

FIRE ISLAND NATIONAL SEASHORE



*exploring*

***SUNKEN FOREST***

## TRAIL INFORMATION

The trail through the forest and back is approximately 1½ miles in length. Along the way you will see numbers painted on the boardwalk that correspond to the descriptive paragraphs in this guide. Plan on taking at least an hour to explore it leisurely. In order to have a safe and pleasant visit please remember the following points:

1. Please wear shoes at all times on the boardwalk. Splinters are the most common first aid problem.
2. Portions of the walk are elevated or pass near water. Please hold onto small children to protect them.
3. Berries and edible plants do grow along the trail, but please leave them intact for others to enjoy visually.
4. Watch for poison ivy with its clusters of three shiny leaves and be careful not to touch any part of the plant.
5. Please stay on the boardwalk at all times. Grass, brush, or even leaf litter may harbor ticks that carry Lyme disease or other illnesses. Remaining on the boardwalk will protect both you and the fragile plant life of the area.

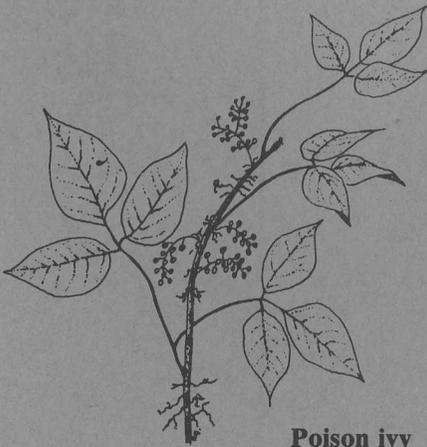
## INTRODUCTION

The barrier island in its natural state is a fascinating mixture of opposites: high and low, wet and dry, hot and cool, sterile and fertile, windblown and sheltered. It is the combinations of these various factors which, within a strip of land varying in width from ¼ mile to a few hundred feet, have produced several distinct zones of life. Most of your walk today will take you through one of these zones: the maritime forest. The purpose of this guide is partly to explain to you *what* you are seeing along the way; but more importantly, to give you an understanding of *why* things have developed here the way they have. Along the first portion of the trail you will be introduced to many of the plants of the area. By the time you have learned to recognize them, you will reach the loop portion of the trail, and there interrelationships between the environment and its life forms will be presented.

*Thank you for your cooperation. Now then...have a pleasant time!*

## 1. THE POISON IVY

Poison ivy (*Rhus radicans*) is truly an adaptable plant and can be found growing in the heat and direct sunlight of the swale or in the dim recesses of the forest. It may occur as single small plants, as large bushes, or as thick vines snaking up tree trunks. The bright green leaves which turn red in the fall, and the white waxy berries contribute to a colorful image, but beware! Every part of the plant contains the oil which produces such an unpleasant reaction on human skin. Interestingly, animals are not affected by it, and deer are often seen feeding on the plant. Many a pet owner has suffered an allergic reaction after petting a dog or cat which has been unconcernedly romping through the poison ivy.

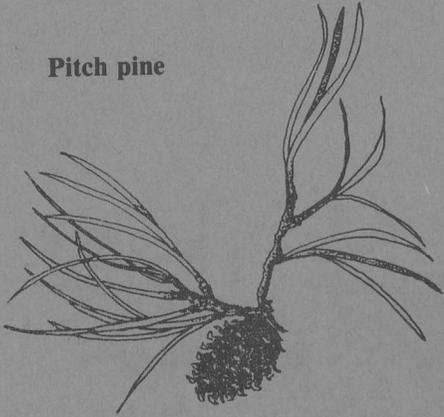


Poison ivy

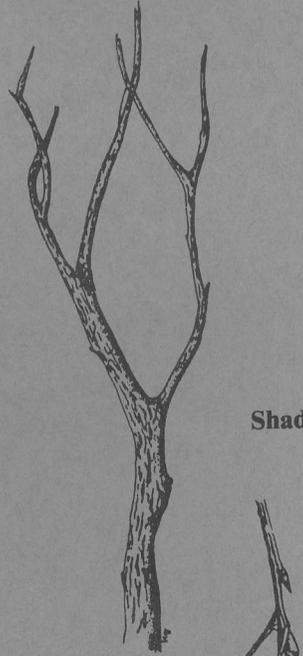
2. Sassafras (*Sassafras albidum*) A large tree with deeply-ridged reddish-brown bark.
3. Catbrier (*Smilax rotundifolia*) Also called common greenbrier; smooth green vines with large thorns and rounded leaves.
4. Shadbush (*Amelanchier arborea*) Also known as juneberry or shadblow; light grey bark with darker stripes, typically growing in groves of many small trunks.
5. Black Oak (*Quercus velutina*) A large tree, often gnarled and with dead limbs.
6. Bench  
Pause here for a few moments and see how many natural or man-made sounds you can identify. As you continue along the trail, use all your senses to explore.
7. Sour Gum (*Nyssa sylvatica*) Also known as black tupelo or pepperidge; a large tree with deeply-ridged bark, growing in boggy areas.
8. American Holly (*Ilex opaca*) A large evergreen tree with sharp-pointed waxy green leaves, red berries, and bark and limbs often fantastically contorted.

9. Inkberry (*Ilex glabra*) An evergreen shrub with long leaves and ink-colored berries during the fall.
10. Cattail (*Typha sp.*) A plant of fresh water bogs, with a large brown seedhead.
11. Highbush Blueberry (*Vaccinium corymbosum*) A large shrub with white flowers in spring; blueberries in late summer.
12. Pitch Pine (*Pinus rigida*) A long-needled evergreen; the only native pine in the area.
13. Red Maple (*Acer rubrum*) Also known as swamp maple; a many-branched tree favoring boggy or moist areas but growing in only a few Fire Island locations.
14. Redcedar (*Juniperus virginiana*) A large evergreen tree with small dark-green needles and smooth, stringy bark.

Pitch pine

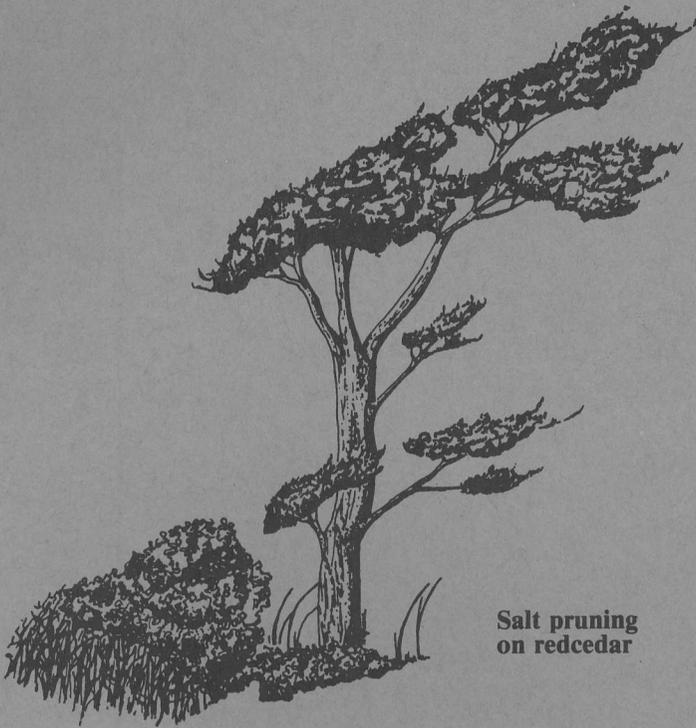


Shadbush



Oak





Salt pruning  
on redcedar

## 15. THE SECONDARY DUNE

A secondary dune line (that is, one that develops behind the ocean-facing primary dune line) is an unusual feature on the barrier island and its origin is probably the result of processes associated with an inlet that once cut through here, from ocean to bay. The secondary dune line is the reason the Sunken Forest can exist here. The most damaging aspect of the maritime environment is the salt spray that blows off the ocean. The sec-

ondary dune line is a barrier to this salt. The trees living high on the dunes are low-growing and stunted because they get more salt. Further down on the dunes the trees reach a more normal height, but even so, twigs that grow up into the zone above the dune tops enter high salt concentration and are killed. Thus the ocean prunes the forest to a uniform height. The redcedar is slightly more resistant than the broad-leaved trees and sometimes extends a few feet higher than the rest of the canopy.

## 16. THE BLOWOUT

Strong winds sweeping across the island can move a considerable amount of sand in a very short time and only the presence of vegetation can anchor the sand for long. However, if the vegetation is damaged by humans or animals walking over it repeatedly, the wind soon starts to scour away sand. As other plants die off around the edges, the blowout expands. Sometimes the wind extends the blowout over the dune top and loose sand starts to spill down into the forest. Regrowth in a blowout is a slow process and any disturbance continues the damage.

## 17. THE SOIL

The basic material of the island is highly weathered sand, 98 per cent of which is quartz, and the remainder mostly garnet, magnetite and tourmaline. This sand is very poor in the minerals which plants need to grow and flourish. As a result of forest development this sand is covered by approximately 15 centimeters (6 in.) of humus or decayed plant material, in turn covered by a thin layer of fresh plant litter. It is within the humus layer that most of the plant roots exist and the roots of even the largest trees do not penetrate deeply into the sand below.



## 18. THE ANIMAL PATHS

Animals instinctively use the easiest route between any two points, and over time these routes develop into definite paths. Deer move from forest to

swale and back in the morning and evening, and other animals use their paths to search for food and water. A moment of silence near these thoroughfares may reward you with sight or sound of forest creatures.

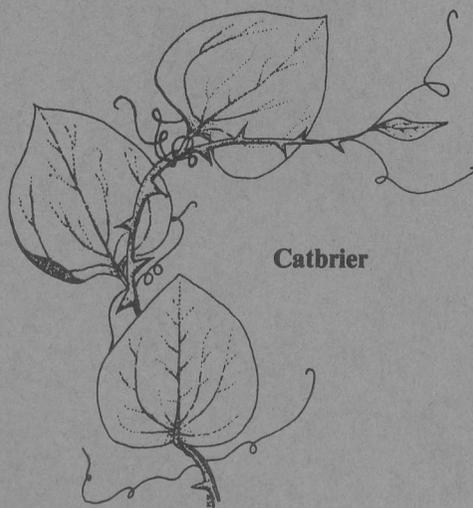
## 19. THE CANOPY

The main impression you receive during the growing season is that the forest is dim and cool. The tops of the trees have developed a thick canopy; the result of lateral growth when vertical development is stopped by reaching the zone of salt-laden air. This surface of upper branches is several times greater than that found in the same plants growing in inland forests. The inability of the trees to grow above the level of the dunes, and the development of an aerodynamically smooth upper canopy surface protect them from damage by storm winds. This is vital because of the shallow roots they develop when growing on sand.

**NOTE:** After entering the large platform just past #19., take the exit to the right to continue along the nature trail. The exit to the left is a shortcut to the beach and the swale walk back to Sailors Haven.

## 20. THE HISTORY

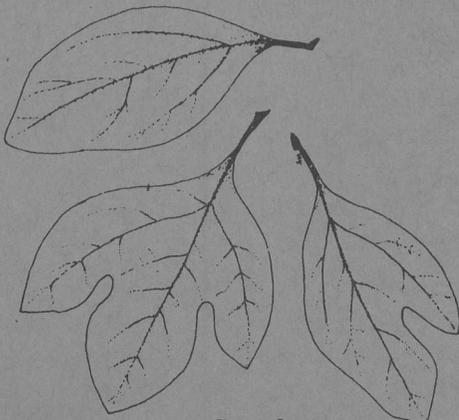
Plant communities come about through a process of natural selection. Many species within a community will eventually create conditions unsuitable for their further growth, which results in the appearance of new species which can benefit. Thus the community changes until ultimately it may reach a "climax."



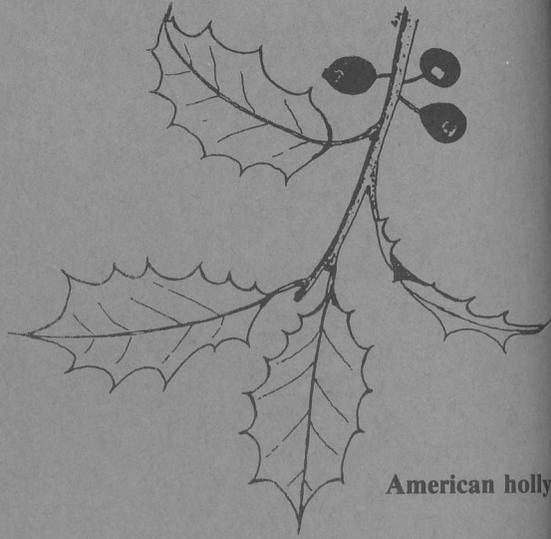
That is, plants which do not create conditions unfavorable to themselves. Most of the Sunken Forest has reached a climax stage characterized by holly and sassafras. Remnants of an earlier community of redcedar, blueberry, oak and pitch pine are scattered here and there, but in most cases are dead or dying. The lack of dead holly trees suggests that the large ones are first generation rather than replacements of earlier trees. The sassafras are somewhat shorter-lived and many of the older trees have died over the past several years. This process of succession leading to climax can take thousands of years in some locations, but probably took less than 300 here. Barring natural catastrophe or man's interference the climax forest should persist for many years.

## 21. THE UNDERSTORY

All plant life is dependent upon the sun for life and growth. Usually trees of several types will grow to approximately the same height and utilize much of the available space and light with their upper leaves. Below them will be a second level of growth containing shrubs, bushes, and young trees of species which do not require as much light. In this particular area of the forest, the trees have grown quite tall and their leaves have formed a very dense canopy overhead. Combined with soil and water conditions, this has prevented much understory from becoming established. Only the vines have been able to adapt. Catbrier, wild grape, Virginia creeper, and an occasional poison ivy entwine themselves around tree trunks and loop between tree trunks and loop between branches following the trees upward to the sun.



Sassafras



American holly

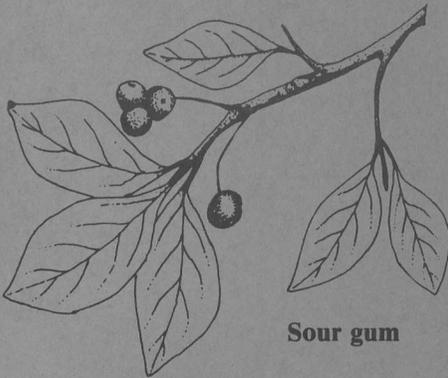
## 22. THE HOLLY

Probably the most beautiful and interesting tree of the maritime forest is the American holly. It is an evergreen and thus retains its leaves all year. Bright red berries appear each year on only the female trees. The oldest holly of which we know began growing around 1804, which gives a fair indication of the age of the climax portion of the forest succession. The holly is not found growing naturally much farther north than this, but on Fire Island the moderating influence of the Gulf Stream on the climate has enabled the tree to survive.

## 23. THE SASSAFRAS

The deeply-ridged, reddish-brown bark of this tree makes it easy to identify. The typical mitten-shaped leaf can also pro-

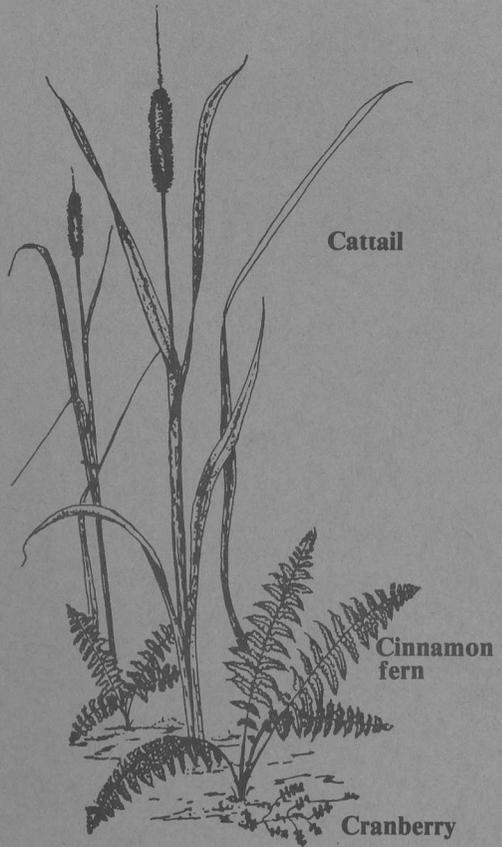
vide a clue, although other leaves on the same tree sometimes take many different shapes. Tea brewed from the roots was an integral part of the culture of early eastern settlers. The oldest trees yet found in the Sunken Forest began growing around 1880. The sassafras and holly are the largest and most common trees representing the mature island forest. Whenever they occur, we can expect that the character of the forest will remain the same unless affected by disease or environmental change.



Sour gum

#### 24. THE SOUR GUM

The sour gum is a typical northern tree whose leaves turn scarlet in early autumn and then drop off. Also known as the tupelo or pepperidge, the sour gum is an indicator of ground water because it grows in spots which are wet and boggy. Although not quite as common as the holly and sassafras, it is occasionally encountered throughout the Sunken Forest.



Cattail

Cinnamon fern

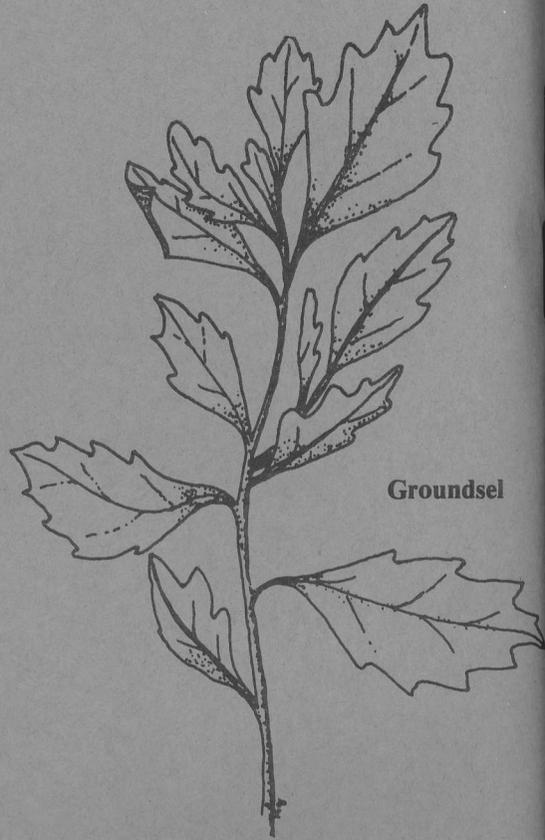
Cranberry

#### 25. THE BOG

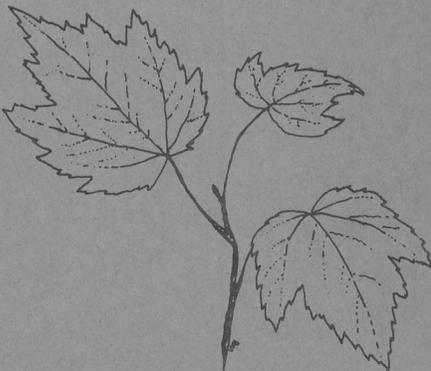
Small freshwater bogs exist in the forest in low spots where the ground water table reaches the land surfaces. Here grow an assemblage of plants similar to those found at any inland bog, including sphagnum and other mosses, ferns, cattails, rushes, spurge and numerous others. Bogs are small and the distance between them large, so the movement of seeds between them is limited. Because a great variety of plants can grow in this habitat, the result is bogs with different species in different locations.

## 26. THE STORMS

Although the presence of the ocean has a favorable moderating influence on the climate of Fire Island, it also brings occasional severe storms. Records collected over an 84-year period indicate that in any given year there is an 11 per cent chance that a significant tropical storm or hurricane may strike Fire Island. In addition, extratropical storms known as northeasters have caused significant damage on the average of once every 1.2 years. Although the dunes in front of the forest in combination with the aerodynamic shape of the canopy provide considerable protection, severe storms do cause localized damage. An example can be seen in the red maples. All of the larger trees of this species in the forest lean in one direction and oral tradition attributes their displacement to the great hurricane of 1938.



Groundsel



Red maple

## 27. THE THICKET

Between the main forest and the salt marsh lies a thicket zone; smaller vegetation of a variety of species which often grows so thickly that only small birds or animals can pass through. The groundsel is common, a plant which can tolerate the presence of salt entering the ground water from the bay. Another interesting thicket plant is the

dodder: a small parasitic vine which contains no chlorophyll of its own and must draw nourishment from a host plant. A thicket zone is common in many locations on the island where a climax forest has not yet been able to form.

where inlets once existed and large quantities of sand were washed into the bay by the ocean. Later the inlets filled in and plant succession began in the shallows.

## 28. THE MARSH

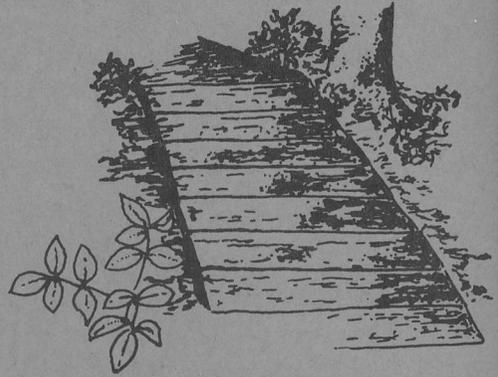
Between the thicket and the bay lies the salt marsh. At its slightly highest elevation is a zone bordering the uplands which contains the tall *Phragmites* reeds. In idealized locations the marsh can actually be divided into two segments: the high marsh which features salt-meadow cordgrass, three-square rush, black grass, spike grass, and which is flooded only by storms and other exceptionally high tides; and the low marsh which is frequently flooded by the tides and where salt marsh cordgrass predominates. In the Sunken Forest area there is little marsh left. Apparently erosion has removed much of what once existed and between the bay overlook platform and Sailors Haven, forest vegetation is now being undercut and toppled by wave action. Marsh does not occur everywhere along the bay shore. It marks those places



*Phragmites*

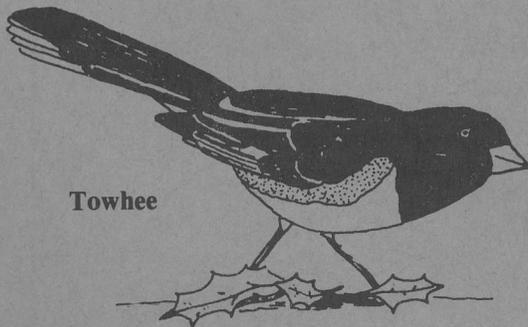
## 29. THE ANIMALS

No discussion of the forest zone would be complete without including the various forms of animal life. Virginia white-tailed deer live here, although not often seen by visitors. Smaller mammals are here too: the red fox, the cottontail rabbit, the long-tailed weasel, and various species of mice. Birds are numerous and that scratching and rustling you may hear in the leaves is probably a catbird. You'll also see the holes in tree bark where the yellow-bellied sapsucker has drilled in search of insects. Other birds you may encounter are the black-capped chickadee, the yellowthroat, eastern wood pewee, and brown thrasher. Reptiles and amphibians are represented by the hognose snake, black racer, and Fowlers toad. Insects are abundant. All of these and more are linked together in complex food chains and interrelationships, all vital parts of life in the forest zone.



## 30. THE BOARDWALK

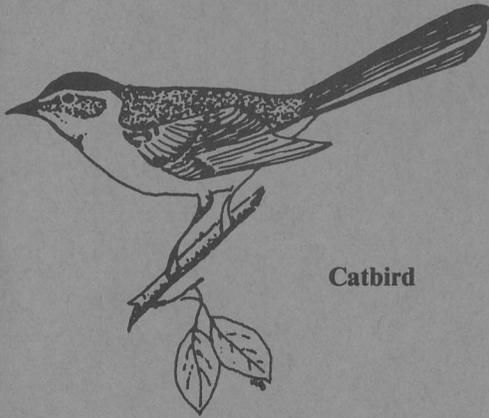
By the end of your walk you will have seen that every foot of the trail through the forest is now on a boardwalk elevated above the ground. This allows you and the many other visitors to enjoy the natural scene while having very little impact upon it. In the years before the boardwalk was built, the feet of relatively few visitors did a great deal of damage, destroying plants and eroding the fragile forest soil down to bare sand.



Towhee

### 31. THE WATER

Surprisingly, Fire Island is underlain by a "lens" or body of fresh water, which is maintained because input through rain and snow is greater than loss through evaporation. This fresh water may extend as deep as 40 meters (131 ft.) below sea level and in low spots in the sand actually comes to the surface. The results are bogs, complete with the plants normally found in such locations. Thus the forest is well watered, and the humus or decayed plant matter acts as a sponge to help retain moisture.



Catbird

### 32. THE NUTRIENTS

Plants require nutrients to live and grow, just as do animals. Some nutrients, such as carbon, nitrogen, oxygen and sulfur are provided in air and rain but others are normally provided by soil weathering. Because the sand contains none of these, the forest is dependent upon

another source. As the winds sweep in from the ocean they pick up seawater in the form of aerosols. The seawater contains calcium, magnesium, potassium and phosphorus, all necessary for plant growth. The winds deposit part of their burden on the tops of the forest plants. Rain eventually washes it down into the soil where it is picked up and used by roots. The nutrients incorporated in leaves, twigs and other organic debris are returned to the cycle as the litter layer is converted to humus by decay. Birds and animals also contribute some nutrients with their droppings and dead bodies.

### 33. THE SUN

The ultimate source of energy for all life is the sun, and the forest plants respond to it, each in its own way. Some, like the holly, retain their leaves all year. Others shed their leaves for the cold winter months and remain dormant during that period. The energy of the sun is converted by plants into leaves, trunks and roots. Countless forms of life both large and microscopic then feed on living or dead plant material, converting this energy source to their own needs. They in turn are fed upon at some stage by still other organisms, and the sun's energy is utilized over and over again; converted but never lost.

## 34. THE GEOLOGY

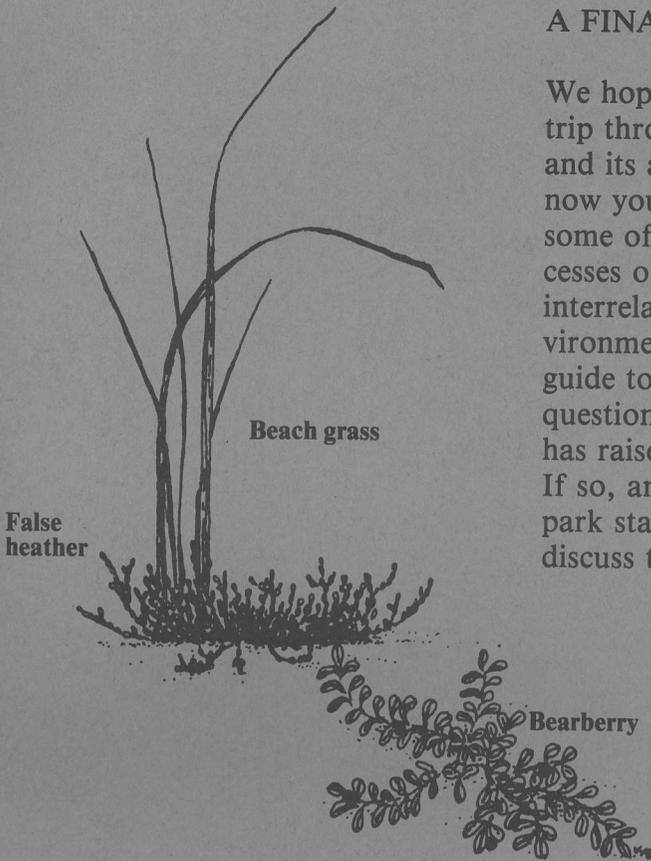
Fire Island had its origin in sands and gravels dumped at the edge of a glacier several thousand years ago. The vast quantities of water locked up in the glaciers caused the sea level at times to drop as much as three hundred feet lower than at present. As the ice melted and the sea level again rose, currents began the work of moving the sands and gravels toward more shallow spots. The ancestral barrier island was once several miles further out on the continental shelf. Even today the sea level slowly continues to rise and Fire Island migrates toward Long Island. You may occasionally see clumps of peat, remnants of former plants which grew in ancient bayside marshes, now resurrected by erosion from the sands of today's ocean beach.

## 35. THE SWALE

On the seaward side of the secondary dunes which shelter the forest is the swale zone. Here the temperature rises and evaporation increases. Grasses and low scrubby bushes predominate. Evergreens such as false heather and bearberry colonize the swale and eventually give way to huckleberry, bayberry, beach plum and poison ivy, all of which are pruned by the constant salt spray. In spots where the vegetation is destroyed for some reason the wind begins to move the sand and creates a blowout. Then the process of plant succession has to begin anew.

## A FINAL WORD

We hope you have enjoyed your trip through the Sunken Forest and its adjacent habitats. By now you should be familiar with some of the life forms and processes of the area and how they interrelate within the natural environment. While we intend this guide to answer some of your questions, we also hope that it has raised others in your mind. If so, any of the uniformed park staff will be happy to discuss them with you.



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Great South Bay

Marina

Begin Trail Here

Sunken Forest

Visitor Center

Restrooms

Atlantic Ocean

North

- Boardwalk
- ▣ Cement Walk

