



INFORMATION AND TRAILS

# Squam Swamp



**Nantucket Conservation Foundation**

Nantucket, Massachusetts [nantucketconservation.org](http://nantucketconservation.org)



## Nantucket Conservation Foundation

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# Welcome to Squam Swamp

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**W**elcome to the Nantucket Conservation Foundation's Squam Swamp property. This unique 294-acre parcel was purchased by the Foundation over several years, beginning in 1982 as a bargain sale from Robert and Molly (Backus) Sziklas. Most of the funds needed for this \$1.2 million purchase price were contributed by our neighbors, the residents of Wauwinet, Squam, and Pocomo.

Immediately abutting Squam Swamp to the south is the Foundation's 210-acre Squam Farm property, which can be accessed via this trail. Squam Farm contains a diverse collection of hardwood forests, freshwater bogs, shrublands, vernal pools, and managed grasslands. The property consists of ten separate parcels that have been pieced together over twenty years through the hard work and generosity of many individuals and organizations. The Foundation acquired these lands through direct purchase, bargain sale, and as gifts from the Koch, Sangree, Sziklas, and Andrews families. Of special note is the Nantucket Land Council's contribution of 90 acres to the Foundation after diligently working for fifteen years to clear title by purchasing partial interests, pursuing court challenges, and researching titles. Because of the generosity and foresight of all those who contributed towards the acquisition of both areas, over 504 contiguous acres are now protected for the benefit of present and future generations.



## PRECAUTIONS AND REGULATIONS

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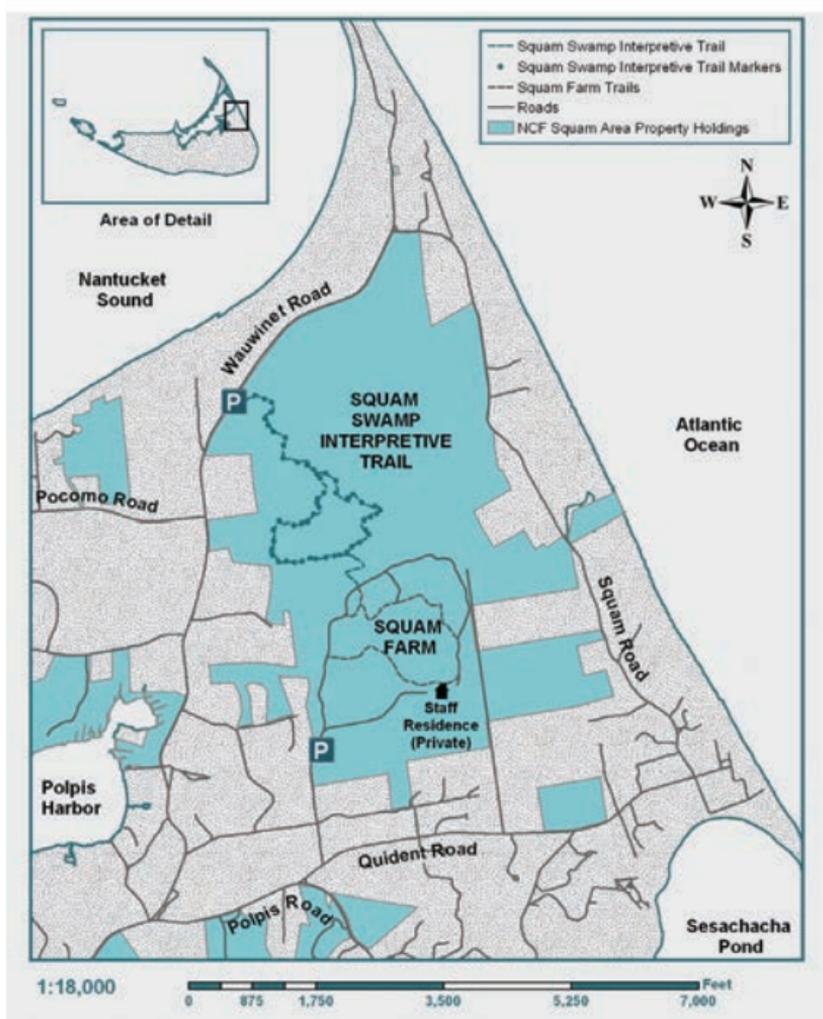
**Dense vegetation and lack of visible landmarks within this property make it easy to become disoriented and lost.** Please stay on the marked trail at all times and keep your children nearby.

**Be sure that you are dressed appropriately.**

Waterproof shoes or boots are recommended, as many portions of the trail can be muddy. Deer or blacklegged ticks (which carry Lyme Disease, Babesiosis, Ehrlichiosis, and/or other tick-borne diseases) and mosquitoes are both common on this property. Check yourself and your clothing thoroughly for ticks after visiting any of Nantucket's natural areas. Staying on the trail and out of the nearby vegetation will minimize your exposure to both ticks and poison ivy, which is also abundant on this property.

**Horses, bicycles, mountain bikes, and motorized vehicles are prohibited, as are camping and any commercial activity.** Hunting is permitted during designated seasons. Please note that there are no restrooms or other facilities on the property.

**We hope you enjoy your visit!**



## THE TRAIL

This brochure provides an introduction to some of the ecological, geological, and historical features of the Squam Swamp property. The walking trail is marked at regular intervals with numbered posts. The numbers correspond with the labels on the trail map and the numbered sections of the text contained in this publication. Each section of text describes and identifies interesting natural resources visible in the immediate vicinity of that particular section of trail.

The interpretive trail is approximately 1.8 miles in length, round trip. It consists of a single path that proceeds for about 0.4 miles, and then splits to form a large, circular loop (see map on pages 18–19). Along the southern portion of the loop (between trail markers #38 and #39) there is an access path leading to the Foundation's Squam Farm property, which contains additional walking paths traversing managed grasslands, hardwood forests and shrublands.



# Property Guide

## by Trail Marker

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1

**Squam Swamp has many interesting vegetation communities largely determined by the water content of the soil.** The roots of the plants that you see here have different tolerances for moisture. Some species of trees and shrubs, such as tupelo, red maple, highbush blueberry, and sweet pepperbush grow in both well-drained upland soils and wetland soils. Others, such as shadbush and arrowwood, cannot tolerate wet soils and only occur in upland areas. You will see examples of these different habitats and how they transition from one to the other along this interpretive trail.

2

**The oak trees growing here are indicators that the soil at their roots is rarely saturated with water.** Wetland soils contain very low levels of oxygen, and the root systems of upland species such as oaks are not adapted to growing under oxygen-depleted conditions. Four species of oaks grow in the vicinity of this trail marker: white oak, black oak, scrub oak, and dwarf chestnut oak. White oaks are named for their pale, scaly bark. The leaves have white undersides and 3–9 lobes that are rounded, rather than having a distinctly pointed tip. Black oaks have smooth, glossy, dark green leaves that are somewhat hairy on the underside. The bark is dark brown and is separated into thick ridges by fissures. Scrub oak is a tall shrub that occurs occasionally in the drier portions of the swamp, but is more common in upland, sandy soils where it forms impenetrable thickets. The second word of its Latin name, *Quercus ilicifolia*,

means “holly-like” and refers to the shape of its small, triangular-lobed leaves with pointed tips. Dwarf chestnut oak is a low shrub that usually grows in clumps. It has bright green leaves with 3-7 rounded teeth on each margin. It also prefers dry, sandy soils, but is occasionally found in moist woodlands such as this.

3

**Hardwood forests are relatively rare on Nantucket.** Settlers who arrived in the early 1600s reported that the island was covered with trees. However, this quickly changed as the trees were harvested for home construction, ship building, and firewood. In addition, large areas were cleared for growing crops and grazing livestock. Due to the decline and eventual elimination of grazing in the late 1800’s, taller shrubs and trees have gradually become established in many parts of the island. Today, hardwood forests are relatively rare and limited to certain areas, including the Masquetuck Reservation in Quaise, the borders of the Windswept Cranberry Bog, Coskata Woods, Squam Farm, and here at Squam Swamp.

4

**Several of the trees in the vicinity of this trail marker are swamp red maples, which are well-adapted to surviving in wetland soils.** The roots of most plants obtain oxygen directly from the soil. When soils become saturated with water, most of the oxygen becomes displaced and is not available to the roots. Swamp red maples produce very shallow, spreading root systems in order to take advantage of what little oxygen is available just below the ground surface. This allows them to survive in wet soils. Also, these trees are dormant during the winter and early spring, which is typically the wettest part of the year.

**5**

**The bolder just off the edge of the trail is a remnant of Nantucket's geologic past.**

When the last glacier moved in from the north approximately 15,000 years ago, it pushed large boulders, small rocks, soil, and clay ahead of it and deposited them along its southernmost extent, forming a moraine. The rolling hills that make up the northern portion of Nantucket are the weathered remains of this glacial material. Boulders such as this are called "glacial erratics" because they differ in size, shape, and type from rocks that are native to the area. They can be found scattered across the moraine at many locations in the northern portion of the island.

**6**

**This large depression, which is usually filled with water during the winter and spring, is one of the many vernal pools scattered throughout these woods.**

A vernal pool is a body of fresh water that either dries up for a portion of the year, or contains water year-round but is free of adult fish populations. These habitats are very important to many species of wildlife, especially amphibians and reptiles such as the spring peeper, green frog, redback salamander, painted turtle, and the rare spotted turtle. Vernal pools provide breeding habitat for amphibians whose eggs and larvae would likely be eaten by fish in larger freshwater ponds. They also contain diverse populations of invertebrates such as damselflies, dragonflies, diving beetles, fairy shrimp, and water striders, all of which are an important source of food for the amphibians, reptiles, and birds that come to feed here.

**7**

Just off the trail is a low, swampy area that provides optimum growing conditions for *Sphagnum*, a large genus of mosses that can hold up to twenty-five times their weight in water. As the top portions of these plants grow,

the underlying layers become deprived of sunlight and die. Highly acidic conditions prevent this material from completely decaying. It builds up and forms extensive layers of organic material called peat. Most plants cannot tolerate such high concentrations of acid, although a few species have developed special adaptations that allow them to survive here. Cinnamon fern and swamp azalea are two examples of such species.

8

**Areas of higher elevation like this are found throughout Squam Swamp.**

The plants in close proximity to this trail marker are not able to survive in wet soils such as those found elsewhere in the swamp. For example, the large black oak tree just off the trail is an example of a common upland tree species. The shape of this particular tree is very different from those that occur within the denser forest. It was probably the only tree at this site when it was a sapling, which enabled it to produce large, horizontally spreading branches as it grew with very little competition for sunlight. Other upland shrubs, trees, and vines in the immediate vicinity include arrowwood, scrub oak, dwarf chestnut oak, bayberry, and fox grape.

9

**This is one of many portions of Squam Swamp that provides ideal habitat for spotted turtles.**

Named for their yellow polka-dotted shells, these 8-10 inch long reptiles are a relatively rare species in Massachusetts. Their rarity is attributed to the degradation and loss of wetlands, road mortality, collection for the pet trade, and habitat fragmentation. Spotted turtles are most frequently seen when adults are searching for mates in late spring and early summer. After mating, females will excavate “nests” (shallow holes) in upland areas adjacent to wetlands, lay one to five eggs, and then cover

them up with soil. The eggs hatch in late summer and the hatchlings, which are about the size of a quarter, will either disperse or over-winter in the nest. Adults hibernate in muddy wetland bottoms during the winter, and may also become inactive during the hottest, driest periods of the summer. Spotted turtles feed on a variety of foods, including small frogs, insects, spiders, small fish, and vegetation.

10

**The important role that soil moisture plays in determining the distribution of plants found within the swamp is particularly visible at this location.**

This part of the trail is situated along the boundary between wetland and upland vegetation communities. The bog on the low side of the trail has wet soils year-round, while the upland slope contains considerably drier, well-drained soils. The scrub oaks and black oaks on the upland side of the trail would not be able to survive in the bog that is less than 100 feet from their present location.

11

**The size of the swamp red maple trees near this trail marker attest to their age.**

Swamp red maples can live for up to a century and reach heights of 90 to 100 feet. They grow very rapidly during the first 20 to 30 years, after which their growth rate slows. The large lumps on the tree trunks that contribute to their gnarly appearance are called burls. When a fungus attacks the trunk or branch, the tree produces growths such as these in an effort to isolate the wound. Despite their appearance, burls are generally not harmful to the tree.

12

**During most of the year, this stream bed contains one of the few flowing streams on Nantucket.**

Most of the island's soils are very sandy and porous, and rainwater usually soaks

into the ground immediately. Here in the northeastern portion of the island, the soils often contain impervious clay layers and much of the rainfall is prevented from entering the water table. The *Sphagnum* and other overlaying organic materials here in Squam Swamp absorb this water and slowly release it, where it collects and flows into slight valley-like depressions such as this one.

13

**The water in this stream is usually tan to dark reddish-brown in color, due to decaying vegetation such as dead aquatic plants, fallen leaves, and branches that lie within the stream and along its margins.** As this matter decomposes, it releases tannins – darkly-colored organic compounds that are the by-products of plant metabolism and decay. This same process gives tea its characteristic brown color as the tea leaves steep in water.

14

**You may notice that the tupelo trees at this location are relatively uniform in trunk diameter and height.** This grove likely became established following cessation of farming or grazing activities. Once the land was no longer maintained, seeds from nearby established trees germinated and began to grow quickly, competing for sunlight and nutrients as they formed the tight canopy of uniform height present today. As the trees in this section of the swamp become older, some will die off from fungal infections, insect infestations, or be blown over by strong winds, creating openings in the canopy. Sunlight will be able to reach the forest floor at these sites, triggering the germination and growth of new trees to replace those that were lost. Due to this cycle of death and germination, the trees that make up a more mature forest usually vary in age and are therefore

not uniform in size like the grove present at this location.

14

*At trail marker #14, the trail splits to form a large circular route that is approximately 1 mile in length* (see map on pages 18–19). The trail can be walked in either direction, but proceed straight (instead of bearing to the left) to follow the numbered trail markers in their correct numeric sequence.

15

**The tall tree above you is a mockernut hickory.** Primarily a southeastern species, it occurs in Massachusetts at the northern limit of its range. In the south, it is the most common hickory species and is harvested commercially. Because the wood is very strong and shock resistant, it is often manufactured into gymnastic equipment, ladder rungs, poles, and tool handles. The sawdust and wood chips are also utilized in the meat smoking industry.

16

**Many of the vines growing up the nearby trees are poison ivy, a common plant here in Squam Swamp.** Poison ivy is a very adaptable species that can grow as a free standing shrub, a climbing woody vine, or a low ground cover in virtually any setting on Nantucket. Here in the forest, its characteristic three leaves tend to be larger than usual and very dark green – an adaptation that allows the plant to maximize the amount of sunlight it collects in shady environments. Contrary to popular belief, you cannot get a rash from poison ivy unless you come in direct contact with the plant’s oils – usually by touching the leaves, stems, or roots. If the oil is vaporized when the plant is being burned, it can enter the throat and lungs and cause a very serious medical condition. Poison ivy oil can be removed from the skin by thoroughly

washing with strong soap and water immediately after contact. However, the best way to avoid the unpleasant effects of contact with this plant is to heed the old saying, “leaves of three, let them be!”

17

**If you look carefully at the trunks and branches of nearby trees, you will see a**

**colorful assortment of lichens.** These organisms, as well as some species of algae and mosses, are epiphytes that live attached to the bark of dead and living wood. They manufacture their own food by photosynthesis — the production of sugar and oxygen from carbon dioxide and water in the presence of sunlight. While lichens emit a weak acid that helps break down organic matter, there is no evidence that they cause harm to healthy, living trees. Lichens are extremely sensitive to pollution and are therefore rare in urban and suburban settings. Their abundance on Nantucket attests to the island’s relatively pure air and high humidity.

18

**Lichens, such as the ones growing on these sassafras trees, are an interesting natural phenomenon because they are actually an**

**association of two organisms.** Tiny green algae cells intertwine with microscopic fungal filaments to produce an entirely new form. Each shade of green is likely a distinct “species.” As observed here, there is a great deal of variation in both color and texture – some have distinct raised, wavy edges while others are flat and appear to be green discolorations on the bark itself.

19

**Although surrounded almost entirely by wetlands, this hilltop is approximately 32 feet above sea level and represents one of the higher elevations in Squam Swamp.** It is

possibly the weathered remains of a large pile of glacial debris left behind as the most recent ice sheet melted and slowly retreated north approximately 12,000 years ago. The northern portion of Nantucket contains many such hilltops (kames) and valleys (kettles). In contrast, the southern portion of the island is relatively flat and consists of finer, sandy sediments laid down in an “outwash plain” by glacial meltwaters flowing to the sea.

20

**You may have noticed that the trees here in Squam Swamp often have mosses growing on their trunks, especially near the base.**

Mosses belong to a group of plants known as bryophytes, which also includes liverworts and hornworts. They have no roots or vascular system, which makes them highly dependent on water for their survival. Because of this, most species can only grow in very moist, shady locations. Their ability to absorb and retain moisture makes them a very important part of the plant communities here at Squam Swamp. Although bryophytes are considered to be relatively primitive plant forms, they are one of the largest groups of plants in the world, with over 25,000 known species.

21

**Fallen swamp red maple trees such as these are common in forested wetlands.**

This species forms extremely shallow root systems in response to the scarcity of oxygen in wetland soils. A disadvantage to shallow roots is that they often cannot support the tree as it grows taller and becomes exposed to the frequent high winds experienced on Nantucket. However, fallen swamp red maple trees are often able to survive if even a small portion of their root system remains in the ground. The craters formed when the tree becomes uprooted

gradually fill with soil, grasses, ferns, mosses, and wetland shrubs. The dead portions of the tree will slowly rot, aided by fungi that specialize in decomposing dead wood.

22

**This vernal pool (which may be dry during the summer months) is one of many areas in Squam Swamp that provides habitat for spring peepers.** These tiny tree frogs announce the impending arrival of spring each year with their loud mating chorus. Peepers (also known as pinkletinks) are only an inch or so long, but the loud breeding calls of the male frogs can be heard from up to a quarter of a mile away. The females lay up to 800 eggs per season in clusters attached to aquatic vegetation in vernal pools and other wetlands. The eggs develop rapidly, hatching within 7-10 days into tadpoles less than a quarter inch long, which then grow to adult size over the next 5-8 weeks. Adult peepers are terrestrial and are equipped with adhesive toe pads that enable them to climb into the treetops of swamps and forested wetlands during the summer months. Therefore, they are not frequently encountered outside of the breeding season.

23

**These tall shrubs with the reddish-brown, somewhat shaggy bark are highbush blueberry bushes – a relatively common species in Squam Swamp.** Several species of blueberries occur on Nantucket. While most grow low to the ground in sunny, upland locations, highbush blueberry occurs primarily in moist environments such as swamps, bogs, pond shores, and damp woodlands and can grow upwards to 12 feet tall. Highbush blueberry is the native species from which most commercial blueberry cultivars originated. Blueberries are characterized by having elliptical, short-stalked leaves and zigzagged stems. They bear small,

white to pale pink bell-shaped flowers in late spring. The berries, which appear in late summer, are enjoyed by many species of wildlife as well as humans.

24

**This tall shrub with the horizontally-lined silver bark is a particularly large example of bayberry – a very common species found in upland and coastal habitats island-wide.**

Bayberry has long been known for its medicinal qualities, which were useful to the Native Americans. The bark and roots were either ground into a powder or made into an astringent used to treat sores, boils, and various digestive disorders. The leaves, stems, berries, and roots of the plant contain spicy, aromatic oil. The small berries were widely collected by the early settlers, who boiled them to melt off their waxy coating and make bayberry candles. This undertaking was very labor intensive, as it takes about 100 pounds of berries to produce a mere 10 pounds of candle wax.

25

**The woods along the down slope portion of the trail at this location exemplify what is locally referred to as a “hidden forest.”**

This type of habitat occurs in the northeast portion of the island within poorly-drained, kettlehole depressions that were left behind by the last glacial advance. These low elevation patches of forest are somewhat obscured when viewed from a distance because the canopy of the trees may be at the same level as the surrounding vegetation growing upslope of the kettlehole. Thus, the trees at these sites can become quite tall before they are impacted by the constant wind and salt spray that occurs on Nantucket.

**26**

**Several of the surrounding trees at this site support large, thick fox grape vines.** These plants are rooted in the forest floor and run a considerable distance up the trunks to reach the canopy. Grape vines are more commonly found overgrowing shrubs and shorter trees because they prefer full sunlight. However, they are also able to survive in the forest under low light conditions by adopting the growth habit seen. Once a well-established grape vine reaches the canopy, it can do considerable damage to the tree that supports it by overgrowing and outshading the leaves and weighing down the branches. Another common species here in Squam Swamp that often utilizes the same growth strategy is poison ivy.

**27**

**The lack of substantial shrub cover in the understory at this site is an indication that very little light reaches the forest floor during the growing season.** The large beech, tupelo, and sassafras trees here have almost completely closed the canopy. Further limiting the germination and establishment of grasses and wildflowers is the dense layer of roots radiating from mature nearby trees and accumulated leaf litter. The understory here consists primarily of tree saplings that are able to survive and grow in low light conditions by spreading their branches laterally to maximize sunlight absorption. These conditions are indicative of what is called a climax community in this type of forest, where the assemblage of species will maintain itself in a “steady state” over time, as long as the environmental conditions remain the same.

**28**

**This site supports a grove of large, mature American beech trees, identified by their very smooth, pale gray bark and toothed,**

**elliptical leaves.** This species is characterized by slow rates of growth. The sizes of these particular specimens attest to their age, believed to be well over 100 years. Beech trees produce both “male” and “female” flowers on the same tree. Wind-blown pollen from the male flowers is transferred to the female flowers, which eventually develop into brown, triangular-shaped beechnuts.

29

**A common tree found in Nantucket’s hardwood forests is tupelo, also known as black gum.**

The slender trees in the immediate vicinity are tupelo trees – they can be identified by their gray, furrowed bark, very straight trunks, and horizontally layered, zigzagged branches. Many of the trees here bear the scars of a fungal or insect infestation at the sites where the lower branches were attached. In New England, tupelo occurs at the northern limit of its range and reaches only 20-50 feet in height, but further south it can grow up to 100 feet tall. On Martha’s Vineyard, this species is referred to as the beetle-bung tree, because it has extremely heavy, tough wood that was made into mallets (or beetles) used to pound wooden stoppers (or bungs) into whale oil casks.

30

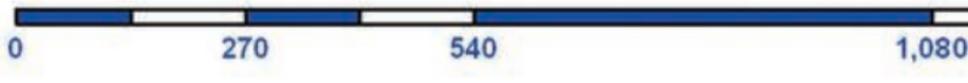
**This is a very large scrub oak – a native species that usually grows as a tall shrub, but occasionally reaches tree size.**

One of the most common woody plant species on Nantucket, scrub oak is extremely tough and resilient. In other areas of the island, particularly in the Middle Moors and along the southeastern shoreline, it has overgrown and out-shaded rare grassland and heathland plant communities that were created and maintained by sheep grazing during the 1800s. Management efforts such as brushcutting and disc harrowing are currently

Wauwinet Rd.



# Squam Swamp Interpretive Trail





being used to keep scrub oak and other species of tall shrubs in check. Scrub oak is an upland plant that cannot survive in wetland soils and its occurrence here in Squam Swamp is limited to dry, higher elevations.

31

**This hilltop, at approximately 54 feet above sea level, represents the highest elevation in Squam Swamp.** As exemplified by the swamp red maple tree growing here, this species can be found growing in a wide range of soil moisture conditions — from flooded *Sphagnum* bogs to dry, upland sites like this. Swamp red maple owes its name to the brilliant color of its leaves in autumn. The red and orange pigments responsible for the display are always present in the leaves. However, during the spring and summer, they are masked by chlorophyll, a green pigment that enables plants to produce sugar and oxygen from water and carbon dioxide in the presence of sunlight. This process of photosynthesis allows leaves to manufacture sugars during the growing season, which are then transported and stored in the root system to nourish the tree during winter when it is leafless. In response to decreasing sunlight and declining temperatures in late summer, the leaves form a corky barrier at the base of their stems. The chlorophyll remaining in the leaves breaks down, revealing the vibrant red and orange colors associated with this species in autumn.

32

**Black cherry trees like those in the vicinity of this marker are common in tall shrub thickets and young forests such as this.** They can be identified by their rough, dark outer bark marked with short, horizontal lines. On older trees, the bark is often cracked, exposing lighter, reddish-brown interior bark. This species bears clusters of tiny white flowers on narrow stalks in

early spring, followed by small, juicy, reddish-black fruits in late summer that are a favorite of birds. The leaves, twigs and seeds all contain hydrocyanic acid, which gives off a bitter odor when these parts of the tree are crushed and makes the foliage poisonous to livestock. However, eastern tent caterpillars favor black cherry and other species in the *Prunus* genus, often causing widespread defoliation.

33

**You will notice that this area contains fewer mature trees and more shrubs, grasses and wildflowers than in other portions of Squam Swamp.**

This indicates that the site recently supported a more open, grassy habitat that was probably used for some type of agriculture. It is now in the process of becoming overgrown by taller, woody vegetation, but the grassland species still persist in the understory. One of the species of tall shrubs occurring along this portion of the trail is groundsel, which is more commonly observed along the edges of dunes, salt marshes, and inlets. On Nantucket, it is also found growing at inland locations such as this because the frequent salt spray and sandy soils that occur island-wide are very similar to coastal habitats. Groundsel produces numerous bristly, off-white flower heads in late September that persist into the winter.

34

**This tall shrub with multiple branches and round, coarse-toothed leaves borne on opposite sides of the stem is northern arrowwood.**

This common shrub is very noticeable in late spring, when it produces numerous creamy white flowers on 3-inch wide, umbrella-like clusters. The fruits are small, blue-black berries that are not particularly palatable to humans, but provide a very important source of food for many species of songbirds passing

through Nantucket and other coastal locations in New England during early autumn migration.

35

**Vegetation growing along this incline consists of mostly upland species not found in the surrounding swamp.** The loosely-spreading, multi-stemmed shrub with the finely-toothed, bright green leaves at this site is beaked hazelnut. Like its close relative, the cultivated hazelnut, this species produces edible fruits eaten by squirrels, woodpeckers and blue jays. The nuts ripen in fall and are enclosed within a very hard shell, covered by a leafy sac with stiff hairs. Although difficult to extract, the nuts within are sweet and were commonly eaten by Native Americans and the early settlers of Nantucket.

36

**This site is representative of many portions of the forest at Squam Swamp in that there are several distinct layers of vegetation.** The older trees and tall saplings form a dense canopy that limits the amount of light reaching the forest floor during the growing season. Below the tree canopy, forming a second vertical layer, are tall shrubs adapted to growing in shady conditions. These include beaked hazelnut, sweet pepperbush, swamp azalea, and dangleberry. Below the tall shrubs is a third layer comprised of wildflowers, mosses, shrub saplings, and vines. This vertical stratification of vegetation influences the types of songbirds that nest and feed in the forest. Different species of birds partition the same habitat by using different levels, thus allowing several species to occur in relatively close proximity. Birds known to nest in the forest at Squam Swamp include the red-tailed hawk, black-capped chickadee, yellow warbler, gray catbird, and great-crested flycatcher.

**37**

**The damp soils on the forest floor in Squam Swamp support an abundance of ferns, including New York fern, sensitive fern, chain fern, and cinnamon fern.** Ferns were among the earliest plant forms to appear on earth. They belong to a group of flowerless plants that produce spores (reproductive bodies) in tiny sacs on the underside of the large leaf, or frond. In spring, the leaves emerge as curled structures reminiscent of the carved upper neck of a violin or fiddle (hence the name “fiddlehead”) that gradually unfurl to become bright green fronds during the summer. In autumn, the fronds turn russet and wither, but often remain visible on the forest floor through the winter.

**38**

**It is possible that many of the American beech trees here in Squam Swamp, including this large example, were once subjected to a timber harvesting practice called pollarding.** This involved removing the main portion of the trunk several feet above the ground, which triggers the tree to re-sprout and grow multiple new trunks from the site of the cut. Trees were often pollarded or coppiced (cut at the base of the trunk at ground level) so that the timber could be harvested without the need to replant. Most of Nantucket’s forests have been subjected to intensive past land use, including timber harvesting, cultivation of agricultural crops, and livestock grazing.

**38**

*If you are following the trail markers in numeric order, the Squam Swamp interpretive trail continues along the path indicated by the post with the left pointing directional arrow approximately 30 feet ahead of trail marker #38. The trail that branches off to the right of the directional arrow will take you to the Foundation’s Squam Farm property.*

Squam Farm can also be accessed by taking the first left turn off Quident Road (look for the boulder marked “Squidnet Way”). Follow the dirt road past the Foundation’s maroon logo post to a fenced parking area on the right and proceed on foot through the gate.

39

**The woods here at Squam Swamp contain several large American holly trees. Holly is not particularly common on Nantucket because it is at the northern limit of its range.** Hollies bear tiny, cream-colored “male” and “female” flowers on separate trees. The characteristic red berries of this species are only produced by female trees when there is a male tree in close proximity to cross-pollinate. Most of the hollies in Squam Swamp do not bear fruit because they are isolated from each other. They probably occur here as a result of seeds being ingested by birds and other wildlife elsewhere on the island and then digested and dropped as these animals wandered in search of additional food sources.

40

**The surface of the *Sphagnum* bog adjacent to the trail marker (which may be flooded during the winter and spring) is not smooth, but quite irregular.** These variations are the result of many different factors such as underlying topography, differences in the rate of *Sphagnum* growth and decay, and freeze/thaw cycles. The raised mounds provide suitable habitat for ferns and wetland shrubs such as swamp azalea and highbush blueberry. The accumulation of decaying plant material surrounding the living plants further contributes to the formations of higher elevations in the bog.

41

**The thicket of tall shrubs along this section of the trail consists almost exclusively of**

**one species – sweet pepperbush, or summer-sweet.** This native plant is common in freshwater wetland margins and damp woods on the island. Sweet pepperbush tends to form dense colonies such as this because it spreads laterally via suckering from the roots near the base of the stems. During late July and August, it produces white to pale pink bottle-brush shaped blossoms with a spicy fragrance that is attractive to butterflies and other nectar-feeding insects.

42

**The vegetation in this small clearing is different from the surrounding forest. The shrubs and trees in the immediate vicinity include white oak, bayberry, greenbrier, scrub oak, and huckleberry.** All of these species are upland plants that grow best in dry soils such as those found on this little section of higher elevation in the swamp. The lack of mature trees and vegetation cover suggests that this site was probably disturbed by either natural or human causes during the recent past.

43

**The large tree to the right of the trail marker with the reddish-brown, deeply furrowed bark is sassafras – a common but interesting species.** One of the unique features of sassafras is that produces polymorphic (meaning “many forms”) leaves, with three or more distinctly different shapes occurring on the same tree. The most common are the single lobed, mitten-shaped, and tri-lobed, but upwards to seven lobes have been known to occur. A member of the laurel family, sassafras has been used for many medicinal, cosmetic, and culinary purposes. The roots, bark, and leaves all contain an aromatic, spicy oil. Native Americans made infusions from parts of the plant to treat syphilis, colds, parasitic worms, measles, and fever. They also made tea from the bark of the

roots to flavor foods and beverages, a practice adopted by European settlers when they developed root beer. The leaves are still dried and ground into a powder to form filé, a condiment and soup thickener used in Cajun cooking.

44

**The decaying wood stumps at this site are the remnants of two trees that once grew side by side.** The tree on the left was a swamp red maple; the tree on the right was a tupelo. While alive, their tree trunks were so close together that they actually pressed into and grew around each other. As a result of the pressure and friction of the trunks rubbing against one another in the wind, both trees suffered lethal damage to their trunk bark and internal vascular systems. Dead wood such as this is an extremely important part of the forest ecosystem. It stores and provides a source of water, energy, carbon, and nutrients. It also supports numerous species of insects, fungi, and microorganisms that aid in breaking down wood into rich hummus, which then serves as a seed bed for tree saplings and other plant species.

45

**Large holly trees such as this one are probably very old.** The red holly berry is botanically known as a drupe – a fleshy fruit that contains a seed encased in a stone-like covering. Under favorable conditions, it takes up to three years for this casing to break down enough for the seed to germinate. Once the seedling has sprouted, it is slow growing, but very long-lived. Hollies are valuable from an ecological point of view. The fruit is eaten by over 20 species of songbirds and the dense, evergreen foliage provides important shelter for wildlife year-round.

**46**

**This large shrub with the thin, multiple trunks is swamp azalea – a common, native wetland species closely related to the rhododendron.** Swamp azaleas bear fragrant, vase-shaped, white to pink flowers from June through August. Both the flowers and the glossy green, oval leaves are poisonous if ingested by humans or animals. This species is a member of the heath, or Ericaceae plant family. This large group of woody shrubs thrives in acidic, nutrient poor soils. There are many other representatives of this family on Nantucket, including huckleberry, several species of blueberry, cranberry, sheep laurel, and wintergreen. Heath species maximize absorption of soil nutrients by maintaining symbiotic relationships with beneficial root fungi. Therefore, they are able to grow under soil conditions unsuitable for many other plants.

**47**

**This large tree with the gray, furrowed bark is one of several mockernut hickory trees found in Squam Swamp.** Mockernut hickory, a species in the walnut family, is uncommon on Nantucket. The leaves are 8-12 inches long and are composed of 7-9 narrow leaflets with hairy undersides and finely toothed margins. These trees get their name from the brown, deeply grooved fruits that they produce in late summer, which may be visible on the ground at the base of the tree. The actual nut, hidden inside the outer husk, is sweet to eat but difficult to extract and is an important source of food for wildlife such as gray squirrels and white-footed deer mice.

**48**

**This is one of many locations in Squam Swamp where fox grapes occur.** These woody, deciduous vines grow over low shrubs and climb up tree trunks to a height of 30 feet

or more. Native to eastern North America, the fox grape readily hybridizes with other grape species and was used in the development of several horticultural varieties, most importantly the Concord grape. The small, inconspicuous flowers are produced in clusters during the late spring and ripen in early September to mature grapes varying from red to dark purple.

**49** **The prickly vine climbing over the shrubs at this site is greenbrier, a native but rather invasive member of the lily family.** Greenbrier attaches itself to the bark and branches of nearby shrubs and trees with curling tendrils and produces vines that can grow up to 20 feet long. It is extremely difficult to eradicate once established, since it spreads via underground rhizomes that can persist in the soil for years after the above-ground portion of the plant is killed. Although it can be problematic to humans when it grows in landscaped situations, it is very palatable to deer and rabbits, and its blue-black berries are a source of food for songbirds.

**50** **The process of forest regeneration is particularly visible here in this small clearing.** The fallen portion of this large beech tree opened up the canopy and allowed sunlight to reach the forest floor. In response, several beech saplings are now taking advantage of the increased sunlight and growing towards the upper canopy. The first trees to attain the height of their surrounding neighbors will quickly fill in this opening by laterally spreading their branches, thus once again limiting the amount of sunlight that can reach the forest floor.

**51** **Vernal pools such as this provide habitat for a host of small, inconspicuous aquatic invertebrates.** These species depend upon sites

that contain water during the winter and spring, and dry up during the rest of the year in order to complete their life cycles. The fairy shrimp is a common inhabitant of Nantucket's vernal pools. This freshwater crustacean is about 1 inch long and feeds by filtering algae and microorganisms from the water. Fairy shrimp produce several broods of eggs over the course of the season, which must experience a period of drying out in order to be viable. To facilitate their survival during such periods of desiccation, the eggs are contained in a drought and temperature-resistant cyst. Once the vernal pool becomes flooded again, the re-submerged eggs will hatch and quickly develop into larvae, which in turn mature into adults capable of reproducing and repeating the life cycle.

52

**The large American beech tree with the fallen trunk near this trail marker is typical of the eventual fate of many of the older trees here in Squam Swamp.** Once a tree exceeds the height of the surrounding vegetation, it becomes more exposed to Nantucket's high winds and more susceptible to lightning strikes. Fungal or insect infestations can also weaken the trunk and branches, making the tree more susceptible to wind, ice, or heavy snow damage. These downed branches and trunks will slowly decompose with the assistance of fungi, insects, and soil microorganisms to become part of the soil hummus. They also provide important shelter sites for smaller organisms such as mice, frogs, salamanders, and snakes.

53

**During the early spring, the forest floor at this and many other locations produces a carpet of small, delicate wildflowers such as Canada mayflower, wood anemone, star**

**flower, and trailing arbutus.** These “spring ephemerals” are among the first flowers to bloom at the end of the winter. They have very short life cycles that enable them to take advantage of increased sunlight reaching the forest floor before the trees and shrubs leaf out. These plants are all less than six inches tall, and they quickly become out-shaded at the end of their bloom period by the taller ferns, summer and fall blooming asters, and goldenrods that dominate the forest floor later in the growing season.

54

**The tree with the smooth, mottled gray bark to the left of this marker is shadbush, a relatively common member of the rose family.**

There are several closely-related species of tree shadbushes in New England that are difficult to distinguish, as all are characterized by having simple oval leaves bordered by fine teeth, clusters of delicate white flowers, and small, sweet, reddish-purple berries. The common name is derived from the fact that the tree’s profuse white blooms, which carpet the island’s woodlands and shrub thickets in the late spring, are produced at roughly the same time as the run of the shad, a native ocean-dwelling fish that returns to its New England spawning grounds in the spring. Other common names for this species include Juneberry, serviceberry, and sugar plum.

54

*If you are following the trail markers in their correct numeric sequence, you will*

14

*be re-joining the main path at trail marker #14, about 100 feet ahead of trail marker #54 (see map on pages 18-19).* You can then follow the trail markers in descending order back to the trail head and parking lot off the Wauwinet Road, located approximately 0.4 miles from here.



**Cinnamon Fern**

*(Osmundastrum cinnamomeum)*

Cinnamon fern is an abundant species in moist forests and along wetland edges. In early spring, the coiled stems emerge to form characteristic “fiddleheads” that are covered with pale cinnamon-colored fuzz. **Mature cinnamon fern leaves are poisonous.**



**Canada Mayflower**

*(Maianthemum canadense)*

This species is one of Nantucket’s spring ephemerals – small, delicate wildflowers that are the first to bloom at the end of the winter. They have very short life cycles that enable them to utilize the increased sunlight that reaches the forest floor before the overstory trees and shrubs leaf out.



**Fox Grape**

*(Vitis labrusca)*

Fox grape is widespread in many of the island’s vegetation communities. However, the vines found in moist habitats such as Squam Swamp seem to produce the best fruit, which ripens into purple, green, or red clusters in early September.



**Poison Ivy**

*(Toxicodendron radicans)*

Poison ivy can grow as a climbing vine, as a creeping ground cover, or as dense shrub. **All parts of this plant, including the roots, contain urushiol – an oil that binds to human skin and causes an allergic reaction in most people, including an itchy rash and fluid-filled blisters.**



**Sweet Pepperbush**

*(Clethra alnifolia)*

Sweet Pepperbush is a common wetland shrub with oval, glossy green leaves and white or light pink flowers that grow in a raceme, or upright spike. Hummingbirds, bees, and butterflies love the flowers, which bloom at the end of July and have a sweet jasmine-like scent.

## SPECIES / DESCRIPTION



### **American Beech**

*(Fagus grandifolia)*

This species is relatively common in the wooded areas of Squam Swamp and can be easily identified by its saw-toothed leaves and smooth, pale gray bark. Some of the beech trees at Squam Swamp are believed to be well over one hundred years old.



### **Eastern White Oak**

*(Quercus alba)*

White oaks are so named for their pale, scaly bark. Their green leaves have white undersides and 3-9 lobes that are rounded, rather than having a distinctly pointed tip. White oak prefers drier, more upland soils, so it tends to occur in the higher elevations on the property.



### **Black Oak**

*(Quercus velutina)*

Black oak is a common species found in drier habitats at Squam Swamp. The bark is dark brown and separated into thick ridges by deep fissures. The smooth, glossy, dark green leaves are somewhat hairy on the underside.



### **Mockernut Hickory**

*(Carya tomentosa)*

Mockernut hickory is a more southern species that occurs in Massachusetts at the northern end of its range. This member of the walnut family gets its name from the brown, deeply grooved fruits it produces in late summer, which are favored by squirrels, mice, and deer.



### **Red Maple**

*(Acer rubrum)*

Red maple trees are often found within or near swamps and other freshwater wetlands, so they are sometimes referred to as swamp red maples. Their common name is derived from the red buds produced in the springtime and their brilliant red foliage in the fall.

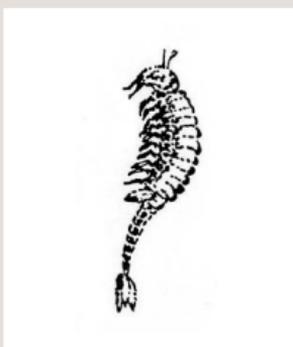
## SPECIES / DESCRIPTION



### **Sassafras**

*(Sassafras albidum)*

Sassafras trees bear “polymorphic” (many-formed) leaves. There are three common shapes that can usually all be found on the same tree – single lobed, mitten-shaped, and tri-lobed. All parts of the tree contain aromatic, spicy oil that has many medicinal and culinary uses.



### **Fairy Shrimp**

*(Eubranchipus sp.)*

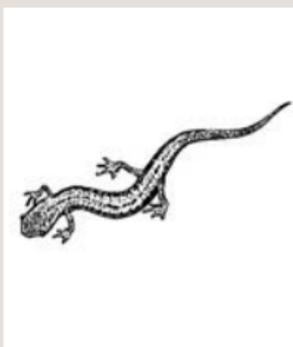
These freshwater crustaceans have special adaptations that enable them to survive in vernal pools – small, shallow bodies of water that dry up for a portion of the year. They are about 1 inch long and feed by filtering algae, detritus, and microorganisms from the water.



### **Common Green Darner**

*(Anax junius)*

This is one of many species of dragonflies that can be found in and around wetlands on Nantucket. Dragonflies are characterized by having large eyes, brightly colored body parts, and broad wings held straight out from their bodies. The nymph stages of these insects are aquatic.



### **Redback Salamander**

*(Plethodon cinereus)*

Redback salamanders inhabit moist woodlands across eastern North America, where they can be found under leaf litter and logs. These common amphibians come in two color phases: “redback” (gray body with a reddish stripe down the back) and “leadback” (lacking the red stripe).



### **Spring Peeper**

*(Pseudacris crucifer)*

A spring peeper breeding chorus is a familiar and welcome sound on rainy nights in the early spring on Nantucket. These common but secretive tree frogs are easily recognizable by their small size and the brown cross on their back – hence the name “*crucifer*,” meaning cross-bearer.



**Spotted Turtle**

*(Clemmys guttata)*

This semi-aquatic, freshwater turtle occurs in vernal pools, bogs, freshwater swamps, and small ponds. The upper shell (or carapace) has a distinctive yellow polka-dot spotting pattern that is believed to mimic dappled sunlight and aid in protective coloration.



**Gray Catbird**

*(Dumetella carolinensis)*

The gray catbird is a common passerine species found in dense shrublands and forest edges. It is so named because its distinctive call resembles the mew of a cat. The genus name for this species, *Dumetella*, means "small thicket" and is reflective of the catbirds' habitat preference.



**Black-capped Chickadee**

*(Poecile atricapilla)*

This common songbird is easily recognized because of its distinctive body shape and black, gray, buff and white color pattern. Chickadees are inquisitive birds that often travel in flocks. Squam Swamp provides ideal habitat because they prefer sites with dense trees and shrubs.



**White-footed Deer Mouse**

*(Peromyscus leucopus)*

The white-footed deer mouse is the most abundant rodent species found in forested habitats of the eastern United States. A preferred prey item of snakes and many birds of prey, they are known to play an important role in the life cycle of ticks that cause Lyme disease.



**White-tailed Deer**

*(Odocoileus virginianus)*

This common and widespread species is an adaptable browser that feeds on grasses, wildflowers, leaves, twigs, shoots, acorns, berries, and seeds. Recent increases in Nantucket's deer population have become problematic because deer often carry ticks into yards and other populated areas.





**Nantucket Conservation Foundation**

# We hope you enjoyed your visit to Squam Swamp!

This interpretive project was funded by a generous grant from the Margaret T. Morris Foundation.

Text by Karen C. Beattie, NCF Science and Stewardship Department  
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## ABOUT THE FOUNDATION

The Nantucket Conservation Foundation is an island nonprofit land trust that is supported by annual membership contributions. Since its establishment in 1963, it has permanently protected approximately 9,006 acres of conservation properties on Nantucket.

**Although the Foundation works closely with government agencies, it is totally dependent on voluntary contributions.**

## PLEASE JOIN US

**If you are not already a member, please join us!**

All contributions to the Nantucket Conservation Foundation are tax deductible. For more information about the Nantucket Conservation Foundation visit us at 118 Cliff Road or visit our website at:

**[www.nantucketconservation.org](http://www.nantucketconservation.org)**

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