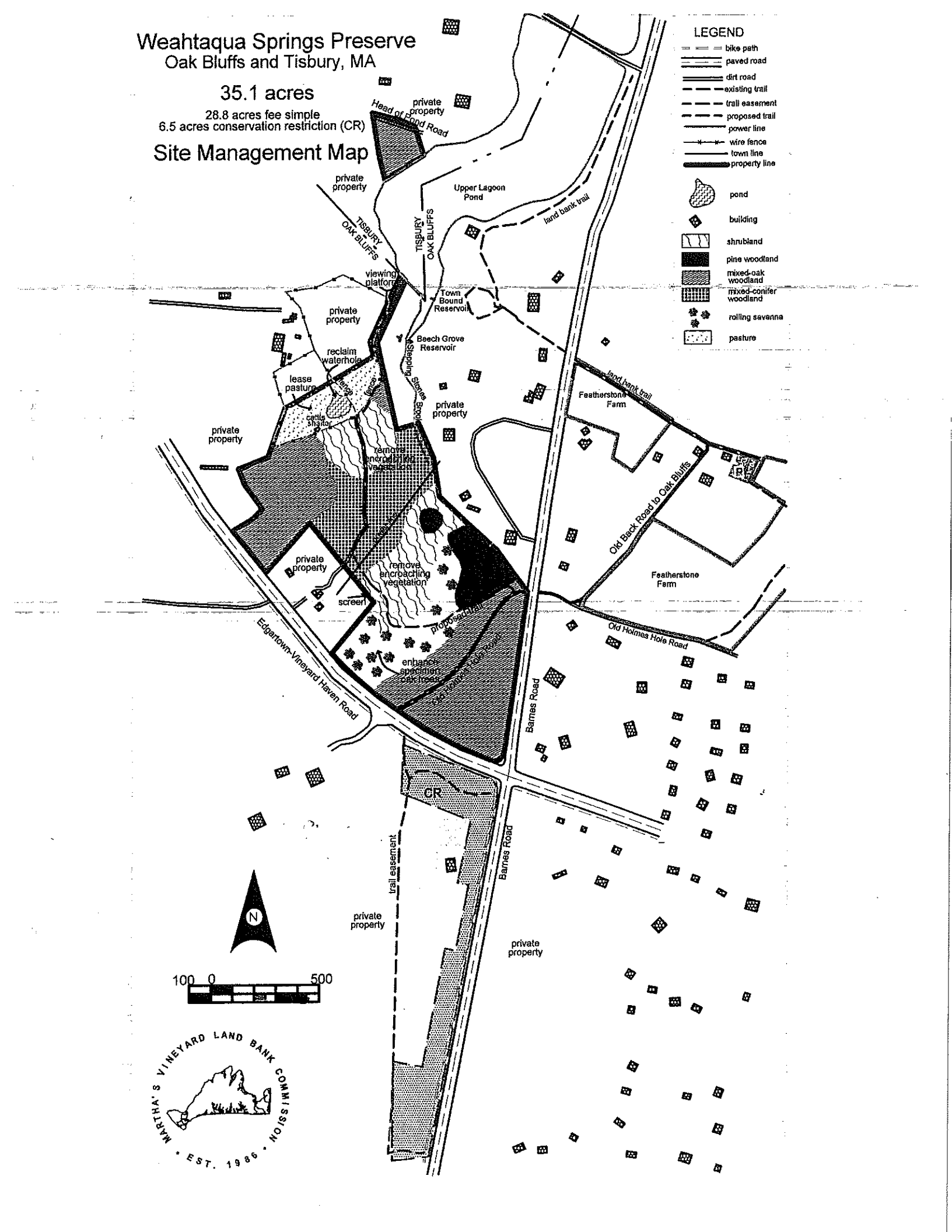
WEAHTAQUA SPRINGS PRESERVE
OAK BLUFFS AND TISBURY, MA

MANAGEMENT PLAN

April 1, 2004

Approved by the Oak Bluffs Town Advisory Board (November 4th, 2003)
Approved by the Tisbury Town Advisory Board (December 12th, 2003)
Approved by the Martha's Vineyard Land Bank Commission (December 22nd, 2003)
Approved by the Secretary of the Executive Office of Environmental Affairs (March 29th, 2004)

Julie Russell, *Ecologist*
Matthew Dix, *Property Foreman*
Jeffrey Komarinetz, *Conservation Land Assistant*
Vernon Welch, *Conservation Land Assistant*


Weahtaqua Springs Preserve
Oak Bluffs and Tisbury, MA
35.1 acres
28.8 acres fee simple
6.5 acres conservation restriction (CR)
Site Management Map
LEGEND
bike path
paved road
dirt road
existing trail
trail easement
proposed trail
power line
wire fence
town line
property line
pond
building
shrubland
pine woodland
mixed-oak woodland
mixed-conifer woodland
rolling savanna
pasture
private property
Head of Pond Road
Upper Lagoon Pond
land bank trail
TISBURY
OAK BLUFFS
viewing platform
Town Bound Reservoir
Beech Grove Reservoir
Sheep Pond Stones Brook
reclaim waterhole
lease pasture
cattle shelter
remove encroaching vegetation
Featherstone Farm
Old Back Road to Oak Bluffs
Old Holmes Hole Road
screen
proposed trail
enhance specimen oak trees
Edgartown-Vineyard Haven Road
Barnes Road
CR
trail easement
N
100 0 500
MARTHA'S VINEYARD LAND BANK COMMISSION
EST. 1986

Executive Summary

Weahtaqua Springs Preserve is keeper of the springs that run underground to Lagoon Pond and the Lagoon Pond watershed of Oak Bluffs. The Preserve's name originates from "Weaquatickquayage", the Wampanoag name denoting the land at the head of Lagoon Pond. Weahtaqua Springs Preserve is part of a most significant Wampanoag archaeological site. While spring water runs underground, lichen, growing at a rate of 0.28 mm per year, covers the arid crowns of the rolling oak savanna. The Preserve comprises seven natural communities: a pitch pine woodland, mixed-oak woodland, mixed-conifer woodland, shrubland, rolling savanna, sandplain grassland and pasture. One Massachusetts state-listed wildlife species – pied-billed grebe – was observed in the head of Lagoon Pond. In addition, two wildlife species – great blue heron and osprey – and three plant species – butterfly-weed, post oak and little ladies' tresses – on the watch list were recorded on the Preserve.

The 35.3 acres of Weahtaqua Springs Preserve are located along Barnes Road, Edgartown-Vineyard Haven Road in Oak Bluffs and along Head of Pond Road in Tisbury. Conservation land in close proximity to Weahtaqua Springs Preserve include Featherstone Farm (MVLBC), Wapatequa Woods Preserve (MVLBC), Thimble Farm (MVLBC, Agricultural Preservation Restriction)), Little Duarte's Pond Preserve (MVLBC), Manuel F. Correllus State Forest (Commonwealth of Massachusetts), and Margaret K. Littlefield Greenlands (Town of West Tisbury). The land bank purchased 28 acres from MVY Realty Trust in 1999 for $885,000, 0.8 acres from Karen Ogden et al. in 2001 for $250,000 and a 6.5-acre conservation restriction over Vineyard Youth Tennis, Inc. in 2002 for $100,000.

Plans for Weahtaqua Springs Preserve include creating an out-and-back trail system to a viewing platform overlooking Lagoon Pond; creating a trail connection to Featherstone Farm and other conservation areas; leasing 1.9 acres of pasture; reclaiming a waterhole in the pasture; selectively cutting vegetation around large spreading oaks to create intimate views of the rolling savanna from the trail; and cutting trees and shrubs encroaching on lichen and grass areas in the shrubland.

Weahtaqua Springs Preserve will provide public access for birding, hiking, non-motorized bicycling and other uses. No hunting will be permitted on the Preserve due to the close proximity to houses and roads. Digging for archaeological artifacts is strictly forbidden on the Preserve. The trailhead at Featherstone Farm will be utilized for vehicular access to Weahtaqua Springs Preserve. No property attendant will be posted on this property.

All planning goals, objectives and strategies are outlined in detail in the final section of this management plan. To be implemented, this plan must be presented at a public hearing and approved by the land bank's Oak Bluffs and Tisbury town advisory boards, the Martha's Vineyard land bank commission and the commonwealth executive office of environmental affairs.

About the authors

Julie Russell is the primary author and has been the land bank ecologist since August 1999. She holds a Master of Science in zoology from Southern Illinois University, Carbondale, and a B.S. in wildlife biology from the University of Vermont. Property foreman Matthew Dix has worked on land bank properties since 1989. He has a background in natural resources and extensive knowledge of the region's natural history and local geography. Jeffrey Komarinetz has been a conservation land assistant since March 2000 and Vernon Welch has been a conservation land assistant since March 2002.

Table of Contents

1

I. Natural Resource Inventory

A. Physical Characteristics

1. Locus

Weahtaqua Springs Preserve is located at roughly 41°25' 30" N latitude and 70° 36' 30" W longitude. The Preserve comprises 35.1 acres. The portion of the Preserve owned in fee simple by the land bank is 28.8 acres in size and is located along Barnes Road to the north of Edgartown-Vineyard Haven Road in the town of Oak Bluffs and along Head of Pond Road in the town of Tisbury. The land bank property is shown as Parcel 7 on Oak Bluffs assessors map 40 and Parcel 10 on Tisbury assessor map 17. The conservation restriction is 6.5 acres in size and is located along Barnes Road to the south of Edgartown-Vineyard Haven Road. The conservation restriction is shown as a portion of Parcel 3 on Oak Bluffs assessors map 51. The Locus Map (page 3) is a section of the U.S.G.S. Edgartown quadrangle topographical map (U.S.G.S. 1972). An Aerial Photograph (page 4) taken in 1999 follows this map (Massachusetts Geographic Information System 2003).

2. Base Map

The **Base Map** (page 5) shows the location of basic elements of Weahtaqua Springs Preserve, such as boundaries, roads and the like. It is composed from surveys, photographs and direct observations.

3. Survey Maps

A survey of Lot 7, Map 40 (Oak Bluffs assessor book) was prepared by Schofield Brothers Inc. in 1986. This survey is shown on page 6 as **Survey Map 1**. A survey of lot 10 Map 17 (Tisbury assessor book) was prepared by Henry R. Anderson in 1967. This survey is shown on page 7 as **Survey Map 2**. A survey of the conservation restriction over 6.5 acres of Lot 3, Map 51 (Oak Bluffs assessors book) was prepared by Vineyard Land Surveying Inc. in 2000. This survey is shown on page 8 as **Survey Map 3**. Larger copies of these surveys are on file at the land bank office and are available for inspection by appointment.

4. Geology and Soils

The **General Soils Map** (page 9) depicts general classes of soil across Martha's Vineyard. An arrow indicates the location of Weahtaqua Springs Preserve. Weahtaqua Springs Preserve lies in soils generally identified as soils formed in glacial outwash or eolian material atop Martha's Vineyard outwash plains and moraines. Outwash is material, primarily sand, that dropped out of suspension in glacial meltwater streams as these streams slowed and spread on their advance to the Atlantic Ocean. Dramatic geologic features are present on the Preserve. A deep cut in the topography runs diagonally through the Preserve along a meltwater streambed created during the Wisconsin glaciation.

The soil conservation service (1986) has mapped six types of soil at Weahtaqua Springs Preserve. These are depicted on the **Soils Map** on page 10. Soils present on the Preserve are carver loamy coarse sand on zero to three percent slopes (CeA), three to eight percent slopes (CeB), 8 to 15 percent slope (CeC) and on 15 to 25 percent slope (CeD), riverhead sandy loam on zero to three percent slope (RvA) and pits, sand, and gravel (Pg) (SCS 1986).

According to the SCS (1986), the carver loamy coarse sands are very deep, level to gentle sloping and excessively drained. Water permeates rapidly through the soil and the available water capacity is very low. The soil can be droughty in late summer and the depth to seasonal high water is over six feet (SCS 1986). These soils are poorly suited to cultivated crops and woodland productivity due to drought conditions. Typical trees species on this soil are pitch pine, scrub oak, scarlet oak, black oak, and white oak (SCS 1986). Pits, sand and gravel are irregularly shaped areas where sand and gravel were removed for construction purposes. They are not suitable for farming, woodland and residential development (SCS 1986). Riverhead sandy loam soils are deep, level and well drained. This soil, unlike carver and pits, sand and gravel, is well suited to cultivated crops, hay and pasture and is moderately permeable (SCS 1986).

5. Topography and Hydrology

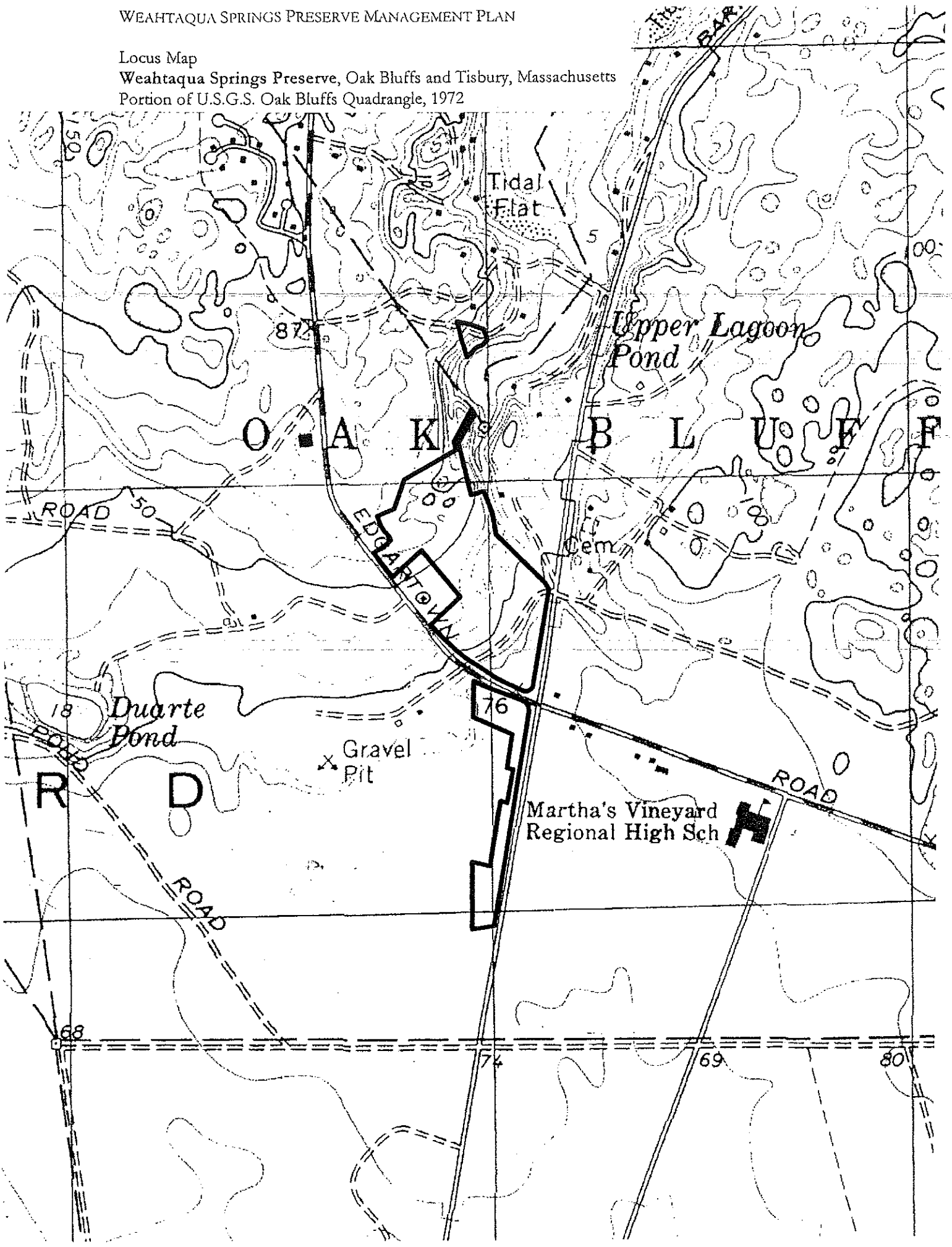
Weahtaqua Springs Preserve is a canvas of rolling hills and dramatic dips in the landscape. The contours of the property are illustrated on the **Topography Map** on page 11. Elevation ranges from approximately 10 to 70 feet above sea level.

Weahtaqua Springs Preserve is situated on top a network of underground springs that contribute to the Lagoon Pond watershed of Oak Bluffs. The Preserve is within the Lagoon Pond wellhead protection district, the public well setback, the inland zone of the coastal district DCPC and the Lagoon Pond DCPC (Wilcox 2003). Two dams are situated at the head of the Lagoon Pond on abutting Town of Oak Bluffs property. Prior to the 1960's, the dams served to create two recharge reservoirs, the Town Bound Reservoir and the Beech Grove Reservoir. Spring water that would otherwise feed into Lagoon Pond was trapped in these recharge reservoirs and trickled down through the soils into the Lagoon Pond well field. Now the well field is fed by ground water and the reservoir water spills back into Lagoon Pond (Perotta, Deacon 2003). A reference in a deed dated 1883 to a Beech Grove Mineral Spring Company suggests that mineral spring water from beneath the Preserve was bottled for sale at one time.

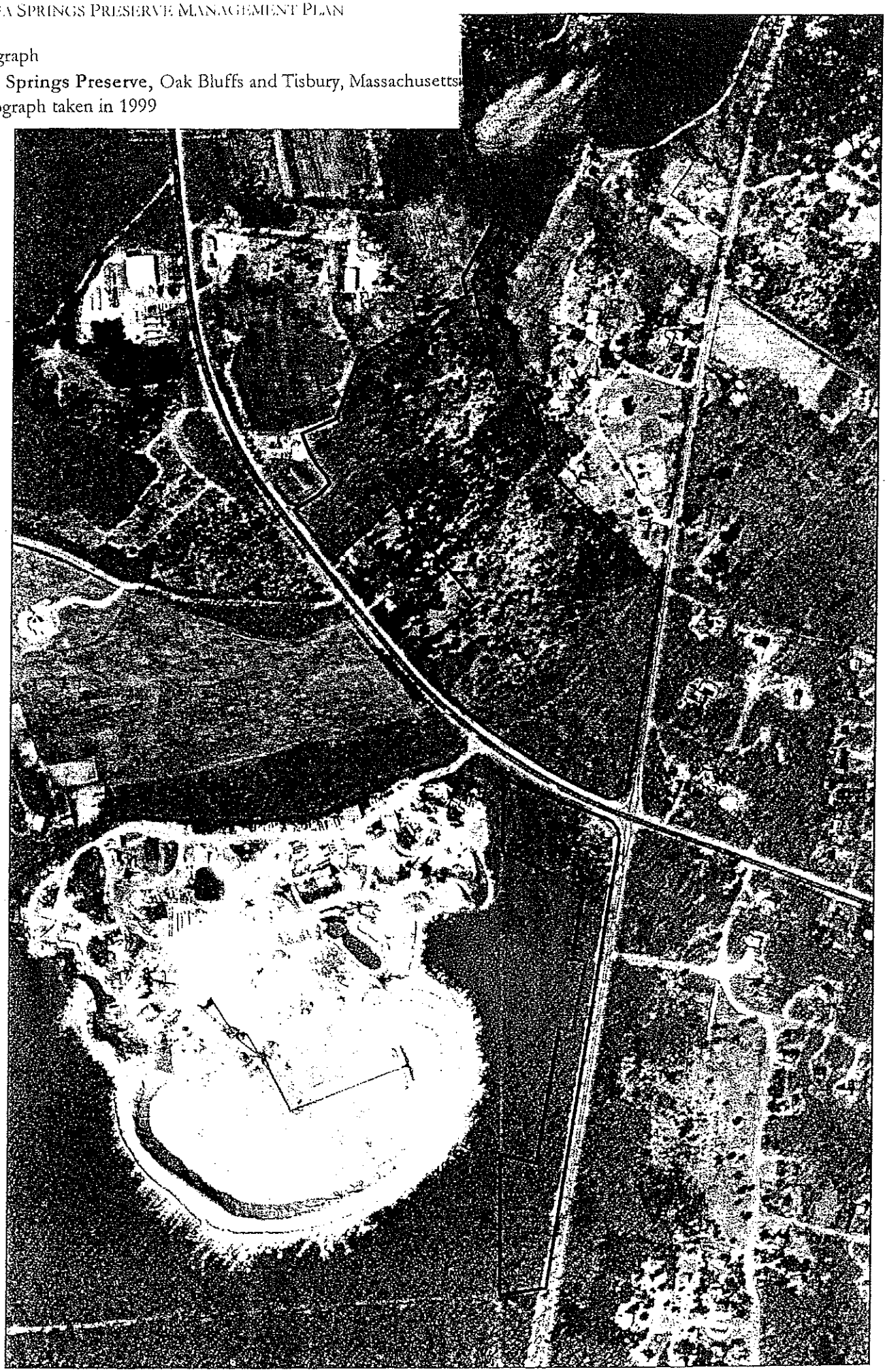
6. Ecological Processes

The primary ecological process occurring at Weahtaqua Springs Preserve is succession. The process of succession is broadly defined as the "recovery process of vegetation following any disturbance" (Bazzaz 1996). Successional habitats are created through human and natural activities. Clearing of natural vegetation for agriculture and the abandonment of less productive land are examples of human and natural activities that created successional habitats on Weahtaqua Springs Preserve. Elisha Smith, a descendent of the Smith family that once owned the Preserve and much of the land around it, reported that the land was used as pasture for pigs and cattle (Smith 2003). Aerial photographs taken in 1938 confirm that the Preserve was at one time cleared of vegetation with the exception of the mixed-oak woods at the intersection of Barnes Road and Edgartown-Vineyard Haven Road. The presence of eastern red cedars, an early successional plant, on the Preserve supports the use of Preserve for agriculture. Cedars are unpalatable to livestock, thus have an advantage over palatable plants that are grazed. Their advantage allows cedars to become well established even prior to pasture abandonment (Jorgensen 1978). The vast lichen fields, bare ground and well drained carver loamy course sandy soils indicate that although the land was cleared for agricultural purposes it was unsuitable for grazing or was overgrazed. Nearby oaks and pitch pines will, over decade's time, encroach upon the shrublands and grasslands and will ultimately dominate the overstory. Dry pastures with sandy soils often experience a period of pasture grasses and scattered cedars at abandonment, several decades of the establishment of sod-forming native grass post-abandonment, and several decades more before deep tap-rooting species take hold (Jorgensen 1978).

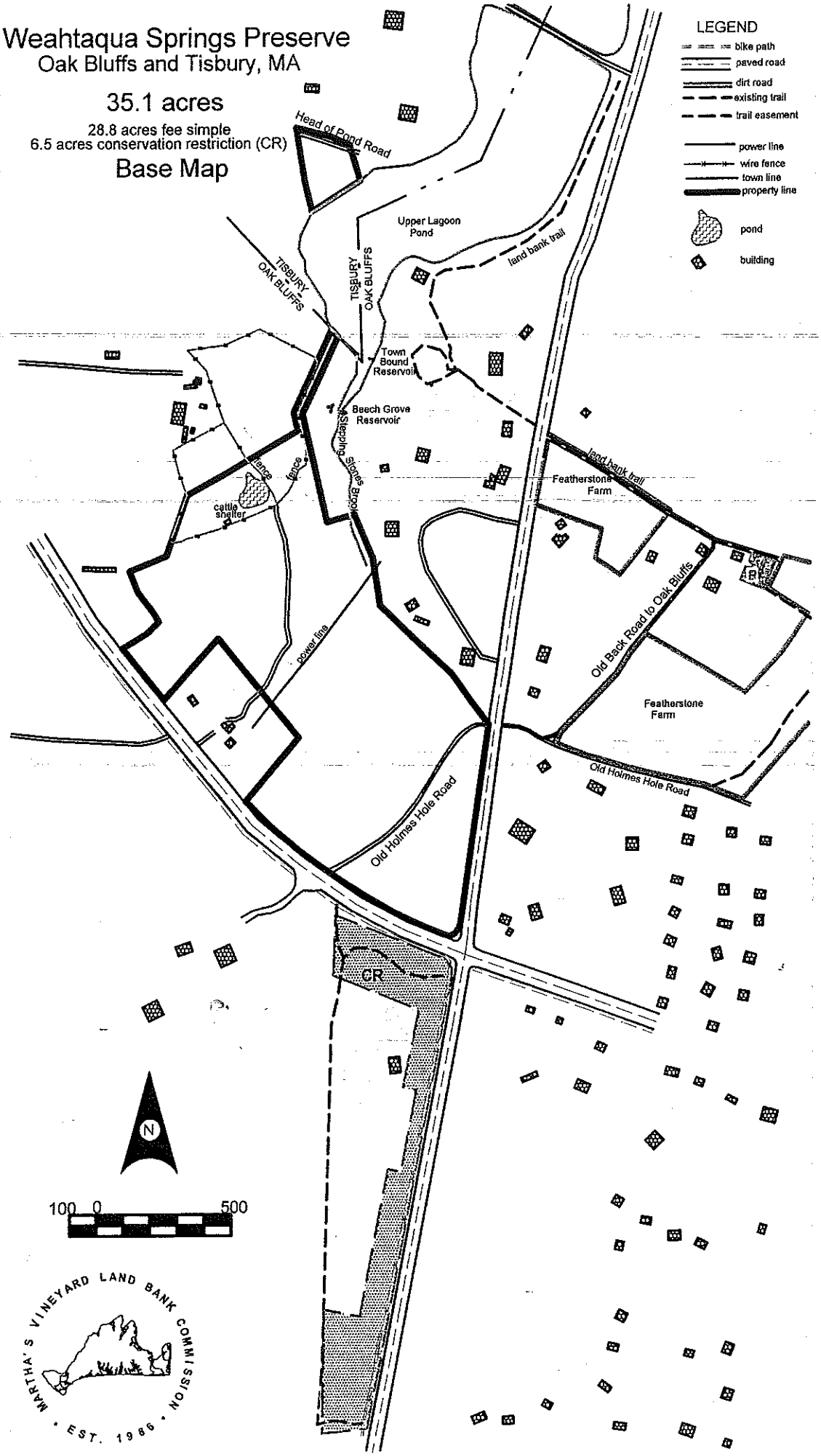
Locus Map
Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, Massachusetts
Portion of U.S.G.S. Oak Bluffs Quadrangle, 1972



Aerial Photograph
Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, Massachusetts
Aerial photograph taken in 1999

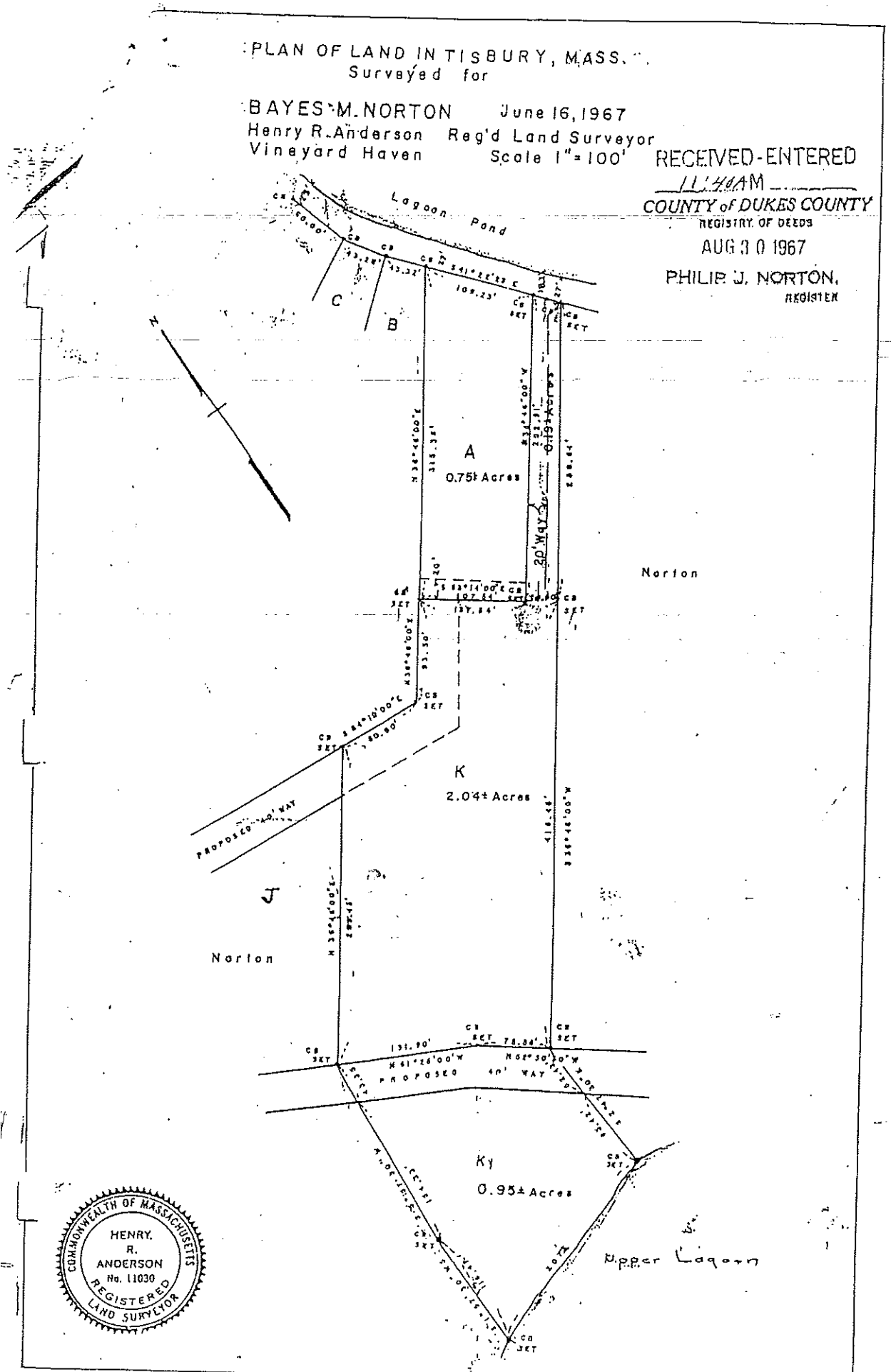


1" = 471'


Weahtaqua Springs Preserve
Oak Bluffs and Tisbury, MA
35.1 acres
28.8 acres fee simple
6.5 acres conservation restriction (CR)
Base Map
LEGEND
bike path
paved road
dirt road
existing trail
trail easement
power line
wire fence
town line
property line
pond
building
Head of Pond Road
Upper Lagoon Pond
TISBURY
OAK BLUFFS
land bank trail
Town Bound Reservoir
Beech Grove Reservoir
Stonewall
Brook
fence
cattle shelter
Featherstone Farm
power line
Old Back Road to Oak Bluffs
Old Holmes Hole Road
CR
N
100 0 500
MARTHA'S VINEYARD LAND BANK COMMISSION
EST. 1986

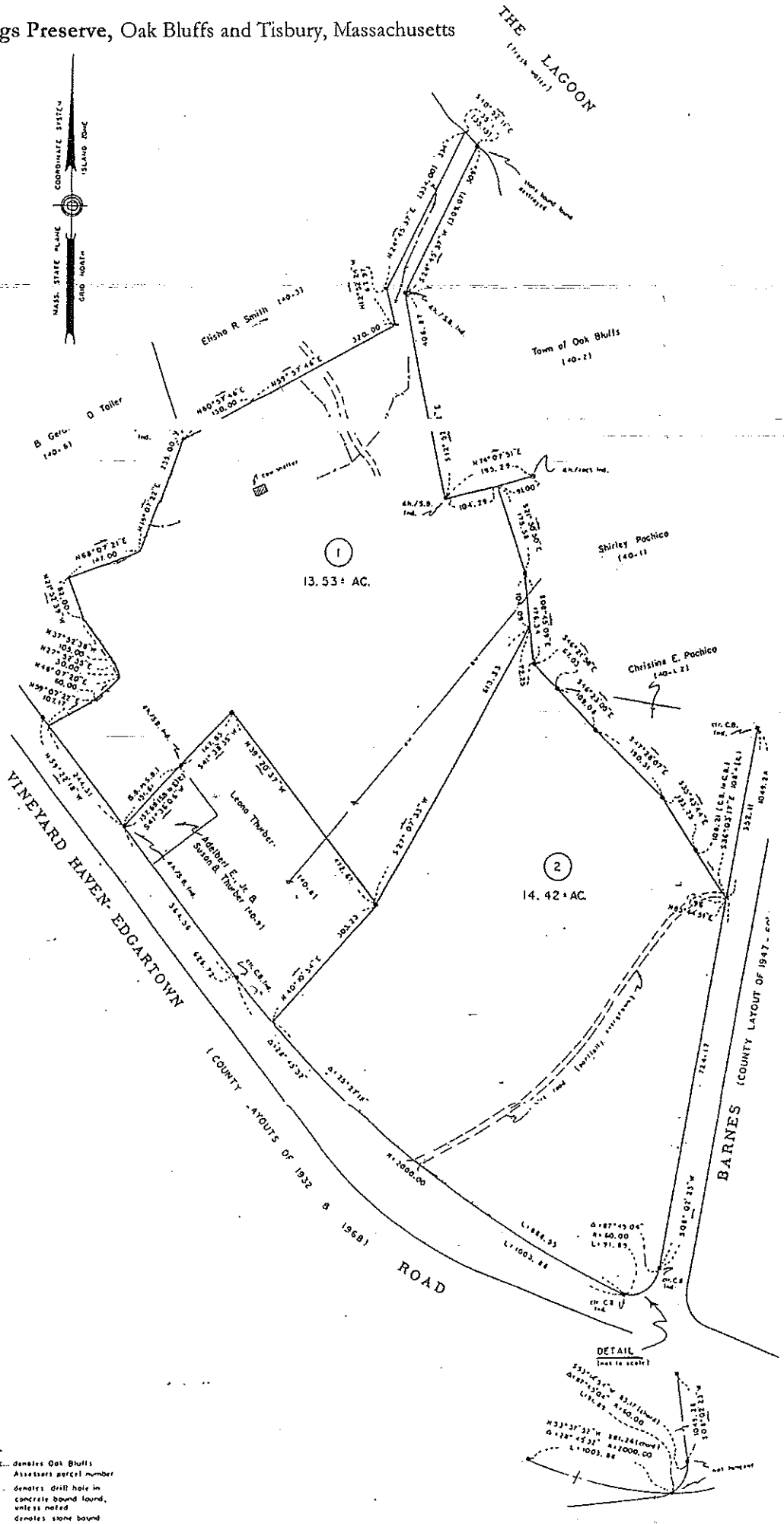
Survey Map 2

Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, Massachusetts



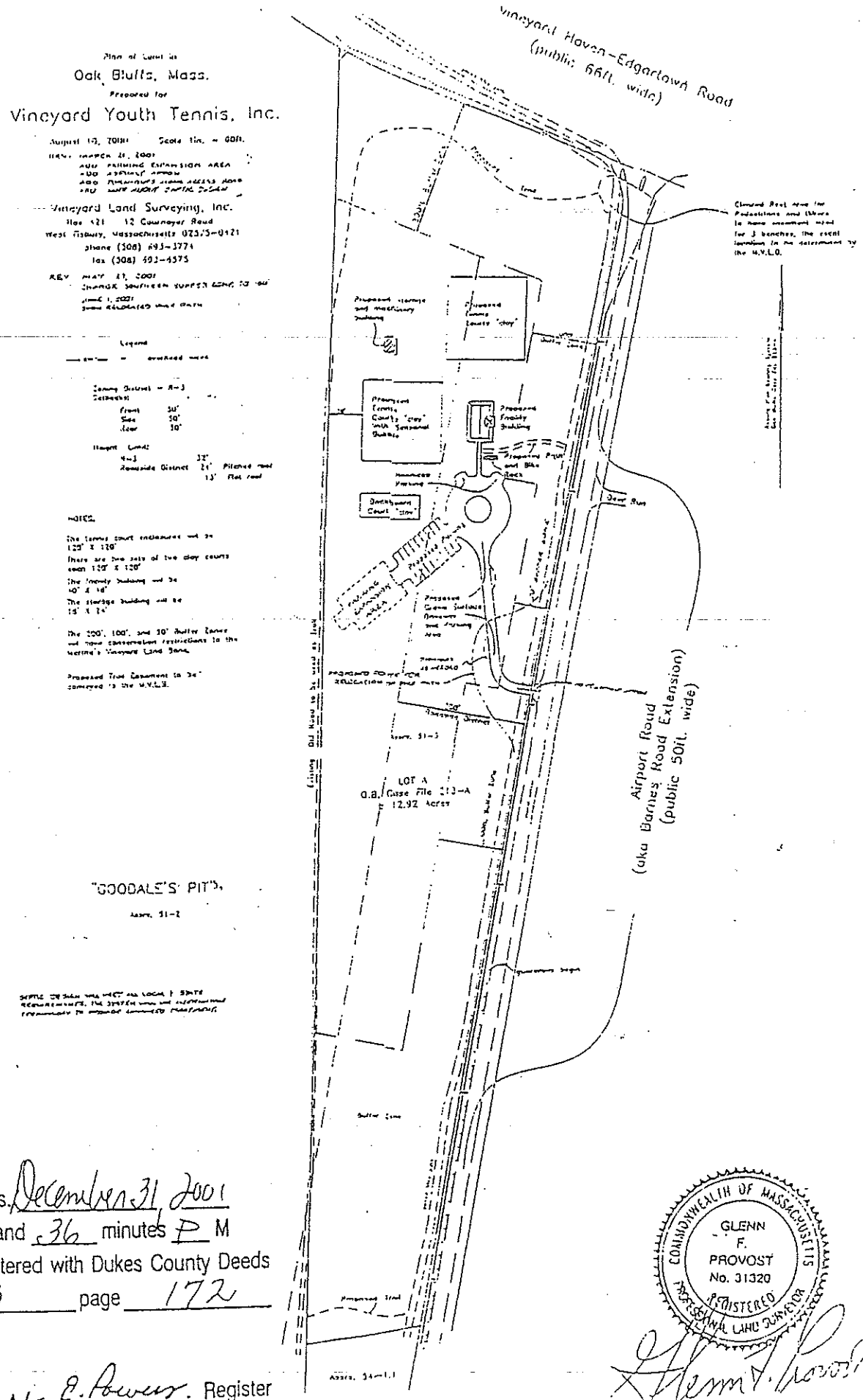
Survey Map 1

Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, Massachusetts



Survey Map 3

Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, Massachusetts



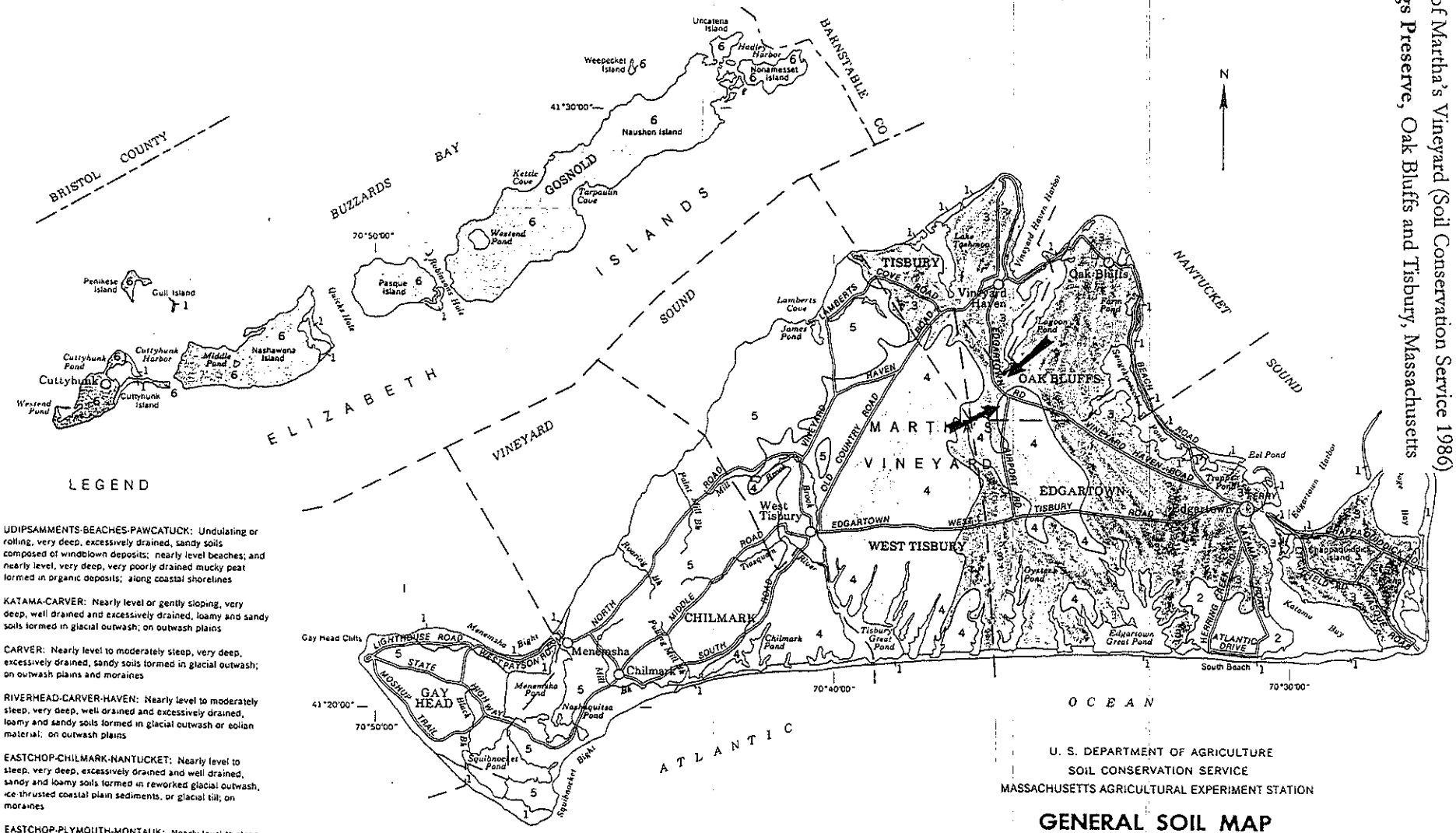
Edgartown, Mass. December 31 2001
at 1 o'clock and 36 minutes P M
received and entered with Dukes County Deeds
book 863 page 172

Attest: Dennis E. Powers. Register

COMMONWEALTH OF MASSACHUSETTS
GLENN F. PROVOST
No. 31320
REGISTERED PROFESSIONAL LAND SURVEYOR

Glenn F. Provost

General Soils Map of Martha's Vineyard (Soil Conservation Service 1986)
Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, Massachusetts



LEGEND

1 UDIPSAMMENTS-BEACHES-PAWCATUCK: Undulating or rolling, very deep, excessively drained, sandy soils composed of windblown deposits; nearly level beaches; and nearly level, very deep, very poorly drained mucky peat formed in organic deposits; along coastal shorelines

2 KATAMA-CARVER: Nearly level or gently sloping, very deep, well drained and excessively drained, loamy and sandy soils formed in glacial outwash; on outwash plains

3 CARVER: Nearly level to moderately steep, very deep, excessively drained, sandy soils formed in glacial outwash; on outwash plains and moraines

4 RIVERHEAD-CARVER-HAVEN: Nearly level to moderately steep, very deep, well drained and excessively drained, loamy and sandy soils formed in glacial outwash or eolian material; on outwash plains

5 EASTCHOP-CHILMARK-NANTUCKET: Nearly level to steep, very deep, excessively drained and well drained, sandy and loamy soils formed in reworked glacial outwash, ice-thrusted coastal plain sediments, or glacial till; on moraines

6 EASTCHOP-PLYMOUTH-MONTAUK: Nearly level to steep, very deep, excessively drained and well drained, sandy and loamy soils formed in reworked glacial outwash or in glacial till, on moraines

Compiled 1983

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

DUKES COUNTY, MASSACHUSETTS

Scale 1:126,720

1 0 1 2 3 4 Miles

1 0 3 6 Km

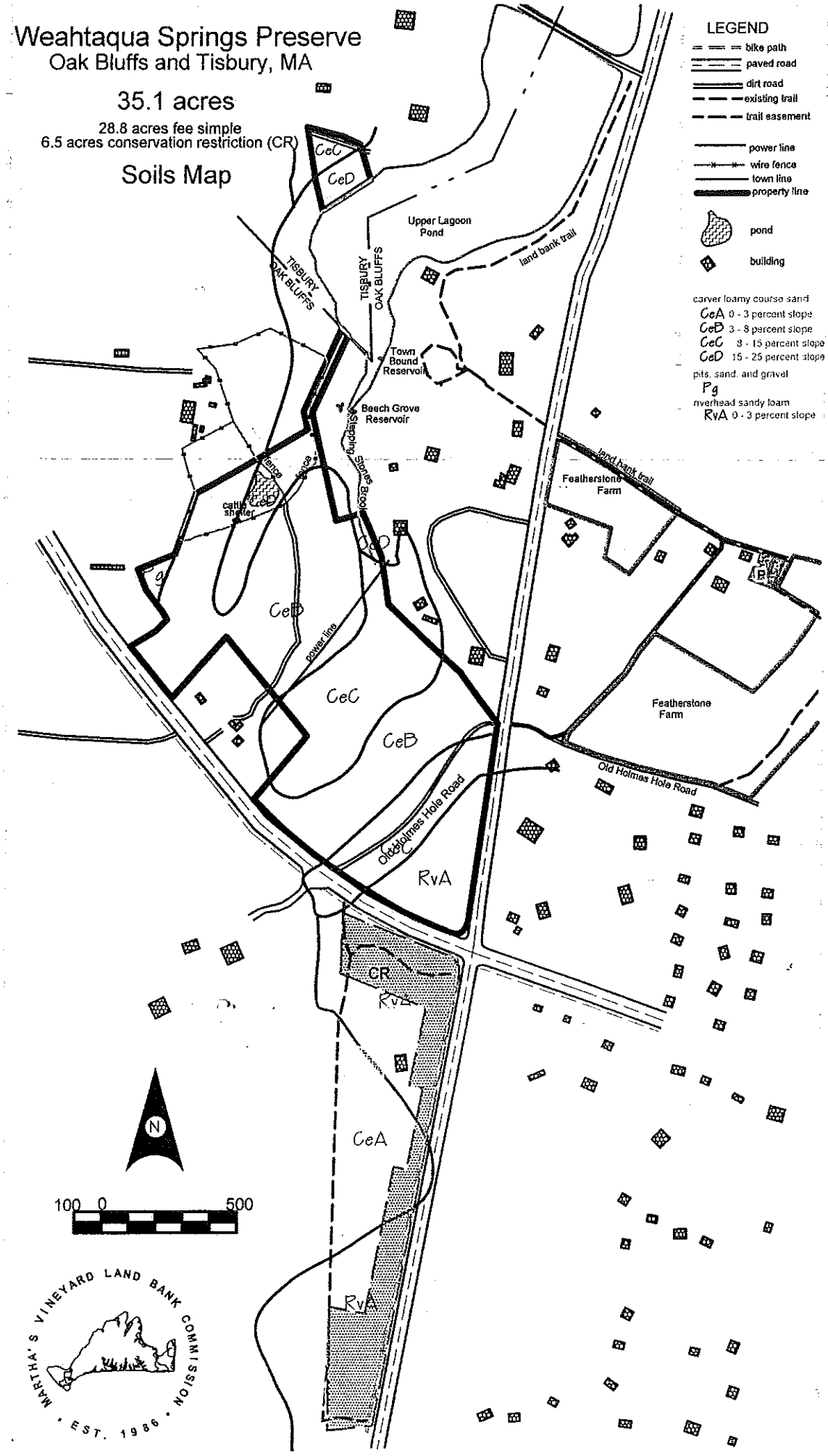
Weahtaqua Springs Preserve

Oak Bluffs and Tisbury, MA

35.1 acres

28.8 acres fee simple
6.5 acres conservation restriction (CR)

Soils Map



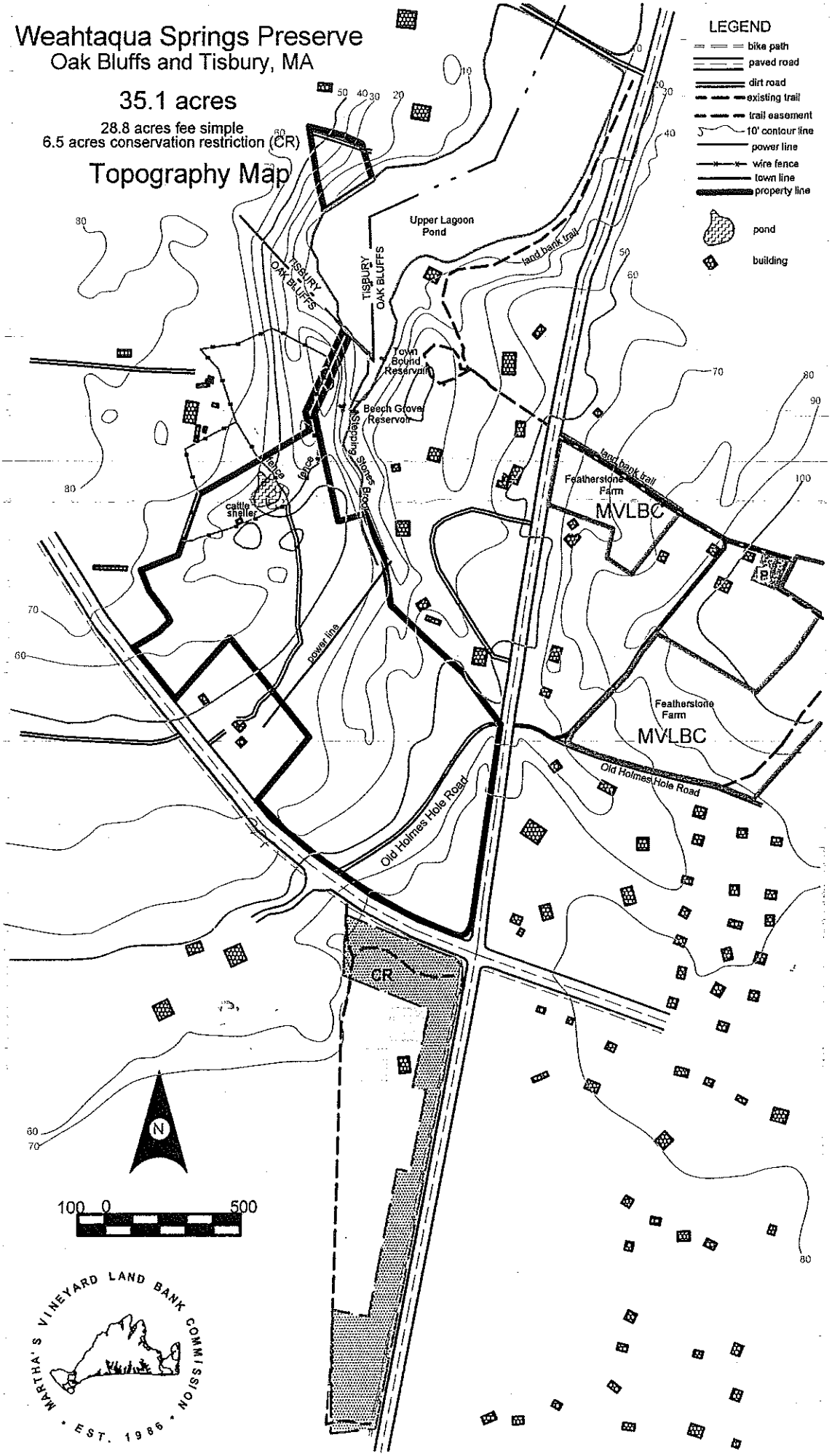
Weahtaqua Springs Preserve

Oak Bluffs and Tisbury, MA

35.1 acres

28.8 acres fee simple
6.5 acres conservation restriction (CR)

Topography Map

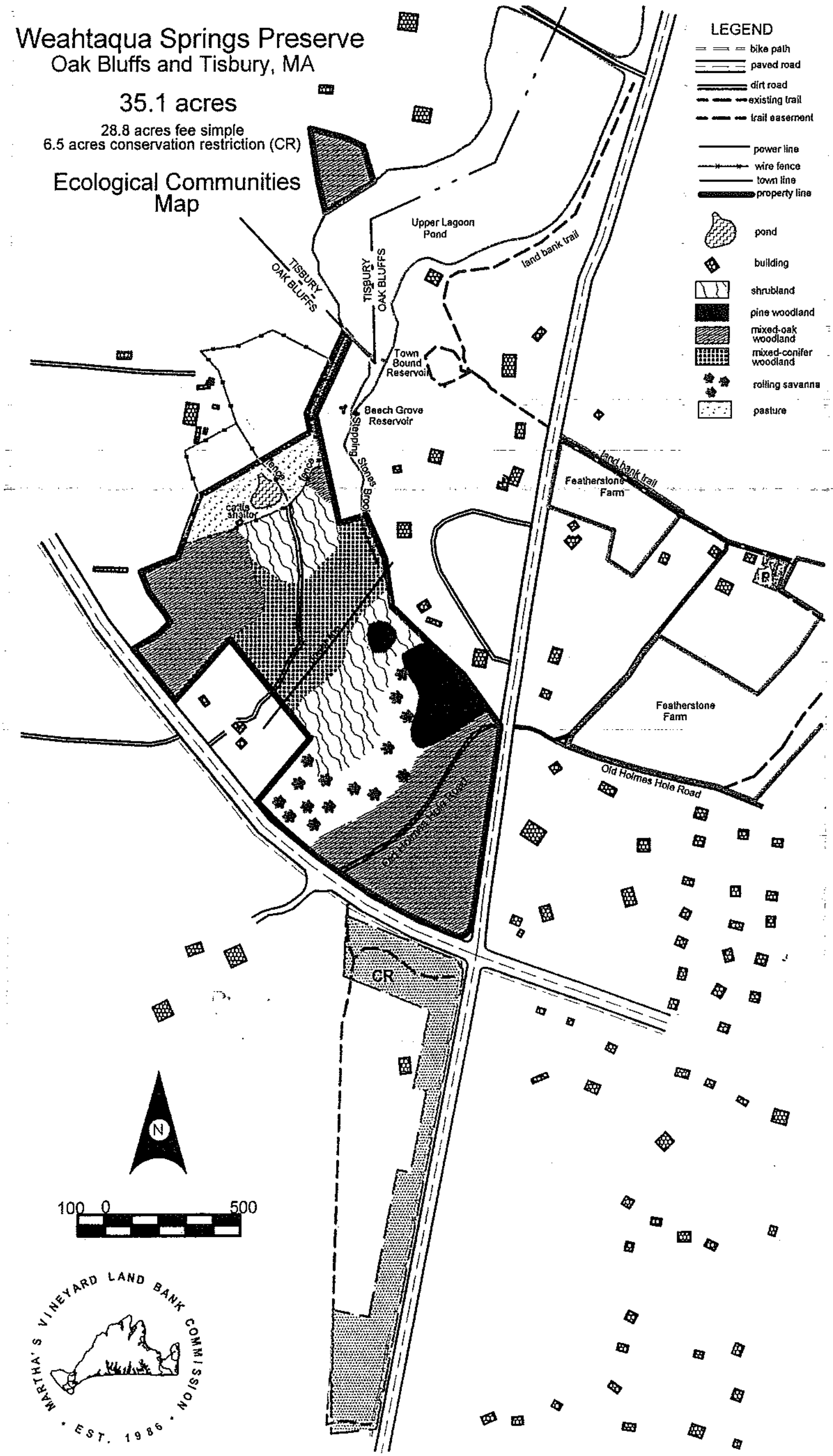


Weahtaqua Springs Preserve
Oak Bluffs and Tisbury, MA

35.1 acres

28.8 acres fee simple
6.5 acres conservation restriction (CR)

Ecological Communities Map



B. Biological Characteristics

1.Vegetation

Seven cover types compose Weahtaqua Springs Preserve, as shown on the **Ecological Communities Map** (Page 12). These seven cover types are dispersed among three vegetation communities: woodland, shrubland and grassland. The mixed-oak woodland (11.4 acres), mixed-conifer woodland (4.6 acres), pitch pine woodland (1.8) and rolling oak savanna (3.9 acres) are four cover types that compose the woodland vegetation community. Shrubland occurs in 4.9 acres of the Preserve and is the only cover type composing the shrubland vegetation community. The remaining two cover types, sandplain grassland and pasture (1.9 acres), compose the grassland vegetation community.

The shrubland vegetation community contributes the greatest to the floristic richness of vascular plants occurring on the Preserve and is represented by 68% of the total number of vascular plant species known to occur on the Preserve (Table 1). Species richness is the number of species present in a community (Begon et al. 1990). The woodland community is the least rich in vascular plant species, contributing only 41% of the total species known to occur on the Preserve. A total of 114 vascular plant species are known to occur on the Preserve (Table 1).

Contrary to vascular plants, the grassland boasts the greatest floristic diversity of non-vascular plants on the Preserve. The grassland accounts for 86% of mosses and lichens known to occur on the Preserve (Table 1). Many lichens and moss species crave light. The grassland offers the greatest amount of ground light of any vegetation community on the Preserve. A total of eight lichen and six moss species are known to occur on the Preserve (Table 1).

Weahtaqua Springs Preserve does not support a diverse or abundant population of exotic invasive plants. Oriental bittersweet, Russian olive, garlic mustard and multiflora rose are the known exotic invasive plants on the Preserve. Oriental bittersweet was the only exotic invasive plant observed within in a survey plot.

Three watch listed plant species – butterfly-weed, post oak and little ladies' tresses – occur on the Preserve. Watch-listed plants are species that are rare or uncommon in Massachusetts and for which enough information, such as number of sites and severity of decline, is lacking to list them as "Rare Native Plants of Massachusetts". Butterfly-weed and little ladies' tresses are specific to sandplain grasslands and typically occur in dry, open sandy fields (MA NHESP 1982, MA NHESP 1985). Post oak is a small to medium size oak that prefers dry soils and is often associated with sandplain grasslands (Swain and Kearsley 2000).

In 2001, Julie Russell and Matthew Dix inventoried the vegetation communities of Weahtaqua Springs Preserve. The point sampling method as described by Avery and Burkhart (1994) was used to inventory the trees of the woodland community. Six, 2-m^2 circular plots were used to inventory the understory at each woodland point. Density and percent cover of understory vegetation was recorded for all plots. The line-transect method as described by Tansley and Chipp (1926) was employed to inventory the shrubland. Plant species and corresponding percent cover were recorded within each 1.5 meter interval along seven line transects, each 30.5 meters long. The grassland community was inventoried following methods described by Dunwiddie (1986). Species diversity and density were recorded within 1-m^2 circular plots located at random locations determined using random numbers table and a dot-grid. The lichen population within the grassland community was inventoried following methods described by Stotler (1976). Forty-eight 50cm x 50cm quadrats were sampled

along two 30m transects at 6m intervals above and below the transect line. Each quadrate was mapped on grid paper. Species occurrence and total species cover were calculated from the grid-maps. Plant species at Weahtaqua Springs Preserve are listed in Appendix A. with proper nomenclature according to Gleason and Cronquist (1991). A description or qualitative summary of each community type follows:

a. Woodland

11.4 acres of mixed-oak woodland, 1.8 acres of pitch pine woodland, 4.6 acres of mixed-conifer woodland and 3.9 acres of rolling oak savanna compose the woodland vegetation community. Woodland trees are, on average, 36 feet high and 8 inches in diameter at breast height. The estimated basal area per acre is 32 square feet. There are an estimated 44 trees per acre in the dbh class of 10 inches and greater. The woodland exhibits the least diversity of any vegetation community and is habitat to 46 % of the total species known to occur on the Preserve (Table 1).

Black oak dominates the overstory and was sampled in 100% of plots inventoried in the mixed-oak woodland. White oak and specimen scarlet oaks also are present but in fewer numbers compared to black oak. Small beech groves are situated on either side of the old roads that run through the mixed-oak woodland. The next generation of canopy trees growing under the shade of the overstory trees consists of oaks, American beech and pitch pine. Understory vegetation in the mixed-oak woodland is dense and dominated by plants of the Ericaceae family. Common lowbush blueberry and black huckleberry are the most dominant plants in the understory of the mixed-oak woodland and have importance values of 38.4 and 30.8, respectively. They occurred in greater than 60% of plots sampled. Other understory plants associated with the mixed-oak woodland include Carolina Rose, black cherry, arrowwood, highbush blueberry, bracken fern, American hazelnut and poison ivy. A diverse array of herbaceous and graminoid species ranging from <1-4 feet tall blanket the woodland floor and are ubiquitously along old roads and trails that meander and cut through the mixed-oak woodland. Virginia creeper and prickly dewberry wind their way along the forest floor. Canada mayflower, striped wintergreen, wild sarsaparilla, wood strawberry, Pennsylvania sedge and wintergreen commonly grow in the banks and center rise of the old roads in the mixed-oak woodland.

Pitch pines dominate the overstory of the pitch pine woodland leaving the understory well-shaded and sparse with vegetation. Small clumps of lowbush blueberry, highbush blueberry, arrowwood, and black cherry dominate the dark understory created by the dense canopy of pith pines. Where light does penetrate the woodland floor, panic grass and little bluestem occur. These grasses are more commonly associated with grasslands and represent a time when the pitch pine woodland was part of once open grassland (Swain and Kearsley 2000). Poison ivy is ubiquitous throughout the pitch pine woodland, growing as small shrubs and hefty vines. Very few ground cover species are observed in the pitch pine woodland. Most occur along trails meandering through the pitch pine woodland. The pitch pine woodland is fire-dependent and well adapted to forest fires (Jorgensen 1978). Fire thins out understory species; reducing regeneration competition between pine and other species and thus ensuring the next generation will be one dominated by pines (Jorgensen 1978).

A dense canopy of red cedar and pitch pine dominate the overstory of the mixed-conifer woodland. Red cedars are typical forest invaders of old fields. They live to be 200-300 years old in open habitats and grow very slowly. The fruit of the red cedar is an important wildlife food item. Approximately 90 species of birds are known to periodically feed at red cedars (Eastman 2003). The property boundary runs along a ridge of the ravine at the head of Lagoon Pond. Red maple, white pine, oaks and Norway spruce are present along this ridge. A dense mixture of shrubs such as oriental bittersweet, honeysuckle, poison ivy, rose, scrub oak, and shining sumac create a nearly impassable understory. The mixed-conifer woodland is in a successional state,

somewhere between an abandoned field and climax woodland. Due to the droughty sandy soils succession is occurring at a very slow pace.

A rolling oak savanna is present on 3.9 acres of sloping grassland/heathland on Weahtaqua Springs Preserve. An open canopy of post oak, black oak, white oak, and scarlet oak form the oak savanna. Each oak is a specimen of tree growth uninhibited by light. Savanna oaks are characteristic of low spreading branches. Savanna trees grow horizontally to monopolize on light and need not grow vertically to compete for light as an understory tree would have to. Patchy areas of grassland and heathland compose the understory of the oak savanna. Dominant grass species are little bluestem and sheep fescue. Bare ground and lichen are common of the sloping sandy soil of the rolling savanna. Thickets of lowbush blueberry, loaded with small sweet berries, form in areas where tree cover and grasslands are not dominant.

b. Shrubland

Shrubland occurs in 4.9 acres of the Preserve and is the only cover type composing the shrubland vegetation community. The shrubland is a more diverse vegetation community than the woodland and represents 69% of the Preserve's flora. Grass, shrub, and tree components compose the shrubland adding to its diversity. The shrubland is in a slower successional state than the mixed-conifer woodland, due possibly to the combination of droughty soils and slope. The dominant grassland species are sheep fescue and little bluestem, with 15% and 13% relative frequency, respectively. Other herbaceous and graminoid species that are present in the shrubland are sickle-leaved golden aster, rockrose, and hawkweed. Lichens and moss cover a good portion of open space in the shrubland. Lichens and moss constitute the fourth-greatest relative percent cover of all species inventoried in the shrubland. Scrub oak, lowbush blueberry and bayberry are the three most common shrubs of the shrubland followed by less common shrubs such as, honeysuckle, Carolina rose, arrowwood, wild indigo, and black huckleberry. Scattered black cherry, black oak, post oak, red cedar, and pitch pine are the dominant trees in the shrubland.

c. Grassland

The remaining two cover types, sandplain grassland, and pasture (1.9 acres), compose the grassland vegetation community. The grassland is moderately diverse and is represented by 53% of the total species known to occur on the Preserve.

The sandplain grassland habitat occurs in patches and is a component of the rolling savanna, mixed-conifer woodland, and shrubland cover types. Lichen, grass, herbaceous plants, and bare ground compose the sandplain grassland cover type. Lichen is the dominant cover of the sandplain grassland with a relative dominance of 25% and frequency of occurrence of 68%. Eight fruticose lichens compose the lichen cover type. *Cladina arbuscula* was the most dominant lichen observed. It is a colony-forming lichen common to soils and humus of open pastures and fields (Hale 1979). *Cladonia caroliniana* is the second most dominant lichen observed in the sandplain grassland. It also grows in large mats and is common on sandy soils and humus of open areas (Hale 1979). Lichens are sensitive to pollution due to surface absorption and their lack of roots. The presence of these lichen colonies suggests that the air is relatively clean in that area (Lyman 1996).

Grasses follow lichens in dominance in the sandplain grassland. Little bluestem and sheep fescue are the most dominant grasses, with relative dominance of 24% and 11%, respectively, and frequency of occurrence of 91% and 81%, respectively. Bare ground is the next common cover type with a relative dominance of 8% and frequency of occurrence of 22%. Bare ground occurs in areas where a blow out of vegetation and topsoil occurs due to weather and erosion. Various herbaceous plants such as false heather, sickle-leaved golden

aster, rockrose, butterfly-weed, orange grass, and earth star occur in sparse numbers amidst the lichen and grassy components of the sandplain grassland. Similar to the shrubland and mixed-cedar woodland, the sandplain grassland is in a state of early succession. Future overstory trees in the form of young cedar, oak and cherry saplings are present in the grassland.

The 1.9 acres of pasture-land are part of a larger pasture to the north. The pasture was not formally inventoried as approximately a dozen grazing cattle, owned by a neighboring farmer, are using it. Sheep fescue, velvet grass, red top, orchard grass, rye grass, and timothy are common grasses that are often associated with pastures. An approximately 10,000 square foot watering hole is situated in a low area in the Pasture. It is filled with decomposing leaves from surrounding oaks and runoff from the pasture. A mat of duckweed turns the waterhole from murky brown to bright green in the summer months.

Table 1. Flora of the Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, MA.

	Species name		Morph	Vegetation communities [a]			Survey [c]
	Scientific	Common		Grassland [b]	Shrubland	Woodlands	
	Non-vascular plants						
1	*Cladina rangiferina*	a fruticose lichen	lichen	U			1,2
2	*Cladina chlorophaea*	a fruticose lichen	lichen	x			1,2
3	*Cladina arbuscula*	a fruticose lichen	lichen	A	x		1,2
4	*Cladonia uncialis*	a fruticose lichen	lichen	U			1,2
5	*Cladonia caroliniana*	a fruticose lichen	lichen	A	x		1,2
6	*Cladina mitis*	a fruticose lichen	lichen	U			1,2
7	*Usnea strigosa*	a fruticose lichen	lichen	U	x	x	1,2
8	*Cetraria arenaria*	a fruticose lichen	lichen	U			1,2
9	*Leucobryum glaucum*	pincushion moss	moss	x			1,2
10	*Polytrichum species*	a bearcup moss	moss	C	x		1,2
11	*Atrichum angustatum*	a bearcup moss	moss	x	x		1,2
12	*Orthotrichum sp.*		moss			x	1,2
13	*Entodon seductrix*	tree moss	moss			x	1,2
14	*Dicranum sp.*	windblown moss	moss	x		x	1,2
		Total # of abundant species		2	0	0	
		Total # of common species		1	0	0	
		Total # of uncommon species		5	0	0	
		Total # of species present outside of survey		4	5	4	
		Total # of species		12	5	4	
	Vascular plants						
1	*Acer rubrum*	red maple	tree			U	1,2
2	*Achillea millefolium*	yarrow	herb	x	x		1,2
3	*Agrostis gigantea*	redtop	graminoid	U	x		1,2
4	*Agrostis capillaris*	Rhode Island bent grass	graminoid	x	x		2
5	*Alliaria officinalis*	garlic mustard	herb			x	2
6	*Amelanchier species*	shadbush species	shrub		x	x	2
7	*Anthoxanthum odoratum*	sweet vernal grass	graminoid	U	U		1,2
8	*Aralia nudicaulis*	wild sarsaparilla	herb			x	2
9	*Arctium minus*	common burdock	herb	x			2
10	*Arctostaphylos uva-ursi*	bearberry	herb	x	U		1
11	*Asclepias syriaca*	common milkweed	herb	x			2
12	*Asclepias tuberosa*	butterflyweed	herb	U	U		1

	Species name		Morph	Vegetation communities			Survey
	Scientific	Common		Grassland	Shrubland	Woodlands	
13	*Aster dumosus*	bushy aster	herb	x	x	x	2
14	*Aster novae-angliae*	New England Aster	herb		x		2
15	*Aster paternus*	toothed white-topped aster	herb	x	U		1,2
16	*Aster solidagineus*	narrow-leaved white-topped aster	herb	x	x		2
17	*Baptisia tinctoria*	wild indigo	herb		U		1,2
18	*Betula populifolia*	grey birch	tree			x	2
19	*Carex pensylvanica*	pennsylvania sedge	graminoid	U	U	U	1,2
20	*Carex swanii*	swans sedge	graminoid		x		2
21	*Carya tomentosa*	mockernut hickory	tree			U	1
22	*Celastris orbiculatus*	oriental bittersweet	vine		U	x	1,2
23	*Chimaphila maculata*	striped wintergreen	herb		U	U	1,2
24	*Chrysopsis falcata*	sickle-leaved golden aster	herb	C	U		1,2
25	*Clethra alnifolia*	sweet pepperbush	shrub		x	x	2
26	*Comptonia peregrina*	sweet fern	herb	U			1,2
27	*Corylus americana*	Amerian hazelnut	shrub		x	U	1,2
28	*Cyperus filiculmis*	button flat sedge	graminoid	U	U		1
29	*Danthonia spicata*	poverty grass	graminoid	U	U		1,2
30	*Deschampsia flexuosa*	hair grass	graminoid	x	x		2
31	*Dichanthelium scoparium*	broom panic-grass	graminoid	x	x		2
32	*Elaeagnus species*	autumn/russian olive	shrub		x	x	2
33	*Epigaea repens*	trailing arbutus	herb			x	2
34	*Eragrostis spectabilis*	purple lovegrass	graminoid	x	U		1,2
35	*Euphorbia maculata*	milk purslane	herb	x	x		2
36	*Fagus grandifolia*	american beech	tree			U	1,2
37	*Festuca ovina*	sheep fescue	graminoid	A	A		1,2
38	*Festuca rubra*	red fescue	graminoid	x	x		2
39	*Festuca filiformis*	hair fescue	graminoid	x	x		2
40	*Fragaria vesca*	wood strawberry	herb			x	2
41	*Gaultheria procumbens*	wintergreen	shrub			U	1,2
42	*Gaylussacia baccata*	black huckleberry	shrub		U	A	1,2
43	*Gaylussacia frondosa*	dangleberry	shrub			x	2
44	*Geastrum sp.*	earth star	fungus	U	x		1,2
45	*Gnaphalium obtusifolium*	sweet everlasting	herb	U	U		1,2
46	*Hamamelis virginiana*	witch-hazel	shrub			x	2

	Species name		Morph	Vegetation communities			Survey
	Scientific	Common		Grassland	Shrubland	Woodlands	
47	*Helianthemum canadense*	frostweed	herb		U		1
48	*Helianthemum bicknelli*	Bicknelli rockrose	herb	C			1,2
49	*Hieracium pratense/ caespitosum*	field hawkweed	herb	U			1,2
50	*Hieracium pilosella*	mouse ear hawkweed	herb	U	U		1,2
51	*Holcus lanatus*	velvetgrass	graminoid	x	x		2
52	*Hudsonia tomentosa*	false heather	herb	U			1,2
53	*Hypericum perforatum*	common St. Johnswort	herb	x	x		2
54	*Hypericum gentianoides*	orange grass	herb	U	U		1,2
55	*Hypochoeris radicata*	cat's ear	herb	U	U		1,2
56	*Hypoxis hirsuta*	yellow star grass	herb		x	x	2
57	*Iris versicolor*	blue flag iris	herb	x	x		2
58	*Juncus gerardii*	blackgrass	graminoid		x		2
59	*Juncus tenuis*	path rush	graminoid	C	U		1,2
60	*Juniperus virginiana*	red cedar	shrub	U	U	U	1,2
61	*Kalmia angustifolia*	sheep laurel	shrub			x	2
62	*Lechea mucronata*	hairy pinweed	herb		x		2
62	*Lemma sp.*	duckweed	herb	x			
63	*Linaria canadensis*	blue toadflax	herb		x		2
64	*Lonicera morrowi*	Morrow's honeysuckle	shrub		U	x	1,2
65	*Lysimachia quadrifolia*	whorled loose strife	herb	x	x		2
66	*Maianthemum canadense*	Canada mayflower	herb		U	U	1,2
67	*Melampyrum lineare*	cow-wheat	herb		x	x	2
68	*Monotropa uniflora*	indian pipes	herb			x	2
69	*Myrica pensylvanica*	bayberry	shrub		U		1,2
70	*Nyssa sylvatica*	tupelo	tree			U	1,2
71	*Osmunda cinnamonea*	cinnamon fern	fern			x	2
72	*Panicum lanuginosum*	panicgrass	graminoid	U			1,2
73	*Panicum virgatum*	switchgrass	graminoid	x	x		2
74	*Parthenocissus quinquefolia*	virginia creeper	vine		x	U	1,2
75	*Panicum species*	panicgrass species	graminoid	x			2
76	*Picea abies*	Norway spruce	tree			x	2
77	*Pinus rigida*	pitch pine	tree		U	U	1,2
78	*Pinus strobus*	white pine	tree		U	x	1,2

	Species Name		Morph.	Vegetation communities			Survey
	Scientific	Common		Grassland	Shrubland	Woodlands	
79	*Polygonella articulata*	sand joint-weed	herb	U			1
80	*Populus grandidentata*	bigtooth aspen	tree		x	x	2
81	*Potentilla canadensis*	dwarf cinquefoil	herb	U	U		1,2
82	*Prunus maritima*	beach plum	shrub		U		1,2
83	*Prunus serotina*	black cherry	tree	U	C	A	1,2
84	*Pteridium aquilinum*	bracken fern	fern			U	1,2
85	*Quercus alba*	white oak	tree	U	U	A	1,2
86	*Quercus coccinea*	scarlet oak	tree		U	C	1,2
87	*Quercus ilicifolia*	scrub oak	tree	C	C		1,2
88	*Quercus stellata*	post oak	tree	U	U		1,2
89	*Quercus velutina*	black oak	tree	U	U	A	1,2
90	*Rhus copallina*	shining sumac	shrub	U	U	x	1,2
91	*Robinia pseudoacacia*	black locust	tree	x		x	2
92	*Rosa carolina*	pasture rose	shrub	U	U	U	1,2
93	*Rosa multiflora*	multiflora rose	shrub	x	x	x	2
94	*Rubus allegheniensis*	common blackberry	vine		x		2
95	*Rubus flagellaris*	prickly dewberry	vine	U	U	U	1,2
96	*Rubus occidentalis*	black raspberry	vine		x		2
97	*Rumex acetosella*	field sorrel	herb	U	U		1
98	*salix discolor*	pussy willow	tree			x	2
99	*Sassafras albidum*	sassafras	tree			x	2
100	*Schizachyrium scoparium*	little bluestem	graminoid	A	A		1,2
101	*Smilax rotundifolia*	common greenbrier	vine		x	x	2
102	*Solidago nemoralis*	gray goldenrod	herb	x			2
103	*Solidago odora*	sweet goldenrod	herb	U	x		1,2
104	*Solidago rugosa*	rough-stemmed goldenrod	herb	x	x		2
105	*Spiranthes tuberosa*	little ladies' tresses	herb		x		2
106	*Toxicodendron radicans*	poison ivy	herb	U	U	U	1,2
107	*Urtica dioica*	stingin nettle	herb	x			2
108	*Vaccinium angustifolium*	common lowbush blueberry	shrub	U	U	A	1,2
109	*Vaccinium corymbosum*	highbush blueberry	shrub			U	1,2
110	*Vaccinium pallidum*	lowbush blueberry	shrub		U	A	1,2
111	*Viburnum dentatum*	southern arrowwood	shrub		U	C	1,2
112	*Viburnum recognitum*	northern arrowwood	shrub		U	U	1,2

	Species Name		Morph.	Vegetation communities			Survey
	Scientific	Common		Grassland	Shrubland	Woodlands	
113	*Vicia americana*	purple vetch	vine	x	x		2
114	*Bare ground*		none	C			2
	Total # of abundant species			2	2	6	
	Total # of common species			4	2	2	
	Total # of uncommon species			29	40	18	
	Total # of species present outside of survey			25	34	27	
	Total # of species unique to a community			13	17	21	
	Total # of species			60	78	53	
	% of total species			53	68	46	

[a] grassland = rolling savanna, pasture; shrubland = shrubland, woodland = mixed-oak woodland, pitch pine woodland and mixed-conifer woodland.

[b] A = abundant (percent occurrence greater than 50 %), C = common (percent occurrence greater than 20 % but less than or equal to 50 %), U = uncommon (percent occurrence less than 20 %), x = observed on property but not detected in survey.

[c] 1 = 2000 MVLBC vegetation inventory (Julie Russell = JR)
2 = 2001 MVLBC ongoing vegetation inventories (JR)

2. Wildlife Habitat

Quality of wildlife habitat on Weahtaqua Springs Preserve depends on the characteristics of the vegetation communities. Formal avian surveys were the primary tools used for analysis of wildlife habitat. Additional direct observations of wildlife occurrences and signs throughout the year contribute to the understanding of habitat value at Weahtaqua Springs Preserve. One Massachusetts state-listed wildlife species – pied-billed grebe – and two watch list species – great blue heron and osprey – occur on the Preserve on the Lagoon Pond shoreline.

a. Habitat Features

The woodland (21.6 acres) of Weahtaqua Springs Preserve has a closed canopy in the mixed-oak, mixed-conifer, and pitch pine woodlands and an open canopy in the rolling oak savanna. Berry-producing shrubs in the understory of the mixed-oak, pitch pine, and mixed-conifer woodlands provide forage for wildlife. Grass and lichen in the understory of the rolling savanna provide forage and nesting material for birds and small mammals. There are tall trees for nesting, roosting, and foraging wildlife species; mast-bearing trees (i.e. oak and beech) for fall foraging; fruiting shrubs and vines (i.e.huckleberry, shadbush, blueberry, greenbrier, and bayberry) for summer and fall foraging; and understory cover for foraging and ground nesting insects (i.e. beetles, ants and spiders), amphibians (i.e. red-backed salamander), reptiles (i.e. snakes and turtles), birds (i.e. towhee), and mammals (i.e. mice, shrews, raccoons and skunks).

The shrubland (4.9 acres) is a mixture of scattered trees, dense shrubs, and open grassland. Tall trees provide birds and other wildlife species with nesting, perching and foraging habitat. Berry-producing shrubs are excellent forage during the summer and fall. Open areas provide cover and forage habitat to ground-nesting insects such as tiger beetles.

The grassland (1.9+ acres) comprises pastureland and isolated sandplain grassland areas. Both offer a dense cover of graminoid and herbaceous plants and lichen that provide forage and cover habitat for a variety of wildlife species including several game birds such as Canada geese and bobwhite quail. Blowouts in the grassland offer breeding and feeding habitat to a variety of ground-dwelling invertebrates. The grassland-woodland ecotone provides perching sites and cover for nesting and foraging wildlife. Various birds of prey hunt in the grassy areas where an abundant supply of rodents exists. The heathland in the grassland provides cover and food for mammals such as eastern cottontails, rats, mice, and voles. The nectar-producing flowing plants and cedar trees growing in and around the grassland are a superb food source for invertebrates namely, species in the Lepidoptera order.

b. Invertebrates

i. Observed Invertebrates

A variety of invertebrates inhabit Weahtaqua Springs Preserve. A dip-net survey in the watering hole in the pasture revealed several typical aquatic invertebrates including midges, mosquitoes, dragon fly larva, water striders, and predaceous diving beetles (Appendix C). Bright red midge larvae were the most abundant aquatic invertebrates observed in the watering hole. Waterfowl and fish are major predators of midge larva. The great abundance of red midge larva in the watering hole suggests that it is polluted with organic wastes. Abundance of midge larva is an indicator of poor environmental health of a water body caused by some pollutant. Bright red midge larvae prefer bodies of water with organic waste or nutrient pollution (Voshell

Invertebrates were not formally inventoried in the shrubland, grassland and woodland habitats. Direct observation revealed the most widely represented order in upland habitat to be the butterfly and moth order (Lepidoptera) with twelve species (Appendix C). The majority of butterfly and moth species were observed in the shrubland and mixed-conifer woodland habitat where Lepidoptera larvae and adults will find cover and forage in the abundance of cedars and nectar-producing shrubs such as honeysuckle, roses, asters, sumac, indigo and milkweeds. Other invertebrates observed in the upland habitats included bumble bees, june bugs, flies, mites and ticks (Appendix C).

ii. Potential Invertebrates

Several invertebrates potentially live in the dry upland soils and vegetation of the Weahtaqua Springs Preserve but were not observed on the property. Two butterfly species, juniper hairstreak (*Callophrys gryneus*) and hoary elfin (*Incisalia polios*), are closely associated with an abundant food source of cedars and bearberry that exist in the shrubland and grassland of the Preserve (Pelikan 2003). The hoary elfin is designated a watch-listed species by the commonwealth of Massachusetts. Rare tiger beetles may be present in the sandy blowouts and lichen-dominated grasslands. The rare purple tiger beetle (*Cicindela purpurea*) is an upland species observed on bare level clay/loam soil. The purple tiger beetle is common to areas such as grasslands, paths and forest openings (Leonard and Bell 1999). Future studies using light traps and pit falls would provide further insight into the diversity of invertebrate fauna at Weahtaqua Spring Preserve.

c. Amphibians and Reptiles

i. Observed Amphibians and Reptiles

There were no amphibian and one reptile species observed on Weahtaqua Springs Preserve. A painted turtle was observed sunning in the watering hole located in the pasture. Painted turtles prefer quiet, shallow water of ponds, marshes, streams and bogs with an abundant supply of submerged vegetation and logs or rocks for basking (Hunter et al. 1999).

ii. Potential Amphibians and Reptiles

Nearby Lagoon Pond and Stepping Stones Brook provide necessary breeding habitat to many amphibian and reptile species. The woodland, grassland, and shrubland of Weahtaqua Springs Preserve provides non-breeding habitat to a variety of amphibians and reptile species (Table 2). Many amphibian species depend on wetlands for the larval stage of their life cycle and upland woods and fields for adult life. Most adult amphibians have lungs but all species absorb water and oxygen through their skin. The skin must remain moist for this exchange to take place, thus they secrete a mucus-like substance to coat their skin and inhabit moist environments (Jergensen 1978). Other amphibian and reptile species depend on wetland vegetation communities for foraging habitat. Salamanders, with the exception of the redback, and certain frog species are rare on the island after heavy pesticide spraying wiped out whole populations of amphibians several decades ago (Lazell 1976). Some isolated populations of rare salamanders and frogs do exist on the island and therefore it is still possible for them to be using Weahtaqua Springs Preserve as non-breeding habitat.

Table 2. Potential amphibian and reptile species that prefer habitat at Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, MA.

Amphibian species	Scientific name	Woodland[a]	Shrubland/ grassland[b]	Wetland[c]
eastern spadefoot	*Scaphiopus h. holbrookii*		NB[d]	
red-spotted newt	*Notophthalmus v. viridescens*	NB	NB	B, NB
redback salamander	*Plethodon cinereus*	B, NB		
northern spring peeper	*Pseudacris c. crucifer*	NB	NB	B
Fowler's toad	*Bufo woodhousii fowleri*	NB	NB	B
pickerel frog	*Rana palustris*		NB	NB
green frog	*Rana clamitans melanota*			B, NB

Reptile Species	Scientific name	Woodland[a]	Shrubland/ grassland[b]	Wetland[c]
common snapping turtle	*Chelydra s. serpentina*		B	B, NB
painted turtle	*Chrysemys picta*			B, NB
spotted turtle	*Clemmys guttata*		B	B, NB
eastern box turtle	*Terrapene c. carolina*	B, NB	B, NB	B
eastern garter snake	*Thamnophis s. sirtalis*	B, NB	B, NB	B, NB
northern ringneck snake	*Diadophis punctatus edwardsii*	B, NB	B, NB	
eastern milk snake	*Lampropeltis t. triangulum*	B, NB	B, NB	B, NB
northern black racer	*Coluber c. constrictor*	B, NB	B, NB	
smooth green snake	*Opheidrys vernalis*		B, NB	
northern redbelly snake	*Storeria o. occipitomaculata*	B, NB		
eastern ribbon snake	*Thamnophis s. sauritus*	B, NB		B, NB

[a] Woodland = mixed-oak woodland, pine woodland and mixed-conifer woodland.
[b] Shrubland = rolling savanna, sandplain grassland and shrubland.
[c] Wetland = watering hole and pond shoreline.
[d] BR = breeding, NB, non-breeding.

Source: Lazell 1976, DeGraaf and Rudis 1986.

d. Birds

Julie Russell conducted surveys of birds on Weahtaqua Springs Preserve from October 1999 to July 2000. The presence of occasional migrant and resident birds throughout the fall migration, winter, spring migration and breeding season were recorded during a total of twenty visits (five visits per season). Birds were sampled from eight point count survey locations. One point was located in the mixed-oak woodland, pitch pine woodland, rolling oak savanna, mixed-conifer woodland, ravine, and lagoon shoreline. Two survey points were located in the shrubland. No bird points were located in the grassland. All birds seen or heard during a five-minute period were recorded. Birds seen or heard outside of the count period were noted as present on the property but were not included in quantitative analyses.

Bird species in the various habitats are seasonally dependent (Table 4). Some bird species occur in more than one habitat type and during more than one season. Total species counts do not include multiple sightings of an individual species. Species that occur on the property during the fall months (early October - early November) include fall migrants as well as year-round residents and bird species that occur during the winter (late November – early April) include year round dwellers and winter migrants. However, bird species that occur during the summer breeding season (May – September) include both late spring and early fall migrants, year-round residents and early summer breeding birds just returning from southern wintering areas. The pond shoreline was not inventoried in all seasons. Totals not including pond shoreline values are used for comparison purposes. The summer breeding season hosts the greatest number of bird species on Weahtaqua Springs Preserve. There are ample nesting opportunities for birds in the shrubs, cedars, oaks and pines of Weahtaqua Springs Preserve and the Preserve is situated near a water source that provides forage for newly hatched chicks.

Table 3. Change in number of bird species during different seasons and in different habitats at Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, MA.

Season	Mixed-oak woodland	Pine wood-land	Rolling savanna	Shrub-land	Ravine ridge	Mixed-conifer wood-land	Pond shoreline	Total[a]
Spring	10	13	8	14	16	14	9	20(29)
Summer	7	10	12	16	12	12	5	25(30)
Fall	5	7	8	13	7	8	/	18(18)
Winter	5	9	6	11	9	13	17	20(37)
Total[b]	15	20	18	28	24	24	25	28(53)
Seasonal specific species[c]	6%	5%	5%	17%	21%	12%	28%	

[a] Total of bird species not including species observed in pond shoreline and total number of species per season are in parenthesis.
[b] Total number of species per habitat type.
[c] Percent of species specific to one season in a given habitat type.

A total of 53 bird species were observed at Weahtaqua Springs Preserve during the fall, winter, spring and breeding seasons (Appendix C). Diversity of bird species is greatest during the spring migration in 75% of the woodland vegetation communities (Table 3). The rolling savanna and shrubland draw the greatest number of bird species during the summer breeding months compared to other seasons. The pond shoreline has the greatest diversity of bird species during the winter due to wintering migratory waterfowl. For that reason, the pond shoreline hosts the greatest percentage of bird species specific to a given season in a particular habitat.

i. Breeding Season

Thirty bird species occurred in the shrubland and woodlands of Weahtaqua Springs Preserve during the breeding season. The majority of these bird species observed during the summer were year-round residents (Table 4). A greater diversity of bird species was observed in the shrubland than the woodland (Table 3). There is greater cover from predatory birds in the shrubland due to the thickness of the shrubs than in the understory of the woodland.

Observations of behaviors associated with nesting or rearing of young such as adults carrying nesting material or food to a nest, carrying fecal sacs from a nest, attending hatch-year birds can confirm that a species is breeding on the property, as can locating an active nest. A species is probably breeding if singing territorial males are present on the property on two occasions at least a week apart. A species is possibly breeding if it is detected in suitable breeding habitat during the breeding season. Of the 30 bird species observed during the summer, one was a confirmed breeder (Table 4). A common grackle nest was observed in the shrubland. Nine bird species were probable breeders and thirteen were possible breeders in the shrubland and woodland (Table 4). Seven species were considered non-breeding bird species (Table 4). Barn swallows and tree swallows were observed flying overhead of non-breeding habitat. Eastern towhee, guinea fowl, pine warbler, red-winged blackbird and red-eyed vireo also were observed only in non-breeding habitat during the breeding season.

Table 4. Birds observed during the breeding season at Weahtaqua Spring Preserve.

Spring Bird Species	Mixed-oak woodland[a]	Pine woodland	Rolling savanna	Shrubland	Ravine ridge	Oak/cedar woodland	Pond shoreline	Breeding status[b]
Year-round Residents[c]								
American crow		U		U		U		PO
American goldfinch OH		O	U	U				PO
American robin	C	C	O	O	C	C		PR
black-capped chickadee		O		U	U	C		PR
blue jay	O	U		U	U	O		PR
brown-headed cowbird				U				PO
Carolina wren				U	C			PR
cedar waxaing				U	O	U		PO
chipping sparrow			U	U				PO
common grackle		O	C	C	O	C		CO(N)
downy woodpecker	U			U		U		PO
eastern towhee	U							NB
gray catbird	O		O	C	C	O		PR
guinea fowl		U	O					NB
great blue heron							U	PO
mallard							U	PO
mourning dove			O	U				PR
northern cardinal	O	O	C	O	U			PR
northern flicker	U	U	U	U				PO
pine warbler						U		NB
prairie warbler		O	O	U	U	U		PR
red-winged blackbird			U					NB
song sparrow					U			PO
wood duck							U	PO
Spring/Fall Migrants								
red-eyed vireo						U		NB
tree swallow OH					U			NB
Winter								
common goldeneye							U	PO
ring-necked duck							U	PO
Summer								
barn swallow OH					U			NB
northern oriole			O	U		O		PR

[a] C= common (birds were detected in more than 50% of the survey visits)
O= occasional (birds were detected in 26-50% of the survey visits)
U= uncommon (birds were detected in 25% and fewer of the survey visits)
P= present (birds were not detected during a survey period but were observed on the property)
C= common (birds were detected in more than 50% of the survey visits)

[b] Breeding status: NB=nonbreeding, PO=possible breeding (species detected in suitable breeding habitat), PR=probable breeding (species heard singing on two occasions over one week apart in suitable breeding habitat). CO=confirmed breeding (species carrying food, CF; feeding young, FY; with begging hatch-year fledglings, HY; or a located nest, N).

[c] OH = birds were observed flying overhead.

ii. Fall

Eighteen bird species were observed during the fall on Weahtaqua Springs Preserve (Table 5). All of the bird species observed on the Preserve during the fall were year-round residents. The majority of birds were observed in the shrubland (Table 3). American crow, black-capped chickadee, and blue jay were the most common birds and were observed in 83% of points sampled. Fall neotropical migrants are common of wet areas such as the head of Lagoon Pond and along Stepping Stones Brook where food is plentiful. Fall neotropical migrants spend little time in areas, such as the Preserve, that are dryer and offer less forage than wet areas and are often missed during the fall survey period.

Table 5. Birds observed during the fall at Weahtaqua Spring Preserve.

Spring Bird Species	Mixed-oak woodland[a]	Pine woodland	Rolling savanna	Shrubland	Ravine ridge	mixed-conifer woodland
Year-round Residents[b]						
American crow	C	C	C	C	O	C
American robin				U	U	U
black-capped chickadee	C	C	C	U	C	C
blue jay	C	O	C	C	C	C
brown-headed cowbird		U		U		
Carolina wren	U			U		
cedar waxwing					U	
common grackle			U			
downy woodpecker				U		U
eastern meadowlark				U		
eastern towhee				U		U
gray catbird			O			
northern cardinal	U	U	O	O	U	O
northern flicker				U		
northern mockingbird			U	U		
red-breasted nuthatch		O	O			
white-breasted nuthatch		U				U
yellow-rumped warbler				O	U	

[a] C= common (birds were detected in more than 50% of the survey visits)
O= occasional (birds were detected in 26-50% of the survey visits)
U= uncommon (birds were detected in 25% and fewer of the survey visits)
P= present (birds were not detected during a survey period but were observed on the property)
[b] OH = birds were observed flying overhead.

iii. Winter

Thirty-seven bird species were observed during the winter on Weahtaqua Springs Preserve (Table 6). Seventeen of the 37 bird species were observed along the pond shoreline. Seven of those birds are waterfowl species. Waterfowl migrate to more southern climates during the winter in search of food and open water. The black-capped chickadee was the most commonly observed bird on the Preserve during the winter.

Table 6. Birds observed during the winter at Weahtaqua Spring Preserve.

Spring Bird Species	Mixed-oak woodland [a]	Pine woodland	Rolling savanna	Shrubland	Ravine ridge	Mixed-conifer woodland	Pond shoreline
Year-round Residents [b]							
American crow OH		O		C		O	O
American goldfinch			O	U			
American robin						U	
black-capped chickadee	C	C	C	C	C	C	
blue jay		U	C	U	U	U	O
brown creeper					U		
Canada goose							U
Carolina wren			U		U	O	
cedar waxwing						P	
common grackle			U				
downy woodpecker	O	C				U	
eastern screech owl				P			
golden-crowned kinglet							U
gray catbird		U			O		
great black-backed gull OH					U		
great blue heron							U
guinea fowl		U	C	C		U	
herring gull OH					O		
house finch					U		
mallard							O
mourning dove				U			U
mute swan							U
northern cardinal		U		U	U	O	O
peacock					P		
pine warbler				U			
red-bellied woodpecker	P	U					
red-breasted nuthatch	P						U
red-winged blackbird						U	
ring-billed gull						U	
sharp-shinned hawk						P	U
song sparrow				U			U
white-breasted nuthatch	U	C					U
wood duck							U
yellow-rumped warbler			-			U	
Summer							
pied-billed grebe							U
Winter							
bufflehead							C
oldsquaw							U

[a] C= common (birds were detected in more than 50% of the survey visits)
O= occasional (birds were detected in 26-50% of the survey visits)
U= uncommon (birds were detected in 25% and fewer of the survey visits)
P= present (birds were not detected during a survey period but were observed on the property)
[b] OH = birds were observed flying overhead.

iv. Spring Migration

Twenty-nine birds were observed during the spring migration on Weahtaqua Springs Preserve (Table 7). The American robin, black-capped chickadee, chipping sparrow, common grackle and northern cardinal were commonly observed in at least one habitat on the Preserve. The greatest diversity of birds observed during spring migration was observed in the mixed-conifer woodland. Of these birds all but one, the osprey, was a year-round resident. Similar to the fall migration, neotropical spring migrants are more likely to be observed in locations with plentiful forage, such as a wet habitats, than on dry uplands.

Table 7. Birds observed during the spring at Weahtaqua Spring Preserve.

Spring Bird Species	Mixed-oak woodland[a]	Pine woodland	Rolling savanna	Shrubland	Ravine ridge	Mixed-conifer woodland	Pond shoreline
Year-round Residents[b]							
American crow	U	U	O		O	O	
American goldfinch				U		U	
American robin	O	C	C	O	C	O	
black-capped chickadee	C	C	C	C	U	O	O
blue jay	U	O	U	O	O	U	
Canada geese							U
Carolina wren	U	O			U		O
chipping sparrow		U	C	O	O		
common grackle OH	O	O	C	C	C	C	
eastern towhee	O			U	U		
gray catbird				O	O	O	
guinea fowl	U	O		U		U	
herring gull OH				U	U		U
house finch		U					
mourning dove				U		O	
northern cardinal	O	O	C	O	C	U	
northern flicker	U	O					
northern mockingbird						U	
pine warbler				U			
prairie warbler		U	O	U	U	U	U
red-winged blackbird					O	O	O
song sparrow					U		
turkey					U		
white-breasted nuthatch							U
Spring/Fall Migrants							
tree swallow OH		U					O
Winter							
bufflehead							U
Summer							
osprey OH					U		
red-eyed vireo						U	
rose-breasted grosbeak				U			

[a] C= common (birds were detected in more than 50% of the survey visits)
O= occasional (birds were detected in 26-50% of the survey visits)
U= uncommon (birds were detected in 25% and fewer of the survey visits)
P= present (birds were not detected during a survey period but were observed on the property)
[b] OH = birds were observed flying overhead.

e. Mammalian Fauna

i. Observed Mammals

Six mammal species were observed on Weahtaqua Springs Preserve (Appendix D). The woodlands provide good forage and breeding habitat for gray squirrels. The gray squirrel is a tree-nester and forages for nuts, such as acorns and hickory nuts (Sutton and Sutton 1923). White-tailed deer forage and breed in the woodland and bed down in the grassland and shrubland at night. White-tailed deer scat and tracks were observed in the mixed-oak woodland. Scat of eastern cottontail was observed in the mixed-oak woodland and rolling oak savanna of the Preserve. Domestic dogs from abutting properties were observed throughout the Preserve. Raccoon scat was observed on a fallen log along the Lagoon Pond shoreline and scat from Norway rats also was observed along the pond shoreline near several animal burrows in the shoreline bank.

ii. Potential Mammals

Weahtaqua Springs Preserve is potential habitat for several mammal species observed in similar habitat types on Martha's Vineyard. Various rodent species may meet some of their habitat needs in the grasslands at Weahtaqua Springs Preserve. They include the shrew (*Sorex cinereus*), northern short-tailed shrew (*Blarina brevicauda*), little brown bat (*Myotis lucifugus*), red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), eastern pipistrellus (*Pipistrellus subflavus*), big brown bat (*Eptesicus fuscus*) and silver-haired bat (*Lasionycterus noctivagans*), eastern mole (*Scalopu aquaticus*), meadow vole (*Microtus pennsylvanicus*), house mouse (*Mus musculus*), meadow jumping mouse (*Zapus hudsonius*), white-footed mouse (*Peromyscus leucopus*) and woodland jumping mouse (*Napaeozapus insignis*). The eastern chipmunk (*Tamias striatus*) and striped skunk (*Mephitis mephitis*) meet some if not their entire habitat needs in the woodlands of Weahtaqua Springs Preserve.

f. Rare and Endangered Species

The Massachusetts natural heritage and endangered species program (MA NHESP) designates that Weahtaqua Springs preserve is not located within a priority or estimated habitat of rare wildlife species. However, one Massachusetts state-listed wildlife species – pied-billed grebe –, two watch-listed wildlife species – great blue heron and osprey – and three watch-listed plant species – butterfly-weed, post oak and little ladies' tresses – were observed on the Preserve.

The pied-billed grebe is an early spring migrant to Massachusetts that nest in marshes, lakes, large ponds, and other wetlands in Massachusetts and winters further south. Pied-billed grebe is listed as endangered by the commonwealth of Massachusetts. The species is rare due to a decline in suitable nesting habitat (MA-NHESP 1990). The commonwealth of Massachusetts classifies the great blue heron as a "watch-listed" species. Great blue herons typically migrate south from Massachusetts in the fall and return to nest in early spring. Loss of rookery habitat, pesticide use and past hunting pressure contribute to the decline of great blue herons (MA-NHESP 1987). The commonwealth of Massachusetts de-listed the osprey from a species of "special concern" to "watch-listed" after the mid 1980s. Ospreys arrive in Massachusetts in early spring and migrate south to winter. The decline of the osprey primarily is a result of egg-thinning induced by exposure to pesticides (MA-NHESP 1985b). The pied-billed grebe and great blue heron were observed along the Lagoon Pond shoreline. The osprey was observed flying overhead of the Preserve.

Butterfly-weed, post oak, and little ladies' tresses are three plant species observed on the preserve that are delisted from the official state list of "rare native plants of Massachusetts" and are classified as "watch-listed" species. Butterfly-weed grows in sandplain grasslands and is an important nectar source for many butterfly species (MA-NHESP 1985a). Little ladies' tresses is an orchid that also prefers sandplain grasslands (MA-NHESP 1982). Habitat destruction and competition with woody shrubs have contributed to the decline of butterfly-weed and little ladies' tresses. Post oak is a small to medium sized tree with a unique cruciform appearance to its leaves (Seiler et al. 2002).

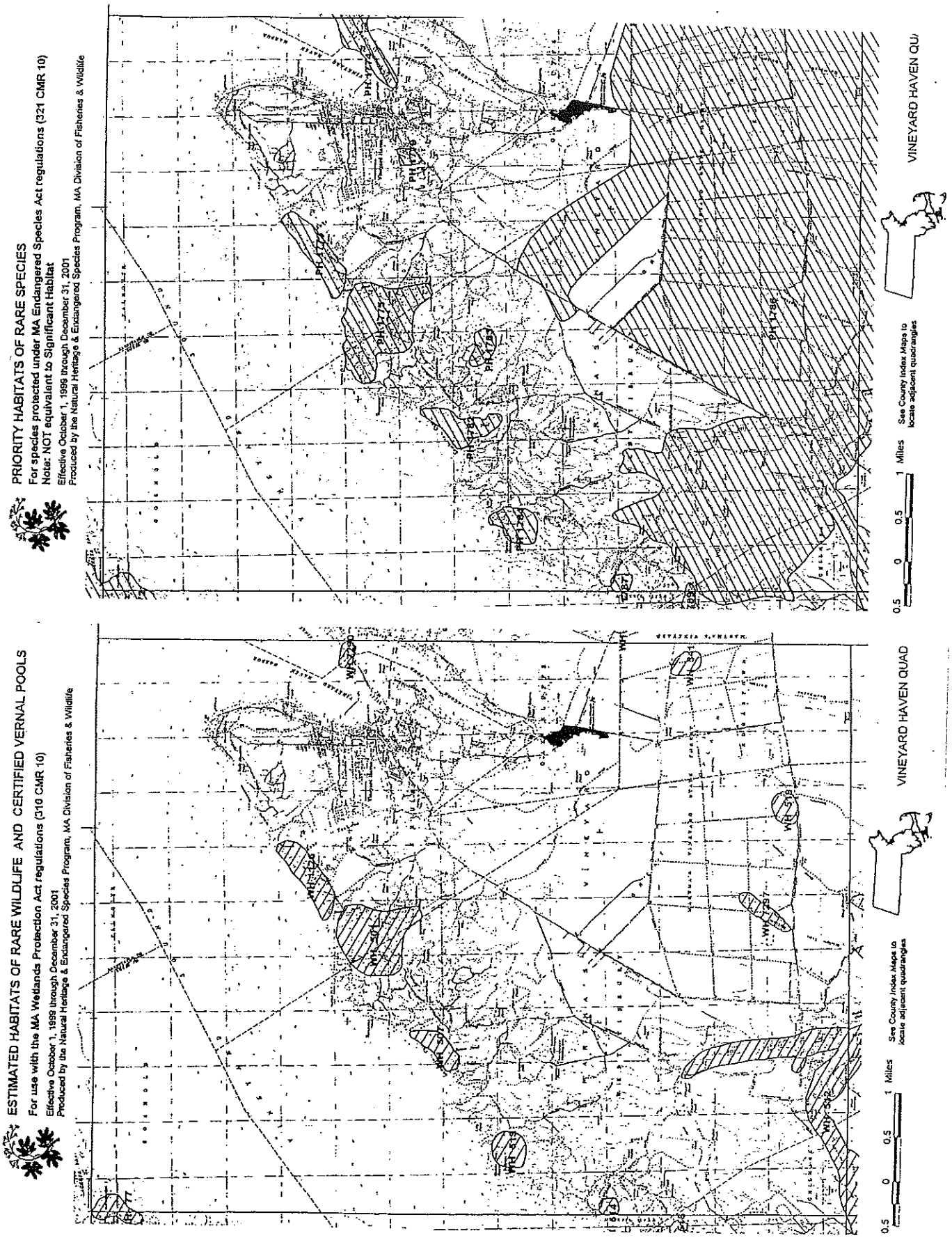
Potential habitat also exists on Weahtaqua Springs Preserve for the purple tiger beetle, a rare ground beetle of "special

concern", the hoary elfin, a "watch-listed" butterfly and the frosted elfin (Callophrys irus) a soon to be "special concern" butterfly. Purple tiger beetles prefer bare sandy soils of uplands in grasslands and along trails (Leonard and Bell 1999). The hoary elfin prefers areas where cedars and bearberry are plentiful (Pelikan 2003). The frosted elfin feeds on *Baptisia* and often occurs in tree and scrub savannas (Simmons 2004).

Endangered Species Map

Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, Massachusetts

Produced from Massachusetts Natural Heritage Atlas



C. Cultural Characteristics

1. Land History

Long before the English established farms and villages on Martha's Vineyard beginning in 1641, the Native Americans of the Wampanoag Tribe made use of the springs at the head of Lagoon Pond as a subordinate village at a location called Wekwetuckauke (Banks 1966). Archaeological evidence from a site at the Head of the Lagoon dates from 1000 B.C to 1500 A.D. This evidence suggests that Wampanoags occupied the site continuously for a long time and that this specific village was abandoned prior to English occupation. Archaeological evidence indicates the villagers depended on shellfish and it does not indicate any use of the area for agriculture (Huntington 1959). Pre-English settlement, the island of Martha's Vineyard was divided into four major sachemships: Chappaquiddick, Nunnepaug (Edgartown, Tisbury and Oak Bluffs), Takemmy (West Tisbury and Chilmark), and Aquinnah (Loparto and Steinitz 1987). Each sachemship had a primary village (Banks 1966). The sachem of Nunnepaug was named Tawanquatuck. He was the first sachem to sell land to Thomas Mayhew, founder of the first English settlement on Martha's Vineyard. The sachem's council, Ahtoskouaog, did not approve of the sale. To appease the council, Tawanquatuck divided off two sub-sachemships, Nobnochet and Ogkechkuppe prior to the sale of land to the English. Tawanquatuck kept a sachemship for himself and sold a portion of it, namely Edgartown Harbor, to Thomas Mayhew. Nobnocket was governed by sub-sachem Cheesechamuck and was located where Vineyard Haven is today. Ogkechkuppe was governed by sub-sachem Wapamauk and was located where Oak Bluffs is today (Allen 1999, Allen 2003). The two sub-sachemships, Nobnocket and Ogkechkuppe shared the waters at the head of Lagoon Pond (Allen 2003). Thomas Mayhew continued to purchase land from the Wampanoags (Banks 1966). Eventually during the mid 1600's the land at the head of Lagoon Pond was owned by the Smith family and was the beginning of a 600-acre farm that extended north and south of the Edgartown-Vineyard Haven Road and to the East and West of Barnes Road. The 300+ year-old homestead of the Smith family is still standing in the vicinity of Weahtaqua Springs Preserve. Elisha Smith is an abutter to Weahtaqua Springs Preserve and is the seven-generation of Elisha Smiths from the Smith family. The Smith family grazed cattle and pigs and raised chickens and turkeys on their farms. George Smith, Elisha's symbolic grandfather, built and operated the watercourse at the Head of the Lagoon Pond in 1890. He also owned a sulky race track south of the Preserve (Lee 1997). In the 1900's the land composing the Preserve was sold out of the Smith family into the Norton, Geurin, Cronig and finally the Nessen family.

2. Planning Concerns

The land bank must address a number of concerns when planning management actions at Weahtaqua Springs Preserve. The Lagoon Pond and Stepping Stones Brook are considered "wetland resource areas" under the Massachusetts wetlands protection act. The pond and the brook are subject to the jurisdiction of the Oak Bluffs and Tisbury conservation commissions. A 100-foot buffer zone around Lagoon Pond and a 200-foot buffer zone around the brook are also subject to the jurisdiction of the Oak Bluffs and Tisbury conservation commissions. The Lagoon Pond District of Critical Planning Concern further protects Lagoon Pond. To undertake such activities as the construction of boardwalks and viewing platforms within the buffer zone the land bank must file a notice of intent with and obtain an order of conditions from the Towns of Oak Bluffs and Tisbury and the Oak Bluffs and Tisbury conservation commissions. Weahtaqua Springs Preserve also is a significant archaeological site. The Massachusetts Historical Commission, Wampanoag Tribe, and Martha's Vineyard Historical Commission were consulted for management recommendations regarding the archaeological significance of the Preserve.

3. Abutters

The following is a list of those owning property abutting or within 200 feet of Weahtaqua Springs Preserve.

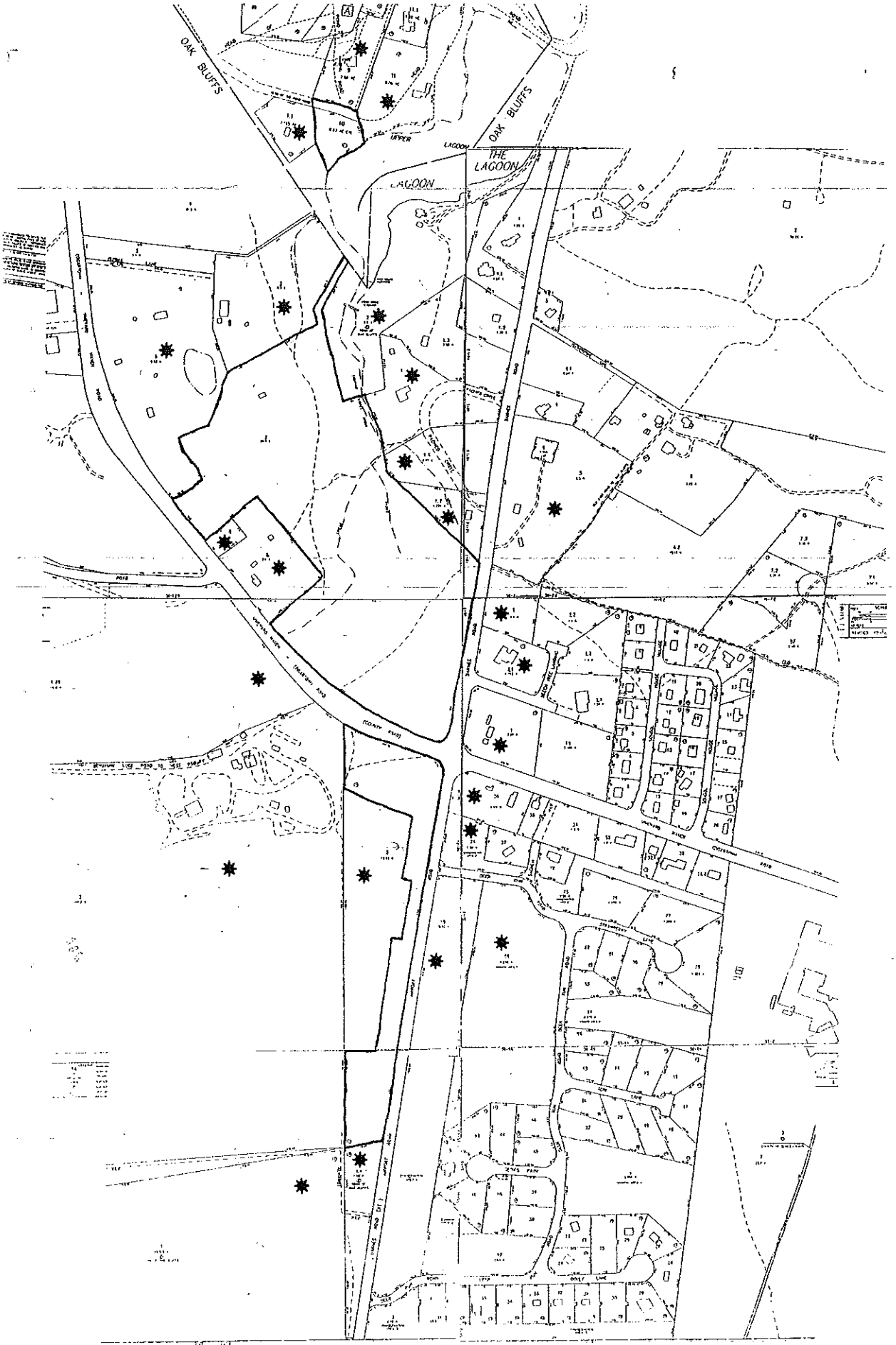
Table 8. Abutters to Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, MA.

Map	Lot	Name	Address
17A	09	Elizabeth H. and Michael B. Kraft	1929 Upshur Street North West, Washington D.C. 20011
17A	11	James H. and Sonya Norton, Bayes Norton Farm Inc.	P.O. Box 1206, Vineyard Haven, MA 02568
17A	01.1	"	"
40	03	Elisha R. Smith	P.O. Box 1061, Vineyard Haven, MA 02568
40	02	Oak Bluffs Water District	P.O. Box 1297, Oak Bluffs, MA 02557
54	01	"	"
54	01.1	"	"
40	06	Thomas W. and Timothy F. Creato	P.O. Box 1501, Edgartown, MA 02539
40	08	Leona C. Thurber c/o Mrs. Lester A. White	P.O. Box 535, Vineyard Haven, MA 02568
40	09	Susan E. Thurber et. al.	P.O. Box 40, Vineyard Haven, MA 02568
40	01	Shirley R. and Christine E. Pachiceo	P.O. Box 1266, Oak Bluffs, MA 02557
40	01.2	"	"
40	01.4	Wendelyn B. Oliver	P.O. Box 1741, Vineyard Haven, MA 02568
41	05	Samuel C. Gloria W. Bullock c/o Ann C. Bullock	427 Mill Creek Bend, Atlanta, GA 30307-1178
50	01	Vineyard Blinkers Inc.	RFD 2 Box 95, Vineyard Haven, MA 02568
50	02	James F. and Patricia Dunn	P.O. Box 3307, Oak Bluffs, MA 02557
50	02.1	Geraldine D. Cronig et.al.	P.O. Box 743, Oak Bluffs, MA 02557
50	36	Barnes Road LLC	P.O. Box 2005, Edgartown, MA 02539
50	74	Deer Run POA Inc.	10 Deer Run Road, Vineyard Haven, 02568
50	86	"	"
51	10	"	"
51	02	Goodale Construction Co.	P.O. Box 506, Vineyard Haven, MA 02568
40	10	"	"
51	03	Vineyard Youth Tennis	3838 N. Causeway Blvd. Ste 2424, Metairie, LA 70002
51	01.29	Convery's Association Ltd.	P.O. Box 1318, Edgartown, MA 02539

Abutters Map

Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, Massachusetts

Produced from Oak Bluffs and Tisbury tax maps.



4. Existing Use and Infrastructure

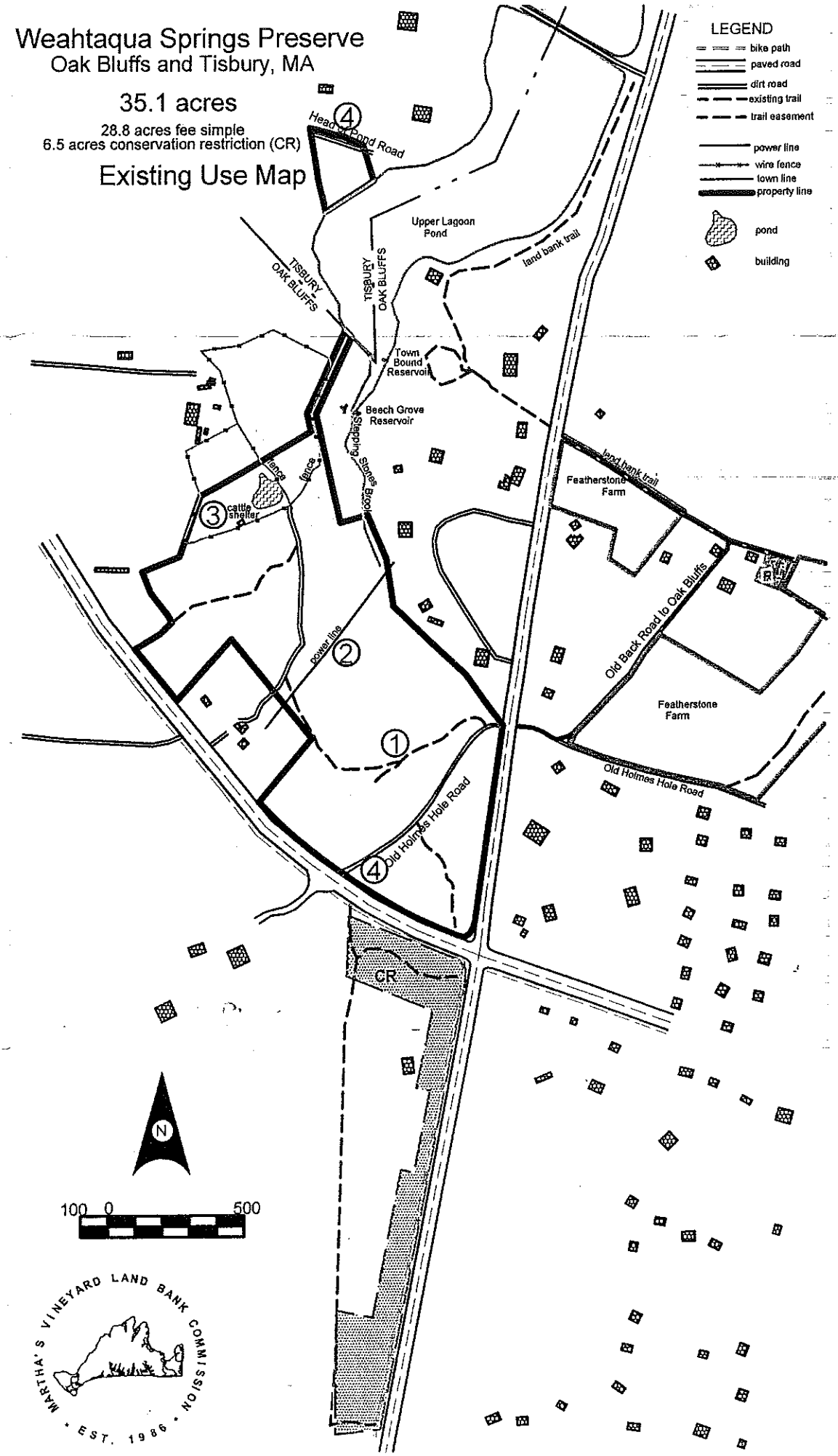
Weahtaqua Springs Preserve has limited existing use and moderate infrastructure (Existing Use Map).

1. *Trails* – A series of trails exist on the Preserve and are used moderately by walkers and occasional all terrain vehicles.

2. *Power lines* – power lines stretch across the center of the Preserve from the Thurber to the Pachico properties.

3. *Encroachments* – 1.9-acres of pasture and barbed wire fence spill onto the Preserve from an abutting farm. A small cattle shelter is the only infrastructure on the preserve.

4. *Old Roads* – A portion of the Old Holmes Hole Road ancient way crosses the southern corner of the Preserve. It is an ancient cart-path dating back to 1670 (Loparto and Steinitz 1987). A paved portion of Head of Pond Road defines the northern boundary of the 0.8-acre parcel of the Preserve situated along Lagoon Pond.


Weahtaqua Springs Preserve
Oak Bluffs and Tisbury, MA
35.1 acres
28.8 acres fee simple
6.5 acres conservation restriction (CR)
Existing Use Map
LEGEND
bike path
paved road
dirt road
existing trail
trail easement
power line
wire fence
town line
property line
pond
building
Head of Pond Road
Upper Lagoon Pond
land bank trail
TISBURY OAK BLUFFS
TISBURY OAK BLUFFS
Town Bound Reservoir
Beech Grove Reservoir
Sepping Stones Brook
fence
fence
cattle shelter
land bank trail
Featherstone Farm
Old Back Road to Oak Bluffs
power line
Featherstone Farm
Old Holmes Hole Road
Old Holmes Hole Road
CR
N
100 0 500
MARTHA'S VINEYARD LAND BANK COMMISSION
EST. 1986

III. Inventory Analysis

In this section, problems and opportunities that may arise in the management of Weahtaqua Springs Preserve are analyzed.

A. Constraints & Issues

1. Ecological Context

Weahtaqua Springs Preserve is host to a great diversity of habitats. Pitch pine and mixed-oak woodlands provide patches of shade while vast lichen beds cover open areas of the Preserve within the rolling oak savanna, sandplain grassland, shrubland and mixed-conifer woodland.

Lichen grows approximately 0.28 mm a year. Repeated disturbance over lichen beds by walkers, bicyclist, and other vehicles will break down the delicate lichen and prevent it from recolonizing. Lichens are used as indicators of air quality. The decline or absence of lichen may be an indicator of air pollution.

Several specimen post oak species exist in the rolling oak savanna, along with excellent examples of pure un-hybridized scarlet oak. The scarlet oak, on the island, appears to be hybridizing with black oak.

Weahtaqua Springs Preserve is a natural filter for the ground water that charges the Barnes Road wellfield.

2. Natural Resource Concerns

Rare species
Three rare plant species – little ladies' tresses, butterfly-weed and post oak – and three rare wildlife species – pied-billed grebe, great blue heron and osprey – were observed on Weahtaqua Springs Preserve. These plant species are associated with the sandplain grassland and rolling oak savanna and these wildlife species are associated with the Lagoon Pond. Maintaining the grassland and protecting Lagoon Pond are essential to the survival of these rare plants and wildlife species.

Succession
Succession is a natural process. However, maintaining the grassland and lichen areas in their pre-successional state is necessary to the survival of various wildlife and plant species rare and common.

3. Sociological Context

Weahtaqua Springs Preserve is in the crux of very heavily traveled roadways and is near a moderately developed area of Martha's Vineyard. The Preserve is situated between two busy roads and the bike path. Many thousands of people will view the Preserve as motorists or passengers on Edgartown-Vineyard Haven Road and Barnes Road and a number of people are likely to walk on the property as they stretch their legs along Old Holmes Hole Road and other trails. The Preserve is located near Featherstone Farm, Wapatequa Woods Preserve, Thimble Farm, Little Duarte's Pond Preserve and the state forest. Weahtaqua Springs Preserve offers moderate-distance hikes and is a link to other conservation properties.

4. Neighborhood Concerns

The land bank considers the concerns of neighbors as part of the planning process. All abutting property owners are sent written notice of a public hearing on the draft plan. All neighbors -- and all members of the public -- are invited to review the draft plan, attend the public hearing, and make written or oral comments. The land bank's Oak Bluffs town advisory board, Tisbury town advisory board and the Martha's Vineyard land bank commission review all comments and can change the draft plan if desired. Anyone may also express concerns at any public meeting of the Martha's Vineyard land bank commission, Oak Bluffs town advisory board and Tisbury town advisory board, or may simply contact land bank staff.

Neighborhood concerns may include unauthorized nighttime use, loitering, vandalism, agricultural run-off and pilfering of archaeological artifacts. The land bank has addressed such problems on other properties through regular patrol and checking of properties, periodic nighttime checks, clear posting of boundaries, hours of use and property rules, and by cooperation with the local police department.

B. Addressing Problems and Opportunities

1. Land Bank Mandate

In 1986, the voters of Martha's Vineyard created the land bank to acquire, hold, and manage land in a predominantly natural, scenic, or open condition. The land bank keeps open space open and allows modest public use. Its "shared-use" policy strives to provide a range of public benefits, from low-impact recreation and aesthetics to wildlife conservation and watershed protection. Protection of natural resources is the land bank's highest priority, yet "shared-use" demands balancing the use of natural resources with protection of the same.

2. Goals at Purchase

The purchase of Weahtaqua Springs Preserve meets seven of the land bank's nine criteria for property acquisition: aquifer and well field protection, forest land, pond frontages, scenic vistas, wildlife habitats, trails, and sites for passive recreation. Preliminary management plans were adopted by the land bank commission, Tisbury town advisory board and Oak Bluffs town advisory board and are attached as Appendix E.

3. Opportunities

Access	Weahtaqua Springs Preserve is accessible by foot, bicycle or horse from the bike path along Edgartown-Vineyard Haven Road or from Featherstone Farm along Old Holmes Hole Road in Oak Bluffs. The trailhead at Featherstone Farm will provide vehicle access to the Preserve; hikers will walk from Featherstone to the preserve via the Old Back Road to Oak Bluffs and Old Holmes Hole Road ancient ways.
Archaeological	The Preserve is part of a significant archaeological site on Martha's Vineyard and provides an opportunity to educate the public on the history of the area and the importance of the site. The Preserve's close proximity to water may explain why the Wampanoags inhabited this area many hundreds of years ago followed by the European settlement in the early 1600's.
Wildlife Viewing	The Preserve offers good opportunities to observe birds and butterflies. Vantage points exist along the edges of the grassland, among the cedars, along the ravine ridge and from the Lagoon Pond shoreline. The berry-producing shrub and heath species in the open grassland and shrubland of the Preserve and the wetlands of the upper Lagoon Pond make the place a magnet for hungry, migrating birds.
Ecological	The Preserve is situated within the Barnes Road well field. Maintaining a vegetative cover on the Preserve will help preserve the quality of water feeding into the well field and Lagoon Pond. Halting succession and the encroachment of woody shrubs into the grasslands and lichen fields will conserve the openness of the Preserve.
Agricultural	Elisha Smith pastures cattle on 1.9-acres of the Preserve and in a larger abutting pasture. The pasture is closed with wire fencing. Continuing to pasture with the establishment of herbaceous, leguminous vegetation and rotational grazing will stop soil erosion and succession of woody plants. Problems such as overgrazing, vegetation establishment,

erosion, and interaction between livestock and humans and their pests are addressed in the proposed farm plan lease. Benefits of pasturing include soil stabilization, field restoration and maintenance and providing land for agriculture.

View

The ridge over Upper Lagoon Pond offers views of the pond, reservoirs, wetlands below, the old and still active pumping station and the herring run. The Head of Lagoon Pond is known as an excellent location for migratory bird sitings from rare flycatchers to the most common warbler. Removal of encroaching vegetation in the shrubland will highlight the dramatic geological features of the Preserve's topography.

Trails

Weahtaqua Springs Preserve has a moderate trail system of ancient cart-paths linking other conservation areas together. Walkers, bicyclists, joggers, and horseback riders use the trails.

4. Universal Access

Weahtaqua Springs Preserve is ill-suited for universal accessibility due to site limitations such as slope and distance from major amenities to the trailhead. The Preserve's ROS ('Recreation Opportunities Spectrum') classification is "more-developed." ROS is a model designed and used by the U.S.D.A. Forest Service to categorize conservation areas or universal access planning. The land bank framework for describing the accessibility of its properties is applied to Weahtaqua Springs Preserve as follows.

Property Name:	Weahtaqua Springs Preserve
Size:	35.3 acres.
Primary Activities:	birding, hiking, picnicking, and horseback riding.
Primary Elements:	two sign station.
Primary Spaces:	pond view, large trees, lichen fields.
Obstacles that Limit Accessibility:	steep slope, sand, distance from trailhead.
Existing or Potential Alternatives:	Corellus State Forest, Trade Wind Fields Preserve.
Proposed ROS Classification:	less-developed.
Proposed Expectation of Accessibility:	difficult

For all more-developed Land Bank conservation areas, the Universal Access Plan states the following (Potter 1997):

> Use outdoor recreation access routes to link primary elements and primary spaces within one-quarter mile of a trailhead or drop-off and use accessible recreation trails to connect other primary elements and primary spaces on all more-developed land bank conservation areas.

The following two tables address compliance with the Universal Access Plan. The first lists features of Weahtaqua Springs Preserve ("primary elements and spaces"), their distance from the trailhead, and possible obstacles to making these features accessible. The second table is a checklist for compliance with objectives of the Universal Access Plan.

Table 12. Primary Elements and Spaces at Weahtaqua Springs Preserve

Primary Element or Space	Distance from offsite trailhead (feet)	Conflict for trailhead linking	Overcome conflict
1. trailhead	0	none	-
2. sign station	1,239	surface, distance	no
3. lichen field	1,728	surface, distance	no
4. oak savanna	1,619	surface, distance	no
5. pond view	31,956	surface, slope, distance	no

Table 9. Universal Access Plan Compliance Checklist for Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, MA.

Objective	Expected Degree of Compliance	Reason for non-compliance
1. ROS Category	100%	None
2. Solicit opinion	100%	None
3. Inform public	100%	None
4. Parking	0%	Parking within close proximity.
5. Toilets	0%	Small size. Toilets nearby in town center.
6. More-developed trails	0%	This is a less developed property.
7. Less-developed trails	100%	Elements are inaccessible due to distance.
8. Facilities	0%	Small size. Facilities nearby in town center.
9. Chemicals	100%	None
10. Site information	100%	None

IV. Land Management Planning

This final section of the management plan states goals for Weahtaqua Springs Preserve and outlines strategies for achieving them. These goals and strategies are designed to fit within the social and ecological constraints defined previously. The plan addresses five areas of planning concern: nature conservation, recreation and aesthetics, natural products, community interaction, and land administration.

A. Nature Conservation

Goal: **Provide long-term protection for plants, animals and natural processes occurring at Weahtaqua Springs Preserve.**

Objective 1: Protect and encourage rare and endangered species on the Preserve.

Strategies:

A. Monitor the property for rare plants and animals during regular property checks.

B. If an endangered species is found, devise and implement a strategy to protect and encourage its population.

C. Maintain and clear vegetation around grasslands and lichen fields to allow for little ladies' tresses and butterfly-weed population expansion.

Objective 2: Maintain grassland, lichen field and rolling oak savanna to provide habitat for a variety of rare wildlife and plant species.

Strategies:

A. Annually pull encroaching pines, cedars and hardwoods that are less than 2 dbh to curb succession in grassland, shrubland, and oak savanna.

B. Flush cut encroaching pines, cedars and hardwoods that are greater than 2 dbh

C. Flush cut (> 2 dbh) or uproot (< 2 dbh) insignificant, woody vegetation around spreading oaks in rolling savanna to allow grass and heath species to dominate the understory.

D. Maintain grassland in an open, grassy condition through limited mowing and hand pruning, at discretion of land bank staff. Use mowing only to reduce woody material in grassland and to encourage the growth of native grasses.

E. Till and seed areas of stubborn woody sprouts in grassland.

F. Protect delicate lichen fields when mowing or cutting vegetation.

G. Maintain variety of native plants in grassland to provide habitat for regionally rare invertebrate populations and other wildlife species through limited mowing and planting.

H. Maintain vegetative buffer between lichen community and road to minimize the impacts of road pollution on lichen.

Objective 3: Reduce and control erosion of trails, roads, bare ground, agricultural land, etc.

Strategies:

A. Install water bars where necessary.

B. Reroute or temporarily close trails and roads where necessary.

C. Use erosion control measures for tree removal where necessary.

Objective 4: Promote habitat characteristics that make the Preserve desirable to migrating and breeding birds.

Strategies:

A. Retain snags in woodland where these trees do not prose unacceptable safety or fire hazard.

B. Retain perching trees along edges of grassland.
C. Maintain berry-producing shrubland.

Objective 5: Control invasive species and succession.
Strategies:
A. Cut or uproot invasive species.
B. Monitor for re-growth and continue to cut or uproot invasive plants.
C. Allow staff to relocate small red cedars for future transplanting.

Objective 6: Maintain quality, breeding habitat for wildlife species on the Preserve.
Strategies:
A. Retain a mixture of habitats on the Preserve to provide a variety of habitat requirements to wildlife species.

Objective 7: Reduce forest fire danger in pitch pine woodlands.
Strategies:
A. Monitor for and reduce "ladder" fuels.

Objective 8: Remove both the watering hole and the dump debris in pasture, in order to protect ground water and Lagoon Pond from farm runoff.
Strategies:
A. Consult with the Oak Bluffs Water Department and the Board of Health to safely remove the watering hole with minimal environmental damage.
B. Collaborate with abutter to remove dump debris from the 1.9-acre pasture on the Preserve and the abutting pasture.

B. Recreation and Aesthetics

Goal: **Allow limited, low-impact recreational use of the area for hiking, bicycling, horseback-riding and picnicking provided that these uses do not preclude attainment of nature conservation objectives. Maintain attractive views and landscapes.**

Objective 1: Create intimate views of the rolling oak savanna and lichen fields and highlight geologic features from the trail system.
Strategies:
A. Flush cut (> 2 dbh) or uproot (< 2 dbh) insignificant, woody vegetation to create views of the rolling oak savanna from the trail.
B. Flush cut or uproot woody vegetation in and around the grassland and lichen fields and restore native grasses and herbs to grassland to create pastoral views from the trail.
C. Plant vegetation where necessary that blends in with the natural context of its environs to define and screen the boundaries where residential dwellings are visible from the trail.

Objective 2: Designate a pedestrian trailhead.

Strategies:

A. Refer vehicles to the Featherstone Farm trailhead.

B. Create sign station off Old Holmes Hole Road on the Preserve as shown on the Site Management Map.

C. Direct visitors arriving via vehicles to park at Featherstone Farm and walk to the Preserve on the Old Back Road to Oak Bluffs and Old Holmes hole Road ancient ways, as shown on the Site Management Map.

D. Defend in court, as elsewhere, any possible challenges to the public rights in ancient ways serving the Preserve.

Objective 3: Establish and maintain trail system.

Strategies:

A. Create trail network as shown on the Site Management Map.
   a. Make trail corridors six feet wide and eight to ten feet tall when possible.
   b. Free trails of rocks, roots, and other obstacles where practical.
   c. Install erosion control measures where needed.
   d. Mark trails with colored markers.

B. Comply with universal access standards for a less-developed property where possible.

C. Allow multiple use of trails by walkers, equestrians, riders of non-motorized bicycles, and cross-country skiers.

D. Allow land bank staff the discretion to create alternative trails for these uses or restrict these uses if significant erosion is observed or if conflicts result.

E. Allow land bank staff the discretion to close or relocate trails.

F. Indicate trail difficulty on trail map.

G. Make hand-held trail maps available at the trailhead.

H. Check and maintain trails monthly.

I. Minimize signage by installing signs only where necessary.

J. Prevent off-trail excursions.

Objective 4: Create overlook of Lagoon Pond and Stepping Stones Brook.

Strategies:

A. Construct platform with railings and bench on ridge overlooking Lagoon Pond.

B. Construct viewing platform overlooking reservoirs of Stepping Stones Brook.

C. Clear minimal vegetation to create views of the pond.

D. Work with the Town of Oak Bluffs for permission to site viewing platforms on town land providing a more environmentally conservative location on land bank property cannot be located.

Objective 5: Entertain possibilities for other trail links.

Strategies:

A. Maintain existing links to other conserved properties.

B. Create links to other conserved land.

Objective 6: Abide by Tisbury and Oak Bluffs town dog bylaws.

Strategies:

A. Allow leashed dogs on the preserve throughout the year.

B. Encourage visitors to clean up after their pets.

C. Natural Products

Goal: **Allow agricultural use of the Preserve's 1.9-acre pasture providing that it does not preclude attainment of natural conservation objectives, protect archaeological interests of the Preserve and prohibit hunting on the Preserve.**

Objective 1: Allow agricultural use of the pasture.

Strategies:

A. Allow current farmer to continue to pasture livestock on 1.9-acre pasture per the land bank farmland leasing policy.
B. Ensure that farmer establishes pasture vegetation and implements soil conservation measures.
C. Ensure that farmer maintains appropriate fencing and gates.
D. Try other restoration and soil conservation techniques in pasture if grassy vegetation cannot be established and if erosion continues to occur or worsens.
E. Allow access to pasture for land bank maintenance vehicles and equipment over Preserve's trails.
F. Work with the farmer to ensure that interaction between livestock and the public's pets is minimal.
G. Require lessee to consult with the US Department of Agriculture Natural Resource Conservation Service's District Conservationist of Cape Cod and the Islands to establish a farm plan prior to use of the pasture.

Objective 2: Protect archaeological interest of Weahtaqua Springs Preserve.

Strategies:

A. Prohibit digging for and taking of archaeological artifacts from the Preserve.
B. Post informational signs stating the laws and regulations regarding pilfering of archaeological artifacts.
C. Monitor the Preserve on a monthly basis for digging activity.
D. Contact the Oak Bluffs or Tisbury Police, the Wampanoag Tribe and the Massachusetts Historical Commission promptly after digging for archaeological artifacts is observed.

Objective 3: Prohibit hunting.

Strategies:

A. Refer to Weahtaqua Springs Preserve in the land bank's hunting policy as a property on which no hunting is allowed due to close proximity to private dwellings and roads.
B. Post "no hunting" signs on sign station during hunting seasons and at regular intervals on the property boundary.

Objective 4: Prohibit camping.

Strategies:

A. Prohibit camping on the preserve unless special permission is granted by the land bank commission.
B. Post "no camping" signs on the sign station.

D. Community Interaction

Goal: **Provide helpful and interesting information about the property for visitors; allow educational use of the property.**

Objective 1: Help people find the property and avoid trespassing.
Strategies:

A. Mark the property on land bank map and provide directions.
B. Create land bank logo marker on Edgartown-Vineyard Haven Road and Barnes Road.
C. Limit trespassing by marking boundaries as trails meet them.
D. Install gates or fencing as needed.
E. Provide directions to nearby conservation land.
F. Post map of property and trails on sign station.
G. Screen abutting properties with cedars.

Objective 2: Provide useful and interesting information about the property and its surroundings.
Strategies:

A. Post information about the archaeological significance of the area and the animals, plants and natural processes occurring on the property.
B. Maintain a copy of this plan at the land bank office and the Oak Bluffs and Tisbury library and conservation commission if they wish to have a copy.

Objective 3: Post signs that explain the rules of property.
Strategies

A. Quote the town dog bylaws.
B. Post the hours that the Preserve is open.
C. Post the activities allowed and prohibited on the Preserve.

E. Land Administration

Goal: Maintain, oversee and police the Preserve.

Objective 1: Comply with all applicable regulations.
Strategies:

A. Comply with Wetlands Protection Act and The Lagoon Pond DCPC.
B. Comply with any applicable local zoning regulations.

Objective 2: Regulate use by maintaining set hours.
Strategies:

A. Open property every day of year from one half-hour before sunrise to one half-hour after sunset.
B. Allow nighttime use only with special permission from land bank commission.

Objective 3: Keep well-maintained boundaries and monitor for encroachment.
Strategies:

A. Locate corners and walk boundaries annually.
B. Post boundaries with land bank boundary markers.
C. Keep photographic record of corners.
D. Work to correct any encroachments.

Objective 4: Monitor conservation restriction.
Strategies:

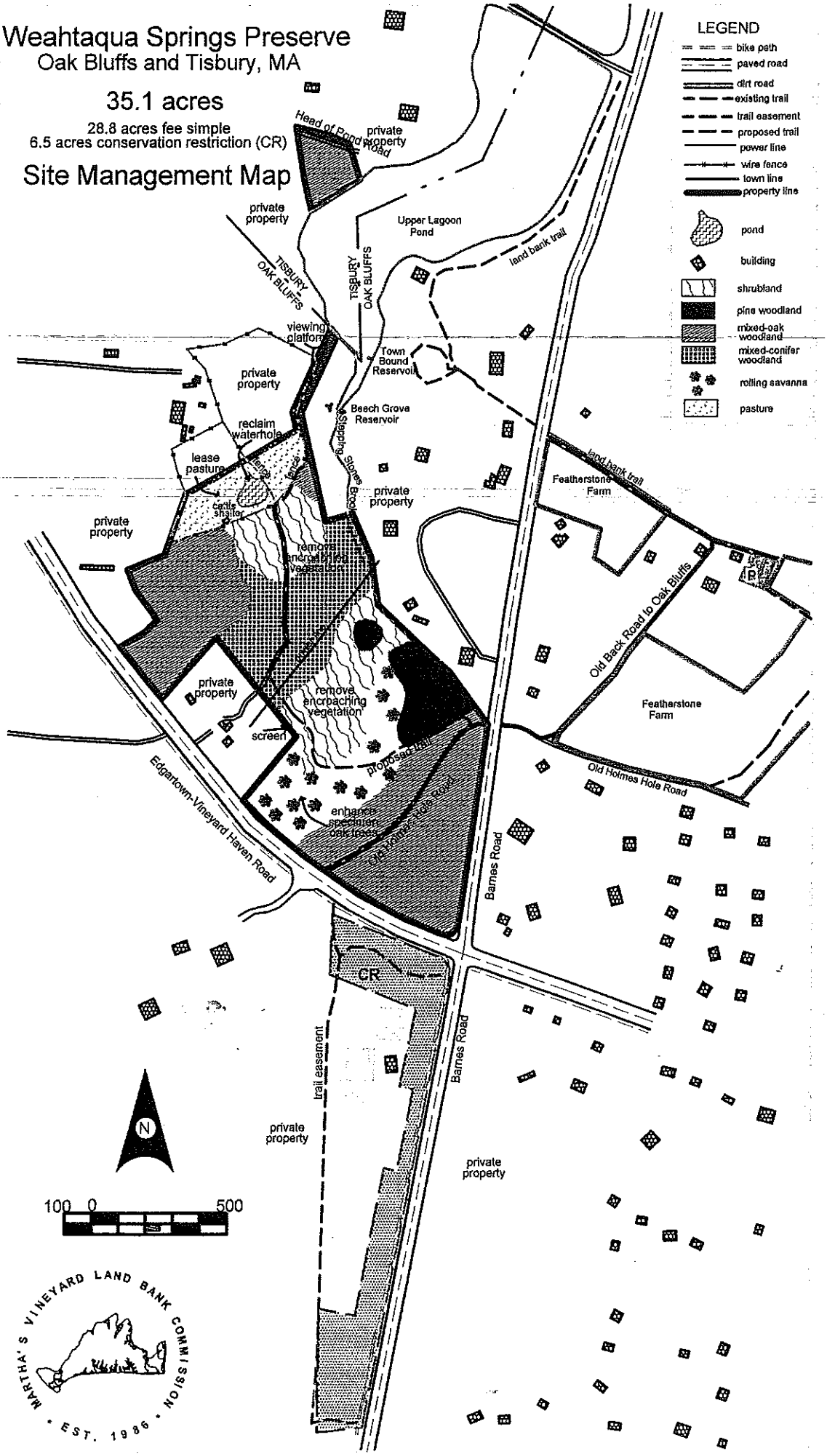
A. Monitor properties periodically to check compliance with terms of restrictions.

B. Establish contact with Vineyard Youth Tennis, Inc. to remain up-to-date on plans for the property.
C. Bring inconsistencies or matters of non-compliance to the attention of the land bank commission.

Objective 5: Keep good records of all land management activities and natural events.
Strategies:
A. Record all significant events, natural or otherwise.
B. Continue to update plant and animal inventories.
C. Maintain photographic record of landscape appearance.

Objective 6: Employ adequate staff to effectively implement land management goals.
Strategies:
A. Inspect property at least monthly.
B. Promptly respond to problems.
C. Monitor property as needed in accordance with land bank patrol policy.

Objective 7: Develop good working relationships with neighbors.
Strategies:
A. Consider neighborhood requests for signs, fencing, screening, etc. to prevent trespass.
B. Promptly respond to questions and address concerns.


Weahtaqua Springs Preserve
Oak Bluffs and Tisbury, MA
35.1 acres
28.8 acres fee simple
6.5 acres conservation restriction (CR)
Site Management Map
LEGEND
bike path
paved road
dirt road
existing trail
trail easement
proposed trail
power line
wire fence
town line
property line
pond
building
shrubland
pine woodland
mixed-oak woodland
mixed-conifer woodland
rolling savanna
pasture
Head of Pond Road
private property
private property
Upper Lagoon Pond
land bank trail
TISBURY OAK BLUFFS
TISBURY OAK BLUFFS
viewing platform
Town Bound Reservoir
private property
reclaim waterhole
Beech Grove Reservoir
Stepping Stones Brook
lease pasture
cattle shaller
land bank trail
Featherstone Farm
private property
private property
remove encroaching vegetation
Old Back Road to Oak Bluffs
Featherstone Farm
private property
remove encroaching vegetation
screen
proposed trail
Old Holmes Hole Road
Edgartown-Vineyard Haven Road
enhance specimen oak trees
Old Holmes Hole Road
Barnes Road
CR
trail easement
Barnes Road
private property
private property
N
100 0 500
MARTHA'S VINEYARD LAND BANK COMMISSION
EST. 1986

VI. Literature Cited

Allen, Ann. 1999. Why Did the Sachem Let the First Settlers Come? Millennium Edition, Vineyard Gazette. July 30, 1999.

Allen, Ann. 2003. Personal communications.

Avery, T. E., and H. E. Burkhart. 1994. *Forest Measurements.* McGraw-Hill, Inc., New York, NY. 408 pp.

Banks, Charles E. 1966. The History of Martha's Vineyard Dukes County Massachusetts: Volume II Town Annals. Dukes County Historical Society. Edgartown, Massachusetts.

Bazzaz F.A. 1998. Plants in Changing Environments: Linking physiological, population, and community ecology. Cambridge University Press. United Kingdom. 320 pp.

Begon M., J.L. Harper and C. R. Townsend. 1990. Ecology: Individuals, Populations and Communities. Blackwell Scientific Publications. Boston, MA. 945 pp.

DeGraaf, R. M. and D. Rudis. 1986. New England Wildlife: Habitat, Natural History, and Distribution. Gen. Tech. Rep. NE-108. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 491 pp.

Dunwiddie, P.W. 1986. Holocene Vegetation history of Nantucket Island, Massachusetts. IV international Congress of Ecology Abstracts. 138 p.

Eastman J. 2003. The Book of Field and Roadside. Stackpole Books. Mechanicsburg, PA. 336pp.

Ehrlich, P. R., D. S. Dobkin and D. Wheye. 1988. The Birder's Handbook. Simon and Schuster Inc. New York, NY. 785 pp.

Gleason, H. A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. 2nd Edition. The New York Botanical Garden, Bronx, New York, NY. 901 pp.

Hale, Mason E. 1979. How to Known the Lichens. 2nd edition. Wm. C. Brown Company Publishers. Dubuque, Iowa. 246 pp.

Huntington, Gale E. 1959. An Archaeological Study From Martha's Vineyard. The Dukes County Intelligencer. Dukes County Historical Society. 1(2):10 pp.

Jorgensen, N. 1978. A Sierra Club Naturalist's Guide. Sierra Club Books, San Francisco. 417 pp.

Lazell J. and M. Michener. 1976. This Broken Archipelago: Cape Cod and the Islands, Amphibians and Reptiles. The New York Times Book Co. New York. 260 pp.

Lee, Lindsey. 1997. Oral History of Elisha Smith. Martha's Vineyard Historical Society, Oral History Department.

Leonard, J.G. and R.T. Bell. 1999. Northeastern tiger beetles: A Field Guide to Tiger Beetles of New England and Eastern Canada. CRC Press, London. 176 pp.

Loparto L. and M. Steinitz. 1987. Historic and Archaeological Resources of Cape Cod and the Islands. Massachusetts Historical Commission.432 pp.

Lyman, Kevin J. 1996. Air Pollution, Lichens and Mosses. Lore. Milwaukee Public Museum, Inc.

Pelikan, M. 2003. Personal communication.

Potter, J. 1997. Universal Access Plan. Martha's Vineyard Land Bank Commission publication. 53pp.

MA-NHESP. 1982. Little ladies' tresses (*Spiranthes tuberosa*). Fact sheet. 1 p.

MA-NHESP. 1985a. Butterfly-weed (*Asclepias tuberosa*). Fact sheet. 1 p.

MA-NHESP. 1985b. Massachusetts Rare and Endangered Plants: Osprey (*Pandion haliaetus*). Fact sheet. 2pp.

MA-NHESP. 1987. Massachusetts Rare and Endangered plants: Great blue heron (*Ardea herodias*). Fact Sheet. 2 pp.

MA-NHESP. 1990. Massachusetts Rare and Endangered Plants: Pied-billed grebe (*Podilymbus podiceps*). Fact Sheet. 2 pp.

Massachusetts Geographic Information System. 2003. Executive Office of Environmental Affairs. www.state.ma.us/mgis/massgis.htm.

Perotta, Deacon. 2003. Personal communications.

Seiler, J.R., E.C. Jensen, J.A. Peterson. 2002. *USDAFS Silvics of North America.* Virginia Tech, Virginia, USA.

Simmons, Tim. 2004. Written communication via the Executive Office of Environmental Affairs.

Smith, Elisha. 2003. Personal communications.

Soil Conservation Service. 1986. Soil Survey of Dukes County, Massachusetts. United States Department of Agriculture. 144 pp.

Stotler, R.E. 1976. Saxicolous Bryophyte and Macrolichen Associations in Southern Illinois: I. Little Grand Canyon, Jackson County. The Bryologist 79:1-15.

Sutton, A. and M. Sutton. 1923. Eastern Woodland. Alfred A. Knopf, New York, New York. 639 pp.

Swain, P.C. and J. B. Kearcley. 2000. Classification of the Natural Communities of Massachusetts. NHESP, Westborough, MA. T-29-T-95.

Swanson, D.L. and C. Knapp. 1999. The Flora of Martha's Vineyard. Martha's Vineyard Sandplain Restoration Project. 129 pp.

Tansely, A.G., and T. F. Chipp, eds. 1926. *Aims and Methods in Study of Vegetation.* British Empire Veg Chee and Crown Agents for the Colonies, London, 383 pp.

Voshell, J. R. 2002. A Guide to Common Freshwater Invertebrates of North America. The McDonald and Woodward Publishing Company. Blacksburg, Virginia. 442 pp.

Appendix A: Deeds and Easements

Deeds and easements are filed at the land bank office for public review.

Appendix B: Taxonomic List of Non-vascular and Vascular Plants at Weahtaqua Springs Preserve, Oak Bluffs, MA

Non-vascular Plants

Division Bryophyta (Mosses, Liverworts, and Lichens)

Cladoniaceae

Cladina rangiferina	reindeer moss
Cladina chlorophaea	a fruticose lichen
Clidina arbuscula	a fruticose lichen
Clidina mitis	a fruticose lichen
Cladonia uncialis	a fruticose lichen
Cladinia caroliniana	a fruticose lichen

Parmeliaceae

Cetraria arenaria	a fruticose lichen

Usneaceae

Usnea strigosa	a fruticose lichen

Dicranaceae

Dicranum scoparum	a wind blown moss

Entodontaceae

Entodon seductrix	a tree moss

Leucobryaceae

Leucobryum glaucum	pincushion moss

Orthotrichaceae

Orthortichum sp.	

Polytrichaceae

Polytrichum sp.	a haircap moss
Atrichum sp.	a haircap moss

Vascular Plants[a]

Division Polypodiophyta (Ferns)

		Abundance[b]	Origin[c]	Conservation Status[d]
Dennstaedtiaceae (Bracken Family)				
Pteridium aquilinum	bracken fern	A	N	
Osmundaceae (Royal Fern Family)				
Osmunda cinnamonea	cinnamon fern	A	N	

Division Pinophyta (Gymnosperms)		Abundance	Origin	Conservation Status
Cupressaceae (Cypress Family)				
Juniperus virginiana	eastern red cedar	A	N	
Pinaceae (Pine Family)				
Picea abies	Norway spruce	O	I	
Pinus rigida	pitch pine	A	N	
Pinus strodus	white pine	F	I	
Division Magnoliophyta (Flowering Plants)				
Aceracae (Maple Family)				
Acer rubrum	red maple	A	N	
Anacardiaceae (Cashew Family)				
Rhus copallinum	shining sumac	F	N	
Toxicodendron radicans	poison-ivy	A	N	
Araliacae (Ginseng Family)				
Aralia nudicaulis	wild sarsparilla	F	N	
Asteraceae (Aster Family)				
Achillea millefolium	common yarrow	A	I	
Arctium minus	common burdock	O	I	
Aster dumosus	bushy aster	F	N	
Aster linariifolius	stiff aster	A	N	
Aster novae-angliae	New England Aster	R	I	
Aster paternus	toothed white-topped aster	A	N	
Aster solidagineus	narrow-leaved white topped aster	O	N	
Chrysopsis falcata	sickle-leaved golden-aster	A	N	
Gnaphalium obtusifolium	sweet everlasting	A	N	
Hieracium caespitosum	field hawkweed	U	N	
Hieracium pilosella	mouse ear hawkweed	U	I	
Hypochoeris radicata	cat=s ear	F	I	
Solidago odora	sweet goldenrod	A	N	
Solidago rugosa	rough-stemmed goldenrod	A	N	
Solidago nemoralis	gray goldenrod	F	N	
Asclepiadaceae (Milkweed Family)				
Asclepias syriaca	common milkweed	A	N	
Asclepias tuberosa	butterfly-weed	F	N	WL
Betulaceae (Birch Family)				
Betula populifolia	gray birch	O	N	
Corylus americana	American hazelnut	F	N	
Brassicaceae (Mustard Family)				
Alliaria petiolata	garlic mustard	U	I	
Caprifoliaceae (Honeysuckle Family)				
Lonicera marrowi	Morrow's honeysuckle	F	I	

		Abundance	Origin	Conservation Status
Viburnum dentatum	southern arrowwood	U	N	
Viburnum recognetum	northern arrowwood	A	N	
Celastraceae (Bittersweet Family)				
Celastris orbiculatus	oriental bittersweet	A	I	
Cistaceae (Rock-rose Family)				
Helianthemum canadense	frostweed			
Helianthemum bicknelli	Bicknelli rockrose	O	N	
Hudsonia tomentosa	false heather	F	N	
Lechea mucronata	hairy pinweed	O	N	
Clusiaceae (Mangosteen Family)				
Hypericum gentianoides	pineweed	F	N	
Hypericum perforatum	common St. Johnswort	F	I	
Cletheraceae (Clethra Family)				
Clethera alnifolia	sweet pepperbush	A	N	
Cornaceae (Dogwood Family)				
Nyssa sylvatica	"beetlebung", black gum	A	N	
Cyperaceae (Sedge Family)				
Carex pensylvanica	pennsylvania sedge	A	N	
Cares swanii	swans sedge	F	N	
Cyperus filiculmis	button flatsedge	U	N	
Elaeagnaceae (Oleaster Family)				
Alaeagnus angustifolia	Russian olive	U	I	
Ericaceae (Heath Family)				
Arctostaphylos uva-ursi	bearberry	A	N	
Epigaea repens	trailing arbutis	A	N	
Gaultheria procumbens	wintergreen	A	N	
Gaylussacia baccata	black huckleberry	A	N	
Gaylussacia frondosa	dangleberry	F	N	
Kalmia angustifolia	sheep laurel	F	N	
Vaccinium angustifolium	late lowbush blueberry	A	N	
Vaccinium corymbosum	highbush blueberry	F	N	
Vaccinium pallidum	s. lowbush blueberry	F	N	
Euphorbiaceae (Spurge Family)				
Euphorbia maculata	milk puslane	U	N	
Fabaceae (Bean Family)				
Baptisia tinctoria	wild indigo	F	N	
Robinia pseudo-acacia	black locust	F	I	
Vicia species	vetch			

		Abundance	Origin	Conservation Status
Fagaceae (Beech Family)				
Fagus grandifolia	American beech	F	N	
Quercus alba	white oak	A	N	
Quercus coccinea	scarlet oak	A	N	
Quercus ilicifolia	scrub oak	A	N	
Quercus velutina	black oak	A	N	
Quercus stellata	post oak	F	N	WL
Hamamelidaceae (Witch-hazel Family)				
Hamamelis virginiana	witch-hazel	O	N	
Iridaceae (Iris Family)				
Iris veriscolor	wild iris	A	N	
Juglandaceae (Walnut Family)				
Carya tomentosa	mockernut hickory	O	N	
Juncaceae (Rush Family)				
Juncus gerardii	blackgrass	A	N	
Juncus tenuis	path rush	A	N	
Lauraceae (Laurel Family)				
Sassafras albidum	sassafras	F	N	
Lemnaceae (Duckweed family)				
Lemma sp.	duckweed sp.	U	N	
Liliaceae (Lilly family)				
Hypoxis hirsuta	yellow star grass	F	N	
Maianthemum canadense	Canada mayflower	A	N	
Monotropacea (Indian Pipe Family)				
Monotropa uniflora	indian pipe	F	N	
Myricaceae (Bayberry Family)				
Comptonia peregrina	sweetfern	A	N	
Myrica pennsylvanica	bayberry			
Orchidaceae (Orchid Family)				
Spiranthes tuberosa	little ladies' tresses	O	N	WL
Poaceae (Grass family)				
Agrostis capillaris	Rhode Island bent grass	U	I	
Agrostis gigantea	redtop	F	I	
Anthoxanthum oderatum	sweet vernal grass	F	I	
Danthonia spicata	poverty grass	F	N	
Deschampsia flexuosa	hairgrass	F	N	
Dichanthelium scoparium	broom panic-grass	H	N	
Eragrostis spectabilis	purple love grass	F	N	
Festuca filiformis	hair fescue	U	I	

		Abundance	Origin	Conservation Status
Festuca ovinia	sheep fescue	F	I	
Festucs rubra	red fescue	F	N	
Holcus lanatus	velvet grass	A	I	
Panicum sp.	a panic grass			
Panicum virgatum	switchgrass	F	N	
Panicum cf. lanuginosum	panic-grass			
Schizachyrium scoparium	little bluestem	F	N	
Polygonaceae (Smartweed Family)				
Rumex acetosella	red sorrel	A	I	
Polygonella articulata	sand jointweed	F	N	
Primulaceae (Primrose Family)				
Lysimachia quadrufolia	whorled loosestrife	F	N	
Pyrolaceae (Shinleaf Family)				
Chimaphila maculata	striped wintergreen	F	N	
Rosaceae (Rose Family)				
Amelanchier sp.	a shadbush species			
Fragaria vesca	wood strawberry	O	I	
Prunus maritima	beach plum	F	N	
Prunus serotina	black cherry	A	N	
Potentilla canadensis	dwarf cinquefoil	F	N	
Rosa carolina	pasture rose	F	N	
Rosa multiflora	multiflora rose	A	I	
Rubus allegheniensis	common blackberry	F	N	
Rubus flagellaris	prickly dewberry	F	N	
Rubus occidentalis	black raspberry	U	N	
Salicaceae (Willow Family)				
Populus grandidentata	bigtooth aspen	O	N	
Salix discolor	pussy willow	U	N	
Scrophulariaceae (Figwort Family)				
Linaria canadensis	blue-toadflax	F	N	
Melampyrum lineare	common cow-wheat	A	N	
Smilacaceae (Catbrier Family)				
Smilax rotundifolia	common greenbrier	A	N	
Urticaceae (Nettle Family)				
Urtica dioica	stinging nettle	U	U	
Vitaceae (Grape Family)				
Parthenocissis quinquefolia	Virginia creeper	A	N	

[a] As reported Swanson, D.L. and C. Knapp 1999 and Gleason and Cronquest 1991.
[b] A = abundant, F = frequent, O = occasional, R = rare, H = historic, U = unknown.
[c] N = native, I = introduced, U = unknown.
[d] E = endangered, T = threatened, SC = special concern, WL = watch-listed.

Appendix C: Taxonomic List of Avian Species at Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, MA.

Family Accipitridae (hawks and eagles)		
osprey	*Pandion haliaetus*	carnifore, ground pouncer
sharp-shinned hawk	*Accipiter striatus*	carnivore, aerial pursuit
Family Anatidae (swans, geese, and ducks)		
Canada goose	*Branta canadensis*	w: granivore, ground forager s: omnivore, water forager
bufflehead	*Bucephala albeola*	w: fiscivore, water forager s: omnivore, water forager
common goldeneye	*Bucephala clangula*	omnivore, water forager
mallard	*Anas platyrhynchos*	omnivore, water forager
oldsquaw	*Clangula hyemalis*	omnivore, water forager
ring-necked duck	*Aythya collaris*	insectivore, water forager
wood duck	*Aix sponsa*	omnivore, water forager
mute swan	*Cygnus olor*	insectivore, water forager
Family Ardeidae (herons)		
great blue heron	*Ardea herodias*	fiscivore, water forager
Family Bombycillidae (waxwings)		
cedar waxwing	*Bombycilla cedrorum*	omnivore, hawks
Family Certhiidae (creepers)		
brown creeper	*Certhia americana*	insectivore, bark gleaner
Family Columbidae (pigeons and doves)		
mourning dove	*Zenaida macroura*	granivore, ground gleaner
Family Corvidae (jays and crows)		
blue jay	*Cyanocitta cristata*	omnivore, ground gleaner
American crow	*Corvus brachyrhynchos*	omnivore, ground gleaner
Family Emberizidae (warblers and sparrows)		
yellow-rumped warbler	*Dendroica coronata*	omnivore, lower canopy gleaner
Baltimore oriole	Icterus *galbula*	insectivore, hawks
eastern meadowlark	*Sturnella magna*	omnivore, ground gleaner
pine warbler	*Dendroica pinus*	insectivore, bark gleaner
prairie warbler	*Dendroica discolor*	insectivore, foliage gleaner
northern cardinal	*Cardinalis cardinalis*	s: omnivore, ground gleaner w: granivore, ground gleaner
rose-breasted grosbeak	*Pheucticus ludovicianus*	omnivore, foliage gleaner
eastern towhee	*Pipilo erythrophthalmus*	omnivore, ground gleaner
chipping sparrow	*Spizella passerina*	omnivore, ground gleaner
song sparrow	*Melospiza melodia*	insectivore, foliage gleaner
red-winged blackbird	*Agelaius phoeniceus*	omnivore, ground gleaner
brown-headed cowbird	*Molothrus ater*	s: omnivore, ground gleaner w: granivore, ground gleaner

common grackle	*Quiscalus quiscula*	omnivore, ground gleaner
Family Fringillidae (finches)		
American goldfinch	*Carduelis tristis*	s: omnivore, ground gleaner w: granivore, ground gleaner
house finch	*Carpodacus mexicanus*	s: omnivore, ground gleaner w: granivore, ground gleaner
Family Hirundinidae (swallows)		
tree swallow	*Tachycineta bicolor*	insectivore, air screener
barn swallow	*Hirundo rustica*	insectivore, air screener
Family Laridae (gulls and terns)		
herring gull	*Larus argentatus*	carnivore, coastal scavenger
great black-backed gull	*Larus mainus*	carnivore, coastal scavenger
ring-billed gull	*Larus delawarensis*	carnivore, coastal scavenger
Family Meleagrididae (turkeys)		
turkey	*Meleagris galloparo*	omnivore, ground gleaner
Family Mimidae (mimic thrushes)		
gray catbird	*Dumetella carolinensis*	s: omnivore, ground gleaner w: frugivore, lower canopy gleaner
northern mockingbird	*Mimus polyglottos*	omnivore, foliage-ground gleaner
Family Muscicapidae (thrushes)		
golden-crowned kinglet	*Regulus satrapa*	insectivore, lower canopy gleaner
American robin	*Turdus migratorius*	omnivore, ground gleaner
Family Numididae (fowls)		
Guinea fowl	*Numida melpagris*	omnivore, ground gleaner
Family Paridae (titmice and chickadees)		
black-capped chickadee	*Parus atricapillus*	s: insectivore, low canopy gleaner w: omnivore, low canopy gleaner
Family Phasianidae (grouse)		
peacock	*Polyplectron sp.*	omnivore, ground gleaner
Family Picidae (woodpeckers)		
red-bellied woodpecker	*Melanerpes carolinus*	insectivore, bark gleaner
northern flicker	*Colaptes auratus*	s: insectivore, ground gleaner w: omnivore, ground gleaner
downy woodpecker	*Picoides pubescens*	insectivore, bark gleaner
Family Pogicipedidae (grebes)		
pied-billed grebe	*Podilymbus podiceps*	omnivore, water forager

Family Sittidae (nuthatches)		
white-breasted nuthatch	*Sitta carolinensis*	insectivore, bark gleaner
red-breasted nuthatch	*Sitta canadensis*	insectivore, bark gleaner
Family Troglodytidae (wrens)		
Carolina wren	*Thryothorus ludovicianus*	insectivore, lower canopy gleaner
Family Strigidae (typical owls)		
eastern screech owl	*Otus asio*	insectivore, swoops
Family Vireonidae (vireos)		
red-eyed vireo	*Vireo olivaceus*	s: insectivore, foliage gleaner w: frugivore, lower canopy gleaner

* Sources: DeGraaf & Rudis (1987) and Ehrlich, Dobkin & Wheye (1988).

** m = foraging guild during spring or fall migration, s = foraging guild during summer (breeding season), w = foraging guild during winter (or nonbreeding seasons).

Appendix D: Taxonomic List of Wildlife Species Observed at Weahtaqua Springs Preserve, Oak Bluffs and Tisbury, MA

Scientific name	Common name	Mixed-oak woodland*	Pine woodland	Rolling savanna	Shrubland	Water-hole	Mixed-conifer woodland	Pond shoreline
Kingdom Metazoa (Animalia)								
Phylum Arthropoda								
Class Insecta								
Order Coleoptera (beetles)								
Family Scarabacidae: *Phyllophaga sp.*	June beetle	Sp						
Family Dytiscidae: *Dytiscus sp.*.	predacious diving beetle					Sp		
Order Hemiptera (true bugs)								
Family Gerridae: *Gerris remigis*	common water strider					Sp		
Order Hymenoptera (sawflies, ants, wasps, and bees)								
Family Apidae: *Bombus sp.*	bumble bee	Sp	Sp		Sp			
Order Lepidoptera (butterflies and moths)								
Family Arctiidae: *Lycomorpha pholus*	lichen moth	S	S	S	S		S	
Family Saturniidae: *Anesota senatoria*	orange stripped oakworm	S						
Family Nymphaliidae: *Nymphalis antiopa*	mourning cloak	S	S	S	S		S	
Family Nymphaliidae: *Cercyonis pegala*	wood nymph	S	S	S	S		S	
Family Lycaenidae: *Celastrina argiolus*	spring azure	Sp	Sp		Sp		Sp	
Family Hesperiidae: *Erynnis sp.*	a duskywing				Sp			

Scientific name	Common name	Mixed oak woodland*	Pine woodland	Rolling savanna	Shrubland	Ravine	Oak/cedar woodland	Pond shoreline
Family Nymphalidae: *Phyciodes tharos*	pearl crescent				Sp			
Family Nymphalidae: *Danaus plexippus*	monarch			S	S		S	
Family Nymphalidae: *Megisto cymela*	little wood satyr	S	S	S	S		S	
Family Nymphalidae: *Vanessa virginiensis*	american painted lady			S	S		S	
Family Nymphalidae: *Vanessa cardui*	painted lady						Sp	
Family Liparidae: *Halysidota tessellaris*	banded tussock moth	S						
Order Diptera (flies)								
Family Culicidae: species unknown	mosquitoes	S	S	S	S	S, Sp	S	S
Family Chironomidae: species unknown	midges					Sp		
Class Arachnida								
Order Acarina								
Family Trombidiidae:: *Trombidium sp.*	velvet mites							Sp
Order Acarina								
Family Ixididae: *Ixodes scapularis*	deer tick	S	S	S	S		S	S
Phylum Chordata								
Subphylum Vertebrata								
Class Mammalia								
Order Lagomorpha								
Family Leporidae: *Sylvilagus floridanus*	eastern cottontail	Sp		Sp				
Order Carnivora								

Scientific name	Common name	Mixed oak woodland*	Pine woodland	Rolling savanna	Shrubland	Ravine	Oak/cedar woodland	Pond shoreline
Family Procyonidae: *Procyon lotor*	raccoon							S,Sp,F,W
Family Canidae: *Canis familiaris*	domestic dog	S,Sp,F,W	S,Sp,F,W	S,Sp,F, W	S,Sp,F,W		S,Sp,F,W	
Order Artiodactyla								
Family Cervidae: *Odocoileus virginianus*	white-tailed deer	S,Sp,F,W						
Order Rodentia								
Family Sciuridae: *Sciurus carolinensis*	gray squirrel	S,Sp,F,W	S,Sp,F,W				S,Sp,F,W	
Family Muridae: *Rattus norvegivus*	Norway rat							S,Sp,F,W

* Season and frequency of occurance: Sp = spring, S = summer, F = fall, W = winter.

Appendix E. Preliminary Management Plans for Weahtaqua Springs Preserve

April 8, 1999

Martha's Vineyard Land Bank Commission

Weahtaqua Springs Preserve
preliminary management plan

acreage	26.4 acres	
tax parcel nos.	40-7	
nature conservation goals	(1)	conduct biological survey of property to serve as base for formulation of management objectives.
	(2)	identify rare and endangered species, if any, and create plan to protect and encourage their populations.
	(3)	create plan for managing lichen habitat at the core of the property so that it remains intact, with public access sited along its perimeter.
cultural conservation goals	(1)	conduct archeological survey of property, since it is understood to have a significant Wampanoag history.
natural products goals	(1)	consider allowing hunting on property, after examining geography and neighborhood development patterns.
recreational goals	(1)	utilize Featherstone Farm trailhead for all vehicular parking by the general public.
	(2)	open property for hiking, non-motorized bicycling and horseback riding; conceive of trail use on a "through" rather than

P.O. Box 2057 • Edgartown, Massachusetts 02539 • 508 627-7141 • Fax 508 627-7415

"loop" basis (as property will be part of a larger town-wide loop) using, in part, the Cross-Oak Bluffs Trail.

(3) continue to work to connect property with other conservation areas and neighborhoods via trails.

administrative goals

(1) oversee and police land on regular basis in order to maintain property as an attractive conservation area

(2) complete management plan before December of 2001

approved by vote of the Oak Bluffs town advisory board: April 8, 1999

approved by vote of the Tisbury town advisory board: April 8, 1999

approved by vote of the land bank commission: April 5, 1999

July 30, 2001

Martha's Vineyard Land Bank Commission

Weahtaqua Springs Preserve [expansion]
preliminary management plan

acreage	0.8 acres	
tax parcel nos.	17-A-10	
nature conservation goals	(1)	conduct biological survey of property to serve as base for formulation of management objectives.
	(2)	identify rare and endangered species, if any, and create plan to protect and encourage their populations.
natural products goals	(1)	prohibit hunting, per the land's size and configuration
recreational goals	(1)	open property for hiking, non-motorized biking and horseback-riding and other passive uses; install trail where appropriate.
	(2)	work to connect property with other conservation areas and neighborhoods by means of trails and nearby roads.
	(3)	explore suitability of property for fishing.
	(4)	install small trailhead on property if it is determined that none of the public trailheads in the area are close enough to be useful.
administrative goals	(1)	oversee and police land on regular basis in order to maintain

P.O. Box 2057 • Edgartown, Massachusetts 02539 • 508 627-7141 • Fax 508 627-7415

property as an attractive conservation area.

(2) complete management plan before December of 2003.

approved by vote of the Tisbury town advisory board: July 30, 2001

approved by vote of the land bank commission: July 30, 2001