of causeway)

- “A cement ‘pump house’, used to house the gasoline engine which pumped water from artesian wells in the Damde Meadows, was erected in about 1916 [and] razed in the 1940’s” (Walker and Walker p. 8)
- Beneath the foundation is a large round culvert which may have collected the fresh water from one of the wells Walker and Walker mentions. This area was referred to as “Martin’s Well” or “Abraham’s Well” from the 17<sup>th</sup> century

### **Stone-faced dam and roadway, Martin’s Cove**

- Originally built after 1667 or probably 1675; definitely before 1830, probably before 1795 (see maps)
- Archeological survey in 2000 identified layered dam construction from different periods but did not find artifacts diagnostic of particular dates

## **Ice Pond** (Rocky Neck)

- Natural depression bordered by granite bedrock dike; possibly spring fed.
- Dredged, with earth dam erected, 1909, to provide ice for Brewer estate (Walker and Walker 1973).
- Only source of drinking water for heifers summer-pastured on Rocky Neck.

## Open Fields and Boundary Markers

- Evolutionary history:
  - pre- 17<sup>th</sup> century: planting fields possible but extent unknown
  - 17<sup>th</sup> century: probable open-field agriculture, perimeter fencing
  - 18<sup>th</sup> - early 19<sup>th</sup> centuries: evolved to consolidated closed-field agricultural holdings, boundaries marked by fences or, in some places, stone walls
  - late 19<sup>th</sup> century: all except Barnes and Loud lots consolidated; outer drumlins shift to grazing; inner drumlin part hay, part feed crops; may have been elimination and/or realignment of some boundaries as result
  - 20<sup>th</sup> century: gradual shift to mowing only (for hay or aesthetic purposes)
- Rocky Neck: few cedar posts, iron anchor spikes around north side; single-course stone wall S/SE of roadway; Walker and Walker: “The heifers were driven...to Rocky Neck, which was fenced as pasture for them” (p. 42). Early 1900s to 1936.
- Barnes Lot: south end Planter’s Hill, east and southeast sides Pine Hill; comparison of Palfrey, Olmsted plans and current tree lines indicate that the 20-acre Barnes field was carefully bounded around much of its circumference by substantial stone walls; in some places no stone walls currently exist, but a windrow of full-growth trees – such as that running uphill at the northeast end of his lot – delineate the boundary. Barnes lot not acquired by Brewers until 1920 (Walker and Walker p. 13) but was in Barnes’ family at least by 1802.
- Damde Meadows: stone line extending into marsh, lines up with single cedar post east of Pine Hill causeway; 1881 deed of Damde Meadows section lying east of this one, described as abutting land of Brewer to the west, “as the line of stakes now stands” (Plymouth Deeds 473:38). The stones and cedar post still visible are what is left of this line. Represented as stone wall on 1915 USC&GS map.
- Shoreline: on both the outer and inner drumlins as well as Rocky Neck; lines of boulders to low tide line, extensions of property boundaries shown on Palfrey plan; probable use to secure fence posts across pebble beach.

## Roadways

- Pre-Brewer era (before 1882, *Palfrey Plan*)
  - Martin’s Cove dam roadway and trail along western shore of Pine Hill.
  - Trail through Loud Lot to dam at east end of Damde Meadows.
  - (Probable) roadway on northeast side of Planter’s Hill.
  - World’s End Bar.
- Brewer-Olmsted roads (after 1886, *Olmsted Plan*)
  - See Cultural Resource Inventory map and Palfrey map.

- Note: the roadway connecting the east dam with Planter's Hill does not appear on the 1915 map, nor do southern and western sections of the World's End loop trails. They are therefore the most recent roads on World's End.

## 6.4 Summary of Historic and Cultural Highlights

Where possible, highlights have been identified as conservation targets on map 7 in Section 9.

- **Prehistoric sites.** All are significant cultural resources since they contain information regarding seven thousand years of human use.
- **Sheepfold.** The only standing structure on the reservation (other than the gate house), the sheep shed provides an interesting visual contrast to its natural surroundings.
- **Entrance pillars.** These pillars, although significantly altered since their construction by the Brewer family sometime after 1850, symbolize the transition of World's End from a collective of private ownerships to a single landholding that served as an estate.
- **Damde Meadows.** Created, maintained and improved over three hundred years for economic (i.e. agricultural) reasons.
- **Fields including hedgerows and walls.** The visible evidence of the property's long history of cultivation and, to a lesser extent, of use for grazing land.
- **Treed avenues and Brewer Grove.** The features that most visitors immediately identify as characterizing the World's End landscape. Designed by Frederick Law Olmsted as a skeleton around which John Brewer could develop a "housing estate." The grove also is one of two features that memorialize the property's spiritual significance to its past stewards and present visitors.
- **Pre-Olmsted designed roadways.** Examples of cultural use at World's End prior to the Olmsted / Brewer alterations.
- **Edwards Memorial.** The monument memorializes the property's spiritual significance to its past stewards and present visitors. Maintaining this monument in conjunction with the Brewer Grove preserves the *raison d'etre* of this landscape.
- **Nilson's Island.** The primary significance of what little remains on Nilson's Island is its interpretive value. Luedtke's report contains a thorough description of the site.

## 6.5 Summary of Significant Threats

- erosion and illegal digging at prehistoric sites
- vegetation, and possibly freezing and thawing of moisture within masonry, threatens stability of sheepfold
- maintenance and restoration work potentially threaten integrity of the dikes, entrance pillars and pre-Olmsted roadways

- removal of field boundary lines without replication or documentation
- woody and invasive species encroaching on fields
- inappropriate species selection, spacing and maintenance for trees along avenues

## **6.6 Summary of Significant Opportunities**

- Interpretation of these artifacts and the cultural landscapes gives depth to the visitor's perception and understanding of the contemporary landscape and how it has evolved over the centuries.

## Section 7: The Visitor Experience

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### 7.1 Introduction

World's End is often described as a gem in The Trustees' system of 90 reservations. The property's extraordinary landscape and pastoral, park-like setting attract over 38,000 visitors every year, making it one of The Trustees' most popular properties.<sup>1</sup> At World's End, visitors can truly experience the vision that the organization's founder, Charles Eliot, had when he proposed that a private organization be created to preserve "...scenery of uncommon beauty and more than usual refreshing power."<sup>2</sup> Visitors to World's End do indeed experience the refreshing power of nature, and preserving this quality is of utmost importance.



**Figure 15:** A visitor finding a quiet moment

### 7.2 Past and Current Use

Since 1967, when The Trustees acquired World's End as one of its reservations, the property has been open to the public. Types and levels of use have largely remained unchanged over the past 34 years. Information from a number of sources, including staff and volunteer observations, entrance gate data, and a systematic visitor survey that was

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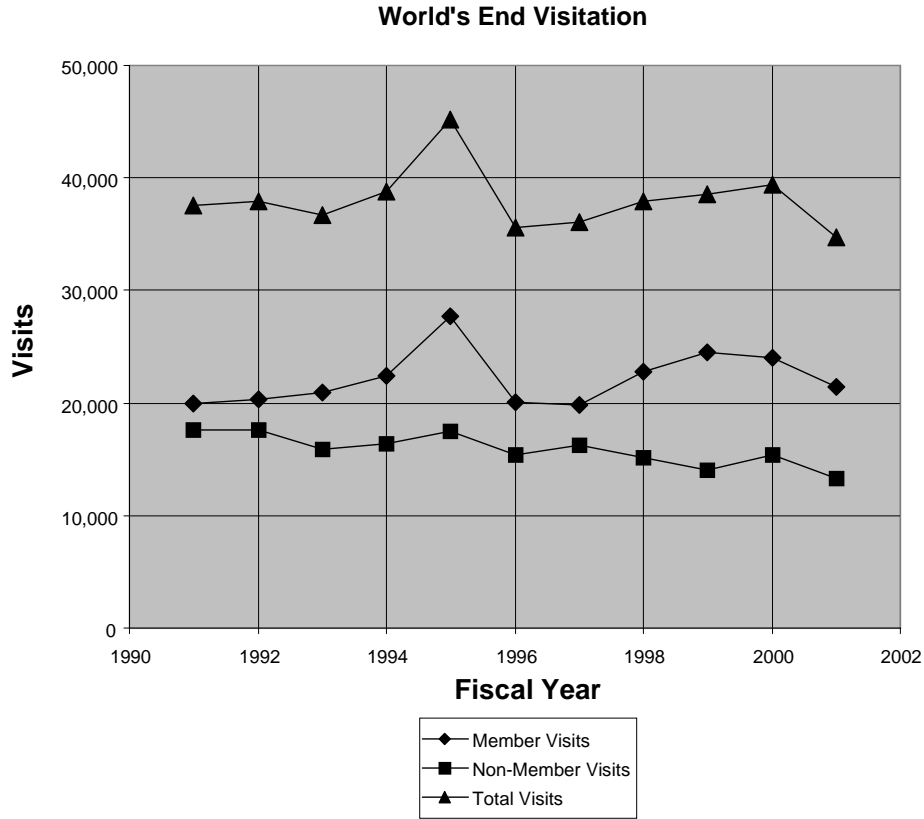
<sup>1</sup> For comparison, The Trustees' beach properties receive the highest use, with a peak daily use of 500 – 1500 people per day. Data shows that peak daily use for World's End may reach 400.

<sup>2</sup> From a letter to the editor of "Garden and Forest," written by Charles Eliot on February 22, 1890, which bore the title, "The Waverly Oaks" but which really outlined his plan for preserving open space near Boston.

conducted in 2000 provides a good visitor profile, with the following highlights. A copy of the visitor survey and a summary of the data can be found in Appendix B.

**Who visits World’s End?**

- Peak visitor use occurs during the spring and fall; Sunday mid-days are the busiest time periods. A beautiful fall or spring weekend day may attract over 400 visitors. All three parking lots are full on these four or five days each year. On more typical “steady” days, 200 – 300 people visit the property. This level of use occurred about 25 times in the past year and does not require the third parking lot to be opened.
- Annual visitation averages approximately 38,000 visitors per year. Figure 16 shows admission data since 1991.



**Figure 16**

- About 75% of those coming to World’s End are repeat visitors.
- Over half are Trustees’ members. This percentage is significantly higher than that at most other Trustees’ properties, which may be the result of three factors: first, the entrance fee (currently \$4.50 for adults) is waived for members; second,

regular visitors may exhibit a stronger than average conservation ethic based on a general sense of stewardship for World's End; third, staff have consistently encouraged visitors to become members. The property's success in recruiting and maintaining members provides an important source of income that helps cover the costs of operations. Appendix B provides a detailed breakdown of membership data between 1994 and 2001.

- Most visitors live in Massachusetts.
- The mean age of visitors who completed the survey was 44.

### **What are common visitor activities?**

- Nearly all visitors come to World's End simply to take a walk.
- Other common activities include dog walking, nature study, and photography/art work.
- In 1995, The Trustees instituted a leash policy for dog walkers. Several factors contributed to this decision, including an increase in the number of serious conflicts involving unleashed dogs and concerns about wildlife impacts. In general, dog walkers were very unhappy with this change, and several withdrew their membership in protest; many more chose not to renew their memberships. However, since the implementation of the leash rule, conflicts involving dogs have dropped significantly. Furthermore, membership recruitment, which suffered initially with the implementation of the leash rule, has rebounded to pre-1995 levels.



**Figure 17:** Visitors enjoying a walk down one of the many tree-lined roadways at World's End

### **What kind of experience are visitors seeking?**

- According to the visitor survey, visitors are seeking many types of experience. The following, listed in order of response, were commonly listed as “moderately, very, or extremely important” by visitors as reasons for going to World’s End:
  - To enjoy the scenery
  - To exercise
  - To relax
  - To find peace and quiet
  - To spend time with friends and family
- Nearly all visitors felt that their expectations for the type of experience they were seeking were met.
- While visitors indicated that they like many things about World’s End, “scenery” leads the list as the number one thing that visitors enjoy most. Several other qualities of the property enhance the visitor experience, including:
  - Ease of gaining access to the property.
  - The juxtaposition of a pastoral landscape with the urban landscape.
  - Its size: World’s End is large enough for repeat visitors not to get bored but small enough for visitors to feel they’ve had a good chance to see most of the property.
  - A park-like landscape with open views and wide paths that are easy to navigate and create a safe environment.
  - Open year-round and for long hours.
  - Even on the busiest of days, some areas of the property remain quiet, giving visitors who are seeking solitude an opportunity to get away from the crowd.

### **Visitor services**

- World’s End is staffed 365 days per year with a ranger who is based at the gatehouse. The ranger collects admission fees or checks membership cards, orients first-time visitors, promotes membership, and provides informal interpretation of the property. Rules are posted and reinforced with occasional patrolling by rangers. The amount of patrolling that rangers are able to do is largely dependent on how busy the gate is. Reference books are also available at the gatehouse for natural history questions.
- Hours of operation vary through the year. The property is open from dawn to dusk, 365 days per year. However, hours that the gate is open to allow access to the parking lot differ slightly from the hours that the property is open. The gate is open at 8:00 am Monday - Friday and from 7:00 am on weekends. The gate closes at 8:00 pm or at sunset, whichever comes first. For example, during

daylight savings time (April – October), the front gate is open at 8:00 am but visitors are welcome before 8:00 am but must park outside the gate.

- There is a small hanging sign at the entrance that states: “World’s End a property of the Trustees of Reservations.”
- Two bulletin boards provide information to visitors. The main bulletin board is a side-by-side double-kiosk with a glass display case in its center. It is located just beyond the entrance of the property and is periodically updated with a description of the organization and the property. Rules and regulations and information about current topics (natural history, for example) are also posted. The second bulletin board is a single kiosk located in the second parking lot. It is also updated with general information about The Trustees and World’s End.



**Figure 18:** World's End bulletin board

- A trail map was revised in the summer of 2001 and is posted at the bulletin boards and made available to visitors at the gatehouse. This update, and its easy availability, should address the expressed desire for a better map in the visitor survey.
- There are no trail signs. In the visitor survey about a quarter of the respondents expressed the wish that there be more signs. At the same time, some have voiced concern about the addition of any signs out on the property.
- Regulations are posted at the main kiosk. These rules have been designed to be enforceable and include:
  1. Motorized vehicles are prohibited except for purposes related to the property’s management.

2. Swimming, wading, or bathing are prohibited for reasons of safety.
3. Camping is prohibited for public health reasons.
4. All fires are prohibited. The density of surrounding woodlands and the generally dry condition of the forest floor make the use of fire hazardous.
5. Cutting or removing vegetation is prohibited. Trees, shrubs, and wildflowers are of scientific interest and are part of the beauty of the landscape.
6. Littering is prohibited. Please carry out what you carry in.
7. Dogs are prohibited except on leash.
8. Horseback riding is prohibited except with a written permit from The Trustees of Reservations.
9. Conduct which disturbs the tranquility of the Reservation or its enjoyment by others is prohibited.
10. Disturbing, removing, defacing, cutting or otherwise causing damage to a natural feature, sign, poster, barrier, building or other property on the Reservation is prohibited.
11. The Reservation closes at sunset. Entering or remaining on the property after that time is prohibited unless authorized by The Trustees of Reservations.

### **Visitor facilities:**

In general, visitors have indicated their satisfaction with the current level of facilities at World's End. Some visitors have explicitly stated that there should be little change in visitor services at the property. Facilities that do exist include:

- Restrooms: There are two portable toilets located in an out-of-view area between the entrance of the property and the parking lot. In the survey, visitors indicated that they would like to see better restroom facilities.
- Parking areas: There are two gravel parking lots built in the late 1960s and one grassy overflow lot built in 1994. Each holds a maximum of about 25 cars. Individual parking spaces are not marked, and because visitors park randomly unless directed, this maximum is often unreachable. Further expansion of the parking lot would not be possible without encroaching on the mature forest that lies to the east of the last lot.

- The Trustees constructed a ranger station in 1985, located to the left of the entrance road, where visitors can get interpretive materials and other information. A phone is available for emergency use.



**Figure 19:** World's End entrance

- Approximately 13 park benches are located on the property. These benches have been donated to The Trustees as part of a memorial gift program. As a result of a new state-wide policy, this is no longer being practiced at World's End and no additional benches are needed at this time.
- Drinking water: There is a stone water fountain at the entrance.
- There are two “Mutt-Mitt” dispensers near the main kiosk that provide dog-walkers with bags to pick up their dogs’ waste.

### **Interpretive programming and materials:**

Over the past 30 years, Trustees-sponsored interpretive programming at World’s End has been sporadic. Other organizations, such as the Appalachian Mountain Club, have also occasionally sponsored programs at World’s End.

Two factors are changing the type and level of interpretive programming at World’s End. First, The Trustees’ 1996 strategic plan highlighted interpretive programming as an organizational initiative. Using an overarching interpretive theme of “people’s interaction with the land,” The Trustees is currently developing a master plan for its statewide interpretive program. This plan will guide future interpretation at World’s End. Second, as a direct response to the strategic plan’s recommendations, The Trustees established a new staff position in 2000 to oversee visitor services at World’s End, Weir River Farm, and Whitney and Thayer Woods. In the past year, this staff member has

created interpretive materials for the site and has started to offer a variety of programs. This start-up phase of programming at World's End is helping The Trustees to understand what kinds of programming are both popular with visitors and effective in achieving a variety of management goals. The plan to establish a strong interpretation program at World's End also meets an expressed wish by surveyed visitors to see more educational materials and programs at the site. In the survey, more than one out of four visitors indicated that they would like to see more interpretive and educational material about the property's cultural and natural features.

### **A Summary Description and Analysis of Interpretive Materials and Programming**

- *A History of World's End*, a 59-page booklet that is available for \$5 at the ranger station.
- Self-guided experiences: During the winter of 2000, staff developed two instruction sheets describing scavenger hunts for visitors to experience while at World's End. One of these, called "Back in Time," is a Quest booklet in which a visitor or group of visitors can learn general historical information about World's End while being guided to specific points of interest. The popularity of this quest continues to grow, and has provided an activity for larger groups. The other, "Count with Me," is a nature scavenger hunt for parents to use with their young children at any location on the property. To date, this program has been rarely used.
- Guided walks: A variety of walks are offered to visitors and advertised mainly through The Trustees' newsletter. These are conducted at a rate of about one program a month, with more during the warm months. In addition, informal bird walks occur every Saturday. Popular themes have included tree identification, Olmsted, geology, butterflies, and wild edibles.
- Special events: For the past 18 years, The Trustees has hosted a "Summer Solstice Celebration" that has included hay rides, musical entertainment and light refreshments. On average, 450 people come to this annual event.
- The Trustees has continued to work cooperatively with partner organizations to co-sponsor programs. These partnerships have provided a good opportunity to promote programs, although attendance has been mixed.
- School/children's programs. In the summer of 2001 the first formal educational program was offered at World's End for children. In the program, called Young Ecologists, children learned about a variety of topics and how each resource related to the others. Four one-week sessions were offered in concert with four one-week programs offered at Weir River Farm. Scout and school groups have for some time visited the property regularly for self-guided group events.

- Web site: World's End is featured on The Trustees' web site, [www.thetrustees.org](http://www.thetrustees.org).

### **Vehicular access and pedestrian circulation**

- Visitors typically gain access to World's End by driving down a narrow residential road, Martin's Lane, in Hingham. Prior to the parking area being expanded in 1994, cars would spill out onto Martin's Lane and nearby roads on busy days, using these streets for overflow parking (despite the best efforts from a very supportive Hingham Police Department to control the situation). With the construction of the additional lot, this problem has declined significantly. Even on the busiest days, the parking lots are able to handle all cars, especially if rangers are available to direct parking. The single-lane entrance at the gate, however, continues to act as a bottleneck, and on busy days, cars temporarily back up on to Martin's Lane while other visitors exit. This bottleneck also causes confusion and creates a safety problem for the ranger, who is faced with the challenge of performing normal duties while also directing traffic.
- While World's End is a tremendous asset to the local community, its popularity also generates traffic on these small roads, and neighbors have expressed concern about any changes in management that may result in an increase in traffic. In particular, some abutters have voiced concerns about World's End's inclusion in the Boston Harbor Islands National Park Area as well as The Trustees' statewide initiative to increase membership and to emphasize visitor services.
- There are no directional signs guiding visitors on the approach to World's End, although the visitor survey did not indicate that this was a significant problem, even for first-time visitors.
- The property's 4½ mile trail network provides visitors with access to all sections of World's End. These trails consist mainly of the gravel cart paths that were established in the late 19<sup>th</sup> century as a part of the Olmsted plan. In addition to these cart paths, mown lanes cut through some of the fields, and single track foot paths provide visitors with access to Rocky Neck.

### **Services for visitors with disabilities**

- No facilities at World's End have been designed specifically to meet the needs of visitors with disabilities. However, the site's mostly gentle sloping roadways and graveled surfaces allow visitors with some physical limitations to use the site. Upon request, The Trustees' staff will also give disabled visitors a tour of the property in The Trustees' truck or allow access by groups in small specially equipped vans.

### 7.3 World's End Visitors and the Boston Harbor Islands National Park Area

In 1996, the United States Congress established the Boston Harbor Islands National Park Area, which, with The Trustees endorsement, includes World's End. As a managing partner of the Boston Harbor Islands National Park Area, The Trustees of Reservations is working cooperatively with twelve other partners to administer the Park. To date, this work has focused primarily on the development of a General Management Plan for the Park; a draft of this plan has been submitted to the Secretary of the Interior for approval.

The General Management Plan designates several *Management Areas* (i.e., zones) throughout the Park. Each management area includes a prescription of the desired visitor experience for a particular area. World's End falls into a zone called, "Managed Landscape Emphasis." The description of the desired visitor experience for this zone includes: "Visitors expect to encounter some people, but they also find many opportunities for tranquility at certain times. Some visitor amenities are available." The plan further outlines the kinds and levels of potential visitor use, such as walking, interpretive programs, and bird watching.

The Trustees led the effort to develop the prescription for this zone. As a result, the language that describes this zone nicely coincides with The Trustees' mission and with the goals and recommendations outlined in the plan.

In addition to the broad goals for visitor experience, the partnership also identified several interpretive themes that tie the individual islands together. World's End is particularly well positioned to support interpretive activities centered on several of these themes, which include:

- *Islands on the Edge.* Since their ancient formation by rising sea level, the Boston Harbor Islands have literally been on the edge where land meets sea. With the growth of Boston and its surrounding communities, the islands came to be unusual for their lack of inhabitants and development at the edge of a major metropolitan area.
- *Home in the Harbor.* The islands and surrounding estuary have been home to a rich diversity of plant and animal life for millennia. People have lived on and around the Boston Harbor Islands for thousands of years and have made a mark on the landscape.
- *Renewal and Reconnection.* Boston Harbor and its islands provided a rich and sustaining environment for human life until pollution and intensive use of the waterfront severed people's everyday connection to the harbor. Now, with the cleanup of Boston Harbor, natural ecosystems have the opportunity to renew themselves. People are rediscovering the harbor as a setting for personal renewal and tranquility.

For more information about The Trustees' partnership in the management of the Boston Harbor Islands, see Section 8.

## 7.4 A Summary of the Elements That Are Important to the Visitor Experience at World's End

- *Carrying Capacity*  
Carrying capacity is a measure of the type and level of visitor use an area can sustain. It is a function of two things, resource protection and visitor experience. First, a high quality experience depends on the resource being in good condition. Second, the number of other visitors and their activities can also affect an individual's experience.
- *Internal Circulation (the trail network)*  
Features such as trail condition, network design, and navigability all impact the visitor's experience.
- *Access to the property*  
The ease of finding the property may have a significant impact on visitors. Conversely, access issues may impact the surrounding neighborhood.
- *Scenery*  
The scenic character of World's End contributes significantly to the visitor experience. These scenic elements are described in Section 4.
- *Facilities*  
The presence or absence of certain facilities can determine the quality of a visitor's experience.
- *Information services, including interpretation and education*  
Good information, from basic directions to detailed descriptions of the property, can greatly enhance the type of experience one has at World's End.

## 7.5 Significant Factors That Threaten or Could Diminish the Quality of the Visitor Experience

The planning committee and the visitor survey identified several real or potential threats to the visitor experience. These are presented here with some explanation.

- **Trails poorly marked.** A small, but significant number of visitors have indicated that it's possible to get disoriented at World's End. This is especially true in the Rocky Neck area, where there are several redundant and informal trails. However, while it is possible to become temporarily disoriented, it is not possible to get "lost" at World's End. It is also important to note that many visitors, together with the committee, have expressed concern that there be minimal intrusions onto the landscape by signs and other structures.
- **Poor quality restrooms.** While the portable toilets are maintained in good working order, some visitors nevertheless object to this type of facility. Neither toilet is handicapped accessible.

- **Crowding**, especially during peak periods. While the visitor survey did not indicate this to be a significant problem, members of the planning committee have raised “crowding” as a potential problem. The inclusion of World’s End as a site in the National Park Service’s Boston Harbor Islands National Park Area has fueled this concern, with some believing that this national affiliation will increase the number of visitors beyond a threshold, necessary to sustain a high quality visitor experience.
- **Unleashed dogs**. Despite efforts by staff to enforce a leash regulation, many visitors continue to ignore this rule, and conflicts between dogs and visitors, and other dogs, continue to occur.
- **Litter**. Surprisingly, some visitors indicated that litter was at least a small problem. The number of visitors who noted this is on par with the number of visitors who listed dogs as being at least a small problem.
- **Discourteous staff**. Typically, The Trustees has had the good fortune of having professional-level staff fill its ranger positions. Due to the difficulty in filling these positions, there have been rare exceptions to this rule, and as a result, there have been occasional problems with staff being discourteous or, at the least, uninformed.
- **Visitor concerns about current management**. Keeping a landscape “open” requires active management, but visitors are often concerned that certain management activities may be harming the resource. At present, there is no systematic effort to inform visitors about The Trustees’ ongoing management activities.
- **Poison ivy**. Some of the fields contain a high density of poison ivy, and visitors who walk through these fields are likely to come into contact with it.
- **Difficulty in walking through fields**. In accordance with The Trustees’ guidelines for grasslands management, most fields are cut late in the season, and some visitors have expressed frustration that the tall grass and woody plants, including blackberries, make it difficult to move through these areas.
- **Noise from planes**. World’s End lies under one of several corridors for planes arriving and departing from Logan Airport, located about nine miles to the northwest of the property. Although all of World’s End is surrounded by urban development, it is the noise from planes that most intrudes on the site’s tranquility. Concern has also been voiced that this situation could be exacerbated if the proposed expansion of Logan Airport is adopted.
- **Parking outside the gate**. Because the property hours sometime extend beyond the time that the gate is open for vehicles to enter, early-morning visitors often use a 4-car parking area that is located just outside the gate. This small parking

area is owned and managed by the Town of Hingham. Often times, the capacity of this lot is not enough to accommodate visitor demand, causing parking congestion in the neighborhood which could pose an access problem for emergency vehicles. The Trustees has worked to solve this problem by extending the hours that the inner lots are open and encouraging visitors to respect the parking restrictions on nearby roadways. Despite these efforts, neighbors continue to voice concern that a parking problem remains. While this problem doesn't threaten the visitor experience directly, it does create a nuisance to neighbors.

- Degradation and/or loss of any of the significant scenic, ecological or cultural features

## 7.6 Significant Opportunities

- The cultural and natural history of World's End provides a terrific **interpretive opportunity** to illustrate how people have interacted with the land over thousands of years.
- **Ongoing management** can demonstrate the challenges and solutions to managing conservation land.
- The proximity of World's End to metropolitan Boston, and its ability to accommodate additional visitors during certain periods, provides The Trustees with an opportunity to provide new visitors with a chance to connect with the land and to instill in members of the public a **conservation ethic**.

## Section 8: Overview of Current Management

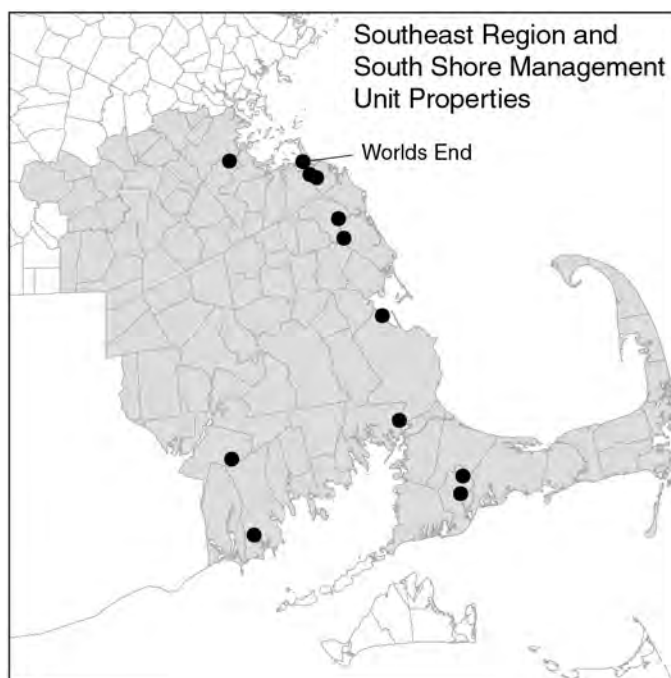
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### 8.1 Introduction

This section describes the current management framework for World's End, including staffing and equipment resources, volunteers, administration, budget framework, organizational initiatives, and The Trustees' management partnerships with other organizations.

### 8.2 Staff Resources

The Trustees of Reservations currently divides its statewide property management activities into five regions. World's End is part of the South Shore and Cape Cod Management Unit of the Southeast Region, which extends from the Cape to the Charles River Valley. Map 5 shows the geographic extent of the Southeast Region, and highlights the properties within the Management Unit.



Map 5

The Management Unit is staffed by a superintendent, and includes four additional full-time staff plus 14+/- seasonal and part-time staff. This staff manages ten properties, including World's End. The maintenance center for the unit is located at Weir River Farm in Hingham.

Current efforts to protect significant tracts of land in the Southeast region are beginning to pay off, and The Trustees is about to acquire two new properties. At this writing, the responsibilities for managing these two new properties, located within Fall River and Wareham, fall within the South Shore and Cape Cod Management Unit as it is currently defined.

It has become clear that the current staffing level and organizational framework cannot adequately address these expanding property management responsibilities. In order to address these and other changes within the region and across the state, The Trustees is developing a strategic plan for its statewide field operations department. Therefore, the important issues of staffing levels and organization cannot be addressed within the context of this single property management plan. However, this plan should help inform the regional and statewide planning process.

### **8.3 Equipment Resources**

As a part of the Southeast Management Region, the South Shore and Cape Cod Management Unit has been subscribing to a mechanization program for the past 15 years. The goal of this program has been to contain operating costs by making the most efficient and effective use of small work forces. This has been achieved by providing staff with vehicles and power equipment that maximizes their productivity and reduces risk of physical strain and injury. As a result, the South Shore and Cape Cod management team is a well-equipped and highly mobile work force.

Major pieces of equipment include two pickup trucks for transporting staff and hauling or trailering small equipment, a one-ton dump truck for hauling small payloads, and a 2½-ton dump truck for hauling large payloads and trailering tractors to various job sites. Two of these vehicles are also used for snow plowing. There are two tractors, a New Holland equipped with a front-end loader and backhoe and a John Deere used primarily for mowing fields.

The Weir River Farm maintenance center has a well-equipped woodworking shop as well as a respectable mechanics shop with welding and metal fabrication capabilities. In addition, the management unit is thoroughly outfitted with landscape maintenance equipment such as a brush chipper, chainsaws, deck mowers, blowers, generators, etc.

All of this equipment is used throughout the management unit and can be incorporated into management needs at World's End as needed.

### **8.4 Committees and Volunteers**

#### Property Committee

A South Shore Properties Committee has recently been formed to provide support and guidance in the management of World's End, Weir River Farm, and Whitney and Thayer

Woods (including Turkey Hill). The committee has focused on providing property management assistance through the use of volunteers on specially planned workdays.

In addition, committee members have been active in sponsoring special events to raise the visibility of The Trustees and in providing assistance with our interpretive and educational programs and events. As the committee gains momentum it is hoped that its future role will promote The Trustees' mission through activities such as interpretation, donor relations, fundraising, and property management.

### Volunteer Opportunities

Many volunteer opportunities exist for members, neighbors, and other visitors to support The Trustees' stewardship efforts at World's End. These opportunities will be developed, defined, and made available through the South Shore Properties Committee and by staff members as individual needs are identified. Efforts to tap the great potential for volunteer involvement will also be guided by the organization-wide effort to build capacity to recruit, manage, and support volunteers.

## 8.5 Partnerships With Other Organizations

The Trustees works to collaborate with a variety of conservation organizations as a means of assisting and promoting land conservation beyond its boundaries. These partnerships can also support The Trustees' own efforts to pursue its mission. The Trustees has worked informally with a number of organizations at World's End over the past 30 years. Recently, it entered into a more structured partnership with the National Park Service; this partnership is described below.

In an effort to improve resource protection and visitor services for the Boston Harbor Islands, the United States Congress established the Boston Harbor Islands National Park Area in 1996. The National Park Area includes World's End and the 33 islands owned and managed by a variety of federal, city, state, and private entities. The 1996 legislation also established a 13-member partnership to administer the Park. The Trustees of Reservations is one of the 13 members.<sup>1</sup>

This partnership is responsible for planning and coordinating the Park's management. To date, The Trustees has played an important role in the development of the Park-wide General Management Plan. The final plan is to be submitted to the Secretary of the Interior for approval in early 2002. This plan lays out the framework for improving resource protection and visitor experience throughout the entire Harbor Region. Going forward, The Trustees' management of World's End can provide a working example of how these goals can be attained. **It is important to note that the partnership operates**

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<sup>1</sup> Other organizations represented include: U.S. National Park Service and U.S. Coast Guard, MA Department of Environmental Management, MA Metropolitan District Commission, MA Water Resources Authority, MA Port Authority, Boston Office of Environmental Services, Boston Redevelopment Authority, Thompson Island Outward Bound Education Center, Island Alliance, and Boston Harbor Islands Advisory Council (2 members)

**by consensus as the means of achieving park-wide goals; The National Park Service and the Partnership have no legal authority to compel actions.** As a partner in the management effort, The Trustees is confident that the goals for the National Park Area are congruent with the organization's management goals at World's End. However, if goals become incongruent, The Trustees remains the final authority in how World's End is managed.

The primary action of the Boston Harbor Islands general management plan was to designate specific "management areas" for each area of the park. By designating these areas, the Partnership prescribed the resource conditions and visitor experiences that should exist in the Park. World's End falls within the designation, *Managed Landscape Emphasis*.<sup>2</sup> The Plan defines this area to include:

*Landscapes that are predominantly "open" space, managed to preserve their cultural and natural features, such as meadows, orchards, gardens, and groves of trees. Visitors expect to encounter some people, but they also find many opportunities for tranquility at certain times. Some visitor amenities are available.*

*Island areas selected for this designation are those that reflect the imprint of human use; that retain some character-defining cultural resource features; and that are able to accommodate a moderate level of visitor activities without significant negative effects. The need to balance natural and cultural resource management will be most evident in these areas.*

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<sup>2</sup> Other designations include: 1) Visitor Services and Park Facilities Emphasis, 2) Historic Preservation Emphasis, 3) Natural Features Emphasis, and 4) Special Use Emphasis.

## Section 9: Recommended Actions

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### 9.1 Introduction

Directed by the organization’s mission, and the goals and guiding principles outlined in Section 2, the management plan provides a blueprint for action at World’s End. The plan specifically addresses the issues and opportunities identified in Sections 4 through 7, and directs efforts to protect the property’s resource integrity while providing visitors with a high quality experience.

The analysis of the property’s resources reaffirmed what is special about World’s End, and the committee concluded that the “look and feel” of the property should be maintained as it essentially has been for the past 30 years while under The Trustees’ stewardship. This planning process has revealed a more comprehensive understanding of the World's End resource. The Trustees should apply the best practices and current knowledge to protect the property’s significant ecological and cultural features.

While management recommendations have been divided into various categories, it is important to note that these recommendations often support more than one goal. For example, maintaining grasslands for ecological goals will support scenic goals. In many cases, the goals and practices are complimentary.

### 9.2 Scenic Resource Management

As described in Section 4, many of the scenic resources at World's End are associated with the property’s general openness. This openness is responsible for many of the obvious long views and small-scale vignettes. Moreover, it is also responsible for many of the intangibles associated with the visitor experience. Therefore, maintaining the open character at World's End will be critical.

#### 9.2.1 Pastoral/Open Character

##### Goal

Maintain fields as critical elements to maintaining the open character of World's End.

##### Current Management

See Section 9.3.1 below.

##### Threats and Issues

See Sections 9.3.1 & 9.4.6 below.

##### Recommended Management

The open character encountered at World's End was the most frequently identified scenic quality. Critical to this element are the fields that occupy 40% of World's End. These

fields not only echo the agricultural past of the property, they expose the contours of World's End itself and allow visitors to view landscapes both near and far. Because management recommendations intended to address scenic values associated with fields are similar to those recommendations made for ecological and cultural values, see Sections 9.3.1 and 9.4.6 below.

## **9.2.2 Designed Landscape**

### Goal

Perpetuate the overall design intent of the Olmsted / Brewer plan.

### Current Management

See Section 9.4.7 below.

### Threats and Issues

See Section 9.4.7 below.

### Recommended Management

Management recommendations are the same for those in Section 9.4.7.

## **9.2.3 Unusual and Expansive Views**

### Goal

Maintain a suite of long views and small-scale vignettes.

### Current Management

Many of the current views and vignettes are maintained as a result of managing natural or cultural resources. In a very few cases (e.g. Ice Pond), limited clearing of small trees and brush is done to maintain scenic access to a special feature.

### Threats and Issues

- Succession. As trees and shrubs grow they can screen and/or diminish scenic features and vistas.

### Recommended Management

Implementing many of the recommendations in Sections 9.3 and 9.4 should address the goal of maintaining a suite of long views and small-scale vignettes.

## **9.2.4 Landscape Diversity**

### Goal

Maintain the diversely textured landscape of World's End.

### Current Management

See Sections 9.3 and 9.4.

### Threats and Issues

See Sections 9.3 and 9.4.

### Recommended Management

Implementing many of the recommendations in Sections 9.3 and 9.4 should address the goal of maintaining a diverse landscape.

## **9.3 Natural Resource Management**

The thrust of natural resource management will focus on maintaining a mosaic of community types and habitats at World's End. This mosaic is critical to preserving the ecological integrity and significance of World's End. The recommendations below focus on features considered to be conservation targets and are based on the ecological highlights, threats and opportunities from Section 5. Map 6 indicates the location of these conservation targets.

### **9.3.1 Grasslands**

#### Goal

Maintain a grassland/early successional mosaic that supports a diversity of species that depend on these habitats. Within this mosaic, specific conservation targets will include: native grassland patches, grassland wildlife including butterflies and nesting birds, rare species, and plant diversity (species richness and composition). As noted in Section 9.2, maintaining the scenic quality associated with open grasslands is also critical.

#### Current Management

All grasslands with one exception are mowed after July 15, after grassland birds have fledged young. The one exception is a small field that is mowed in the first week of June for parking for the summer solstice event. Field margins are cleared/cut-back periodically on an as-needed basis.

#### Threats and Issues

- Woody plants are increasingly becoming dominant in fields, thus threatening the many plants and animals dependent on open grassland habitat.
- Exotic invasive plants are colonizing many of the fields. These invasive species include many of the woody plants above but many non-woody species as well. These species threaten grassland habitats and their many native plants and animals.
- Unleashed dogs can disturb and displace grassland nesting birds during breeding season.
- Visitors walking through fields can disturb and displace grassland nesting birds during breeding season.
- Visitor opinion about grassland management is not uniform and is often conflicting; some think that late mowing looks messy while others like it.
- Hedgerows and treed avenues fragment the existing grasslands and reduce the potential habitat value of the grasslands.

- Early mowing can threaten wildlife (e.g. birds).

Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Develop grasslands management plan.	A detailed plan is needed to specifically address the conservation goal as well as threats for the grasslands at World's End.
Develop control strategy for exotic invasive plants as part of a comprehensive invasive species management plan.	A detailed plan is needed to specifically address invasive plants throughout World's End, including grasslands. A comprehensive invasive species management plan (CISMP) plan will allow invasive species to be assessed collectively so management priorities can be identified.
Interpret grassland issues and management to visitors.	Educating visitors on grassland issues will reduce impacts to wildlife and help reduce conflicting attitudes on management.
Enforce existing leash regulation. See Section 9.5.1.	Enforcement will reduce impacts to grassland wildlife during breeding season.

**9.3.2 Oak Hickory Forest (Loud Lot)**

Goal

Maintain mature oak hickory forest as a unique natural feature for the property and region.

Current Management

No active management except what is needed to maintain trails for visitor access. Dead or dying trees that pose a risk to visitors if they fall are removed.

Threats and Issues

- Cutting and/or clearing beyond the occasional tree for access will compromise this unique area.
- Exotic invasive plants can displace native plants and alter the current species composition.
- Aesthetics management (e.g. cutting and cleaning up understory) will reduce the significance of this forest.

Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Maintain a "do nothing" approach except for what is needed to maintain trails for visitors. This includes leaving all dead and dying trees that do not pose a risk to visitors as well as those that fall to the ground.	Maintains a unique natural feature for the property and region that is a contrast to the highly manipulated and/or actively managed landscape and possibly serves as a representation of the natural forest cover of prehistoric World's End.
Monitor for exotic invasive plants and control as needed to prevent species from becoming established.	Monitoring will be part of the CISMP and can be as simple as walking the area and observing for invasives.

**9.3.3 Maritime Juniper Woodland/Shrubland**

Goal

Maintain maritime juniper woodland/shrubland as a unique natural feature and as a state-listed rare natural community type for Massachusetts.

Current Management

No active management except what is needed to maintain visitor access.

Threats and Issues

- Exotic invasive plants (especially hardwood trees) are colonizing and can potentially shade out the cedars and understory species dependent on more open conditions.
- 

Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Selective removal of competing hardwoods (e.g. English oak).	Hardwoods can be removed and/or controlled as time allows to perpetuate the cedars and other species dependent on open conditions with direct exposure to sunlight. See CISMP for more details.

### 9.3.4 Red Cedar Woodland

#### Goal

Maintain red cedar woodland as a unique natural feature for the property that provides habitat for wintering birds (e.g. owls), species dependent on cedars, and plants and animals requiring early successional conditions.

#### Current Management

Historically this area was mowed annually; recently (last three years), this practice has been abandoned because encroaching woody vegetation made cutting too difficult.

#### Threats and Issues

- Succession; competing hardwoods will out compete and overshadow cedars.
- Exotic invasive plants (e.g. buckthorn and bittersweet) can displace cedars and other plants dependent on the early successional habitat.

#### Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Thin cedars and remove competing hardwoods.	Thinning of cedars and removal of hardwoods will allow understory to be mowed annually in spring to promote plant and habitat diversity, especially native grasses and wildflowers. Annual mowing will also suppress resprouting hardwoods.
Control invasive plants.	Treat invasive plants selectively with herbicide as needed following the IPM process to maintain cedars and habitat. See CISMP for more details.

### 9.3.5 Damde Meadows

#### Goal

Restore Damde Meadows to a functioning salt marsh ecosystem.

#### Current Management

Culvert is opened periodically to lower water level in "Damde Meadows" to maintain integrity of dike by reducing saturation of soils.

#### Threats and Issues

- Restricted tidal flow reduces biological potential and benefits invasive phragmites.
- Exotic invasive plants (i.e. phragmites) reduce plant species diversity and crowd out beneficial native species.
- Restoration will substantially alter the existing conditions of this prominent landscape feature. This change may cause concern among some visitors.

### Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Develop and implement restoration plan.	Ecological value is currently greatly compromised.
Interpret restoration to public.	Interpretation should begin before construction work begins.

### **9.3.6 Ice Pond**

#### Goal

Maintain pond as unique vernal pool habitat and as an important source of fresh water at World's End.

#### Current Management

Periodic, limited clearing of small trees and shrubs at eastern end of pond to maintain pond vista.

#### Threats and Issues

- Succession may close in the view of the pond but should not pose any threat to the pond's ecological value.

### Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Monitor pond for succession.	Monitoring is necessary to understand rate of succession to determine threat to ecological value.
Periodic <i>limited</i> clearing of woody plants along southeast end.	Maintaining a 10-foot opening on the south shore of Ice Pond will allow visitors a view across this small yet scenic pond. Trees and shrubs will likely need to be cut annually since stumps will resprout.

## **9.4 Cultural Resource Management**

### **9.4.1 Introduction**

World's End is, of itself, effectively a single large dynamic cultural resource. It has evolved through millennia of natural changes and centuries of human use. Its continued unhurried evolution depends primarily on maintaining a delicate balance.

World's End supports a variety of cultural resources that fall into three categories: prehistoric archeological sites and remains, historic archeological sites and remains, and

cultural landscape features that are distinguished by the extent of current visibility in the landscape. The Trustees’ original philosophy toward this property – of substantial maintenance and cautious change – will serve World's End's varied cultural resources well. Recommendations focus on features considered to be conservation targets and are based on the historic and cultural highlights, threats and opportunities described in Section 6. Map 7 indicates the location of these preservation targets.

### 9.4.2 Prehistoric Sites

Goal

Maintain prehistoric sites, complete with any artifacts, in an undisturbed state.

Current Management

None. These sites are all invisible since they are underground.

Threats and Issues

- Erosion, particularly at shoreline sites and one prehistoric site beyond the Bar where the roadway cuts through it.
- Unauthorized digging from archeological ‘pot-hunting.’

Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Excavation should be avoided whenever possible.	World's End is a highly sensitive prehistoric cultural resource area.
If excavation is required, workers should keep a sharp lookout for any indication of subsurface features or artifacts.	Evidence and artifacts should be documented.
Workers should notify supervisor or headquarters immediately if any items or features appear.	Evidence and artifacts should be documented.
Site location information should not be provided to the public.	Site location information is classified as sensitive information by the Massachusetts Historical Commission. (Collectors may disturb sites in pursuit of artifacts). Note: classification by the Massachusetts Historical Commission serves only as a recommendation; there is no legal obligation attached with this classification for The Trustees.

Evaluate sites threatened by erosion for stabilization.	Some sites (e.g. along roadways) may be stabilized where as others (e.g. coastal banks) may not be practical and/or possible due to environmental forces and coastal regulations.
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### 9.4.3 Nilson Camp Remains

Goal

Maintain remains as a late nineteenth century site depicting recreational use and occupation of the World’s End area.

Current Management

None.

Threats and Issues

None identified.

Recommended Management

Action	Description/Rationale
Complete a photo record of Nilson’s Island to supplement Luedtke report. <sup>1</sup>	Completes documentation of important cultural feature.
Interpret history of island.	The island provides a visual interpretive opportunity for visitors on the shore, representing the late nineteenth century recreational use and occupation of the World’s End area.

### 9.4.4 Sheepfold

Goal

Maintain as the only standing structure on World's End (other than the gate house). The sheepfold provides an interesting visual contrast to its natural surroundings and serves as a focal point for visitors to learn about the property's agricultural past.

Current Management

None.

Threats and Issues

- Further deterioration of the structure, primarily caused by encroaching vegetation.

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<sup>1</sup> Luedtke, B.E. 1990. Report on an archaeological survey of World's End, Massachusetts. University of Massachusetts, Department of Anthropology. Boston



## Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Preserve the feature's tangible remains.	Recent staff survey of the feature indicates that it is presently a stable ruin. However, the structure needs attention soon to avoid potential damage. A few intrusive saplings threaten stability of the foundation and should be girdled or removed completely before their root systems develop further.
Interpret sheepfold to public.	The shed foundation can be used as a focus for learning about the pasture and grazing use of World's End. The undergrowth surrounding the foundation should be removed, the tree cover thinned, and a minor trail laid out to bring the visitor past the open front of the building.

### **9.4.5 Damde Meadows**

#### Goal

Maintain evidence of past cultural components that still exist and interpret to visitors.

#### Current Management

See 9.3.5 above.

#### Threats and Issues

- Trees and shrubs are encroaching upon dikes. Roots from these plants threaten the stability of stonework.
- High water level in Damde Meadows threatens the stability of the inner dike by saturating soils.
- Maintenance and restoration work needs to consider historic integrity of the dikes.

#### Recommended Management

The current 'restoration' project appears to be a case of adaptive reuse or 'rehabilitation' – a term borrowed from historic preservation, that acknowledges the evolution of needs and abilities from one generation to another. Rather than attempting to maintain Damde Meadows as a static resource which is without historic precedent, it is recommended that the rehabilitation project preserve evidence of cultural components that did exist in the past and/or do exist now.

<b>Action</b>	<b>Description/Rationale</b>
Document past and present features.	Damde Meadows' history is documented in the Tritsch land use report (Appendix A). A thorough photo record will document its present state including dams, marsh areas and roadways. This documentation is of immediate importance since ecological restoration efforts are underway.
Maintain stone facing and dirt/gravel surfaces of dams/causeways.	Preserves the feature's tangible remains. Remove encroaching woody vegetation.
Provide visitors with interpretive materials that include illustrations of Brewer's meadow and earlier illustrations. Incorporate any panels into a central location on interpretation.	Interprets successive stages of Damde Meadows evolution, including components that may be destroyed.
Implement restoration plan to maintain stability of dike.	See Section 9.3.5 above for more details.

#### **9.4.6 Fields and Associated Boundaries**

##### Goal

Maintain fields, in an open and delineated form, as visible evidence of the property's long agricultural history.

##### Current Management

See 9.3.1 above.

##### Threats and Issues

- Same as for 5.2.1 above.
- Disturbance or removal of boundary lines.

##### Recommended Management

It is quite clear that stone walls, fence remains, and tree/hedgerows are field bounds and most probably originally property bounds that may date back to the late 17<sup>th</sup> century. The actual form these bounds take is undatable. One of the Barnes stonewalls, in fact, may be among the most recent versions of boundary marking, possibly postdating the Palfrey/Olmsted plan.

Action	Description/Rationale
Document present boundaries using GPS or other surveying system to plot all boundaries as overlay on base map.	Useful for future management planning and affirms legal status of boundaries. Record marker types (e.g. stone wall, hedgerow) and any other evidence of lost fencing and/or stonework before any changes are made to current conditions.
Interpret or represent any boundary that is eliminated.	Maintains aesthetic effect of boundary on landscape (e.g. tree lines and Pine Hill).

### 9.4.7 Treed Avenues and Brewer Grove

#### Goal

Perpetuate the overall design intent of the Olmsted / Brewer plan.

#### Current Management

Trees receive three days of annual pruning with bucket truck and dead trees are replanted as budget allows. Species used for replanting typically represent those that do well at World's End. Understory mowed annually with grass under Brewer Grove being mowed regularly to maintain as lawn.

#### Threats and Issues

- Most of the planted trees are non-native species; some are highly invasive.
- Tree lines and groves fragment grassland habitat.
- Spacing of trees is often too close for proper tree health. As trees mature they become crowded and as a result, trees are becoming stressed and are beginning to die, which some feel is unsightly.
- Storm damage.
- Inappropriate tree species for site conditions.

#### Recommended Management

The intent of the designers is important. They wanted tree-lined avenues that provided shade and that were aesthetically pleasing. What was more important than particular species of trees was for trees to do the job well. The trees that were planted probably reflected what was commonly available or popular at the time.

Olmsted was certainly the author of the concept of a curving system of well-drained, tree-lined roadways with pleasing vistas and peaceful greenspace. The Brewers were in charge of actual tree planting. Some of the roadways were not even constructed until thirty years after the Olmsted plan was drawn.

Recommend Management:

<b>Action</b>	<b>Description/Rationale</b>
Document present features including recording species and locations of trees, taking care to record separately those that might be contemporary with the original plan, and those that were planted subsequently.	Helps to maintain original design and features through guiding future plantings.
Develop comprehensive plan for plantings.	Maintains important design features that characterizes World's End. This plan should address identified threats and adhere to the spirit of the original design.

### 9.4.8 Pre-Olmsted Roadways

Goal

Maintain the pre-Olmsted roadways as examples of human use at World's End prior to the Olmsted / Brewer alterations.

Current Management

Roads are kept clear of trees and brush and low or eroded spots are filled periodically with gravel/crushed stone.

Threats and Issues

- Maintenance that alters road materials or locations.
- Field management (e.g. plowing, regrading) that alters remnant of Pine Hill road as it bisects field.

Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Preserve tangible remains of roadways.	Preservation will require little except keeping roads clear of encroaching trees and shrubs and minimizing disturbance/alteration to roadways.

## 9.4.9 Entrance Pillars

### Goal

Maintain pillars as structural and historical symbols from the Brewer period that mark the entrance to World's End.

### Current Management

None.

### Threats and Issues

- Removal or significant relocation to improve visitor circulation. The reason why is not important; it's the removal/relocation that's the threat.

### Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Preserve as entrance markers.	It is important to maintain the pillars as entrance markers. While it may be desirable to move at least one pillar to widen entrance, pillars should not be relocated beyond what is necessary for improved vehicular circulation. Conservative common sense is called for when considering relocation.

## 9.4.10 Edwards Memorial

### Goal

Maintain the Edwards Memorial which provides a spiritual connection between World's End's past stewards and present visitors.

### Current Management

The surrounding lawn is mowed regularly.

### Threats and Issues

None.

### Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Maintain current mowing for Edwards Memorial.	Maintains memorial setting and visitor access to memorial.

## 9.5 The Visitor Experience

Section 7 touched on several important elements that contribute to the visitor experience at World's End. These include:

- *Carrying capacity*
- *Internal circulation (the trail network)*
- *Access to the property*
- *Scenery*
- *Facilities*
- *Information services, including interpretation and education*

Section 7 also outlined the current visitor services at World's End and identified significant threats and opportunities relating to the visitor experience. The following recommendations are organized by the elements outlined above and are designed to protect those outstanding visitor features and to mitigate or prevent factors that may threaten the visitor experience.

### 9.5.1 Carrying Capacity

#### Goals

- The Trustees will protect World's End's special resources while providing for public use and enjoyment of those resources. Because public enjoyment cannot be sustained if the resource is damaged, resource protection must remain as a paramount goal. Only by preserving the significant resource features can we attain our visitor experience goals.
- The Trustees will protect the tranquility that distinguishes the World's End experience.
- Within the framework of these two goals, The Trustees will provide opportunities for new visitors to experience the property.
- The Trustees will seek to resolve conflicting uses of the property in ways that permit and protect visitor experiences.

#### Threats and Issues

- **Impacts to natural and cultural resources.** With the exception of visitors and their dogs entering grasslands during the nesting season, current visitor numbers and activities pose a limited threat to the property's natural and cultural resources.
- **Crowding,** especially during peak periods. While not considered a current problem, increased numbers of visitors, especially during peak periods, could threaten the quality of the visitor experience.
- **Unleashed dogs.** Despite efforts by staff to enforce a leash regulation, many visitors continue to ignore this rule, and conflicts between dogs and visitors, and other dogs, continue to occur.

Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Implement a monitoring program that measures visitor impact on the significant cultural and natural resources.	See Sections 9.3 and 9.4.
Continue to collect data about visitor use. Conduct periodic surveys to get feedback on the type of experience visitors are having.	Periodic, ~ every 3 years, short surveys focusing on the quality of the visitor experience will give staff objective feedback on visitor use.
Do not actively encourage use of Rocky Neck.	Rocky Neck has been described as the “hidden gem” where even on the busiest days, one encounters only a few people. By down-playing this area, it will remain possible to find quiet spots on the property.
Continue to inform dog walkers about the leash rule and provide interpretive information that explains rationale behind this rule.	Dog walkers may require regular reminders to follow this regulation. Compliance is likely to improve if visitors understand the rationale (e.g., habitat protection) that backs this policy.
Continue to monitor the degree of conflict that is occurring between visitors and the impact that dogs may be having on wildlife habitat.	Staff will monitor conflict via surveys, anecdotal information, and direct observation.
If dog conflicts persist as a problem, outline a dog permit system and assess its feasibility based on cost and benefit.	In theory, a permit program will ensure all dog walkers are fully informed of the regulation and will provide some accountability to compliance. However, a permit program will be costly, and before proceeding, a thorough cost/benefit analysis would need to be done.

Inform visitors about the presence of both poison ivy and ground nesting birds in the fields, and ask that they remain on the trails.	By abiding by this request, visitors will avoid poison ivy and will also not disturb wildlife habitat during the nesting season.
Re-direct incremental increases in visitation during off-peak periods.	World's End has the capacity to accept additional visitors, especially during weekdays and on some weekends. This action would support The Trustees' organizational initiative of inviting people to use and enjoy properties without compromising the high quality of the visitor experience.

## 9.5.2 Internal Circulation (the trail network)

### Goals

- Visitors will be able to navigate through World's End with confidence.

### Threats and Issues

- **Trails poorly marked.** A small number of visitors have indicated that it's possible to get disoriented at World's End. This is especially true in the Rocky Neck area, where there are several redundant and informal trails. However, while it is possible to become temporarily disoriented, it not possible to get "lost" at World's End. It is also important to note that many visitors, together with the committee, have expressed concern that there be minimal intrusions onto the landscape by signs and other structures.
- **Trails not accessible to visitors with physical limitations.**
- **Trail maintenance.** Maintenance is ongoing and requires regravelling of roads in places were erosion occurs, maintaining and/or improving drainage to keep trails dry for visitors, and periodic removal of encroaching vegetation.

### Recommended Management

Action	Description/Rationale
Update the existing trail map and make available at no charge. Include trail mileage on map.	This will help ensure that new visitors can find their way across the property.
Investigate ways to make the trail network more accessible to visitors with physical limitations.	Improving access will broaden World's End's constituency and allow visitors of all abilities to enjoy this significant property.

Identify areas where roads/trails are eroded, wet or restricted due to encroaching vegetation and take remedial action (i.e. regravels, provide necessary drainage and cut back plants).	Maintaining trails in good condition will allow visitors to navigate through World's End with confidence.
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### 9.5.3 Access to the Property

#### Goals

- Visitors will be able to find the property with confidence.
- The Trustees will seek to be a “good neighbor” by working to take reasonable steps to minimize the impact of visitors accessing World’s End on the neighborhood.

#### Threats and Issues

- **Congestion of vehicles** at the gate. During peak periods, many cars may arrive at the gate in a short period of time, causing a back-up onto Martin’s Lane. This back-up not only causes traffic problems in the neighborhood, it annoys neighbors.
- **Parking outside the gate.** Because the property hours often extend beyond the time that the gate is open for vehicles to enter, early-morning visitors often use a 4-car parking area that is located just outside the gate. This small parking area is owned and managed by the Town of Hingham. Often times, the capacity of this lot is not enough to accommodate visitor demand, causing parking congestion in the neighborhood which could pose an access problem for emergency vehicles. The Trustees has worked to solve this problem by extending the hours that the inner lots are open and encouraging visitors to respect the parking restrictions on nearby roadways. Despite these efforts, neighbors continue to voice concern that a parking problem remains.

#### Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Improve visitor's ability to find property.	At this time, no action is needed to address visitor's ability to find the property. Based on visitor survey data, visitor comments to staff, and committee opinions, better directions and signs are not needed. It is also believed that the new visitors guide and website have improved upon directions and provide visitors with better access to directions.

<p>Form a small advisory committee who will work with staff and a consulting landscape architect to evaluate the current entrance design, and if necessary to propose alternative designs that accommodate two-way traffic.</p>	<p>Several criteria should be used to evaluate the current and proposed designs, including:</p> <ol style="list-style-type: none"> <li>1. impact to the appearance of the entrance.</li> <li>2. ability to facilitate traffic flow and reduce congestion.</li> <li>3. safety of visitors and staff.</li> <li>4. impact on cultural and natural features.</li> <li>5. ability to accommodate parked vehicles during non-staffed hours.</li> <li>6. security of the property.</li> </ol>
<p>Investigate the possibility of including a 3 year pilot shuttle service to provide alternative access to World's End and other South Shore properties.</p>	<p>A shuttle service may provide a way to offset the impacts associated with The Trustees' organizational initiative to broaden its constituencies and to encourage new visitors to engage in the stewardship of special places. This pilot program should coordinate with the train and commuter ferry service.</p>

#### 9.5.4 Scenery (see Section 9.2)

#### 9.5.5 Facilities

##### Goals

- The Trustees will seek to meet the basic needs of visitors for safety and comfort.

##### Threats and Issues

- **Poor quality restrooms.** While the portable toilets are maintained in good working order, some visitors nevertheless object to this type of facility. Neither toilet is handicapped accessible.

##### Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
<p>Investigate the costs and benefits of installing a composting toilet facility. Costs should include staff requirements for maintenance.</p>	<p>Composting toilets may partially address the aesthetic issue associated with portable toilets. They would also provide us with the opportunity to accommodate handicapped access.</p>

## 9.5.6 Information Services, Including Interpretation and Education

### Goals

- Visitors should feel welcomed to World’s End and will be given the opportunity to learn about The Trustees as a conservation organization.
- Visitors will be able to learn about the natural, historic, and cultural resources of World’s End and about The Trustees’ actions to preserve them.
- Trustees’ staff and volunteers will be courteous, professional, knowledgeable, and identifiable.
- The Trustees will provide opportunities for visitors to “connect” with the landscape by participating in the stewardship of each property.

### Threats and Issues

- **Visitor concerns about current management.** Keeping a landscape “open” requires active management, but visitors are often concerned that certain management activities may be harming the resource. At present, there is no systematic effort to inform visitors about The Trustees’ ongoing management activities.
- **Discourteous staff.** Typically, The Trustees has had the good fortune of having professional-level staff fill its ranger positions. There have been rare exceptions to this rule and, as a result, there have been occasional problems with staff being discourteous or, at the least, uninformed.

### Recommended Management

<b>Action</b>	<b>Description/Rationale</b>
Develop a 3-year interpretation programming plan.	A good program plan will help guide staff and volunteers as they develop and implement programs. This plan will also be done in conjunction with an organization-wide plan for education and interpretation, which is under development.
Construct a wildlife viewing station that interprets the ecology of Damde Meadows.	The restoration of Damde Meadows will provide an exceptional opportunity for visitors to learn about salt marsh ecology and restoration.
Create an interpretive display that describes and explains current management activities: “What’s happening at World’s End this month?”	Good information will help to explain the rationale that is driving management decisions, and will engage visitors in the stewardship of the property.

<p>Develop interpretive materials or programs that will help demonstrate some of The Trustees' management approaches.</p>	<p>These programs can showcase the importance of conservation as well as The Trustees' leadership in this area.</p>
<p>Establish a professional, full-time ranger position to supervise and train all rangers.</p>	<p>This staff member would provide training and supervise rangers and would address a variety of visitor issues and opportunities. This position would also enable the Visitor Services coordinator to spend more time on interpretation and education.</p>
<p>Expand the training of rangers and volunteers to include orientation about the organization as a whole.</p>	<p>This will help rangers and volunteers to inform visitors about The Trustees as a conservation organization.</p>
<p>Implement organization-wide initiatives for engaging volunteers.</p>	<p>Volunteer opportunities will provide visitors with a means to engage in the stewardship of World's End. The Trustees is currently looking at ways to support volunteer activities, through staffing and committee structures. Once these support mechanisms are in place, existing staff and volunteers will work to encourage additional participation.</p>

## Section 10: Implementation

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### 10.1 Introduction

Section 9 outlines the recommended actions needed to meet the goals and objectives for protecting World's End's natural and cultural resources while at the same time providing visitors with a high quality experience. Financial resources permitting, these actions will be implemented over a six-year period, broken into three phases with two consecutive fiscal years representing a phase. Thus, Phase 1 will include FY 2003 & 2004, Phase 2 FY 2005 & 2006, and Phase 3 FY 2007 & 2008.<sup>1</sup>

The Implementation Table found in Section 10.3 lists all of the recommended actions and their assigned phase, and identifies the resources that will be needed to implement the action steps. If an action step requires new resources, human or financial, it has been bolded.

Table 1 summarizes the new financial and volunteer resources required to implement the recommended actions in each phase and provides an estimate of the total cost of implementing this management plan (in 2002 dollars). It is important to note that these estimates do not reflect several key action steps, such as implementing a grassland management plan, where the costs are not yet known.

Table 1: Implementation Costs

<u>Phase</u>	<u>New Costs</u>	<u>Additional Volunteer Hours</u>
1	\$231,500*	270
2	30,800	
3	800	
Ongoing	43,000	56
<b>Total</b>	<b>\$306,100</b>	<b>326</b>

\* This figure includes \$125,000 already pledged for the restoration of Damde Meadows.

### 10.2 Plan Monitoring and Review

This management plan will inform the development of annual work plans for the staff that are responsible for managing World's End. The staff will convene members of the planning team (selected staff and volunteers) annually to review the progress on recommendations and will summarize progress and revisions in memo form for inclusion with the management plan.

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<sup>1</sup> The Trustees' fiscal year runs from April 1 - March 31. Thus, FY 2003 = April 1, 2002 - March 31, 2003.

### 10.3 Implementation Table

Action	Phase	Description/Rationale	Resources Needed
Interpret grassland issues and management to visitors.	Ongoing	Educating visitors on grassland issues will reduce impacts to wildlife and help reduce conflicting attitudes on management.	Incorporate into existing staff interpretation efforts; <b>In Phase 1 engage a volunteer to develop interpretive materials (40 hours).</b>
Enforce existing leash regulation. See Section 9.5.1.	Ongoing	Enforcement will reduce impacts to grassland wildlife during breeding season.	No additional resources needed. Continued use of rangers to educate visitors and enforce regulations.
Maintain a "do nothing" approach except for what is needed to maintain trails for visitors for the oak hickory forest (i.e. Loud Lot). This includes leaving all dead and dying trees that do not pose a risk to visitors as well as those that fall to the ground.	Ongoing	Maintains a unique natural feature for the property and region that is a contrast to the highly manipulated and/or actively managed landscape and possibly serves as a representation of the natural forest cover of prehistoric World's End.	No additional resources needed. Existing field staff can monitor for conditions and address any safety issues.
Monitor for exotic invasive plants in the oak hickory forest (i.e. Loud Lot) and control as needed to prevent species from becoming established.	Ongoing	Monitoring can be as simple as walking the area and observing for invasives. Control efforts should be included in the CISMP.	No additional resources needed for monitoring. <b>If control efforts are needed, some additional resources may be needed.</b>
Control invasive plants within the red cedar woodland.	Ongoing	Treat invasive plants selectively with herbicide as needed following the IPM process to maintain cedars and habitat. See CISMP for more details.	<b>To be specified in the CISMP. Additional resources likely required.</b>
Monitor Ice Pond for succession.	Ongoing	Monitoring is necessary to understand rate of succession to determine threat to ecological value.	Existing staff/volunteers will monitor.

Periodic <i>limited</i> clearing of woody plants along southeast shoreline of Ice Pond.	Ongoing	Maintaining a 10-foot opening on the south shore of Ice Pond will allow visitors a view across this small yet scenic pond. Trees and shrubs will likely need to be cut annually since stumps will resprout.	<b>16 hours/year of volunteer assistance.</b>
Excavation at World's End should be avoided whenever possible to preserve prehistoric sites.	Ongoing	World's End is a highly sensitive prehistoric cultural resource area.	No additional resources needed.
If excavation is required, workers should keep a sharp lookout for any indication of subsurface features or artifacts.	Ongoing	Evidence and artifacts should be documented.	Consult historic resources staff to determine subsequent procedure, may involve consulting with outside professional.
Workers should notify supervisor or headquarters immediately if any prehistoric items or features appear.	Ongoing	Evidence and artifacts should be documented.	Consult historic resources staff to identify artifact.
Prehistoric site location information should not be provided to the public.	Ongoing	Site location information is classified as sensitive information by the Massachusetts Historical Commission. (Collectors may disturb sites in pursuit of artifacts). Note: classification by the Massachusetts Historical Commission serves only as a recommendation; there is no legal obligation attached with this classification for The Trustees.	No additional resources needed.
Interpret history of Nilson's Island.	Ongoing	The island provides a visual interpretive opportunity for visitors on the shore, representing the late nineteenth century recreational use and occupation of the World's End area.	Incorporate into existing staff interpretation efforts; <b>In Phase 1 engage a volunteer to develop interpretive materials (40 hours).</b>

Preserve the sheepfold's tangible remains.	Ongoing	Recent staff survey of the feature indicates that it is presently a stable ruin. However, the structure needs attention soon to avoid potential damage. A few intrusive saplings threaten stability of the foundation and should be girdled or removed completely before their root systems develop further.	No additional resources needed. Existing staff will undertake mitigation measures.
Interpret sheepfold to public.	Ongoing	The shed foundation can be used as a focus for learning about the pasture and grazing use of World's End. The undergrowth surrounding the foundation should be removed, the tree cover thinned, and a minor trail laid out to bring the visitor past the open front of the building.	Incorporate into existing staff interpretation efforts; <b>In Phase 1 engage a volunteer to develop interpretive materials (40 hours).</b>  Existing staff can clear and thin vegetation from around the foundation as well as layout minor trail.
Maintain Damde Meadows' stone facing and dirt/gravel surfaces of the dams/causeways.	Ongoing	Preserves the feature's tangible remains. Remove encroaching woody vegetation.	Part of Damde Meadows restoration project, described above.
Interpret or represent any field boundary that is eliminated.	Ongoing	Maintains aesthetic effect of boundary on landscape (e.g. tree lines and Pine Hill).	TBD. Additional resources may be needed.
Preserve tangible remains of the pre-Olmsted roadways.	Ongoing	Preservation will require little except keeping roads clear of encroaching trees and shrubs and minimizing disturbance/alteration to roadways.	No additional resources needed.

Preserve the stone pillars as entrance markers.	Ongoing	Important to maintain pillars as entrance markers. While it may be desirable to move at least one pillar to widen entrance, pillars should not be relocated beyond what is necessary for improved vehicular circulation. Conservative common sense is called for when considering relocation.	No additional resources needed unless pillar(s) is to be moved. <b>Engineering cost (TBD) likely associated with move.</b>
Implement a monitoring program that measures visitor impact on the significant cultural and natural resources.	Ongoing	See Sections 9.3 and 9.4.	<b>40 hours of volunteer assistance/year.</b>
Do not actively encourage use of Rocky Neck.	Ongoing	Rocky Neck has been described as the “hidden gem” where even on the busiest days, one encounters only a few people. By down-playing this area, it will remain possible to find quiet spots on the property.	No additional resources needed.
Continue to inform dog walkers about the leash rule and provide interpretive information that explains rationale behind this rule.	Ongoing	Dog walkers may require regular reminders to follow this regulation. Compliance is likely to improve if visitors understand the rationale (e.g., habitat protection) that backs this policy.	No additional resources needed.
Re-direct incremental increases in visitation during off-peak periods.	Ongoing	World’s End has the capacity to accept additional visitors, especially during weekdays and on some weekends. This action would support The Trustees’ organizational initiative of inviting people to use and enjoy properties without compromising the high quality of the visitor experience.	No (or minor) additional resources needed.

Identify areas where roads/trails are eroded, wet or restricted due to encroaching vegetation and take remedial action (i.e. regravels, provide necessary drainage and cut back plants).	Ongoing	Maintaining trails in good condition will allow visitors to navigate through World's End with confidence.	No additional resources needed.
Improve visitor's ability to find property.	Ongoing	At this time, no action is needed to address visitor's ability to find the property. Based on visitor survey data, visitor comments to staff, and committee opinions, better directions and signs are not needed. It is also believed that the new visitors guide and website have improved upon directions and provide visitors with better access to directions.	No additional resources needed.
Establish a professional, full-time ranger position to supervise and train all rangers.	Ongoing	This staff member would provide training and supervise rangers and would address a variety of visitor issues and opportunities. This position would also enable the Visitor Services coordinator to spend more time on interpretation and education.	<b>\$43,000 annually to cover salary and benefits.</b>
Implement organization-wide initiatives for engaging volunteers.	TBD	Volunteer opportunities will provide visitors with a means to engage in the stewardship of World's End. The Trustees is currently looking at ways to support volunteer activities, through staffing and committee structures. Once these support mechanisms are in place, existing staff and volunteers will work to encourage additional participation.	<b>TBD. Additional resources may be needed.</b>
Develop and implement a grasslands management plan.	1	A detailed plan is needed to specifically address the conservation goal as well as threats for the grasslands at World's End.	No additional resources needed to develop the plan. <b>Additional resources are likely required to implement the plan. Amount TBD.</b>

Develop control strategy for exotic invasive plants as part of a comprehensive invasive species management plan.	1	A detailed plan is needed to specifically address invasive plants throughout World's End, including grasslands. A comprehensive invasive species management plan (CISMP) plan will allow invasive species to be assessed collectively so management priorities can be identified.	No additional resources needed to develop the plan. <b>Additional resources are likely required to implement the plan. Amount TBD.</b>
Thin cedars and remove competing hardwoods from the red cedar woodland.	1	Thinning of cedars and removal of hardwoods will allow understory to be mowed annually in spring to promote plant and habitat diversity, especially native grasses and wildflowers. Annual mowing will also suppress resprouting hardwoods.	Existing staff will supervise an additional <b>120 hours of seasonal and/or volunteer help.</b>
Develop and implement restoration plan for Damde Meadows.	1	Ecological value is currently greatly compromised.	<b>Estimated \$175,000 (as of January 2002, approx \$50,000 outstanding need.</b>
Interpret Damde Meadows restoration to public.	1	Interpretation should begin before construction work begins.	<b>Long-term interpretation requirements are included in the overall restoration budget (above).</b>
Evaluate prehistoric sites threatened by erosion for stabilization.	1	Some sites (e.g. along roadways) may be stabilized where as others (e.g. coastal banks) may not be practical and/or possible due to environmental forces and coastal regulations.	Superintendent, historic resources and ecology staff need to assess each threatened site and make recommendations. <b>Additional costs TBD.</b>
Complete a photo record of Nilson's Island to supplement Luedtke report. <sup>2</sup>	1	Completes documentation of important cultural feature.	<b>30 hours of volunteer assistance.</b>

<sup>2</sup> Luedtke, B.E. 1990. Report on an archaeological survey of World's End, Massachusetts. University of Massachusetts, Department of Anthropology. Boston  
10 – Implementation

Document Damde Meadows' past and present cultural features.	1	Damde Meadows' history is documented in the Tritsch land use report (Appendix A). A thorough photo record will document its present state including dams, marsh areas and roadways. This documentation is of immediate importance since ecological restoration efforts are underway.	Part of Damde Meadows restoration project, described above.
Implement Damde Meadows restoration plan to maintain stability of dike.	1	See Section 9.3.5 above for more details.	Part of Damde Meadows restoration project, described above.
Document the species and locations of trees along the treed avenues, including the Brewer grove, taking care to record separately those that might be contemporary with the original plan, and those that were planted subsequently.	1	Helps to maintain original design and features through guiding future plantings.	<b>\$2500 for a paid intern.</b>
Inform visitors about the presence of both poison ivy and ground nesting birds in the fields, and ask that they remain on the trails.	1	By abiding by this request, visitors will avoid poison ivy and will also not disturb wildlife habitat during the nesting season.	No additional resources needed.
Form a small advisory committee who will work with staff and a consulting landscape architect to evaluate the current entrance design, and if necessary to propose alternative designs that accommodate two-way traffic.	1	Several criteria should be used to evaluate the current and proposed designs, including: <ol style="list-style-type: none"> <li>1. impact to the appearance of the entrance.</li> <li>2. ability to facilitate traffic flow and reduce congestion.</li> <li>3. safety of visitors and staff.</li> <li>4. impact on cultural and natural features.</li> <li>5. ability to accommodate parked vehicles during non-staffed hours.</li> <li>6. security of the property.</li> </ol>	<b>\$5,000 to contract with a consulting Landscape Architect.</b>

Investigate the possibility of including a 3 year pilot shuttle service to provide alternative access to World's End and other South Shore properties.	1	A shuttle service may provide a way to offset the impacts associated with The Trustees' organizational initiative to broaden its constituencies and to encourage new visitors to engage in the stewardship of special places. This pilot program should coordinate with the train and commuter ferry service.	No additional resources needed to design program; <b>implementation costs to be determined.</b>
Develop a 3-year interpretation programming plan.	1	A good program plan will help guide staff and volunteers as they develop and implement programs. This plan will also be done in conjunction with an organization-wide plan for education and interpretation, which is under development.	<b>\$6000 for a consultant to work with the existing staff to guide this project. (\$300-\$500/day x 15 days for consultant).</b>
Create an interpretive display that describes and explains current management activities: "What's happening at World's End this month?"	1	Good information will help to explain the rationale that is driving management decisions, and will engage visitors in the stewardship of the property.	No additional resources needed.
Develop interpretive materials or programs that will help demonstrate some of The Trustees' management approaches.	1	These programs can showcase the importance of conservation as well as The Trustees' leadership in this area.	No additional resources needed.
Expand the training of rangers and volunteers to include orientation about the organization as a whole.	1	This will help rangers and volunteers to inform visitors about The Trustees as a conservation organization.	No additional resources needed.

Provide visitors with interpretive materials for Damde Meadows that include illustrations of Brewer's meadow and earlier illustrations. Incorporate any panels into a central location on interpretation.	2	Interprets successive stages of Damde Meadows evolution, including components that may be destroyed.	<b>Long-term interpretation requirements are included in the overall restoration budget (above).</b>
Document present field boundaries using GPS or other surveying system to plot all boundaries as overlay on base map.	2	Useful for future management planning and affirms legal status of boundaries. Record marker types (e.g. stone wall, hedgerow) and any other evidence of lost fencing and/or stonework before any changes are made to current conditions.	Existing GIS and Field Staff.
Develop a comprehensive plan for the treed avenues and Brewer grove.	2	Maintains important design features that characterizes World's End. This plan should address identified threats and adhere to the spirit of the original design.	<b>Arborist consultant at a cost TBD (depends on actual scope of work).</b>
If dog conflicts persist as a problem, outline a dog permit system and assess its feasibility based on cost and benefit.	2	In theory, a permit program will ensure all dog walkers are fully informed of the regulation and will provide some accountability to compliance. However, a permit program will be costly, and before proceeding, a thorough cost/benefit analysis would need to be done.	No additional resources needed to design program; <b>implementation costs to be determined.</b>
Investigate ways to make the trail network more accessible to visitors with physical limitations.	2	Improving access will broaden World's End's constituency and allow visitors of all abilities to enjoy this significant property.	<b>Consultant at a cost TBD.</b>
Investigate the costs and benefits of installing a composting toilet facility. Costs should include staff requirements for maintenance.	2	Composting toilets may partially address the aesthetic issue associated with portable toilets. They would also provide us with the opportunity to accommodate handicapped access.	No additional resources needed.

Construct a wildlife viewing station that interprets the ecology of Damde Meadows.	2	The restoration of Damde Meadows will provide an exceptional opportunity for visitors to learn about salt marsh ecology and restoration.	<b>\$30,000 for design, permitting, and construction (including interpretive panels).</b>
Selectively remove competing hardwoods (e.g. English oak) from the maritime juniper woodland/shrubland.	3	Hardwoods can be removed and/or controlled as time allows to perpetuate the cedars and other species dependent on open conditions with direct exposure to sunlight. See CISMP for more details.	Occasional use of existing field staff to perform thinning.
Update the existing trail map and make available at no charge. Include trail mileage on map.	3	This will help ensure that new visitors can find their way across the property. Recognizing that the trail map was revised in FY 02, this action does not need immediate attention.	No additional resources needed. Existing maps can be made available at no charge and mileage can be posted at ranger station and on bulletin boards. Mileage can also be added to maps with next reprint.
Continue to collect data about visitor use. Conduct periodic surveys to get feedback on the type of experience visitors are having.	2, 3 and Ongoing	Periodic, ~ every 3 years, short surveys focusing on the quality of the visitor experience will give staff objective feedback on visitor use.	<b>Additional 60 hours of part-time help per survey year.</b>