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**Beebe Woods Management Plan**

**January 2007**

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## EXECUTIVE SUMMARY OF FINDINGS AND RECOMMENDATIONS

**1. REVENUE:** Beebe Woods is sufficiently attractive to increase the property values of residences nearby or adjacent to Beebe Woods and thus increase tax revenues to the town. These revenues likely offset any maintenance costs that the town expends upon Beebe Woods. Tax revenues from private properties adjacent to other conservation lands and sanctuaries constitute a permanent revenue stream for the Town that should support an Open Space Manager.

**2. ECOSYSTEM SERVICES:** Falmouth is fortunate to have such a large parcel of forest close to the Town center for all to enjoy. Beebe Woods, in addition to being attractive, offers opportunities for active recreation and nature study and cleans the air and rainwater that passes through it. Beebe Woods is, as well, a carbon sink and, in its own small way, helps to decrease the buildup of CO<sub>2</sub> in the atmosphere. Also, it functions as sanctuary for forest-dwelling wildlife and for plant diversity and is a link to both our historical and natural heritage.

**3. AQUATIC RESOURCES:** Because Deep Pond and Miles Pond are used for swimming, the Falmouth Board of Health should consider testing the water quality in these ponds. Foot traffic around ponds and wetlands should be monitored to see if paths need to be modified or moved. We recommend a study to determine whether there are more vernal ponds than the one currently certified in Beebe Woods.

**4. WILDLIFE:** Beebe Woods is an important link in the series of open space parcels along the moraine. Management activities should protect the varied wildlife habitats within the Woods and support potential corridors within and adjacent to the rest of the moraine. Thorough studies on wildlife habitats and populations should be sought, including the effect of dogs, and cats.

**5. TRAILS:** The former carriage paths are a distinctive, historic feature of Beebe Woods. Their gentle grades and generous width attract many users. In addition, numerous foot trails lead to all sectors of the Woods. The Beebe Woods Management Team (BWMT) believes maintaining the carriage trail system is a top management priority. In addition to their recreational value, they potentially provide access for fire fighting vehicles. The number of trails and their looping layout make some potential Woods users apprehensive. The BWMT recommends making trail maps more readily available and increased blazing and/or signage at key junctions.

**6. PARKING:** Planning is underway to replace or supplement the current parking for visitors to Beebe Woods on the Cape Cod Conservatory property at the end of Highfield Drive. The small lot off Ter Heun Drive should be enhanced to make it a more attractive parking option, and depending upon the Highfield parking resolution, the Ter Heun lot could be expanded to accommodate more Beebe Woods users.

**7. RECREATION:** Miles of shaded carriage and single track trails, access to two ponds, the interestingly variable terrain and vegetation, the sense of being well removed from traffic and other "hassles" of a more urbanized Falmouth have combined to make Beebe Woods a well-used recreation destination, with walking the predominant use. Other potentially conflicting non-pedestrian uses such as bicycling and horseback riding are currently insufficient to cause significant problems, and no limitations are proposed. However, the overall degree of use is causing wear and tear on the trails and is especially problematic near the ponds. The BWMT recommends that the highest management priority be given to maintenance of the trail system and correcting and preventing erosion.

**8. DOGS:** The majority of the users of the Beebe Woods appear to be dog owners who, despite town leash laws, are accustomed to letting their dogs run off leash. Among results are complaints about dog feces and negative human-dog interactions from some citizens, the Cape Cod Conservatory, and Historic Highfield. A minority of the 296 users of Beebe Woods surveyed by the BWMT described the negative effects of dogs upon their enjoyment of Beebe Woods. There appears to be acceptance of the needs for signage about dog and dog owner behavior and for plastic mitts and trash bins for the disposal of dog waste, and the BWMT is recommending both. In addition the BWMT is specifically recommending requiring that dogs be leashed until they are 500 feet into Beebe Woods and away from parking areas.

**9. FOREST MANAGEMENT:** To protect the forest, effective wildland fire prevention and preparation should be actively pursued in Falmouth, consistent with expert advice and conservation goals. Trained stewards are needed to survey regularly the health and diversity of forest and wetlands, with special attention to rare plant habitats and

invasive plants. Non-native invasive plants, such as Japanese knotweed, Japanese barberry, and bittersweet thrive in a few areas of the woods. They supplant native vegetation and add to fuel build-up. To mitigate their attack on the forest, the Town should provide on-going control and possible removal. Also, monitor for plant disease, insect damage, and negative human impact. A Town Open Space Manager, after seeking qualified advice, should work with the Conservation Commission to develop policies and secure resources to mitigate threats to forest health.

**10. WILDLAND FIRE MANAGEMENT:** Beebe Woods, not having suffered a major fire since 1947, has a buildup of understory vegetation, climbing vegetation and leaf litter that increases the fire risk to surrounding homes and, in particular, to Falmouth's medical complex that is in the path of prevailing winds at the NE corner of Beebe Woods. A comprehensive wildland fire preparedness plan is needed for Beebe Woods, but is beyond both the resources currently available to the Conservation Commission and the scope of this document. While the Conservation Commission is willing to work with other Town departments to develop such a plan, developing a plan that not only balances protection of the woods but which addresses the numerous other public safety issues associated with a wildland fire is beyond the scope of the Commission's responsibilities.

**11. EROSION:** A significant erosion problem exists at Deep Pond. It results from the steep pitch of the access paths and is exacerbated by the use of a rope hanging from a tree that extends over the pond. An engineering solution needs to be devised, funded and implemented for the erosion problem. Erosion will only worsen as tree roots are exposed leading to increasing degradation of the water quality and habitat of Deep Pond. Erosion is less but also is a problem at Miles Pond.

**12. SURVEY AND BOUNDS:** The boundaries of Beebe Woods should be surveyed and marked with concrete bounds where bounds do not currently exist. Any encroachments by activities on abutting properties should be identified and addressed.

**13. EDUCATION AND OUTREACH:** Managers of Beebe Woods should be pro-active in reaching out to civic groups, neighborhood associations, schools, and neighboring institutions, to encourage nature study, increase public awareness of threats to the woods, and support neighborly cooperation.

**14. MANAGEMENT STRUCTURE:** The BWMT views the current ad-hoc arrangements for managing Falmouth's open spaces as inadequate for the long term management needs of Beebe Woods and other Town open spaces. The BWMT recommends that the Town create the position of Open Space Manager to oversee maintenance of Town owned open space parcels, seek grant funds, field complaints and work with volunteer stewards.

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## 1.0 BEEBE WOODS MANAGEMENT TEAM APPOINTEES AND CONSULTANTS

The Beebe Woods Management Team (BWMT) was appointed by the Falmouth Conservation Commission in the spring of 2004, charged with the task of developing a management plan for Falmouth's largest Town owned conservation area. The impetus for establishing the BWMT was the Town's consideration of implementing a wildland fire preparedness plan in Beebe Woods. Although the BWMT directed much attention to concerns about the threat of forest fire and possible responsive strategies, other important management issues were studied, as evident from this report. The BWMT met monthly or more often for over two years. Its work has included public meetings devoted expressly to issues such as fire prevention and dogs in Beebe Woods, and the preparation, distribution and consideration of an informal survey about the public's use of Beebe Woods and management concerns. The BWMT hopes that this report raises awareness concerning these matters, and that the following discussion and the recommendations herein prove useful to the Conservation Commission, other Town officials and the public in developing policies and undertaking projects to protect, maintain and enhance Beebe Woods.

Original BWMT appointees who have served from inception of the committee until distribution of this report are Victoria Lowell (Chair), Robert Ament, Janice Hayes, Thomas Stone and Maureen Conte. Arthur Calfee was a member of the BWMT in 2004 and 2005. Karen Wilson, and Eric McLaughlin before her, have served as Conservation Commission representatives on the BWMT. Other Town officials who worked directly with the BWMT include Falmouth Fire and Rescue Department Chief Paul Brodeur, Tree Warden and Parks Superintendent Brian Dale, Department of Natural Resources Director Mark Patton and Officer Sarah Brooks, and Animal Control Officer Tom Garland and Debbie Pronk.

## 2.0 HISTORY OF BEEBE WOODS

"Beebe Woods: Falmouth's Miracle," an article by Judith Stetson, published in the Summer 2003 edition of Spritsail, the Woods Hole Historical Society's biannual journal, provides wonderful insight in just 22 pages into Beebe Woods and its history. In this article, Ms. Stetson quotes extensively from the book Ring Around the Punchbowl by George Moses and also from the introduction by naturalist Robert Finch. This book was published in 1976, the year that Josephine and Josiah K. Lilly III granted a deed of trust to the Town of Falmouth to preserve the 383 acres of Beebe Woods that is the subject of this management plan.

Ring Around the Punch Bowl is highly recommended reading for those who would like a long, lively and humorous account of the Beebe family and a host of fascinating characters who lived on or had ambitions and visions for how to develop Beebe Woods. The "Miracle" is that Beebe Woods was still largely intact in the early 1970's when Mr. and Mrs Lilly initiated their purchase and gift.

Ms. Stetson also quotes passages from Beth Schwarzman's chapter on Beebe Woods and Peterson Farm in The Nature of Cape Cod, Schwarzman points out the history one can glean from observing the trees, stone walls and carriage trails on a walk through Beebe Woods.

For those readers of this management plan who would like to know some history without referring to other sources, a few highlights follow.

"When the early settlers came [to Falmouth], an old Indian Trail ran over the ridges down through North and West Falmouth and through what is now called Beebe Woods." Jim Mavor of Woods Hole has observed and mapped stone mounds and structures on the Beebe Woods moraine that he believes represent a Native American "sacred architecture." (Smith 1986)

Falmouth's early settlers used Beebe Woods as a source of lumber, firewood and fence posts. Initially the land was held in common, but as the value of wood increased it was divided into private ownership. Once the trees were harvested, the cleared land became pasture for sheep and cattle.

In the mid-nineteenth century when the first summer families began to arrive, the historical economics of sheep and cattle raising and wood lots paled before the value placed on land by these new arrivals. Joseph Story Fay, Falmouth's first summer resident, made Woods Hole his seasonal home but invested in real estate throughout

Falmouth. It was Mr. Fay who sold the 95.5 acres of land to James Madison Beebe in 1873 that was to become the nucleus of Beebe Woods. That tract was added to 28 acres purchased in the previous year; eventually the Beebes accumulated 708 acres.

For Mr. Beebe and his heirs, the acreage on the moraine above Falmouth Center was not just an investment. Two of his sons built spacious Victorian summer homes, Highfield Hall and Tanglewood, and surrounded them with grand gardens and landscaping. A Beebe legacy of specific importance for this management plan is the miles of carriage paths that the Beebes had constructed throughout their woods for the enjoyment of their family and friends. These paths continue as the backbone of the Beebe Woods trail system and are especially appreciated by users as being wide enough for side by side walking, cross country skiing, horseback riding, and cycling.

The Beebe family retained ownership of Beebe Woods until 1932. Over the next 40 years, the property changed hands four times and became 200 acres smaller. Some 22.5 of the “lost” acres were a gift of Dewitt McLaughlin Ter Heun, the third subsequent owner, for the site of Falmouth Hospital. Ter Heun’s generosity is memorialized as the name of the public way leading to the Falmouth Hospital.

Also over these forty years, Beebe Woods survived the fire of 1947 and two other major threats—plans for roads and for housing in the woods. In October of 1947, a three-day fire fanned out from Sippewissett across Beebe Woods, raining embers down on Falmouth Village. Sixty years later indications of the fire are invisible to any but a careful observer.

After the 1947 fire, a noted Falmouth contractor floated the idea of replanting Beebe Woods and building a scenic drive to open the area for development. In 1951, the scenic drive proposal was incorporated into a master plan prepared for the Town Planning Board by the Boston landscape architects, Arthur and Sidney Shurcliff. The objective of the proposed parkway was to increase property values and tax revenues and also to relieve the traffic congestion in Falmouth Center. However, “there was not enough money or enthusiasm for this element of the Shurcliff plan...and Beebe Woods was left to grow on its own.” (Judy Stetson)

After the death of Dewitt Ter Heun in 1963, Beebe Woods (including Highfield Hall, Tanglewood and the old stables which had become Highfield Theatre) was sold to Stanley Welsh and his sister, Marjorie Whittemore. In 1966, operating as Highfield Associates, these siblings proposed a “blue ribbon development of 500 houses, a roomy neighborhood blended into the wild landscape.” Implementation of their concept, which was to have clusters of housing on small lots surrounded by “reservoirs of open space,” could not be done without amending local zoning. The Falmouth Planning Board resisted this change and by 1972 the proposal was “dead.”

Falmouth was developing rapidly. Although the cluster proposal had failed, it was unlikely that Beebe Woods would remain undivided for long. On October 3, 1972, a powerful challenge was put forth by the editor of the Falmouth Enterprise to save Beebe Woods as a public park. “...nearly 500 acres of unspoiled woodland remain within a stone’s throw of Main Street. It is somewhat of a miracle. ...if there is a better and higher use for Beebe Woods, the time to recognize it is now. Later will probably be too late. Future generations would think very kindly if we left a public park of this size in the heart of town.”

Less than a month later, the Lilly family heeded the challenge. The headline in the Falmouth Enterprise read, “Lilly’s Buying Highfield for Falmouth.” The article stated, “Their intent is that the nearly 500 acre property will not be developed but will be set aside for conservation.” On July 19, 1976, Josiah K. Lilly III signed the deed conveying 382.7 acres to the Town of Falmouth for conservation. Beebe Woods was to be preserved in perpetuity. \*

The Lilly’s philanthropy was not limited to conservation. From the nearly 500 acres, pieces were carved out for Falmouth Hospital and the Falmouth Visiting Nursing Association. Two parcels containing the former Beebe residences and gardens were deeded to the Cape Cod Conservatory of Music and the Arts. On one parcel off Highfield Drive, Mr. Lilly developed the Falmouth Sports Center. In 1985 a remaining parcel was given to Falmouth Academy.

The language of the Lilly Deed makes it clear that Beebe Woods is to remain a natural area (Appendix A). It states, “...the trust property conveyed shall be kept and maintained in its present natural state for conservation and protection of natural resources, the protection of watershed resources and the preservation of wildlife, and for such outdoor recreation uses as shall not involve the construction or development of any buildings or other facilities.”



The deed also lists prohibited uses including mining; logging except as consistent with good forest and land management practices; dumping, storing of motor vehicles or equipment; overnight camping; fires of any kind except as may be authorized by the Fire Department; hunting of any kind; parking of motor vehicles except at one or more areas for the exclusive use of those visiting and using the property; the use of gasoline, electric, or other powered vehicle or equipment by anyone other than authorized agents of the Conservation Commission; and public entertainment of any kind which would draw large crowds and present a risk of serious damage to the vegetation or other natural resources.

\*In 1989 Beebe Woods was augmented by the donation of 10.2 acres of land along the western shore of Deep Pond. The benefactors were long-time Woods Hole residents, Dr. George A. Clowes, Jr. and Allen W. Clowes.

### **Continuing the Lilly Legacy:**

In the now thirty years of Town ownership no challenges have emerged to the Lilly's vision and the legal requirements of the deed, and there do not appear to be threats lurking in the shadows. Part of our management plan process, an informal public survey (11/04) with 296 responses and comments (Appendix B), has confirmed tremendous public support for keeping Beebe Woods a natural area and for protecting it from intrusive amenities.

Yet, the intervening years have brought complications. Beebe Woods has barely changed, but the land around it has. Major community institutions and scores of new residences now ring Beebe Woods. Indeed, the population of Falmouth has doubled between 1970 and 2000 (from 16,000 to 32,000). As Falmouth's population has increased and the amount of open land has decreased, even without the benefit of records of use, it seems certain that Beebe Woods is more frequently visited and intensively used than 30 years ago. As a result Beebe Woods now shows signs of wear. To what extent should Beebe Woods be managed to accommodate heavier public use? To what degree do its natural resources need management or protection? The BWMT has wrestled with these complications in the development of this plan. Our desire is to ensure the Beebe Woods miracle will endure essentially undiminished for Falmouth's generations to come.

## **3.0 DESCRIPTION OF BEEBE WOODS**

### **3.1 HISTORICAL USES**

Much of Cape Cod (and New England) was devoted to sheep farming in the early 1800s when the early mills of nearby New Bedford and Fall River sought high quality wool. In 1837, Falmouth averaged about 50 sheep per sq. mile. The poor quality of the soils in what is now Beebe Woods did not prevent the land from being used by early settlers for grazing sheep and cattle and also possibly for hay; much or all of Beebe Woods was likely completely cleared of trees in the 1700s and early 1800s. There are several stonewalls running through Beebe Woods today enclosing areas of 5 to 20 acres in size which would be suitable for small herds of sheep. Lack of barbed wire indicates the walls were established before barbed wire's invention around 1872. The large glacial stones or erratics were often cut for foundation stones, doorsteps, and fence posts. Examination of the larger boulders will often reveal chisel marks and splits.

We know of no archeological studies that have been done in or adjacent to Beebe Woods.

### **3.2 SURROUNDING LAND USE**

The current perimeter of Beebe Woods is about 5.4 miles long. Beebe Woods and the Peterson Farm conservation lands share a border of about 0.33 miles (Appendix C, Figure 1). Today, much of the land surrounding Beebe Woods is used for single-family homes. Most of these homes were built in the last 20 to 40 years; there are few that were in existence during or prior to the 1947 fire.

The largest single development, in terms of common edge, is the Greengate development that extends from Woods Hole Road directly west into Beebe Woods for about 4,000 feet. In Greengate, there are about 30 single-family homes on one-acre lots along the southern edge of Beebe Woods. Typically, the houses are 25 to 50 yards from the boundary of Beebe Woods and have assessed values greater than \$550,000 (2006). There are another 7

homes along the western edge of the Greengate development with similar values. Here, houses tend to be much closer to the Beebe Woods boundary – some houses less than 5 yards away. The southern side of Greengate forms much of the border of the Town conservation land of Peterson Farm. Greengate includes several apartment buildings at the north end of Greengate Road and several more multifamily building at the west end of Riddle Hill Road.

The eastern side of Beebe Woods borders the Highfield-Conservatory area and the Falmouth Academy (FA) complex of school buildings and three athletic fields. The common border of Beebe Woods and Falmouth Academy is about 1,100 feet long. The FA area is about 34 acres in size and shares an Atlantic White Cedar swamp in common with Beebe Woods. North of FA is Falmouth’s major medical complex—Falmouth Hospital, the Bramblebush Medical Offices, Heritage Assisted Living, the JML Skilled Nursing Care Center (both part of Cape Cod Health Care), and the Gosnold Treatment Center. These health facilities share a border with Beebe Woods of about 2,100 feet. Of all these structures, only Highfield Hall existed prior to 1947.

Ter Heun Drive borders Beebe Woods on the north for 1,400 feet. To the northwest is another area of about 27 single-family homes south of Ter Heun Drive (part of Sippewissett Highlands) on half acre and a few on multi-acre lots. Also along the western margin in the area from the Sippewissett Rd—Ter Heun Rd. intersection to Miles Pond are single-family homes on half-acre lots. In all, about 60 single-family homes directly border Beebe Woods.

### **3.3 THE VALUE OF BEEBE WOODS**

#### **3.3.1 Ecosystems Services**

This forest, like all other forests on an urban fringe, provides several benefits or ecosystems services to the town. It provides a relatively large habitat for native plant and animal species (listed elsewhere); absorbing rainfall and runoff and thus recharging the water table; protecting against localized flooding by absorbing excess water in lowlands and wetlands; intercepting and removing particulates and pollutants from the air and thereby improving the quality of the air that all citizens breathe; cooling and buffering the local climate in the summer; and providing a carbon sink for excess atmospheric carbon dioxide (CO<sub>2</sub>). Also, the forest acts as a noise buffer for many area residents; provides a visual screen; and shades many homes from the sun. Of course, Beebe Woods also provides recreational, educational, and aesthetic benefits to the entire community. Beebe Woods, when all benefits are accounted for, may already be in its “highest and best use” without regard to the Lilly deed restrictions.

The relatively new field of ecological economics tries to place monetary values on the common functions of natural ecosystems and their benefits to society. Similar to other new fields of research, there is a wide array of methodological approaches to defining economic benefits of natural ecosystems and, consequently, a wide range of estimates for the values of the specific functions of ecosystems. Some of these functions (as described above) are directly applicable to an urban forest such as Beebe Woods.

#### **3.3.2. Increased Property Values and Tax Revenue**

The economic value of parcels that abut Beebe Woods (or other open space) is generally greater than that of comparable properties that are surrounded by development. One local realtor has said abutting Beebe Woods (e.g. Greengate) could add as much as \$30,000 to the value of a residential property. If there are 60 private homes abutting Beebe Woods, the total value of the properties could be as much as \$1.8 million, greater than if these properties were located elsewhere. An appraiser indicates that the “added value ... of proximity to conservation land ... ranges from 2 to 12%.” This range would mean for a \$400,000 home an added value of \$8,000 to \$48,000. If we choose the 2% number and assume there are 150 homes in the Beebe Woods area worth \$400,000 each, then that would add some \$1.2 million in property values and generate some \$6,300 in tax revenue (at \$5.25/\$1000) per year. If we use 12% with the same assumptions, the preservation of Beebe Woods has added \$7.2 million in value to adjacent properties and \$37,800 in tax revenue per year. This value is in addition to all other ecosystems services and benefits such as cleaning the air, cleaning the water, recreation, etc.

### **3.4 GEOLOGY AND SOILS**

Beebe Woods sits upon the Buzzards Bay glacial moraine established between 15,000 and 20,000 years ago during the last glaciation. Like all Cape Cod, there is no exposed bedrock. Bedrock on Cape Cod is typically about 300 feet below the surface. Moraines are composed of large and small rocks and poorly sorted gravels and sands.

Typically, moraines are hummocky with small depressions. Deep Pond (a.k.a the Punch Bowl) is likely a kettle hole, a place where a large block of ice remained behind and was covered by soils. When the ice melted, a depression was formed and filled with water. The level of the water in the Pond reflects the level of the ground water table.

In general, the soils of morainal areas are unlikely locations for tilled crops due to rocks. Also, there are occasional clay pockets in the soils in Beebe Woods and throughout the moraine. These are likely locations of present and former ponds and marshes. If the clay is thick enough, it can create a “perched” water table, one higher than the general water table. The Atlantic White Cedar swamp on the eastern side of Beebe Woods near Falmouth Academy is the site of a perched water table that supports this increasingly rare forest formation.

### **3.5 AQUATIC RESOURCES**

Beebe Woods contains kettlehole ponds and wetlands that are highly significant for their conservation value. The ponds are important sites for recreation (swimming, ice skating, fishing, bird watching). Additionally, the western side of Beebe Woods is in close proximity to the Buzzards Bay coastal marshes, salt ponds and vernal pools. There are also ephemeral streams in Beebe Woods.

There are no current plans for drinking water wells in Beebe Woods. At one time, Beebe Woods included a designated potential municipal well site. The Water Resource Protection District designation was eliminated by Town Meeting in April 2001 based on reports showing that other well locations in Falmouth would be more productive.

#### **3.5.1 Kettle Ponds**

Two kettleponds are found in Beebe Woods. Deep Pond is a 2.7 acre pond located in the northern section of Beebe Woods. Miles Pond (a.k.a. Ice House Pond) is a 6.6 acre pond located on the southeast periphery of Beebe Woods. While not part of the Beebe Woods property, it is a popular recreational destination with a major access for hikers from the Beebe Woods carriage road and so is included here. Both ponds are significant for providing habitat for wildlife (waterfowl, frogs, turtles, aquatic insects, etc.) and habitat for plants that need a wetter environment. Ponds also store water for wildlife use and process nutrients while filtering water. Miles Pond is heavily used for swimming, ice-skating and nature study. Miles Pond is also used occasionally for canoeing and fishing.

Deep Pond is a perched water body located at ~70' elevation and entirely surrounded by wooded slopes. It has a small, seasonally variable wetland at the south end. Deep Pond enjoys apparently good (but untested) water quality as it is recharged by rainwater percolating through largely undisturbed forest soils. A significant number of people and dogs enjoy swimming in it. Erosion is currently a problem at popular trail access points and also at the site of a popular rope swing. It contains small fish (e.g., catfish, small-mouthed bass) that youngsters often catch.

In contrast to Deep Pond, Miles Pond is only 10' above sea level and is fed mostly by groundwater. The majority of the pond shoreline is wooded with typical marginal pond flora such as maple, swamp azalea, summer sweet and water lilies. The pond contains snapping turtles and mud turtles and supports many species of dragonflies, damselflies and other aquatic insects. With the exception of the shoreline abutting Beebe Woods, the pond perimeter is entirely surrounded by house lots and roads. Although a wooded setback is maintained on most lots, fertilizer and septic leachates from nearby houses likely impact the waters. In addition, there is direct road drainage from Sippewissett Road and McCallum Drive during heavy rains. Algal growth (both plankton and macroalgae) in Miles Pond during the spring and summer is significant and indicates moderate impairment of water quality. Long-term residents also have stated that this growth has worsened over the years, suggesting a direct linkage between declining water quality and increased development. Erosion is currently a problem at the Beebe Woods access point.

A third smaller (0.3 acre) kettlehole pond (one of the “two ponds” off Two Ponds Road) also abuts Beebe Woods. It is likely that this pond is utilized by wildlife in Beebe Woods and so it is mentioned here. The buffer to this pond has been altered by development of the lot and construction of a house less than 50 ft away.

#### **3.5.2 Wetlands and Vernal Pools**

Three perched wetlands are found in Beebe Woods. A small (4 acre) Atlantic white cedar swamp is located on the eastern periphery of Beebe Woods and continues into Falmouth Academy property. It typically has water

year round and contains sphagnum moss, red maple, cedars and other typical cedar swamp vegetation. The second is a seasonally dry wetland located at the northeast periphery at the trail entrance off Standish Avenue. [Note that a certified vernal pool (NHESP certification #1514) is located nearby on privately held conservation land.] A second small and seasonally dry wetland is located about halfway between the Standish Avenue wetland and the vernal pool mentioned in the next paragraph. Both the Atlantic white cedar swamp and the two Standish wetlands are of very high conservation value. Wetlands such as these provide habitat for amphibians, invertebrates, and reptiles as well as filtering water and providing a water source for wildlife.

The western portion of the Buzzards Bay moraine contains a large number of vernal pools. Within Beebe Woods, a large and highly productive vernal pool (NHESP certification #2024) is found in the northeast quadrant off Upland Avenue. This vernal pool contains large populations of spotted salamanders, wood frogs and facultative vernal pool species. Large choruses of wood frogs, spring peepers, toads and other amphibians indicate the pool is a major amphibian breeding site. Another smaller vernal pool (NHESP certification #1900) is located across Upland Avenue on wooded private property.

Another wetland, north of Deep Pond, deserves further study to see if it is a vernal pool. It is separated from Deep Pond by about 75 feet and a slightly built up trail. It sits east of the trail that connects to Ter Heun Road. There are other small seasonal wetlands interspersed throughout Beebe Woods that support breeding populations of spring peepers, American toads and other amphibians. These wetlands should be surveyed to determine whether or not they are vernal pools.

Two wet areas shown on The 300 Committee map of the woods were not wet in April 2006. One is mapped as a small pond about 800 feet east and slightly north of Miles Pond at about 45 feet elevation. The area showed no signs of a former wetland, and it is possible it was mapped incorrectly. The second is near George's Rock in an area now covered by Japanese Knotweed and other invasives. Caljouw's report of February 2005 notes knotweed there in "a wet depression." It is possible that the knotweed and digging in the area have changed or almost swallowed that former small swamp.

#### **Recommendations for Aquatic Resources:**

1. The Falmouth Department of Health should consider monitoring water quality (turbidity, dissolved oxygen, chlorophyll) at Deep Pond and Miles Pond. In addition, the Department of Health should consider sampling for bacterial contamination (from septic leachate) in Miles Pond during the swimming season.
2. Monitor foot paths and other access points near wetlands. If human traffic is damaging any wetland, consider blocking off and/or relocating paths.
3. Study the wetland north of Deep Pond (and other wetlands) to determine whether they are vernal pools. Certify any that meet the criteria for certification by the State of Massachusetts.

### **3.6 WILDLIFE IN BEEBE WOODS**

Beebe Woods is one of the largest and most significant conservation lands in Falmouth. The large, relatively undisturbed parcels of wooded uplands, ponds and wetlands provide important habitat for many species. In addition to year-round resident species, the ponds and woodlands provide important stopovers for migratory birds.

#### **3.6.1 HABITAT PROTECTION**

Despite the value of Beebe Woods to the preservation of Falmouth's natural heritage, there have been no systematic assessments of wildlife habitat or thorough inventories of the plant and animal species. However, one might reasonably expect that the wildlife found in Beebe Woods would include species commonly found in patches of second-growth mixed oak-pitch pine forest that exist within the context of a suburban Cape Cod landscape. The small ponds, wetlands, and vernal pools within Beebe Woods support additional wetland and facultative wetland species, and some of the animals that inhabit the thickets and grasslands of Peterson Farm may include Beebe Woods in their daily or seasonal movements.

Chris Neill, an abutter to Peterson Farm and avid birder, provided the BWMT with a list of birds he has observed on Peterson Farm, which abuts Beebe Woods to the southwest (Appendix D, Table 1). Those species not found exclusively in grasslands are likely also found in the woodlands and thickets of Beebe Woods. In addition, the mammals, reptiles, and amphibians known to inhabit pitch pine-oak forests of Camp Edwards, (which borders Falmouth to the north), might also be found in the mixed oak-pitch pine woodlands of Beebe Woods (Appendix D, Tables 2, 3, and 4). Although Camp Edwards is significantly larger than Beebe Woods (15,000 acres) and supports a greater diversity of habitats, these confirmed species lists, along with the bird species list from Dr. Neill, provide a reasonable starting point for any discussion of the wildlife that may be found in Falmouth's larger woodlands.

Habitat isolation and fragmentation seriously threaten the maintenance of healthy wildlife populations on the moraine. Since Beebe Woods was given to the town, it has been increasingly surrounded by houses and altered landscapes inhospitable to or of limited value to wildlife. As a major part of a greenbelt that runs along the moraine roughly parallel to Buzzards Bay, Beebe Woods not only provides habitat for resident animals but also may play a role in the movement of wildlife among patches of open space. Protecting the forests and wetlands of Beebe Woods and also taking steps to protect wildlife corridors will help to maintain healthy ecosystems and wildlife populations both in Beebe Woods and in surrounding areas.

While wildlife habitat of Beebe Woods is protected from direct alteration due to development, its protected status does not insulate the Woods from changes in vegetation or other habitat characteristics essential to maintaining healthy wildlife populations. Seemingly natural changes in any plant community or habitat include those caused by ecological succession, invasion by exotic plant species, over-browsing, insect infestation, disease, indirect effects of adjacent development, severe weather, over-population, and wildfire. In addition, whether, how, and for what purpose the Woods is "managed" in the future may have profound implications for its ability to support wildlife. Even if management of vegetation is limited to "allowing nature to take its course," Beebe Woods will change and wildlife populations will respond in accordance with the specific requirements of each individual species.

The effects of specific variables on wildlife populations in Beebe Woods have not been formally studied. For one variable, disease, Mark Patton, Director of Falmouth Department of Natural Resources, notes that despite a recent drop in mammal populations due to a series of diseases (distemper, rabies, and sarcoptic mange), there is no real concern over the reduced numbers. They have always rebounded. In addition, although the deed to Beebe Woods prohibits hunting, the BWMT is not aware of any evidence that white-tailed deer have over-browsed the Woods; nor do they appear to be a serious nuisance as is often the case in suburban communities. Finally, although some residents consider Falmouth's coyote population a nuisance (based on letters to the *Falmouth Enterprise* and complaints to DNR), intervention by the Town has been limited to dealing with individual animals that pose an immediate threat to human health or safety.

How off-leash dog-walking affects wildlife in Beebe Woods has not been studied or documented. However, common sense and studies of the impact of off-leash dog-walking at other sites (e.g., Miller et al. 2001) prompt the conclusion that off-leash dogs at least occasionally negatively impact wildlife. Even if dogs do not actively chase, capture, or injure other animals, their presence may disrupt feeding, breeding, or other behavior as wildlife scramble to avoid encounters with dogs. Some animals, particularly those that consider dogs predators or competitors, may avoid altogether hiking trails and the adjacent corridors through which dogs frequently roam. Finally, dog-wildlife disease transmission may occur through dog-wildlife encounters or through contact with another animal's feces. These problems are likely exacerbated by the fact that off-leash dog walking allows dogs to wander farther and interact more frequently with wild animals than they might if they were leashed. Indeed, protection of wildlife is one of several reasons that The National Park Service, the U.S. Fish and Wildlife Service, and other conservation-oriented organizations restrict dogs to designated areas or ban them altogether (The National Park Service 1999, Eastern Massachusetts National Wildlife Refuge Complex 2005). While the BWMT does not recommend banning dog-walking nor restricting dogs entirely to leashes at this time (Section 6.0), the Team recognizes that this activity is not without cost to the resource.

Similarly, the impact of domestic cats on wildlife in Beebe Woods is unknown. In general, however, free-ranging and feral cats are known to negatively impact wildlife (Coleman et al. 1997). Wildlife in Beebe Woods may be particularly vulnerable to impacts from cats because development not only surrounds the Woods but reaches deep into the Woods' interior. This "edge effect" allows cats that roam the suburban-woodland boundary to access areas

that might have otherwise provided a refuge for prey species. In addition, feral and free-ranging cats can transmit diseases, including rabies, to wildlife, pets, and humans. If a population of feral cats became established in Beebe Woods, the cats might pose a risk to the safety of the people and pets that enjoy this popular dog-walking area. Although domestic cats do not appear to pose a threat to the wildlife or users of Beebe Woods at this time, managers of the Woods should be aware of this concern.

The BWMT is not prepared to identify specific goals or recommend major changes in the management of Beebe Woods for the purposes of promoting or controlling wildlife populations. The current practice of largely “allowing nature to take its course” seems to work well for most users, and the BWMT is not aware of any major complaints from the community that would suggest an alternate approach is needed. However, the BWMT believes that a more thorough evaluation of the wildlife habitat in Beebe Woods and perhaps monitoring of selected wildlife species, preferably as part of a Town-wide plan, would be valuable if and when the Town hires a full-time conservation land manager. Meanwhile, an analysis of the potential impacts to wildlife should accompany any proposal that would significantly modify, in whole or in part, the existing practice of passive forest management.

### 3.6.2 RARE ANIMAL SPECIES

A New England rare animal, the eastern box turtle, *Terrapene carolina*, occurs in Beebe Woods. The eastern box turtle is protected as a “species of special concern” by the Massachusetts Endangered Species Act. Eastern box turtles have been observed by members of the BWMT and reported by visitors to Beebe Woods (E. Gladfelter, pers. obs., 2003), and box turtles have been documented over much of the Upper Cape. Potential threats to box turtles in Beebe Woods include being collected by visitors, injured or harassed by dogs, cats, or natural predators, and killed by wildland fire. The long-term viability of eastern box turtles in Beebe Woods may also be threatened by the loss of individuals that wander onto adjacent roads and into developed areas and are then killed by cars.

The New England cottontail, although not currently protected by state or federal law, is considered rare (T. Simmons, Massachusetts Natural Heritage and Endangered Species Program, pers. comm.). It is known to occur on the Upper Cape and has been sighted in Beebe Woods environs (M. Conte, pers. obs.). The New England cottontail prefers dense thickets and shrublands rather than the pastures and fields preferred by its more adaptable cousin, the eastern cottontail. However, if this species were to receive state or federal protection, its potential presence on Town-owned lands could have major implications for the management of wildland fire, off-leash dog walking, or other activity that might alter its habitat or disturb individual animals.

One other animal of note, although not rare in a regional (eastern Massachusetts) context, is the fisher, *Martes pennanti*. The fisher, which is a large weasel, had been considered extirpated from Cape Cod for many years. However, during the last decade, there have been unconfirmed but reliable sightings of the animal on the Upper Cape; the 1999 management plan for Peterson Farm even mentions “a recent sighting of a fisher in the Cumloden area,” a wooded residential area near Beebe Woods. In November 2005, a dead fisher was found in Sandwich, and more recently, another dead fisher was found in Chatham. These sightings suggest that the fisher has re-colonized Cape Cod; and while this species is generally considered an animal of the deep woods, its presence suggests that it may be adapting to life in a more suburban environment. Whether the fisher truly has a future on an increasingly suburbanized Cape Cod is unknown; but if it does, one might reasonably expect to find them in Beebe Woods in the foreseeable future, if they are not already there.

#### Recommendations for Wildlife:

1. Be proactive in preserving parcels adjacent to Beebe Woods and parcels that link Beebe Woods to other conservation lands along the Buzzards Bay moraine and coastline. Purchase undeveloped parcels or obtain conservation restriction of undeveloped or partially developed parcels.
2. Ensure that any proposal for major change in the Woods includes an analysis of the potential impacts on wildlife.
3. Consider conducting a more detailed wildlife habitat analysis and monitoring program when a full-time conservation land manager is hired. Enlisting a professional wildlife consultant may be advisable.

Special attention should be given to habitats that support or are capable of supporting threatened and rare species.

4. Monitor wildlife as possible. Train land stewards to recognize and report signs of wildlife such as scat, tracks, browsed vegetation, den sites, and burrows. Give special attention to the box turtle, New England cottontail, and fisher, and to habitats likely to support rare species.
5. Note on kiosks that dogs can negatively impact wildlife and encourage dog walkers to keep their dogs under control. Encourage Beebe Woods users to inform the Animal Control Officer of significant wildlife/dog incidents they observe.
6. Ask land stewards and other regular users of the Woods to report sightings or signs of domestic cats. Encourage owners of abutting properties to keep their cats indoors or confined to their own property.

## **4.0 ANTHROPOGENIC FEATURES**

Beebe Woods reflects varied human influence. The most used anthropogenic feature of Beebe Woods today is the carriage road network throughout Beebe Woods, created under the direction of the Beebe family. These roads were built to be wide enough to accommodate a horse drawn carriage. Vegetation was cleared; grades made comfortable. Cut and fill smoothed the surface, sometimes with rock reinforcement along drop-offs. Today, vegetation has reclaimed the edges of these roads, in some case significantly so, and although erosion is minimized by their construction quality, erosion is a problem in some areas (see sections on Erosion and Trails). Additionally, many narrow paths have been created by human foot traffic.

### **4.1 TRAILS**

Between the carriage paths that were originally constructed and maintained by the Beebe family and numerous footpaths, Beebe Woods has an extensive system of trails reaching into every sector of the Woods (Appendix C, Figure 2). Some trails that lead off the Town-owned portion of the Woods onto private property have been truncated as these surrounding properties have been developed. However, because the trail layout has many loops and connections one can still travel many miles and remain in the Woods (and even farther if one crosses over to the adjoining Peterson Farm). With the exception of a few footpaths providing access to surrounding residences, the network of trails and paths was in place prior to Town ownership of the Woods. In the past thirty years, the Town has initiated no new trails and provided only minimal trail maintenance.

#### **4.1.1 Inventory of Trails**

An inventory of the existing trails setting out width (foot paths vis a vis carriage paths), length, type of terrain, distance, condition etc. might be expected in this plan, but it is made difficult by a lack of trail names. On the excellent map of Beebe Woods and Peterson Farm published by The 300 Committee only two trails are named, the 0.3 mile Esker Trail, named for the type of surficial geological formation which it traverses, and the 0.5 mile Red Dot Trail which is marked with a single red blaze. One can, however, estimate from aerial photography the total miles of mapped trails and categorize them as carriage or foot trails. The calculation is that within the boundaries of Beebe Woods, there are 3.8 miles of former carriage paths and another 2.7 miles of foot trails. Trail elevations range from 10 ft. above sea level at the edge of Miles Pond to greater than 150ft above sea level along the Esker Trail. There are approximately 35 trail intersections.

The topographical map showing trails and other land and water features is attached to this plan and serves as a visual inventory of the Beebe Woods trails.

#### **4.1.2 Directional Signage – Naming and/or Blazing Trails**

The BWMT survey of Woods' users reveals that more than 1/3 of respondents felt they had a high or medium risk of getting lost in Beebe Woods. In addition, 50% of respondents supported better availability of maps. Leaders of group walks in Beebe Woods report that participants often remark that they find the trails confusing and that they appreciate being led. These responses suggest that more directional signs, color blazing of trails and/or

posting trails names, and adding the names to a map could make the Woods more accessible to those who find the existing nexus of trails confusing.

Currently there are 10 useful directional signs within Beebe Woods; all are along the former carriage trails (Appendix E). Eight of them were designed, built and installed as an Eagle Scout project in c.2000. They are sturdy and handsome and provide distances as well as arrows to various destinations. The two other smaller directional signs are of unknown origin. The Eagle Scout chose his sign locations well; they are at major trail intersections. An important omission is that there are no signs pointing out the linkages to Peterson Farm.

One downside of more signs and blazes is that the multiplicity of signs and markings could detract from the natural experience of being in the Woods. More than 90% of survey respondents said they thought Beebe Woods management should focus on maintaining healthy woods, not park-like improvements. Therefore, we recommend that blazing and signage be kept to the minimum required to adequately identify trails. Should Woods' users have a chance to explore and/or even get "lost" without being overly "supervised?"

More signage, including identifying the narrower footpaths, may encourage users to become familiar with the less frequented areas of the Woods. The downside is that these trails tend to have steep and stony sections, and additional foot traffic is likely to exacerbate erosion. Similarly the vernal pools, wetlands and cedar swamp of Beebe Woods have been protected by their "hidden" location, removed from the main pathways. Increased public access might require more active management such as signs and fencing to discourage overburdening these environmentally sensitive resources.

Beebe Woods has had years of use with almost no signage. The many comments, "Beebe Woods is fine the way it is. Don't change it," which were attached to our survey cannot be easily dismissed. On the other hand, perhaps the Woods should be made somewhat more welcoming and safer to more residents and visitors with less familiarity with the area.

#### **Recommendations for Directional Signage:**

1. Install two additional directional signs, one along the trail to Miles Pond and one at Miles Pond, identifying linkages to Peterson Farm.
2. Seek further public input in regard to trail names, blazes and signs before deciding whether to proceed with a broader program of increased signage. If blazing is to be implemented, it should be done according to established protocols, e.g., the Appalachian Mountain Club standards.
3. Coordination with Peterson Farm management is essential so that there will be a coordinated approach for trail naming and blazing.
4. Have trail maps available for distribution at kiosks at the Ter Heun Drive and Highfield access points as well as larger trail maps displayed on the kiosks.

#### **4.1.3 Trail Maintenance**

The carriage trails in Beebe Woods are a historical element that differentiates Beebe Woods from Falmouth's other open spaces. Maintaining these trails needs to be a priority for Beebe Woods management. Without a regular maintenance program, the carriage paths will gradually become single-track trails or even disappear.

The current condition of the carriage trail leading to Miles Pond exemplifies the need for maintenance. Vegetation has narrowed the trail so that even a single walker has to be alert not to be swiped by an errant branch. While a fallen tree lying across a path may not hamper a walker, it would certainly be an obstacle to access by an emergency vehicle. Indeed the encroachment of the forest on each side of the paths may already make such access impossible or impractical.

A second management issue is the condition of the carriage path surface. Over time, (see section on erosion) small boulders and cobbles have become more prominent on the sloping sections of the carriage trails.



Those who use Beebe Woods for cross country skiing are most aware of these boulders. The rougher the surfaces, the more removed the paths become from their historic function as carriage trails. Rough surfaces may discourage senior strollers or be more likely to trip up joggers. A few respondents to our survey have recommended making Beebe Woods accessible to the disabled. A relatively smooth trail surface would be essential for access.

**Recommendations for Trail Maintenance:**

1. At a minimum, vegetation along the carriage trails should be cut back to a trail width sufficient to allow for side-by-side walking, and fallen trees should be promptly removed if blocking the trail. For both aesthetic reasons and in order not to add to fire fuel loads, the slash created by such cutting either needs to be chipped or removed off-site.
2. Survey the surface conditions of the carriage trails and determine the feasibility of reducing rough surfaces.
3. Maintain single-track trails by clipping back and removing vegetation as needed.
4. Use established erosion-reduction methods such as those employed by trail maintenance groups like the AMC to divert water and foot-traffic erosion where needed.
5. Maintain carriage trails with sufficient width and grade to facilitate fire-fighting capability.

**4.1.4 Additional Trails**

Study of the map of the existing Beebe Woods trail system reveals minimal need for additional trails. As noted above, every sector of the Woods is accessible. Also, it may be beneficial to wildlife to leave areas of the Woods undisturbed. Exceptions to this general observation are as follows:

**Recommendations for Additional Trails:**

1. Extending the trail behind the Greengate development to the Town-owned Depot Avenue parking lot would allow users of Beebe Woods to access the west side of the Woods without parking on private property. The terrain slopes upward into the Woods, so such a short link would have to be carefully laid out to minimize erosion.
2. After a parking and access plan in the area of Highfield Hall and the Conservatory is completed, a new trail may need to be cut to link the parking area with the existing trail system.
3. On the western side of the Woods one trail ends at Haynes Avenue and then less than 200 ft to the northeast another trail leads into the Woods. Haynes Avenue is a private road. Linking these two trails within the Beebe Woods boundary would be reasonable.

**4.1.5 Abandoning Trails**

The Beebe Woods trail system may be extensive, but in our deliberations no one has suggested that it is too extensive. One identified problem area is around the Deep Pond, where the trails down and across the steep slopes are causing erosion. As discussed in the plan section on erosion, portions of these trails may have to be abandoned or moved as part of an engineered plan to reduce erosion. Also, a short stretch of the trail that circumnavigates the Deep Pond is on private property and crosses a wetland bordering the south end of the pond. This portion of the trail is seldom used, in part because it is often wet. This trail on private property may be a candidate for abandonment, or the private property may be acquired for Beebe Woods and the trail upgraded.

The stretch of old carriage trail that leads onto Cape Cod Healthcare property behind JML Care Center and Heritage Assisted Living is in danger of being abandoned by lack of use and maintenance. Similarly the trail leading to the new Falmouth Academy playing field is threatened as it becomes even more of a dead-end. (It formerly was part of a loop that went through the woods where Heritage Assisted Living is now located.)

**Recommendations for Abandoning Trails:**

1. Work with Cape Cod Healthcare and Falmouth Academy to keep access trails open. Such trails allow more people (e.g. healthcare workers, students, and teachers) to use the Woods without driving to an access point. They also potentially provide options for fire-fighting access.
2. As the Falmouth population continues to grow, open space diminishes, and more users come to Beebe Woods, the need to realign or move trails in vulnerable areas such as down steep slopes or adjacent to wetlands may become apparent.

**4.1.6 Access for the Physically Challenged**

Our survey resulted in some support for making a handicapped accessible trail. Another idea is for a Braille trail. We recommend that those responsible for stewardship of Beebe Woods be open to working with any group or person that has the expertise and specific interest to create such amenities. One of the advantages of the existing parking at the Cape Cod Conservatory is that it provides relatively level access into the Woods. Such access might be more problematic when the parking and entrance are moved. A location accessible from Heritage Assisted Living and the JML Care Center might be suggested by those institutions.

**Recommendation for Access for the Physically Challenged:**

1. Be receptive to qualified assistance in developing access for the physically challenged. Those planning a new access point in the Highfield area should keep the needs of the disabled in mind.

**4.1.7 Linkage to Other Parcels**

Given its size and location near downtown Falmouth and its proximity to the Shining Sea Bike Path and other conservation and recreation areas, Beebe Woods can serve as the cornerstone for more extensive, mostly off-road hiking possibilities.

For instance, a long walk might begin at the Highfield/Conservatory parking area, proceed along paths through the Woods onto and through Falmouth Academy land down to the Bike Path and along the Bike Path all the way to Oyster Pond Road; along Oyster Pond Road to Fells Road and, passing Spohr Garden, to the path along the Zinn Conservation parcel to Ransom Road and up to Woods Hole Road, which must be crossed with extreme caution. Except for a fairly short stretch of Woods Hole Road before McCallum Drive, there is a wide grassy shoulder to walk on the west side of Woods Hole Road. At McCallum Drive is the main entrance to Peterson Farm and the trail network through the Farm into Beebe Woods and back to the Conservatory. With stops to look out over Vineyard Sound, enjoy the beauty of Spohr Garden and observe the unexpected sheep farm operation at Peterson Farm, this hike can fill a full and wonderful morning or afternoon.

It is also possible to reach Goodwill Park via Palmer Avenue fairly easily from the Beebe Woods paths that extend to Ter Heun Drive and the Bike Path, again requiring extreme caution crossing Palmer Avenue. Goodwill Park gives access to the mapped and blazed Moraine Trail that allows off-road hiking all the way to Route 151 in North Falmouth.

That such long walks, mainly in the quiet of the woods and open areas, are still possible in Falmouth today is worth celebrating.

**Recommendations for Linkages to Other Parcels:**

1. Look for opportunities to enhance linkages between Beebe Woods and other open spaces.
2. Seek permission from Falmouth Academy for traversing its land to the bike path. This may not be necessary if the recommended path is created from the Depot Avenue parking lot up to Highfield.
3. Support safe crossings from Bike Path across Palmer Avenue to Goodwill Park and across Woods Hole Road from Ransom Road.

4. Support extending a sidewalk or pathway along Woods Hole Road from McCallum Drive to Ransom Road.

## **4.2 ACCESS AND PARKING**

### **4.2.1 Cape Cod Conservatory and Highfield Drive**

The Cape Cod Conservatory, Highfield Theatre parking lot currently serves as the primary access to Beebe Woods for those who arrive by car. From the northwest corner of the lot, a carriage path leads past a large boulder engraved with “Beebe Woods” and gate into Beebe Woods. What most users do not realize is that boundary for Town ownership does not begin for almost three hundred feet from the edge of the parking lot. The Cape Cod Conservatory owns the entrance; Woods users are allowed to park as a courtesy of the Conservatory.

This arrangement, which was satisfactory for many years, has become strained. The Cape Cod Conservatory offers more programs and is much busier than ten years ago. The size of the lot is already inadequate for Highfield Theatre. During matinees there is no room for Woods parking. The demand for parking will only increase when a restored Highfield Hall brings more visitors to the hill looking for parking. A heavy dog presence has exacerbated the situation with loose dogs defecating on Conservatory plantings, frightening children arriving for nursery school and arts classes and endangering themselves in the parking lot traffic.

The Town, Historic Highfield, the Cape Cod Conservatory and other institutions served by Highfield Drive are working on a plan to upgrade Highfield Drive and create more parking for the multiple users of the former Beebe property. In all likelihood the existing parking and probably the entrance to Beebe Woods will be relocated, but as of this writing there is no consensus proposal. Because the parking and traffic flow issues are complex and involve private entities as well as several Town departments, the Assistant Town Administrator has assumed responsibility for representing the Town in discussions this issue. Although an additional parking area for Highfield Hall was under construction when this plan was nearing completion, discussion of outstanding issues, including parking for Beebe Woods users, was ongoing.

The BWMT believes that it is important to maintain a Highfield entrance to Beebe Woods. Beebe Woods, the Theatre, Highfield Hall and to a lesser extent the Conservatory have a shared history; Historic Highfield may be interested in giving Woods users the opportunity to know more of its history.

Other advantages of a Highfield access are close proximity to the bicycle path and Falmouth Center and a feeling of safety because of the extent of other activity at the site. A third positive attribute specific to the present access is that the entrance is relatively flat and provides an easy stroll into Beebe Woods. Users of varying degrees of fitness are accommodated. This last advantage may be hard to replicate at a different location on Highfield Hill, but it would be desirable.

Peak demand for Beebe Woods parking is probably on Saturday mornings and when there are guided walks or other special events. Continuing the tradition of shared parking could be practical for these peak times, but 25 to 30 spaces should be regularly available for Beebe Woods parking. These spaces could in turn be available for evening events at the other institutions on the hill. However, any parking developed within the conservation property gifted to the town by Mr. Lilly must be for the exclusive use of the visitors to the Woods per the deed and cannot be developed with the intent of it also serving abutting property.

Given the current relatively high level of public use, it would be hard to describe Beebe Woods as a well-kept secret, but for the uninitiated, neither the Conservatory nor Ter Heun Drive (see below) access is easily found. There are not off-premises signs providing direction and neither access is off a well-traveled public way. Since Beebe Woods was given by the Lilly deed “for the good and benefit of all the citizens of the Town of Falmouth,” it would seem desirable to use appropriate signage to provide assistance in locating parking and access.

**Recommendations for Highfield Parking**

1. Support the ongoing effort between Historic Highfield, the Cape Cod Conservatory and the Town to create a new Highfield access to Beebe Woods that avoids the conflicts of the present parking location and access while to the extent feasible maintaining the positive aspects.
2. Add a sign for Beebe Woods to the existing compound ladder sign at the corner of Depot Avenue and Route 28.
3. Include an informational kiosk, mutt-mitt dispenser and trash receptacle in plans for the relocated Highfield Hall access.

**4.2.2 Ter Heun Drive Access**

Ter Heun Drive also offers parking and access to Beebe Woods. There is a small, unpaved lot that with careful parking can accommodate 8 to 10 cars. It is located on the south side of Ter Heun Drive 900 ft past the entrance to the Gosnold Treatment Center. A footpath from the rear of the lot leads down a short slope to a carriage trail. An inscribed boulder, similar to the one at the Conservatory, marks the entrance, but it blends well into the surrounding landscape so that the entrance is easy to miss.

Utilization of the Ter Heun Drive parking lot and access is low compared to that at Highfield. Only 12% of the 300 respondents to our survey reported that they ever use this lot compared to more than 70% who use Highfield. The current condition of the Ter Heun lot is unwelcoming. It has no surface treatment and can be muddy. There is a large depression at the entrance that forms a large puddle after rain. As noted, the entrance boulder is handsome but unobtrusive, and there are no directional signs. The relative isolation of the lot encourages dumping and littering. (Currently, a conscientious neighbor who cleans up the trash on a fairly regular basis eases this situation.) The narrow path connecting the lot to the nearby carriage path is not well marked and could be hard for some users to negotiate. The alternative of walking along Ter Heun Drive to the carriage trail entrance is not attractive as there is no shoulder or sidewalk. Another explanation for low utilization could be that one must negotiate through the busy Ter Heun Drive/Route 28 intersection and Hospital traffic to reach this access. However, for those driving from North, West or East Falmouth, it is actually easier to reach than Highfield.

Greater utilization of the Ter Heun Drive access would relieve some of the pressure on the Highfield parking and also disperse users into the less visited northeast sector of Beebe Woods. People are creatures of habit, but directional signs and an effort to make the Ter Heun lot more inviting might be successful. Potentially the Ter Heun access is easier to find and reach than that at Highfield. Any amount of increased traffic along Ter Heun Drive generated by Woods users would be insignificant compared to that generated by the healthcare facilities. If the current effort to relocate the Beebe Woods users' parking at Highfield were unsuccessful, limited expansion of the Ter Heun Drive lot would be a feasible alternative.

**Recommendations for Ter Heun Drive Access**

1. Erect a sign and an informational kiosk to include map and information about Beebe Woods.
2. Install a trash bin and have dog mitts available as at Highfield with regular re-supply and collection.
3. Regrade and enlarge, if possible, the parking lot. Spread gravel, chips or other appropriate materials to reduce muddiness and improve appearance.
4. Thin vegetation along parking lot frontage. This should increase visibility and safety and could deter illegal dumping.
5. Widen the link trail and identify it at the parking lot.
6. Install directional sign(s) along Ter Heun Drive; e.g. "Beebe Woods Parking on left 1000 ft."

#### **4.2.3 Neighborhood and Individual Points of Access**

Those living near or adjacent to Beebe Woods have access without the need for parking and driving. Neighborhood paths lead into Beebe Woods from Haynes and Standish Avenues in Sippewissett, from the Sippewissett Highlands development and from Greengate. These are supplemented by paths from individual lots, which link into the network of Beebe Woods trails.

The benefits of these multiple access points are that they allow use of Beebe Woods without driving and parking and they allow abutters “to keep an eye” on Beebe Woods. A negative attribute is that the sheer number of paths can confuse users who may unexpectedly end up in someone’s back yard.

There is currently no oversight of their creation or maintenance, but our observation is that these access trails are generally narrow and appear to have minimal impact on the ground or vegetation.

##### **Recommendations for Private Access Paths:**

1. Inventory neighborhood and private access paths on an annual or other regular basis. Contact abutters if path maintenance is seen as detrimental or other problems are observed.
2. Consider obtaining easements from bordering neighborhoods to ensure continued access for pedestrians to enter paths leading from private ways.

#### **4.2.4 Additional Access from West Side (Sippewissett):**

Beebe Woods lacks public access from its western side, Sippewissett. Neighborhood access exists as described above, but each access is either off a private road or through private land, and there is no parking. A carriage trail along the northern shore of Miles Pond at one time was used for access from Sippewissett Road, but rights to use it were unclear; and when a house was built on the property, the owners closed the access. Although there is currently no obvious site for a west side access, the idea should not be abandoned. A Sippewissett access would allow users from Woods Hole, Quissett and West and North Falmouth to enter Beebe Woods without negotiating the greater traffic congestion on the east side of Beebe Woods.

##### **Recommendation for Sippewissett Access:**

1. Future managers should be vigilant for an opportunity to acquire an access point with parking on the Sippewissett side of Beebe Woods.

#### **4.2.5 Other Anthropogenic Features**

Stonewalls are numerous in Beebe Woods. These walls likely divided Beebe Woods into grazing areas and reflect heavy human labor (Appendix F). Similar walls are common throughout Falmouth, particularly in morainal areas.

Stone markers, many of them numbered, are found along carriage roads and paths, mostly south of Upland and Dearborn Avenues over to northwest edge of Two Ponds. Their original use is unclear but it is assumed the Beebe family added them. Most but not all (67, 68, 74) are marked on the 300 Committee Beebe Woods/Peterson Farm map.

Cape Cod has many rocks that bear signs of stone quarrying by hand. Small round holes, usually in a row, show early methods of obtaining building rock. In Beebe Woods, George’s Rock has rows of such holes reflecting the stubbornness of both rock and human. Similar rocks also are seen along some carriage paths.

Various cultivated plants grow in Beebe Woods. Many of them may have been planted by the Beebe family, which had a great interest in horticulture. Others may be escaped ornamentals. Some are also invasive (Section 7.4)

North of the #50 stone marker, barely visible from the trail, may be the remains of a sheep pen. The toppled rock walls indicate three sides of a rectangle; the fourth side is a steep upward slope.

A few isolated illegal campsites may still be found today in less visited areas of Beebe Woods. Sites with fire pits are a clear danger in Beebe Woods.

Trash in Beebe Woods is only a minor concern. Most woods users are careful of trash, and many carry out trash that they find. The exception is the Ter Heun Drive parking lot, but this problem appears to be caused by dumping, not by Beebe Woods' users. Fire risk, however, is indicated by an occasional cigarette butt and by remains of bottle rockets. There are also occasional brush piles in Beebe Woods.

**Recommendations for Other Anthropogenic Features:**

1. Discourage and dismantle any illegal campsites in Beebe Woods in order to prevent wildfire.

## **5.0 RECREATION**

Miles of shaded carriage and single track trails, access to two ponds, the interestingly variable terrain and vegetation, the sense of being well removed from traffic and other "hassles" of a more urbanized Falmouth have combined to make Beebe Woods a well-used recreation destination. While some conflicts may exist between different users, the Lilly deed of trust prohibited the most potentially controversial uses, e.g. hunting, motorized vehicles, camping, and fire. In the 30 years of Town ownership the varied recreational uses have coexisted in relative harmony. There has been no significant public outcry for the creation of "rules and regulations."

That being said, the charge of the BWMT is to assess whether the status quo of minimal management is sufficient for the future of Beebe Woods and the ongoing enjoyment and safety of its users. Responding to that charge, the paragraphs that follow assess these current uses and their impact on Beebe Woods and suggest management initiatives to enhance or expand the user experience, as well as those necessary to protect natural resources or public safety.

### **5.1 WALKING, JOGGING, RUNNING, AND HIKING**

The BWMT's survey confirmed years of observation by BWMT members that walking is the most popular use of Beebe Woods. Of the 296 respondents to the survey, 264 (89%) checked off that they use Beebe Woods for walking. Dogs, a majority unleashed, accompany many of the walkers. While the survey did not differentiate the activities of jogging and hiking, 54 respondents checked off running.

Trails such as the Esker and the Red Dot and those on the northwest side of Beebe Woods are single track with some steep sections and offer more of a hiking experience than the wider and well graded carriage trails.

If the extensive trail system of Beebe Woods is to continue to serve users well and be an attractive complement to the natural woodland environment, a regular program of trail maintenance will be essential. Trail maintenance is addressed in Section 4.1

### **5.2 CROSS COUNTRY SKIING AND SNOW SHOEING**

When snow conditions are right which in Falmouth may vary from one or two days to two or three weeks per winter, cross country skiers head to Beebe Woods. The gentle slopes and curves of the carriage trails are ideal terrain, and the forest blocks the coldest winds and shades the track from the melting sun. About 15% (43) of our survey respondents checked that they use Beebe Woods for skiing.

While there was no specific survey question for snowshoers, the same attributes that attract skiers attract them. After any significant snowfall, snowshoes tracks break out along the carriage trails. Once the trails are broken out walkers and dogs soon follow. This can be disappointing to cross country skiers as walkers tend to obliterate the ski track, but this conflict is not a key management concern. Perhaps information posted on a kiosk or in a pamphlet could encourage walkers to stay to the side of the trail, when conditions are good for skiing.

The issues raised regarding carriage trail surface (Section 4.1) especially applies to skiing. It takes a greater depth of snow to provide adequate snow coverage than it did 10, 20 or 30 years ago. Avoiding rocks has increased the challenge of Beebe Woods skiing and at least somewhat reduced the enjoyment. Boulder removal or other surface restoration of the carriage trails would be of benefit to skiers as well as walkers, joggers, and bicyclists.

### **5.3 SKATING**

While there have been periods of extended frigid weather in recent years, opportunities in Falmouth for pond skating as for cross-country skiing are infrequent. The isolation of the Deep Pond in the middle of Beebe Woods makes it less attractive to skaters, and our observation is that very few skaters use it. Miles Pond is a popular place for skating, but its access and use do not involve the Beebe Woods access point. Skaters arrive from Sippewissett Road or McCallum Drive, and only a few of them even venture toward the Beebe Woods side of the pond that tends to freeze last.

Skating on natural ice on a pond of more than a few feet in depth raises safety concerns that are broader than the management of Beebe Woods. These concerns are magnified when someone chooses to skate on a pond such as Deep Pond where help could not readily be summoned in an emergency.

#### **Recommendations for Skating:**

1. Include in kiosk information a warning that skating is potentially dangerous and is at one's own risk.

### **5.4 CYCLING**

An Internet search on Google for "Beebe Woods" + mountain + bike as of February 2006 produced 62 results. While some of these are repetitive, the number is an indication that Beebe Woods is considered a mountain biking destination. If one delves into the details, it appears that Beebe Woods carriage trails are considered easy terrain, and they are particularly recommended for beginning bikers. That observation conforms to one of Ted Rowan, a former member of the Falmouth Bikeways Committee, that Beebe Woods bikers are generally families or small groups. It has not been a site for club rides. Comments attached to our survey indicate some users have had a negative experience with cyclists on the trails, but the numbers of cyclists are relatively small. Only 27 respondents to our survey checked that they use Beebe Woods for biking.

Depending on the terrain, however, even limited numbers of cyclists can have significant impacts. Churning tires disturb the ground much more than multiple footsteps. Damp earth can be turned into a muddy "quagmire" and a gully can form on a steep bank. One regular hiker observed a mossy, lichen filled hollow in a boulder completely destroyed by cyclists "hopping" over the boulder.

#### **Recommendation for Cycling:**

1. If negative impact from mountain biking increases, it may be necessary to prohibit bicycles on the most vulnerable trails. In addition, to help lessen conflicts between other users and cyclists it may be desirable to remind riders to look out for and yield to pedestrians.

### **5.5 HORSEBACK RIDING**

The tradition of horses on the carriage trails continues, but unlike in the days of the Beebe family, equestrian use is no longer common. Small groups of riders from Field Crest Farm (corner of Sippewissett Road and Palmer Avenue) make use of the carriage trails on an irregular basis (probably no more than once or twice a week).

A few respondents to our survey commented that horses on the trails pose a risk to walkers, but no specific incidents were reported. Others have said that it is silly to worry about cleaning up dog waste when horse droppings are on the paths.

Times have changed; walkers and their dogs are the primary users of Beebe Woods, but the conflicts seem insufficient to consider barring horses from Beebe Woods. Other more “gentle” management options are proposed at this time.

**Recommendations for Horseback Riding:**

1. Post on kiosks to whom to report any negative encounters in Beebe Woods, including with horses.
2. Contact Field Crest Farm regarding horse waste. Consider a clean-up by riders as necessary.

**5.6 SWIMMING**

Both Miles Pond and the Deep Pond attract swimmers. Few swimmers in Miles Pond would enter the water through the Beebe Woods landing as access from Sippewissett Road and McCallum Drive is more convenient. Twenty respondents to our survey checked that they use Beebe Woods for swimming; our assumption is that these swimmers were referring to the Deep Pond. Swimming at either location is unsupervised and at one’s own risk. Dogs also take advantage of these ponds to frolic, retrieve and cool off.

At least some of the swimmers at Deep Pond take advantage of the trees and ropes to swing over the water and drop into the pond. They, plus the spectators who clamber up and down on the bank above, have created a serious erosion problem (see Section 9.0). Weighing the joy of swinging and dropping versus the resulting erosion and possible liability issues if the management plan were to advocate maintaining the swinging tree, our committee favors discouraging the use of the swinging tree.

Another BWMT concern is water quality, particularly in Miles Pond, that is subject to road runoff and an increasing number of septic systems in the watershed. The waters at Falmouth’s beaches and some of its swimming ponds are tested regularly. The BWMT believes Miles Pond should be tested to see if it should be added to the regular program.

**Recommendation for Swimming:**

1. Include in kiosk information a reminder that swimmers do so at their own risk.

**5.7 FISHING**

Serious fishermen do not use Deep Pond, but young fishermen (and parents) have fun putting bait on a hook or using a net to pull up catfish. The only management concern is that fishing line or nets not be left along the shore or in water where they could ensnare wildlife. Fishing access to Miles Pond, which offers a more diverse fishery, generally occurs outside of Beebe Woods.

**5.8 BOATING**

Deep Pond’s small size and fragile shoreline make it unsuitable for mooring or storing boats. In the fall of 2005 and 2006 a canoe was seen in the shoreline vegetation, padlocked or tied to a tree or bushes at Deep Pond. Apparently it was left there by its owner for future use. This was an unusual siting. Portaging a canoe or even a small lightweight kayak to Deep Pond is not easily done. As for fishing, ice skating and swimming, boating access to Miles Pond is not convenient or desirable from Beebe Woods. If there were sufficient demand for boaters to land at the Beebe Woods Miles Pond access, it could be desirable to install some stakes for tie up so that pond edge vegetation would not be used.

**Recommendation for Boating:**

1. On an individual basis, inform owners of boats/canoes stored on the shoreline of Deep Pond that this storage is not appropriate due to erosion concerns.



## 5.9 NATURE STUDY

Beyond the enjoyment of being in a natural setting which is an attraction for all users, Beebe Woods is also used for more active nature study. Classes from Mullen Hall School, the Children's School of Science, and Falmouth Academy have used Beebe Woods as a natural history resource. The 300 Committee conducts natural history walks and tree identification workshops in Beebe Woods. Beth Schwarzman, author of The Nature of Cape Cod, observes that Falmouth's moraine woods have many more species of trees than woods on the outwash plain, making Beebe Woods an interesting place for tree study.

Being entirely forested, Beebe Woods does not attract the diversity of birds that one can find on adjacent Peterson Farm. Organized bird walks may stray into Beebe Woods, but the fields, thickets and edges of Peterson Farm are more productive for bird watching.

As intensifying development on its borders and greater public use increase pressure on the natural environment of Beebe Woods, it will become ever more desirable to have information on how Beebe Woods' ecosystems change over time. Perhaps students at Falmouth Academy, the closest appropriate institution, or other Falmouth schools could be encouraged to study or monitor certain aspects of Beebe Woods, e.g. water quality in Deep Pond, the spread of invasive species, species dominance and succession.

### Recommendations for Nature Study:

Mr. Lilly entrusted Beebe Woods to Falmouth as a natural park. It would seem fitting that this legacy be nurtured by encouraging appreciation and understanding of Beebe Woods natural history.

1. Include information on the entrance kiosk about the flora, fauna and/or geology of Beebe Woods, a more detailed natural studies brochure, and/or a self-guided nature walk.
2. Any nature study that requires gathering samples, digging, or other disturbance of habitats should require a written proposal submitted to and approved by the Conservation Commission.
3. Ask students and others using Beebe Woods for nature study projects to share their findings with the Conservation Commission.

## 5.10 HAZARDS

### 5.11.1 Ticks

Beebe Woods provides an ideal habitat for both dog ticks (*Rhipicephalus sanguineus* and *Dermacentor variabilis*) and deer ticks (*Ixodes dammini*), the typical vector for Lyme disease. Thus, Woods users are at risk for Lyme and other tick-borne diseases. The risk is greatest in the warmer months, but ticks can be active in every season.

### Recommendations on ticks:

1. Post information and warnings about ticks on kiosks.
2. Keep carriage trails brushed back, as recommended in Section 4.1, in order to reduce the risk of walkers acquiring ticks from brushing adjacent vegetation.

### 5.11.2 Crime/Vagrancy

Our survey shows crime/vagrancy has not been a great concern. The feeling of safety is increased with the large number of dog walkers in Beebe Woods. The Police Department advised the BWMT that crime had not been a significant concern relative to the Woods.

### 5.11.3 Becoming Lost

The fear of getting lost (or perhaps it is fear of getting confused) appears to be a deterrent to some potential Beebe Woods users. See Section 10.2.3 for discussion of improved access to maps and improved signage.

## 6.0 DOG-WALKING IN BEEBE WOODS

The BWMT 2004 survey confirmed informal observations that dog walking is a very popular use of Beebe Woods. Of the 264 respondents to the survey who answered they use Beebe Woods for walking, 182 or 69% checked off “with a dog”, and of those 182 dog walkers 81 responded that they use Beebe Woods daily.

The Beebe Woods Survey asked respondents to rate their level of concern about effects of dogs in regard to dog feces on trails, erosion near ponds, wildlife/nature study, and reduction of quiet contemplation. Dog feces on trails had the highest level of concern and was rated as very or somewhat troubling by a majority (54%) of respondents. The effect of dogs on “wildlife/nature study” was seen as somewhat or very troubling by 27% of all respondents, and erosion caused by dogs near ponds was rated as very or somewhat troubling by 29% of all respondents. This is much lower percentage than the 54% of respondents who in a different section of the survey on environmental issues rated erosion control as a medium or high priority.

### 6.1 Off-Leash Dog Walking

The survey also confirmed that the expansive wooded trails of Beebe Woods are particularly appreciated for off-lead dog walking. Less than 10% of dog walkers replied that they “always” keep their dogs on a leash. Many comments were attached to the surveys by both dog and non-dog owners saying how much having a place to allow dogs to run free is valued and pointing out the advantages of having Beebe Woods be a friendly place for dogs, e.g. having many dog walkers makes the Woods safer. Several non-dog-owners commented how much they enjoy encountering dogs and dog owners in Beebe Woods and the socialization contacts that dogs provide.

The opportunity for off-leash dog walking is so well established in Beebe Woods that many would sorely miss it if the Town of Falmouth leash law were to be enforced. Almost 80% of the dog walkers responded that their use of Beebe Woods would decrease if the leash law were enforced. Except for the issue of dog feces (discussed below) the overwhelming majority of responding dog owners do not believe that dogs create “troubling” management concerns for Beebe Woods.

While there is a strong constituency for keeping Beebe Woods as a place of relative freedom for dogs, a significant minority of survey respondents finds off-leash dogs problematic. Their discomfort with encountering loose dogs means that they use the Beebe Woods less frequently or not at all. Sixty-four (or 56%) non-dog walkers responded that dogs negatively affect their enjoyment of Beebe Woods at least some of the time. Thirty-nine respondents said their use of Beebe Woods would increase if the leash law were enforced. Comments received show particular concern for children. “Dogs off leash scare the kids terribly.” “I can no longer use Beebe Woods since having children.” Particular concerns about dog feces and dogs upsetting children were expressed by management of both the Cape Cod Conservatory and Highfield Hall. At a public meeting held by the BWMT on January 12, 2006 to hear concerns about dog walking pro and con, the voices of those who use Beebe Woods for dog walking were dominant, and their general consensus was that there is no need for significant change to the Town’s laissez-faire policy toward off-leash dogs in Beebe Woods.

It is illegal for dogs to be off-lead anywhere in Falmouth, but one could argue that 30 years of no enforcement is the equivalent of giving dogs and dog walkers prescriptive rights to continue the current practice and that the management plan should reflect this history. An opposite view is that the development of a management plan presents a chance to strike a reasonable balance between the differing interests of those using Beebe Woods, and the plan should incorporate some restraint on unleashed dog walking.

The maximum restraint would be for the plan to ask for the enforcement of Falmouth’s leash law in Beebe Woods. (No one has put forward the most extreme proposal that no dogs be allowed in Beebe Woods.) However, the BWMT does not envision that Falmouth’s limited dog monitoring capacity will be expanding, and recognizes that in Beebe Woods the leash law generally has to be self enforcing.

A middle ground that could reduce conflicts and might be more amenable to self-enforcement would be to adopt a policy of separation by time or space. In the first instance there could be designated days or times of day for off-lead walking. The second would involve segmenting Beebe Woods so that on some trails dogs could be off-lead and on others they would have to be leashed. The two policies could be combined as has been done on certain Trustees of Reservations sites, where there are designated areas for off-leash and leashed dogs, but also days when no dogs are allowed. It should be noted that the Trustees requires Green Dog permits for dog walkers and has rangers on site for enforcement.

The configuration of Beebe Woods with its irregular shape, looping paths, many intersections and two popular pond destinations makes it challenging to decide what would be a fair apportionment of Beebe Woods between off-leash dogs and other users, but it certainly could be done with trails marked accordingly. Since dogs share access with other users such an approach might require that all dogs be leashed until at a designated off-leash trail. Separation by time might be simpler. Odd numbered days could be for off-leash dog walking. On even numbered days all dogs would have to be leashed. There are infinite ways times could be designated, but if the policy is to be self-enforcing simplicity is advantageous.

At the public meeting on January 12, 2006, concerning dogs in Beebe Woods, there appeared to be general support even among the dog-walkers in attendance that dogs should be leashed in and near parking areas and trail heads. Tom Garland, Falmouth's Animal Control Officer, advised that dogs started on a walk on-leash will be calmer when let off-leash.

It should be noted that as this is being written, the Friends of Falmouth Dogs is trying to find a site for a "dog park". This would be a fenced large yard (150' x 150') where dogs could run off-leash. While this would provide an alternate site for those who seek places for letting their dogs run and socialize with other dogs, it would not duplicate the experience of ambling along the trails of Beebe Woods. It would be an addition, not a substitute.

## **6.2 Dog Feces**

Heavy dog use means many opportunities for dogs to defecate in Beebe Woods, and naturally they do. While almost half of the dog walkers responding to the survey claim to always pick up their dog feces, more than half answered seldom or never. With the intense dog use, the result is a lot of dog "poop" along the trails. Teachers have complained that they are reluctant to take children into Beebe Woods as one of them invariably has an encounter with dog feces. Last winter a skier, new to Beebe Woods, was heard to extol the trails but lament the amount of dog poop. As some respondents pointed out, dog feces are particularly problematic near the Cape Cod Conservatory trailhead. The Conservatory is by far the most popular access to Beebe Woods and as one comment pointed out "[most] poop happens in that first 100 yards of path." When unleashed dogs are let out of the car at the Conservatory, they do not know that Beebe Woods is still two hundred feet away. The Conservatory grounds are also subjected to dog defecation.

Some dog walkers feel that the amount of dog waste left in the woods is insignificant or not objectionable and thus did not consider it to be a problem; some belittle those who do. However, as Falmouth has become more urbanized, the idea of cleaning up after one's dog has become more important. Survey responses indicate that many Beebe Woods dog walkers are ready to participate in a culture of cleanup (2/3 of Beebe Woods dog walkers responded that they would use plastic bags to pick up their dog's feces if bags were available). Initial steps could be to provide clean-up mitt dispensers (e.g. Mutt Mitts) and trash bins at both the Conservatory and Ter Heun Drive entrances to Beebe Woods. Observed dog behavior is that dogs tend to defecate in the leaf litter off the trail, but a culture that exhorts cleanup of any dog feces on the trail or within reasonable reach from the trail will make Beebe Woods more enjoyable for all users.

## **6.3 Dogs and Erosion**

Dogs "playing" at the edges of the ponds undoubtedly add to erosion, but the survey responses noted above can perhaps be interpreted as recognition that controlling erosion goes well beyond controlling dogs. One troubling behavior that has been observed is dog owners tearing off branches or roots to throw into the water for dogs to retrieve. Destruction of vegetation is antithetical to reducing erosion.

### **Recommendations for Dog Walking:**

The intensive use of Beebe Woods for dog walking is likely detrimental to Beebe Woods' value as a wildlife habitat (Section 3.6.1) and nature preserve. However, the experience of walking with a dog or dogs through Beebe Woods is too valued by users to be denied. The goal of the following recommendations is to minimize negative impacts of dogs in Beebe Woods and to allow Beebe Woods to be enjoyed by all.

No recommendations will be practical without the support and/or acceptance of those who use Beebe Woods. These proposals are just options that need further public discussion from which a sufficient consensus may develop to significantly improve dog and owner courtesy in Beebe Woods.

1. Until another policy is developed, through signage or other means, ask dog walkers to have dogs on a leash when released from a vehicle and until they are at least 500 ft. into Beebe Woods. Animal Control officers have agreed to enforce this area. The Animal Control Officer has approved the following language:

***Please leash your dog. The Animal Control Officer will monitor and strictly enforce the leash law within 500 feet of parking area.***

Other Town officials have expressed concern that there should be no written implication that the leash law will not be enforced in all of Beebe Woods.

2. Place dog mitt dispensers and trash barrels at the Conservatory and Ter Heun Drive entrances to Beebe Woods. The BWMT is making some efforts to effect this recommendation.
3. At entrance Kiosks (to be built) post educational information about the duty of cleaning up after one's dog and having dogs under control.
4. As part of a Beebe Woods stewardship group, establish a dog committee with the charge of:
  - a. Refining recommendations for reducing conflicts between dog walking and other uses.
  - b. Suggesting /developing ways to encourage compliance with these policies.
  - c. Monitoring implementation of and suggesting changes to these policies.
  - d. Helping create a culture of cooperation and appreciation of Mr. Lilly's gift to all.
  - e. Assisting in implementing and managing the use of dog mitt dispensers and trash barrels
5. Propose amendments to the Falmouth Leash Law if appropriate.

## **7.0 FOREST MANAGEMENT**

### **7.1 PLANT COMMUNITIES**

Vegetation within Beebe Woods reflects a history of disturbance, probably including agriculture, managed woodlots, and wildfire. Thus, vegetation is typical of a second-growth forest community found on Cape Cod (Sorrie and Somers 1999). Over 70% of Beebe Woods was described by Caljouw (2005) as a mixed oak-pitch pine forest with a dense canopy of black oak, scarlet oak, white oak, and pitch pine over a sub-canopy of black oak, white oak, sassafras and white pine, and an understory of black huckleberry, lowbush blueberry, and sheep laurel. Within the mixed oak-pitch pine forest are patches of vegetation that form variants of this plant community characterized by differences in the proportion of each of the dominant canopy species. Of the remaining thirty percent of Beebe Woods, one third is characterized as white pine-mixed oak forest, with white pine, white oak, black oak, and scattered pitch pine in the canopy. The remaining twenty percent of the Woods is generally characterized by plant communities found in wetlands and moist depressions, small pockets of exotic invasive plants, and remnants of historic landscaping. These plant communities are fire-prone because of droughty soils, a thick layer of leaf litter, and the prevalence of a continuous ericaceous shrub understory. More detailed descriptions of the plant communities of Beebe Woods can be found in Caljouw (2005) (Appendix G).

## 7.2 RARE PLANT SPECIES

None of the approximately 125 plants observed during a preliminary survey of Beebe Woods by the Botanical Club of Cape Cod and the Islands and increased by Caljouw (2005), Benjamin (2002), Peterson Farm Management Plan (2002), and BWMT member Janice Hayes are protected as rare species (Appendix H). However, the Woods and aquatic habitats have not been thoroughly surveyed for the presence of rare species. A Massachusetts rare plant community, an Atlantic white cedar swamp, is found on the border of Beebe Woods, west of Falmouth Academy. This appealing cedar swamp, with red maple, sphagnum moss and other wetland plants, tempts walkers to explore, but their actions can cause damage. Fortunately, the only trail that leads to the swamp is largely overgrown.

Studies have shown that resurgence of plant communities in land that has not been tilled is fairly rapid; most of the rare woodland species in Massachusetts today occur on land that was previously pastures and woodlots.

### Recommendations for rare plant species:

1. Enlist qualified volunteers to survey periodically appropriate habitats for rare plant species and monitor for any damage to the Atlantic white cedar swamp. Allow the secondary trail to the site to continue to overgrow to discourage foot traffic within and around the swamp.
2. Cooperate with Falmouth Academy in protecting the Atlantic white cedar swamp.

## 7.3 EXOTIC INVASIVE PLANTS AND NATIVE PLANTS OF CONCERN

The Massachusetts Invasive Plant Advisory Council defines invasive plants as “non-native species that have spread into native or minimally managed plant systems in Massachusetts. These plants cause economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.” For example, exotic invasive shrubs such as autumn olive, multiflora rose, and bush honeysuckle often invade abandoned agricultural fields and other open habitats and replace native grassland plant and animal species. Vines such as oriental bittersweet climb and smother adjacent plants, and may serve as ladder fuels that provide a pathway for a ground fire to move into the tree canopy. Even herbaceous invasives can crowd out wildflowers and groundcover vegetation, and aquatic invasives such as Phragmites and purple loosestrife can form extensive monocultures that supplant native species critical to wildlife.

To date there has been no systematic survey of exotic invasive plants within Beebe Woods, but Caljouw (2005) noted several occurrences of invasive species during her survey of the Woods’ plant communities. Currently, the wet depression near George’s Rock supports the greatest known concentration of exotic invasive plants in Beebe Woods. This wet depression is dominated by Japanese knotweed but also contains periwinkle, multiflora rose, Japanese barberry, Oriental bittersweet, honeysuckle, and tree of heaven. In the midst, a few non-invasive jonquils bloom. A large red maple dominates the north edge, and the Benjamin Report (1998) notes a basswood tree (American linden) that may indicate this location was a former home site, as does the vinca. The area may also be a former dump site for Highfield Hall.

Although native to Cape Cod, two other vines, wild grape and cat brier, share some of the same characteristics of some of the exotic invasive vines that are of concern. Like oriental bittersweet, both wild grape and cat brier climb neighboring plants and form thick mats of vines that can smother or damage the underlying shrubs and trees. Both species also serve as ladder fuels that carry fire into the tree canopy. While not nearly as invasive as bittersweet, both wild grape and cat brier form large thickets within open habitats and in openings in the forest canopy. In addition, cat brier has thorns that can be a nuisance where this species grows along foot paths or other areas used for recreation. However, both species provide valuable food and cover for wildlife, so control or removal of these plants should be carefully balanced with other management objectives.

Disturbance to soils and existing vegetation encourages the establishment of invasive plant species. In particular, invasives are often found along foot trails or where the soil has been disturbed by vehicles as feet and tires transport seeds from other localities and deposit them on receptive ground. Early detection and removal of invasives is key to effective management; once established, most invasives are very difficult to eliminate or control because they rapidly spread by vigorous root systems and/or abundant seeds. Therefore, careful monitoring for

invasive plants should be included in any proposal for mechanical removal of vegetation for fuel reduction or other activity that has the potential to disturb the forest soils.

**Recommendations for invasive plant control:**

1. Develop and implement a plan based on expert advice, (e.g. New England Wildflower Society) to control or remove known populations of exotic invasive plants within Beebe Woods. The first priority should be removal of Japanese knotweed and other exotic species from the area near George's Rock and the Conservatory entrance.
2. Monitor areas where exotic plants are likely to appear, such as along trails and other areas disturbed by foot traffic, vehicles, and fuel reduction. Promptly remove invasives before they can become established. Monitor pond edges and wetlands for invasive species of Phragmites , purple loosestrife , and water chestnut.
3. Consider removing fire-ladder vines like bittersweet from trees along trails.

**7.4 PLANT DISEASE AND INSECT DAMAGE**

Disease and insects also influence the composition and succession of a forest. For example, hemlocks are succumbing to woolly adelgid (*Adelges tsugae*) for which there is no known natural resistance. Gypsy moth and a more recent visitor, winter moth (*Operophtera brumata*), can defoliate oaks, maples and other trees, and severely stress or kill trees during outbreaks. The population cycles of both species of moths will influence forest health in future years, and Beebe Woods is too large for effective prevention or treatment for either insect.

**Recommendation for plant disease and insect damage:**

1. Stewards should learn to recognize plant disease and insect damage. After careful research, treatment of a serious disease or infestation may be implemented, especially for plant species with low populations.

**7.5 FOREST THINNING**

The Benjamin report recommends thinning white pine. Benjamin notes, "The white pine is beginning to grow into the underside of the oak canopy. This will lead to overall stagnation within these areas of oak and white pine and, in some cases, increase the mortality." Later in his report, Benjamin notes, "Prudent thinning to improve the growing conditions of some of the better formed white pines can greatly enhance these areas while minimizing the opportunity for the suppressed trees to die, adding to the fuel load."

**Recommendation for forest thinning:**

1. Consider thinning some carefully chosen white pine (and possibly white spruce) in order to build health of remaining trees and to reduce numbers of dead trees in the forest. However, white pine is an early successional species and replacement by oaks is natural.

**8.0 WILDLAND FIRE HISTORY AND MANAGEMENT**

**8.1 THE BEEBE WOODS FIRE OF OCTOBER 1947**

The following history of the 1947 fire, based on *Falmouth Enterprise* articles of the time, describes the last large fire in Beebe Woods and is meant to provide an understanding of the potential fire risk.

From Thursday October 20<sup>th</sup> to Sunday October 23, 1947, about 1,150 acres of woodlands were burned in the Beebe Woods section of Falmouth. The fire, probably set, originated along Sippewisset Road, then spread north, then east, and then northeast as winds shifted over 4 days. The area of Beebe Woods was, in 1947, much larger than now. Today, the town owned portion of Beebe Woods covers some 395 acres, only about a third of the total area burned in 1947.

The fall of 1947 in the northeastern US was a period of some of the worst forest fires in New England's history, extending, in particular, over large areas of southern and coastal Maine. It was a period when weather conditions were perfect for extensive fires with summer and fall droughts and strong winds in October. The Maine fires lasted ten days and followed 108 rainless days. There, sixteen people died and almost 10,000 were injured. Some 206,000 acres of land were burned and hundreds of homes were destroyed. To escape the fires in Biddeford, Maine, people stood on the beach with their backs to sea.

Falmouth too had suffered from a 45-day period with no rain in September and October 1947, but this was not as severe as in Maine and not unusual. Weather and local newspaper records from the time indicate that with the long dry spell, the total rainfall was about 8.8 inches below normal for the year. Fortunately, a heavy rainfall of 2.9 inches occurred on the following Wednesday, 6 days after Beebe Woods fire began and 3 days after it was under control.

In 1947, the town spent about \$15,000 – the equivalent of \$130,000 today - to fight the fires, pumped 1.2 million gallons of water and suffered 9 casualties, none serious. The Fire Department was unable to get into the center of the forest to fight the blaze due to the density of the forest and the narrow width of the existing carriage roads. The smoke from the forest fire was noticed some 60 miles at sea. It is likely that the Great Atlantic Hurricane of 1944, a category 3 storm, created enough downed trees in Beebe Woods so that the fire three years later was more severe than it would have been otherwise.

In sum, the fire burned for about 3½ days and was a high severity or high intensity fire that exposes soil and kills most trees. The last woodlands to be affected were the areas around Highfield Hall, the area that is now Falmouth's medical complex, and the current Wood Rise condominium area near Palmer Avenue. Although no structures were lost in 1947, "fist-sized" and smaller embers landed on much of downtown Falmouth and down Main Street at least as far as Walker Street. In addition to Highfield Hall and Theater and the Cape Cod Conservatory, the region covered by the 1947 fire today contains at least 120 homes, plus apartment buildings, the Sports Center, the Curling Club, Falmouth Academy, the Bramblebush Medical Offices, Falmouth Hospital, the JML Care Center, Heritage Assisted Living, the Visiting Nurses Association, and the Gosnold Treatment Center. In all, these properties today are worth well in excess of hundreds of millions of dollars.

(Newspaper accounts of the fire are summarized in Moses's 1976 book Ring Around the Punch Bowl, the story of the Beebe family in Falmouth. Microfilms of the newspaper accounts are also available at the Falmouth Public Library.)

## **8.2 CURRENT CONDITIONS AND WILDLAND FIRE RISK**

Plant communities in Beebe Woods, like those throughout Cape Cod, formed on extremely acid and excessively drained soils. Mixed oak-pitch pine forest, which occupies over 70% of Beebe Woods, reflects these dry, acidic conditions and is, largely by definition, a wildfire-prone and wildfire-dependent plant community. Organic matter decays slowly in this dry, acidic environment and the forest floor of a mixed oak pitch pine forest is typically characterized by a thick layer of leaf litter and duff. Many of the dominant plants within the mixed oak-pitch pine community, including black huckleberry, lowbush blueberry, and pitch pine, produce volatile resins that are highly combustible and contribute to the spread of fire. The mixed oak-pitch pine community typically supports a dense, continuous shrub layer which, along with climbing vines, creates ladder fuel that can carry a ground or surface fire into the canopy (Caljouw 2005).

Fires within the mixed oak-pitch pine community are typically moderate-intensity surface fires carried through the shrub understory. Fast moving fires may occur in spring with torching of trees in areas dominated by pines. During periods of low humidity and high winds, rates of spread and flame lengths increase dramatically, and under dry conditions, fire may enter the duff layer and a severe burn may occur (Caljouw 2005). Although the mixed oak-pitch pine community and the wildlife that inhabit it often benefit from fire, particularly hot wildland fire can destroy the rootstock, seed source, and organic material needed to support regeneration of the forest. The likelihood of a severe, high intensity wildland fire increases as fuel loads of litter, pitch pine, and ericaceous shrubs accumulate, unchecked by wildland fire, prescribed fire, or mechanical clearing. There has been no significant reduction in fuel loads within Beebe Woods since the Great Fire of 1947, and the risk of wildland fire is increasing as fuel continues to accumulate.

### **8.3 MITIGATING WILDLAND FIRE RISK**

As the Beebe Woods Management Team began its work, its members learned that Town staff, including representatives of the Fire Department, the DPW Parks Division, the Department of Natural Resources, and the Conservation Commission, were developing a wildfire protection and preparedness plan with the assistance of Caren A. Caljouw, a consultant engaged by the Cape Cod Cooperative Extension. The Team met with Fire Chief Paul Brodeur, Tree Warden Brian Dale, and Ms. Caljouw, and reviewed her draft report entitled “Draft Wildland Fire and Preparedness Plan for Beebe Woods and Peterson Farm Conservation Areas, February 2005,” and her supplemental report dated August 15, 2005. Based on the fire history of Beebe Woods (in particular, the fire of 1947), years of accumulating forest debris and understory growth, extensive abutting development, increased user activity within Beebe Woods, and the possibility of prolonged drought in coming years, the BWMT concluded that fire is a significant and growing risk to Beebe Woods and thus also to nearby developed neighborhoods. There is considerable concern about fire threat to the institutional properties to the northeast of Beebe Woods, including Falmouth Hospital, Heritage Assisted Living, JML Care Center and the Gosnold Treatment Center facilities. The threat of fire to the medical complex is heightened because the prevailing wind is across Beebe Woods from the southwest, and fire and accompanying smoke could affect essential operations and endanger patients and elderly residents, who may require evacuation.

The draft wildland fire and preparedness plan (drafted by Caren Caljouw) recommended large-scale understory clearing and thinning of the canopy to create areas of reduced fuel loads, as well as widening of paths and roads to increase access for emergency vehicles, as a part of a broad fire management plan for Beebe Woods. The BWMT reviewed the plan in detail, but had serious concerns about implementing a plan that would alter 57% of the Woods. Instead, the BWMT, along with the Fire Chief Brodeur and Brian Dale, proposed a demonstration project that included understory clearing and thinning of the canopy near the medical complex in the northeastern corner of Beebe Woods and along one carriage trail off of Ter Heun Drive. This proposal was approved by the Falmouth Conservation Commission in June of 2005. However, County officials declined to fund the effort through a grant from the Cape Cod Cooperative Extension because they felt this plan did not significantly reduce the threat of wildland fire nor increase the Town’s ability to fight a wildland fire. The demonstration plan was then revised to include clearing of understory and thinning of the canopy along a longer and wider portion of the carriage trail. In December 2005, the Conservation Commission rejected the proposal for increasing the size of the demonstration project in the interior forest by a vote of 4 to 4 with 2 abstentions. Some clearing of understory vegetation within the medical complex adjacent to Beebe Woods has recently occurred and may help protect these facilities in the event of a wildland fire. However, the risk of a significant wildfire remains due to the high fuel loads found within the Woods.

Comments provided by the Conservation Commission during a discussion of the fuel reduction plan suggest that additional research and planning is needed. First, several Commissioners suggested that any plan that proposes mechanical clearing of portions of Beebe Woods should include a reasonable analysis of the potential impacts of the proposed clearing on the wildlife and plant communities, as well as some level of pre- and post-treatment monitoring. Second, the Commission expressed concern about the costs of long-term maintenance of the proposed fuel reduction areas and the commitment of Town funds that will be needed to ensure that the fuel reduction strategy remains effective and the fuel reduction areas do not become dominated by invasive species. Third, the Commission noted that much of Falmouth is heavily wooded and that wildland fire is not a concern unique to Beebe Woods. Several Commissioners suggested that the Town should consider a more comprehensive approach that includes the abutting property owners; more thoroughly addresses the numerous public safety issues associated with a wildland fire (e.g., the impact of smoke on the medical facilities); and carefully analyzes alternatives to mechanical clearing within Beebe Woods. Although the Commission recognizes that the fuel loads in Beebe Woods are a concern, fuel reduction is only one of many actions that the Town can take to protect the community. The Commission feels that this alternative should be selected only if, after careful analysis, the community determines that other alternatives do not sufficiently protect the public interest.

Although the Commission is not prepared to move forward with a fuel reduction plan at this time, the BWMT believes that fuel load within Beebe Woods poses a risk of wildland fire that is unacceptably high. The BWMT therefore recommends that the Commission and the Fire Chief work together to develop a plan to protect the community as soon as possible. The lessons learned from the BWMT’s study of the wildland fire risk in Beebe Woods will provide valuable insight when the Town revisits this issue.



**Recommendations for developing a wildland fire and preparedness plan:**

1. A successful comprehensive wildland fire and preparedness plan will require broad support from the community. The Commission, Town officials, owners of abutting properties, and the general public, must be informed of the risks, possible responses, and direct and indirect costs associated with a wildland fire in Beebe Woods if the community is to make an informed decision regarding wildland fire risk management. Development and implementation of a comprehensive wildland fire and preparedness plan will require a long-term commitment by the community and may require allocation of funds for additional training, equipment, apparatus, outreach, fuel reduction, monitoring, or planning. Fuel reduction strategies, in particular, may be controversial and will require a long-term commitment in order to be effective for more than a few years. Large-scale fuel reduction strategies should not be undertaken without broad community support and a commitment of funds that will allow periodic maintenance over an extended period of perhaps a decade or more. The BWMT strongly believes that a demonstration project, perhaps one of smaller scope than that proposed, may be useful in educating the community about the aesthetic and ecological impacts of a fuel reduction strategy. In addition, Falmouth may benefit from the lessons learned by the towns of Bourne and Brewster; these towns have also developed wildland fire preparedness plans with the assistance of the Cape Cod Cooperative Extension.
  
2. An outreach program may decrease the likelihood of wildland fire in Beebe Woods and may reduce the impacts of a wildland fire on the community. The outreach program could include information on how homeowners can protect their property from wildland fire, suggestions for managing their own activities to minimize the risk of starting a fire, and actions property owners should take if a wildland fire occurs. Chief Brodeur has indicated that he intends to distribute literature developed by *Firewise*, an outreach program originally developed for fire-prone communities of the western United States, to the neighborhoods that surround Beebe Woods. Additional outreach efforts may be useful.
  
3. The Town should consider a more comprehensive approach to mitigating the risks posed by a wildland fire in Beebe Woods. The plan reviewed by the BWMT focused primarily on reducing fuel loads by removing vegetation and improving access for emergency vehicles into the interior of the forest. However, there are numerous other actions the community might take to minimize the risk of wildland fires or the impacts that a wildland fire might have on the community. Other strategies to protect the community, as well as other strategies to manage the Woods, should receive additional consideration. For example, maintenance of the surface of the carriage trails, along with selective removal of individual trees that have grown into the trails, may significantly improve access for emergency vehicles with little to no impact to the aesthetics or ecology of the Woods. In addition, prescribed fire may be preferable to mechanical clearing.

**9.0 EROSION**

The popularity of Beebe Woods for walking with and without “man’s best friend,” running, mountain biking, and horseback riding is resulting in “wear and tear” on the carriage paths and trails. Along the banks and access points to the Deep Pond and Miles Pond, the foot traffic loosens soils and exposes roots on the trails making paths more susceptible to erosion during heavy rains (Appendix F). Our observation is also that the carriage paths and trails have more prominent emerging boulders, and the slopes have become generally more cobbly in the thirty years of public use. Less agile walkers and public safety vehicles may find that rocky trail conditions impede access. The extent of trail/path erosion compromises their use during the winter months when a greater depth of snow is needed to provide sufficient cover for cross-country skiing.

At Deep Pond and Miles Pond erosion is a concern. Dirt washing into these ponds brings turbidity and some nutrients that appear to be resulting in clumps of floating macrophytes near the runoff sites.

Steep slopes, a circumferential trail and multiple access points at Deep Pond combine with heavy use to provide ideal conditions for erosion, and its effects are manifest. At the access path on the SE shore, the hard work of an Eagle Scout to lay magnificent stone steps and to divert runoff has helped to reduce but not eliminate the continuing outwash of the pathway. The less defined trails at the NE end of the pond are severely eroded, causing roots to be totally exposed and requiring a walker to scramble down large “steps” as one nears the shoreline. The

trail connecting these two access points has numerous small outwash gullies and a significant length of path where the bank both above and below the path and the path itself are eroding unabated directly into the pond. This condition is aggravated by the “swinging tree” from which suspended ropes are used by many to swing out over Deep Pond and either swing back to shore or drop into the pond. It is also a gathering point for those observing such activities. As one continues on the path NW around Deep Pond, an opening in the vegetation has provided someone access to tie up a canoe. If launched and pulled up on a regular basis, this activity could provide another source of erosion and damage to vegetation. Another manifestation of erosion is the growing dirt “deltas” at the two major access points.

There is only one access point to the shore of Miles Pond from Beebe Woods; it also serves as Pond access from the Peterson Farm property. Town acquisition of Peterson Farm has increased use of this access, and presently there is a wide swath of unvegetated slope that is eroding into Miles Pond. Someone has placed a “ramp” of logs in the middle of this swath, which may serve to reduce the erosion and prevent muddy feet, but it falls short of being a solution. As at Deep Pond, a delta of outwash soil is building up in the pond.

**Discussion:**

People are attracted to the water. It appears that the major use of the two ponds’ access points are to be near the water and to be able to have views across and along the ponds’ shorelines. People who walk their dogs in Beebe Woods also may stop to encourage their dogs to swim, wade, drink or retrieve sticks or balls thrown out into the pond.

Swimming is popular in the summer. When swimmers use the “swinging tree” at Deep Pond, they are contributing to erosion as they repeatedly scamper up and down the steep slope.

Deep Pond does not have boat launching because the distance from any roadway makes getting even a small boat to the shore difficult. Miles Pond has public access along Sippewissett Road and private access along McCallum Drive from which boats are launched.

Unchecked erosion has negative consequences for both the land and water. At Deep Pond it is making foot access more difficult as the washouts during major rains turn the paths into gullies. It is gradually denuding areas of vegetation with negative aesthetic consequences.

An option of trying to protect the ponds by keeping people at a distance might work to “save” the ponds, but it would be both impractical and unappealing. Enjoyment of the nature of Beebe Woods should not exclude enjoying the shores and waters of the ponds. However, if reasonable access is to be maintained, action needs to be taken to eliminate or at a minimum reduce erosion.

Other trail/path erosion is a lower priority. There may be opportunities for some erosion reduction on paths in conjunction with other projects, e.g. chips from clearing for fuel reduction.

**Recommendations to reduce erosion near ponds:**

1. Address the erosion problem associated with the rope swing at Deep Pond.
2. Maintain only two access points at Deep Pond and one at Miles Pond.
3. Construct stone “landings” at access points, where 3 to 5 people could stand at the water’s edge without standing on the shoreline.
4. Hire an engineer to redesign paths to the pond access points that would allow foot traffic while reducing or eliminating erosion.
5. Revegetate the slopes adjacent to the rope swing.
6. Rebuild path between SE and NE access trails of Deep Pond, perhaps using a boardwalk structure on the steepest, most eroded section.

7. Add signage to remind users of the fragility of the pond shores, “Please Stay on Paths to Prevent Erosion,” as has been done at the Knob.
8. Remind dog owners to bring their own objects for dog retrieval and not to tear sticks off bushes or roots.
9. Improve trail surfaces as part of fuel reduction/wildland fire management program (if and when implemented.)
10. Individually remind canoe/kayak owners that, due to erosion concerns, the shoreline of Deep Pond is not an appropriate place to store canoes.

## **10.0 OTHER MANAGEMENT TOPICS**

### **10.1 BOUNDS**

The long perimeter of Beebe Woods and the many abutters provides a lot of opportunity for boundary confusion and encroachment. The Benjamin report noted areas of brush clearing and dumped yard waste in Beebe Woods adjacent to residential properties north of Two Ponds Road. Many trails as noted elsewhere lead from private property into Beebe Woods. It is generally unclear where the private property ends and the public begins. Benjamin stressed the importance to the Town, visitors and abutters of knowing where the boundaries of Beebe Woods are. This situation was true also for most other Town open space properties.

The Town Engineering Department, with a grant from the Buzzards’ Bay Project, has been able to set bounds on the west side of Beebe Woods and around Greengate at 400 ft intervals. The east side where most of the abutters are institutional has not been done.

Setting bounds is an essential step for protecting the integrity of Beebe Woods, but bounds are most effective if accompanied by regular vigilance. Future management should endeavor to establish communication and good relations with Beebe Woods’ abutters.

#### **Recommendations for bounds:**

1. Complete work to clearly establish the boundaries of Beebe Woods.
2. Write letters to abutters as needed. Such letters could include gentle reminders about encroachments and access trails as well as reinforce concerns about wildfire. Letters could also give abutters contact information if they need to report trespass or other problems from Beebe Woods users.
3. “Walk” boundaries on a regular basis to see if there are boundary problems that need attention.

### **10.2 OTHER POSSIBLE IMPROVEMENTS**

Our survey of Beebe Woods’ users showed minimal support for most items listed as possible improvements. “Better availability of trail maps” (50%), “trash receptacles” (33%) and “improved signage”(30%) were modestly supported. All of the other items—more benches, wider paths, educational signs/kiosks, pruning for vistas or stonewall exposure and a handicapped accessible trail—received less than 13% support each.

Perhaps these responses were unduly influenced by how the survey questions were ordered and phrased. “Select improvements you would welcome” followed the question, “Should management focus on healthy woods, not park-like improvements?” Some 93% of respondents chose “focus on healthy woods,” and many attached comments urging, “leave Beebe Woods alone” and suggested there not be “park-like improvements.” It was natural for the respondent to equate the listed possible improvements with being park-like and not to think that they could also be a beneficial accessory to a healthy woods.

### 10.2.1 Kiosks

It is very typical for conservation areas whether they be state or national parks, forest service lands, bird sanctuaries or other protected open space to have informational kiosks at their entrances. These kiosks usually constructed of wood with an overhang to protect the display space from the elements can be relatively unobtrusive and aesthetically complementary to their location. They provide space for posting and or distributing maps, educational information about the natural history of the area and notices about rules of behavior or risks or hazards, e.g. please stay on paths, no smoking, no fires, no plant collecting etc. Other Falmouth open spaces, e.g. Peterson Farm and the Coonamessett Reservation, have kiosks. Information can be posted seasonally or as conditions change. With the number of visitors using Beebe Woods, both Beebe Woods and the visitors could benefit from having information available on a kiosk. While cognizant of the Lilly deed restriction barring “facilities” in Beebe Woods, the BWMT thinks that such kiosks would be consistent with the purpose of the Lilly gift.

#### Recommendations for kiosks:

1. Install kiosks at both the Highfield and Ter Heun drive entrances to Beebe Woods.
2. Have a stewardship group or other appropriate entity be responsible for the content of the information displayed with the objective of keeping it up to date and aesthetically appealing.
3. Include contact information for the Conservation Commission, Fire Department, and Animal Control Officer.

### 10.2.2 Benches

Currently there is only one bench in Beebe Woods. It is a generic park bench situated less than 1,000 ft from the present Conservatory/Highfield entrance at the major junction where trails diverge toward Miles Pond, Deep Pond, Ter Heun Drive and the northwest sector of Beebe Woods. Of course, hikers also sit on rocks adjacent to trails. Soil compaction near rocks suggests their use as a resting spots. In his 2002 report, Philip Benjamin suggests placing benches at some of the “far reaches of the property” to “provide visitors with an opportunity to rest and enjoy the beauty and solitude....”

The two locations that seem most appropriate are sites overlooking Deep Pond and Miles Pond. Someone able to walk to Deep Pond could potentially find it difficult to descend the relatively steep trails to the water’s edge. A bench overlooking Deep Pond from the heights above would provide an opportunity for more distant contemplation. The exact placement and design of such a bench or benches could be part of a plan to rectify erosion problems at Deep Pond. It is a fair walk from either Highfield or Ter Heun Drive to Miles Pond. A bench at the Miles Pond “landing” would be a suitable resting/observation point for those coming through Beebe Woods or Peterson Farm.

The existing bench made of green wrought iron and artificial wood is urban park-like. Sturdy benches of a more rustic or natural design and materials would be a better choice of additional benches.

#### Recommendation for benches:

1. Consider placing benches for views of Deep Pond and Miles Pond.

### 10.2.3 Signage

Signage for trails and signage to direct users to parking and access are discussed in the Trails and Parking and Access sections respectively.

### 10.2.4 Vista Pruning

The Benjamin Report also proposes thinning the vegetation along and below the high ridge trail that leads to Haynes Road in Sippewissett with the objective of opening up views to Buzzards Bay. There is currently a very limited winter view, which disappears in summer, through the pitch pines and oak tree trunks and branches. The

need to prune vegetation to maintain trails and (if consensus can be achieved) for wildland fire management is (to us plan writers) a much higher priority than providing a vista. Until these other maintenance needs are met, consideration of vista pruning is untimely.

Visual appreciation of the stonewalls of Beebe Woods could be enhanced by clearing, but to the detriment to the wildlife that use them for shelter. As is the case for vista pruning, other maintenance pruning should take precedence. Under story clearing as part of a wildland fire protection program could result in greater visual exposure of stonewalls in those selected areas. Also, it is not clear whether clearing for views would be consistent with the Lilly deed restrictions.

## **11.0 EDUCATION AND OUTREACH**

Although there are occasional bird walks, science class walks and research activities in the Woods, most visitors to Beebe Woods come for exercise, dog walking, and/or natural beauty and probably not education. Yet, education, besides its value to a visitor, helps build support for conservation and for the value of Beebe Woods to the community. In addition, just getting a wider range of visitors to Beebe Woods spreads the conservation message. For example, Beebe Woods could be more welcoming to the elderly, student groups, families with small children, the handicapped, tourists, the easily lost, those who stroll. Outreach to neighbors, civic groups, and schools could broaden the base of support for Beebe in particular and conservation in general.

### **Recommendations for Education and Outreach**

1. Help all nearby property owners to be aware of wildland fire risk and of the FireWise program. Nearby residential areas with active neighborhood associations—the Sippewissett Highlands Homeowners Association and the Sippewissett Association—have both already expressed interest in the FireWise program.
2. The Falmouth School System, local private schools, and nursery schools undoubtedly teach about geology, habitats, and the natural environment. Beebe Woods stewards should consult with teachers on how trips to and visitors from Beebe Woods could support their curriculum.
3. Contact organizations close to Beebe Woods about joint ventures. For example, numerous employees in the health complex walk on the bike path or on Ter Heun during breaks. Perhaps health-complex walkers have suggestions to make Beebe Woods hiking more appealing to them.
4. Civic organizations may have contributions to make. For example, the Falmouth Garden Club has worked successfully in other conservation areas and has expressed interest in creating a modest nature trail in Beebe Woods.
5. The Town, Highfield Hall, Falmouth Academy and the Cape Cod Conservatory, and Beebe management, all will have continuing shared concerns in management and neighborliness. Just figuring out roads, signs, and shared parking will need cooperation. Dog issues may also continue. The Town should welcome cooperation.
6. Since the Atlantic White Cedar swamp is located on both Falmouth Academy and Town property, these institutions should contact each other freely about any use or management concerns, including nature study that uses both “parts” of the swamp.

## **12.0 MANAGEMENT STRUCTURE**

In developing this management plan, the BWMT has looked at how Beebe Woods is used today, the condition of the Woods, opinions of users, expert advice, and the charge of the Lilly deed and is proposing various specific management recommendations. The BWMT is, however, less than confident that these recommendations will have a reasonable chance of being implemented unless Falmouth makes a greater, more systematic commitment

to managing its open spaces. In this section, we discuss the existing ad-hoc arrangements for managing Beebe Woods and other Town open spaces and lay out the need for an open space manager.

In the Trust Deed of July 19, 1976, which conveyed Beebe Woods from Josiah K. Lilly III to the Town of Falmouth, it is specifically stated that “The Conservation Commission of the Town of Falmouth shall manage and control the trust property (Beebe Woods)...and shall constitute a board of visitors to enforce and preserve this trust by whatever legal means it deems necessary or appropriate...” However, neither thirty years ago nor today does the Conservation Commission have the staff and other resources to be an active manager of Beebe Woods. In Beebe Woods as in other Town owned open spaces, management projects have been accomplished by a mix of volunteer labor and ad hoc arrangements with other Town of Falmouth Departments.

If the past management of Beebe Woods were to be evaluated, it would perhaps best be described as light. Shortly after Beebe Woods became Town property, the existing carriage trails were restored to their original width by C.E.T.A. (Commonwealth Employment Training Agency) workers. Over the next decade, the Department of Natural Resources utilized juvenile offenders as assigned by the Department of Probation to maintain carriageways. This work was limited by the fact that juveniles were not allowed to use power tools. In the early 1990’s, the Conservation Commission approved a proposal to widen the carriage trails to Deep Pond and Miles Pond for improved fire vehicle access with the work to be done courtesy of the D.P.W. Highway Department. Due to public dismay at the aesthetics of the clearing, including on-site disposal of slash and the limited time the DPW had available to do the work, the clearing was halted. (The above information is courtesy of Mark Patton, Director of the Department of Natural Resources.)

In the intervening years, with the exception of spreading wood chips, no significant work has been done on the trails. If a fallen tree obstructs a path, an abutter with a chainsaw may remove it or someone may call it to the Town’s attention and the DPW does the work when they have time and equipment. Beebe Woods’ users help keep the narrower trails open by pruning the stray briar or protruding branch.

Beebe Woods has benefited from Boy Scout, Eagle Badge projects. One scout did a major reconstruction of one of the eroding steep paths to Deep Pond. However, it too is now eroding. Another installed an array of handsome and sturdy directional signs at trail intersections. In addition, the Town has provided a bench, gates to keep out vehicles, engraved boulders to mark the entrances and a parking lot off Ter Heun Drive.

In 2001, the Town of Falmouth hired Philip B. Benjamin of Benjamin Forestry Services to develop land management recommendations for eleven of Falmouth’s open space parcels including Beebe Woods. Subsequent to receiving the Benjamin report, the Town Administrator established a Land Use Management Working Group, which has staff representation from the Town Administrator’s office, the Planning Department, the Department of Natural Resources, the Department of Public Works, the Shellfish Warden and the Conservation Commission. It also includes a representative of the 300 Committee. The Assistant Town Administrator chairs this working group. A primary charge of the Group is to implement the Benjamin recommendations, and there is a line item in the Town’s capital budget for this purpose. Lack of clear boundaries was noted as a problem for all of the studied open spaces, so a priority for the working group has been to clarify property lines for Beebe Woods and the other properties. For Beebe Woods specifically, the Working Group has recently been working with the Cape Cod Conservatory and Historic Highfield to develop a plan to improve parking and access to those organizations and Beebe Woods.

With the exception of the Benjamin Report’s suggestion of pruning a vista to Buzzards Bay, the management recommendations of this plan run parallel to, reinforce and/or add to those of the Benjamin Report; they are also more detailed than Benjamin and focus on routine oversight as well as specific projects.

An overarching management question for Beebe Woods (and perhaps for other Town open spaces) is: Are the Town’s current management structures/systems adequate to implement this plan’s management recommendations? To answer this question one must first describe and assess the existing situation that involves many different “actors.”

**STEWARDSHIP:** The 300 Committee, Falmouth’s Land Trust, has a stewardship committee that takes responsibility for some Town open spaces as well as land and conservation restrictions held by the Committee. The Conservation Commission and the 300 Committee have adopted a MOU regarding stewardship responsibilities. The Stewardship Committee of the 300 Committee recruits stewards for individual parcels. The stewards are more watchdogs than managers. They generally live near the parcel and/or regularly walk it. They will inform the

Stewardship Committee or perhaps the Town Department of Natural Resources if trash has been dumped or they observe other problems. The Stewardship Committee has some equipment and ability to cut and maintain trails. They must judge whether the maintenance is minimal or whether it is sufficient that they should first seek permission from the Conservation Commission.

**PARCEL SPECIFIC MANAGEMENT COMMITTEES:** For those open spaces with approved management plans, the Conservation Commission has appointed management committees. Both Peterson Farm and the Coonamessett Reservation had management teams until recently. The Peterson Farm Team had largely completed tasks described in the management plan and was dissolved in August 2006 after attrition of all but one of the original members, the Coonamessett Reservation Management Team was dissolved at the discretion of the Commission in April 2006. The role of these committees is to keep an eye on the land and work to implement the respective plans. They have proven to be quite entrepreneurial. They may do work themselves, recruit volunteer labor and/or equipment for a project, seek donations of funds or materials or ask for help from the DPW.

**CONSERVATION COMMISSION:** Town Open Spaces that have been acquired for the purpose of conservation are placed under the jurisdiction of the Conservation Commission. The Commission is responsible for implementing management plans and reviewing requests from other Town departments or private individuals to make improvements or do other work on these open spaces. The time and staff resources of the Commission, however, are largely consumed by the regulatory responsibilities of wetlands protection. The Commission itself has limited capability to undertake land management projects or even to do routine maintenance such as trail clearing.

**DEPARTMENT OF NATURAL RESOURCES (DNR):** The Department of Natural Resources has “police power” over the Town’s open spaces. Its officers investigate illegal activity such as dumping and arrange for cleanup. They enforce hunting laws and deal with any issues relating to wild animals. They also enforce off-road vehicle laws and have made numerous arrests for narcotics possession. (Off-road drug trafficking on conservation land is seen as a way of avoiding the scrutiny of the Police Department.) DNR manages and regulates shell and freshwater fisheries. Through its Animal Control Division the DNR enforces the town and state laws regarding dogs. The name of the DNR would suggest that management of the Town’s natural areas would be part of its mission, but the DNR does not have the equipment, budget or manpower to actively manage land. However, since the work of DNR takes staff out onto the Town’s open spaces, the DNR is in the position to be aware of problems and play an ombudsman role for these areas.

**DEPARTMENT OF PUBLIC WORKS (DPW):** No division of the DPW has maintenance of the Town’s open spaces in its mission or budget. However, because both the Highway Division and the Division of Forestry and Parks have the equipment, expertise and manpower to do many of the tasks of land management, on a cooperative, *ad hoc* basis these DPW Divisions have been willing to do specific projects or jobs as time and manpower allow.

**LAND MANAGEMENT WORKING GROUP:** As noted above, the Working Group brings together staff from various Town departments that have an interest in Land Management. Because no Town Department by itself has the combination of authority and resources to manage open space lands, the group meetings provide opportunity for the communication and cooperation that allow projects to go forward. The group has been focused on implementing the recommendations of the Benjamin Report. It does not do day-to-day oversight of Falmouth’s open spaces.

**Other MANAGEMENT MODELS:** The history of open space management in Falmouth is undoubtedly not unique, but there are other models to consider. Our understanding is that some towns have separated the Conservation Commission’s land management function from its regulatory role, forming a separate Open Space Management Committee. Such a volunteer committee may work with a designated town staff person (or department) to manage a town’s open spaces. Another model would be for a town to cede management of a specific area through a MOU with a non-profit organization. The organization could be responsible for underwriting the entire costs of land management or only for specific projects.

**Discussion:**

With its miles of trails, easy parking and access and natural attractions, Beebe Woods is probably the most heavily used of Falmouth’s open spaces. Its irregular shape gives it a long perimeter and many abutters. These users and abutters provide an *ad hoc* watchdog service. Something amiss would not go long unnoticed in Beebe Woods. What is less certain is to whom a problem in Beebe Woods should be reported. If there are to be informational

kiosks at the main entrances to Beebe Woods, directions for reaching a responsible party or parties to receive notice of any problems should be part of the information provided.

Establishment of a Beebe Woods Management Committee would have the advantage of creating a group that could both implement and be an advocate for implementing this Plan's recommendations. Whether the same sort of entrepreneurial spirit that has fueled the Peterson Farm Committee and energized the Coonamessett group can be captured remains to be seen. In any case, it would seem that with Beebe Woods and Peterson Farm an extension of each other, if a Beebe Woods Management Committee is established, it should not be entirely separate from the stewardship of Peterson Farm.

The experiences of managing Falmouth's other open spaces might not be totally applicable to Beebe Woods as maintenance of the miles of carriage trails and eroding pond frontages and the heavy use of Beebe Woods are likely to require a sizeable investment of resources. It may not be realistic to expect a management committee to be able to assemble the volunteer expertise and manpower to implement the Plan's recommendations.

Another concern is the controversy that led the Conservation Commission to disband the Coonamessett Reservation Management Committee. The specifics are not germane to Beebe Woods, but the fact that tensions reached the point of compelling such action is. Extending the Conservation Commission's authority for open space management to separate management committees has the benefit of bringing in more human resources, but the risk in delegating management is that the interests and/or priorities of a committee and the Commission may diverge. A typical management plan lays out goals that leave room for interpretation. The amount of procedural consultation and oversight to keep everyone on track can be formidable. If management committees proliferate, the Commission's task of coordination and oversight is likely to be ever more challenging.

A more practical option for Beebe Woods may be stewardship oversight either by adding it to the parcels covered in the existing MOU with the 300 Committee or by another arrangement. As discussed above, the stewards could be an active presence in Beebe Woods and be in a position to report problems, make recommendations and/or do limited maintenance work such as picking up trash and emptying trash receptacles or organizing volunteers for a particular maintenance project.

**Assigning the responsibility and providing a Town 'body' with the resources to manage open space:**

The inescapable conclusion from the above discussion is that Falmouth has a fragmented approach to open space management. The Conservation Commission has oversight responsibility, but hands-on management comes from a combination of volunteers and various Town departments. The Land Management Working Group has been created by the Town Administrator to provide coordination among these various parties.

Our observation is that the Working Group is filling a much-needed role, but it does not take the place of having a day-to-day staff person or department with the interest, authority, expertise and access to resources to manage Beebe Woods and Falmouth's increasing number of varied and expansive open spaces. Such an open space manager could look at Beebe Woods and have ideas of how to encourage appropriate use and enjoyment of Beebe Woods, how to improve the wildlife habitat, how to integrate the Conservation Commission's concerns into an approvable plan for reducing wildfire risk, how best to remove invasives or how temporarily to reduce erosion until a fully engineered solution can be budgeted. The manager would be at the other end of the phone or e-mail, if a steward or citizen calls to report a problem in Beebe Woods.

Such a position could potentially increase the effectiveness of volunteer stewards and management committees and vice versa. Such a manager could develop work plans with the committees that would define where town "help" is needed and set priorities. He or she could ensure that Falmouth actively pursues the public and private grant funds that are available for open space enhancement projects. And, volunteer stewards/managers would benefit from having someone accessible for consultation.

Exactly how this open space manager should be integrated into the Town of Falmouth organizational structure is beyond the scope of our assignment. Our observation is that the Conservation Commission and staff are too overburdened with regulatory matters to have sufficient time to devote to open space management. This situation could be eased if a land manager were in place. Such a person could develop specific plans and projects for Commission approval. Given that the resources and manpower for working on open space projects are in the DPW



and that the Town of Falmouth is not in a financial position to duplicate these resources for a separate open space department, and given that the Department of Natural Resources has oversight responsibilities for many activities on conservation land, inter-departmental cooperation is likely to remain a prerequisite for the management of Beebe Woods or any of Falmouth's open spaces.

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