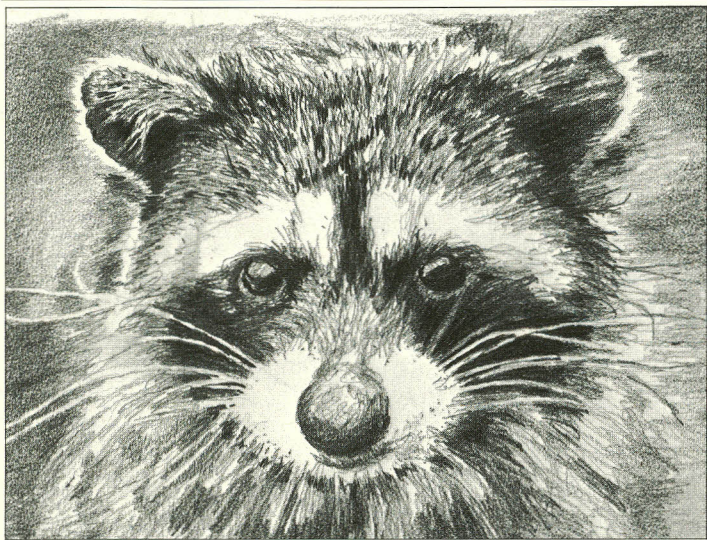


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# KIRBY NATURE TRAIL

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Big Thicket National Preserve  
Texas



## the trail

Big Thicket National Preserve, Texas was established in 1974 and covers 84,550 acres (34,242 ha).

### Description of trail

Length - 1.7 mile (2.2 km) loop

Time required - 1½ - 2 hours

Terrain - Easy walking - mostly flat to mildly sloping

### Rules

No specimen collecting. No pets. No camping in the Turkey Creek Unit.

### Warnings

Watch for snakes. Watch for bee, wasp and fire ant nests. The trail is not paved and tree roots are exposed - please watch your step. Bring insect repellent.

### How to use this Guide

Numbered stops along the trail correspond to numbered stops in the trail guide.

Big Thicket is a biological crossroad featuring both temperate and subtropical plants and animals, along with species from the dry west.

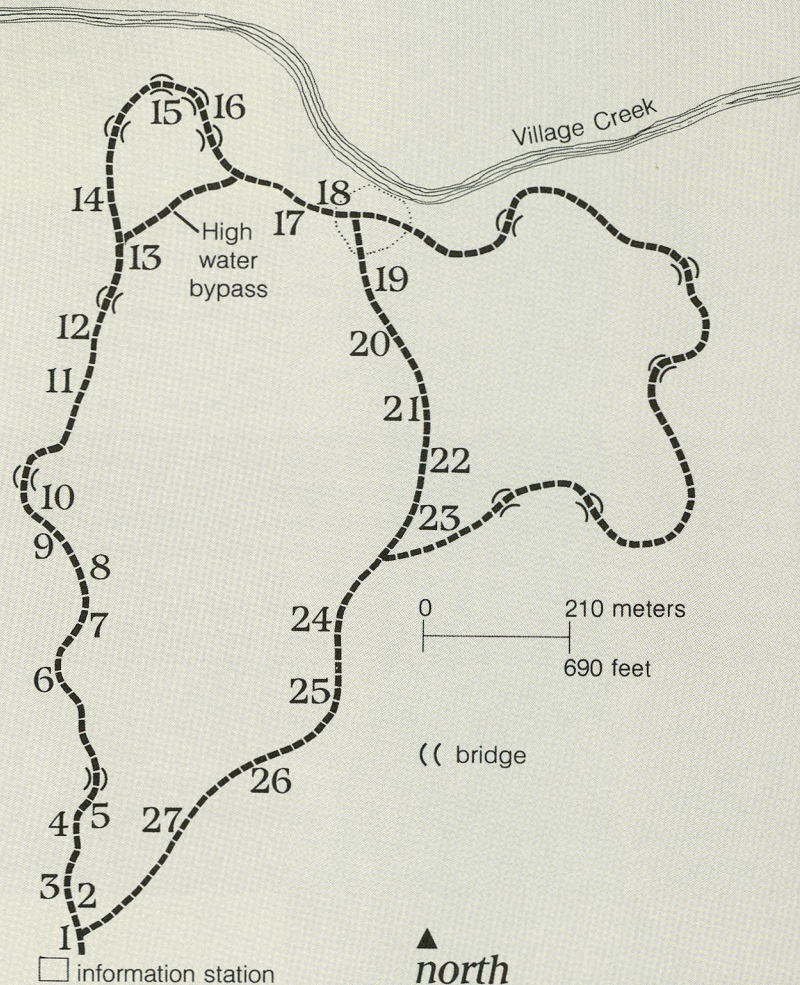
Published by Southwest Parks and Monuments Association in cooperation with the National Park Service.

Written and Pen & ink drawings by Margaret Littlejohn

Edited by David Dunatchik,

Dan Murphy

Designed and illustrated by Ormsby and Thickstun





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# I

## COMMUNITIES

---

Each of us belongs to a community. Some communities are large like Dallas and Beaumont, while others are small like Silsbee and Warren. Various smaller communities exist within these larger ones. For example, the members of a club or organization belong to a smaller community and even the family unit might be considered a little community.

Nature also has large and small communities — of plants and animals. In the Big Thicket community, plants grow together in “associations” or communities, based on location, elevation, moisture, and soil drainage. Animals abound within these plant communities, but are seldom seen. Because of the dense vegetation, small animals such as salamanders and toads are easier to find than white-tailed deer or gray foxes. Even more visible are the



*beech*

abundant insects, which often have interesting relationships with particular plants.

Community members depend upon each other — interactions take place, within as well as between communities. On this trail, you will walk through several Big Thicket communities. For a few moments, you will be involved in the interactions taking place here. You will meet some of the individuals in the communities and learn how and why you and they depend on each other.

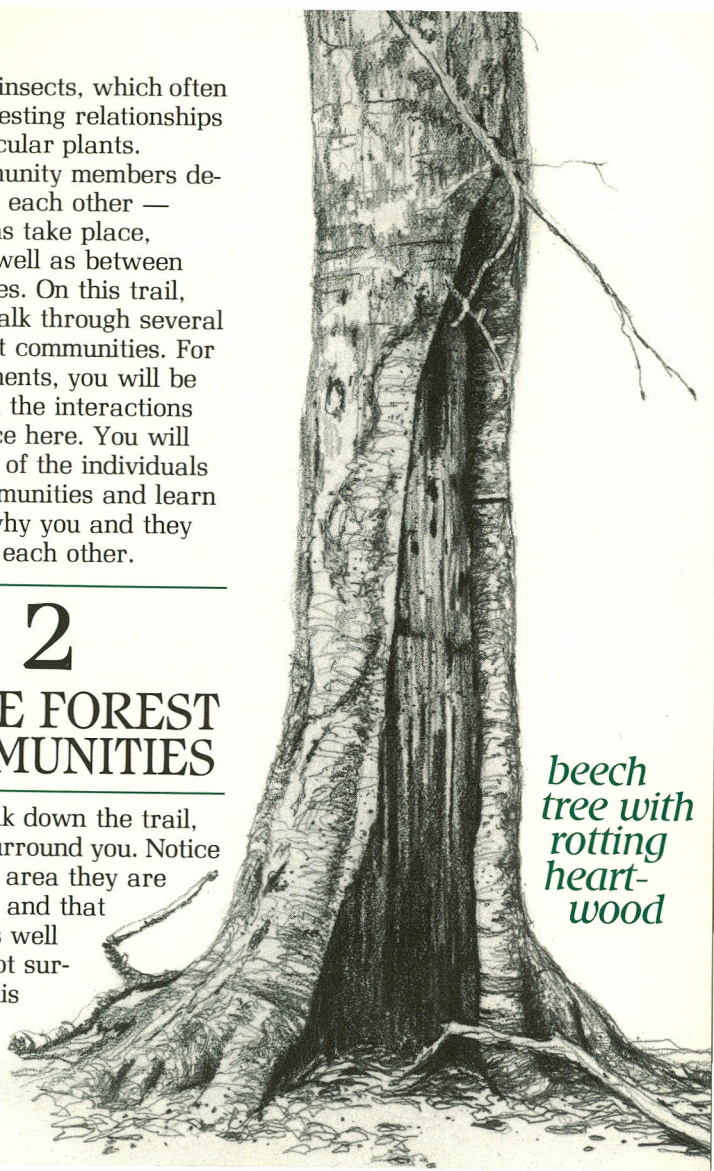
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# 2

## SLOPE FOREST COMMUNITIES

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As you walk down the trail, big trees surround you. Notice that in this area they are on a slope, and that the slope is well drained. Not surprisingly this plant community is called



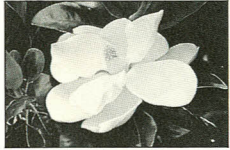
*beech tree with rotting heartwood*

a slope forest. With a little effort one can recognize several of the common trees:

The smooth bark of American beech (*Fagus grandifolia*) is splotted with lichens. Heart rot may hollow out the bases of beech trees, providing shelter for small animals. Squirrels and other mammals eat the small beech nuts, which ripen in the fall.

Big, shiny evergreen leaves cover the magnolia (*Magnolia grandiflora*). Large, waxy white blossoms decorate these trees in the spring. Magnolia cones contain many red seeds, each attached by a cotton-like thread. Squirrels eat these seeds as part of their autumn diet.

The pine you see nearby, and the most common along this trail is the loblolly pine (*Pinus taeda*). Pine stumps are all that remain of timber cut before the preserve was established.



magnolia  
blossom

rattan  
vine



---

# 3

## SMALLER MEMBERS OF THE SLOPE FOREST

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The sterile fronds (leaves) of the Christmas fern (*Polystichum acrostichoides*) remain evergreen through the winter, giving this fern its name. The fertile fronds produce spores (reproductive cells) only on the smaller upper leaflets.

Vines add to the tangle of the thicket, wrapping around shrubs, trees and even other vines. They sometimes strangle these plants as they grow toward sunlight. A common vine, smooth-barked rattan (*Berchemia scandens*) may grow to several inches in diameter. While it is green, it is sometimes made into furniture.

A plant with unusual flowers appears about March each year. The two species of jack-in-the-pulpit produce many tiny flowers on a spadix (stalk), all hidden within a spathe (sheath). The five-leaved jack-in-the-pulpit (*Arisaema quinatum*) has a green spathe, while a purple-striped spathe identifies the three-leaved species (*Arisaema triphyllum*).

These plants depend on the larger community members for life, support, shade, or soil conditions created by decaying leaves.



---

# 4

## FOREST CANOPIES

---

Compare the forest community to a city community. Both must use space efficiently, so they develop vertically. Different canopies or plant levels make up the forest just like buildings of different heights make up a city. The inhabitants of these levels are independent, but must rely on other community members for food, shelter, and protection.

The forest community starts below ground in the basement level. The first visible level is the ground or forest floor, followed by the shrub and small tree levels. Finally, the large tree canopy tops the forest like skyscrapers top a city. These interconnected canopies compete for moisture, nutrients and sunlight.

The plants and animals may occupy only one canopy or may live in several canopies. The same is true of city inhabitants. In both situations, some inhabitants walk to work, some travel by air, while others stay in one place.



*gallberry  
holly*

---

# 5

## BAYGALL COMMUNITY

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The bridge ahead crosses a baygall community, not known to many people. A baygall is a very wet area, named for sweetbay (*Magnolia virginiana*) and gallberry holly (*Ilex coriacea*) which often grow there. These shrubs are not visible from this bridge.

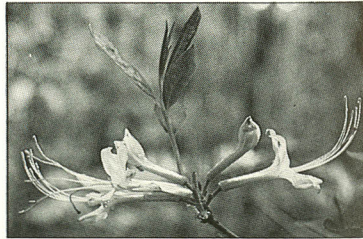


Baygalls often form at the bottom of slopes which drain into them. The acid water in baygalls leaches tannins from fallen leaves, staining the water a clear, almost black color (except during flooding). The slow decay of leaves on the muddy bottom sometimes causes gas bubbles to rise to the water's surface.

A number of water-loving plants flourish in or around the edge of the acidic, low oxygen water in the baygall. Feel the corky orange-colored bark of the titi or swamp cyrilla (*Cyrilla racemiflora*). Natives of the woods, wild azaleas (*Rhododendron canescens*) produce showy pink blossoms about March each year.

The acidic water which is low in oxygen, determines what plants grow here. In a broad sense water quality and availability affects where all living things live, including humans. You can probably think of times when water quality & quantity has touched your life.

titi



azalea

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# 6

## TWO PLANTS IN ONE

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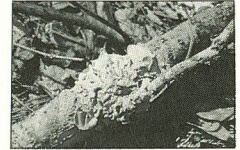
Algae and fungi live together as lichens on many trees and logs in the woods. In this tiny community, both members are dependent on each other (a symbiotic relationship). The algae makes food from sunlight and nutrients, while the fungi shelters the algae and absorbs water. These multi-colored plants decorate many trees in the woods, especially beech and holly. Man has used lichens for food, medicines, and as an indicator of air pollution.

Look for the 3 types of lichens on trees along this part of the trail:

**Crustose:** thin flat patches of color on bark, may be fissured.

**Fruticose:** shrubby, hairy, erect or drooping, on branches or soil.

**Foliose:** have distinct leaf-like lobes with different upper and lower surfaces on bark.



crustose &  
foliose lichen



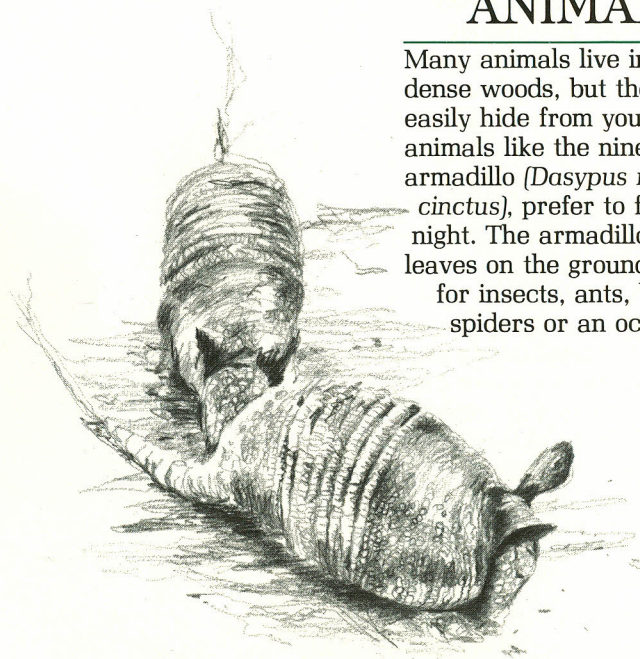
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# 7

## WHAT ABOUT ANIMALS

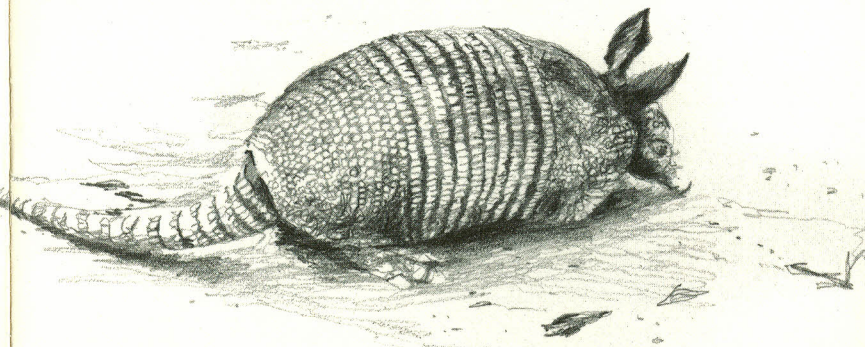
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Many animals live in these dense woods, but they can easily hide from you. Some animals like the nine-banded armadillo (*Dasypus novemcinctus*), prefer to feed at night. The armadillo roots up leaves on the ground to look for insects, ants, beetles, spiders or an occasional



lizard or salamander. You may find an area along the trail where an armadillo recently hunted for food. With his long digging claws, the armadillo digs a burrow about 8 inches in diameter and 10-15 feet long, where he spends most daylight hours.

Animals are more difficult to see after the trees leaf out in spring. You may have better luck in clearings or along creeks if you approach quietly. Signs of animals are everywhere - if you just look for the clues... leftovers of a meal, tracks in the mud, scats on a log or in the trail, or nests and homes. By studying these clues, you may be able to tell what other community members the animals depend upon.





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## 8 VINES

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You may notice many types of vines as you walk along, some with thorns, some without, but all reaching for something to support them. Because they reach for the sun, you may not easily find their leaves or flowers, unless you find a younger or shorter vine.

Wild grapes, including muscadine (*Vitis rotundifolia*), provide delicious eating, if you locate the fruit before the birds and other animals. Muscadine grapes make prized jelly and wine. Most grape vines have rough, shreddy bark, but muscadine has smooth red-brown to gray bark and coarsely toothed leaves.



red  
bay

---

## 9 PLANT GALLS

---

Galls are easily found along this section of the trail in spring. Galls are abnormal growths produced by plants, often in response to a chemical or fungal irritant. Insect eggs laid on a plant may cause a gall. If you look at this type of gall, you may see a small hole where the larva emerged. Inside, there might be an egg



sweetleaf

or larva, or maybe just a space where the larva grew.

### azalea gall



In spring, you may find fleshy galls hanging from some of the twigs of the hoary azaleas. These galls were eaten raw or pickled by early settlers.

A wasp egg laid in the leaf bud causes odd-shaped green, spongy galls to form on sweet-leaf or horsesugar (*Symplocos tinctoria*). This common shrub has shiny evergreen leaves which droop slightly.

Insects often seek out a particular plant species on which to lay their eggs, so the galls may be used to help identify that species, like the leaf galls on red bay (*Persea borbonia*). Red bay may be familiar if you cook, since the leaves may be used in flavoring meats and soups.

These plant-insect interactions are examples of specialized relationships in a community, and usually do not help or harm the host plant.

### muscadine grape





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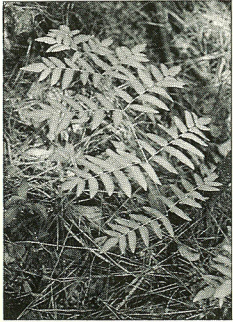
# 10

## LIFE IN A BAYGALL

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In spring or summer, look for the royal ferns (*Osmunda regalis*) on the left as you cross the bridge over the next baygall. They grow in or around the edges of the baygall. The fronds of the royal fern grow in a circular cluster and bear red-brown spores.

royal fern



When a tree falls or gets knocked over, the stump may not die completely. The cambium (living layer just beneath the bark) sometimes remains alive. A new tree may begin growing from the cambium, like this black gum or tupelo (*Nyssa sylvatica*) has done. In summer, the black gum is easy to recognize with its red or red-blotched leaves.

Sweet or white bay, a deciduous relative of magnolia, has large shiny leaves with a white, hairy underside. If you can find one, feel the underside of the leaf.



white bay

Beds of sphagnum mosses (*Sphagnum* spp) help build mounds along the edges and around tree bases in the baygall. Although these mosses often live in water-saturated soil, they use special cells to absorb water from the air.

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# 11

## NATURAL RECYCLING

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What good is a rotting log or stump in the forest community? A rotting log is food for mushrooms, home for resurrection ferns, and mosses; food and home for ants, beetles, termites, spiders, slugs; support for muscadine vines... a miniature community... recycled into soil by all of the above.

Animals and plants live on top of, inside of, and underneath a log. By looking closely, you may find other plants or animals living here, but please leave their homes undisturbed.

Dead and decaying organic matter is the "garbage" of the forest. The natural ecosystem - the total balance among plants and animals - provides an effective and productive disposal system. In urban human communities disposal of garbage is usually expensive and often consumes rather than produces.



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# 12

## WATER IN THE THICKET

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netted  
chain  
fern

Water plays an important role in the Big Thicket; in fact, it makes the thicket what it is. The amount of water affects what plant, and in turn, what animal communities live here. Imagine how different this area would be if annual rainfall were only 15 inches instead of the present 55 inches!

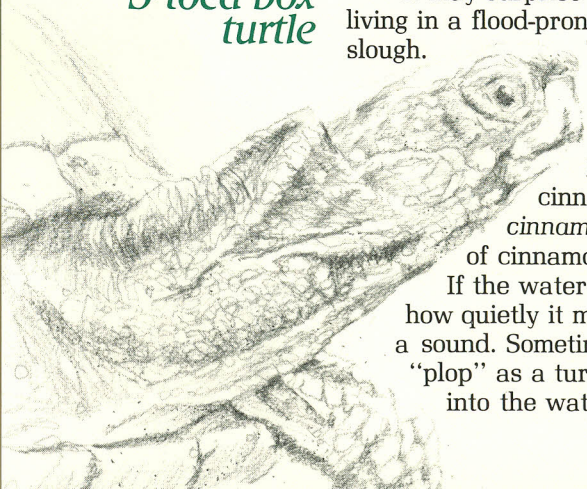
Because the heavy clay soil is so water-saturated, even one inch of rain at a time may result in flooding. Many thicket communities are subject to regular flooding. Sometimes this whole bridge is underwater!

It may surprise you to find ferns living in a flood-prone area such as this slough.

The more abundant of the two species here is netted chain fern (*Lorinseria areolata*). The tall erect cinnamon ferns (*Osmunda cinnamomea*) produce stalks of cinnamon-colored spores.

If the water is moving, listen to how quietly it moves - hardly making a sound. Sometimes you might hear a "plop" as a turtle or a frog jumps into the water.

3-toed box  
turtle

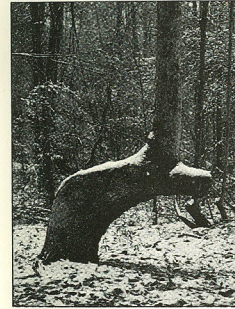


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# 13

## CHANGING COMMUNITY

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Turn left at the fork  
ahead to see the  
huge cypress trees  
on the Cypress Loop.

Notice what happens when a large tree dies and falls over. Sunlight suddenly floods a once-shaded area. When the tree falls, it often knocks over smaller trees, sometimes uprooting them. Other more flexible trees may only get bent by the fallen tree. On these trees, one or more of the branches may reach for the sky to become the new trunk(s). A whole forest of new plants begin growing to take the place of the former tree. Then it's a race - to see which plants can beat the others - for light, moisture and nutrients. Compare this race to what happens when a desirable piece of land goes up for sale in a city.

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# 14

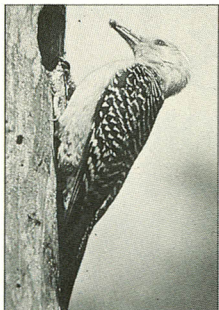
## WOOD DRUMMERS

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Listen... can you hear a woodpecker drumming or tapping on a nearby tree? Or maybe the distinct call of the large pileated woodpecker? Woodpeckers are one of the most commonly seen birds in the thicket.

Using their specially adapted feet and tail, woodpeckers can easily cling to and move around vertical tree trunks. They chisel holes in trees or snags, hunting for wood-boring insects. Sapsuckers drill neat rows of holes in rattan vines and





red-bellied  
woodpecker

various trees to let sap collect. With its brush-like tongue, the sapsucker sweeps up the sap or bugs attracted to the sap.

Pileated, red-bellied, red-headed, and downy woodpeckers and yellow-bellied sapsuckers are often seen on this trail.

Woodpeckers are highly mobile animals and often interact with many community members. Humans are also highly mobile and influence many natural communities.

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# 15

## CYPRESS SLOUGH

---

Sit on the bench and listen to sounds in this community. Watch for activity in the water and in the trees. Wait quietly for a few minutes. You may be surprised at what you see and hear...

Cypress trees (*Taxodium distichum*)



grow to 130 feet tall and reportedly live up to 1200 years of age. They often grow in standing water. Upright growths called "knees" rise from cypress roots and serve an unknown purpose for the tree. Some theories suggest they help in aeration or in balancing the tremendous weight of the tree in the wet soil. What is your theory?

The cypress is a conifer with short, fine needles and small round cones. Unlike most conifers, it is deciduous since the needles drop every fall.

Epiphytes are plants which depend on nutrients and moisture carried by the air. These cypress trees support two epiphytes - Spanish moss (*Tillandsia usneoides*) and resurrection fern (*Polypodium polypodioides*). A member of the pineapple family, Spanish moss is the gray hairy plant which often drapes over branches. Resurrection ferns are more visible on the higher branches during winter.

Because these plants live on air, they are easily affected by air pollution.

cypress



cypress knee

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# 16

## FLOODPLAIN COMMUNITY

---

A member of the birch family is abundant in river and stream floodplain communities. Feel the smooth, muscle-like trunk of American hornbeam (*Carpinus caroliniana*) or musclewood. The bark of



## Virginia creeper

this small tree is often blotched with gray patches, some of which are crustose lichens. Hornbeam leaves have small-toothed edges.

Cane (*Arundinaria gigantea*), our only native bamboo, is one of the few plants you will find growing beneath floodplain trees. It withstands the frequent flooding which prevents many other lower canopy plants from living here.

A common poisonous vine, poison ivy (*Rhus radicans*) forms a creeping ground cover or climbs trees in floodplains. With leaflets in three's, poison ivy is sometimes confused with Virginia creeper (*Parthenocissus quinquefolia*), a non-poisonous plant with leaflets in five's.

Flooding affects our human communities too. When man alters or intrudes upon natural drainage patterns the consequences are often severe.

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# 17

## THE ACORN & THE OAK

---

Leaves of the basket or swamp chestnut oak (*Quercus michauxii*) can be easily distinguished from other oaks, by their many shallow, even lobes. Gray squirrels and other animals eat its very large acorns and sometimes bury them to eat

## white oak



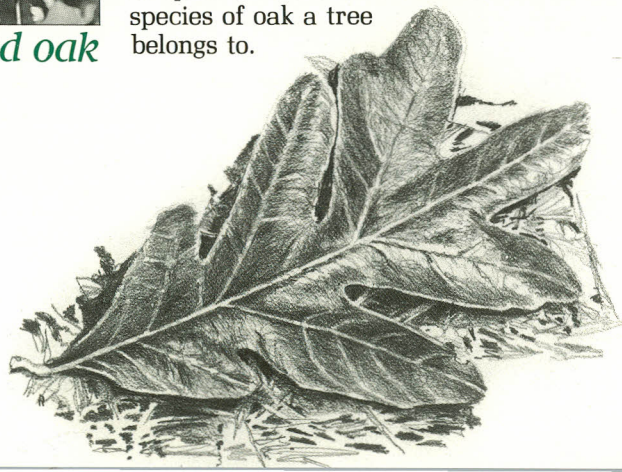
**White oak group:** **Leaves** - rounded lobes or teeth without bristles.  
**Acorns** - sweet, mature in 1 season.

**Red oak group:** **Leaves** - pointed lobes or smooth margin with bristles.  
**Acorns** - bitter, usually mature in 2 years.



## red oak

Because oaks often hybridize, leaves on a single tree may have many different shapes. For that reason, it may be quite difficult to determine which species of oak a tree belongs to.





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# 18

## ALONG VILLAGE CREEK

---

This clearing along Village Creek used to be a popular camping spot. Camping is not allowed here now to protect the watershed from pollution and overuse, as well as to protect fragile plant communities in this unit. With a valid state license, you may fish in this creek or in any water in the preserve. Village Creek is also popular for canoeing.

You are now at the trail junction. This booklet follows the shorter loop (.6 mile) back to the Information Station. You may, however, follow the outer loop (1.3 miles) back to the Information Station and use the trail guide again at marker number 24.

Before continuing, why not sit on a log in the clearing ahead and rest a minute. If you are quiet, you may see a number of birds. They often fly down along the edge of

the clearing to feed on the ground. In the brushier areas along the trail ahead, you may have a good opportunity to see birds like the ruby-crowned kinglet, wood or hermit thrushes, cardinal, or tufted titmouse. In the spring, brightly colored warblers sing and fly among the leafy cover.

---

# 19

## WOODLAND FLOWERS

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In spring, look for woodland flowers scattered along the edges of the trail. Violets (*Viola spp.*) are the first flowers to brighten the trail, sometimes appearing as early as January during mild winters. Flowers of the various violet species continue blooming through most of the spring.

Another early bloomer, yellow wood-sorrel (*Oxalis priceae*) grows in sunny spots. At night or during cloudy weather, its clover-like

leaves close up by folding downward.

All flowers must be pollinated to produce seed to continue the species. Pollination may be accomplished by insects, wind, or self-pollination. To attract insects, flowers use colors and scents. Flower shape and size insure that pollination occurs.

Can you tell flowers apart by scent only? Try it...

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# 20

## REMEDIES OF THE WOODS

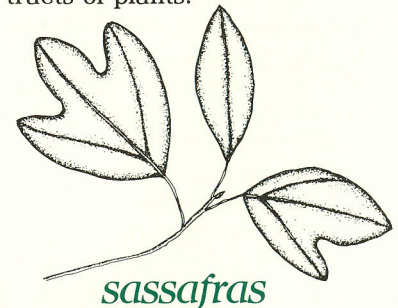
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It may surprise you to find relief for toothaches right here in the woods. The Hercules' club, also known as prickly ash, or toothache tree (*Zanthoxylum clava-herculis*) does just that. Chewing either the twigs or the projections from the trunk causes a short-term numbness in your mouth. The tree contains a mild anesthetic which acts like the novocaine your dentist uses to numb your mouth.

Along the trail you may find other plants which have medicinal value. Look for sassafras (*Sassafras albidum*) - a tree with three leaf shapes. The bark contains an oil used for flavoring, as an antiseptic and as disinfectant.

Witch hazel (*Hamamelis virginiana*) defies the approaching winter by producing small yellow flowers about November each year. Extracts from the leaves, bark, and twigs are used in making salves and lotions to lessen inflammation and stop bleeding.

By studying the labels on our modern drugs, you will find many that contain extracts of plants.





dogwood

---

21

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## FRUIT-PRODUCING PLANTS

---

Various species of hawthorns (*Crataegus* spp.) are among the first trees to bloom in the spring. Hawthorns, as their names imply, come well-armed with thorns, which help in identifying these small trees. Birds, animals and humans compete for the small apple-like fruits, which vary in color.

Another fruit-producing tree is American holly (*Ilex opaca*). Red berries ripen about November and soon get eaten by various bird and animals. Look for the spiny evergreen leaves and smooth lichen-covered bark. In April, masses of small, sweet-smelling yellow blossoms attract bees to this tree.

Flowering dogwoods (*Cornus florida*) attract many visitors to the woods in the spring. The four white "petals" of the



American holly

dogwood blossom are actually bracts or leaflike structures. The true flowers are tiny - clustered at the center of the white bracts. Red clustered berries ripen at the same time as the leaves change color.

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22

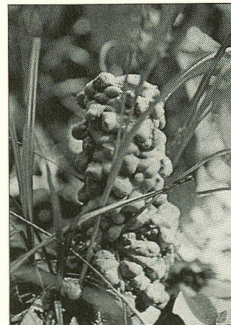
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## MUD CHIMNEYS

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These little mud chimneys differ from those built by pioneers on their houses. The small builders are "crawdads," who carry mud from their burrows to the surface, building the chimney. Crawdads or crayfish like to live in wet, often muddy areas in the woods, or just about any wet spot as many homeowners in this area can tell you. Crawdads are a popular item on menus along the Gulf Coast. If you would like to try one, outside the preserve of course, attach a piece of meat to a string and lower it into the hole... or visit a local seafood restaurant.

There are many kinds of animal homes in these communities, each adapted to the animal's capabilities and needs and to the environment. Knowing your own capacity and needs, what kind of home would you build if you had to live here?



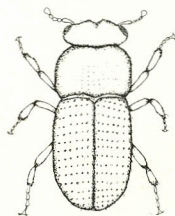
crawdada chimney

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# 23

## RECYCLING A PINE TREE

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*pine  
beetle*

In the early 1970s, southern pine beetle populations increased tremendously and spread rapidly through pine trees in this area. These tiny 1/8" long beetles attacked pines already weakened by drought, fire, fungus or other insect infestations. Thousands of them bored through the bark and laid eggs. When they hatched, the larvae burrowed around through the cambium layer, eating as they went. This network of burrows cut off the supply of nutrients and water to the top of the trees, helping to kill them in just a few days.

On a dead pine, look for the tiny holes where the adults emerged through the bark or the etched tunnels in the wood. Insects can be beneficial as well as destructive.

After pine trees and other trees die, woodpeckers soon discover them. Chunks of wood fly in all directions as the pileated woodpecker works on trees stumps or snags, gouging out large holes. The pileated uses its tongue, which it can extend, to gather beetle larvae and wood-boring insects in small cracks and crevices. It seeks out colonies of carpenter ants, sometimes preventing their spread to living trees. This large woodpecker also eats crickets, caterpillars, spiders, fruit, berries, and nuts in smaller amounts. It can quickly demolish a pine stump, helping to recycle the wood back into soil. This activity illustrates the importance of each individual in the ecosystem.

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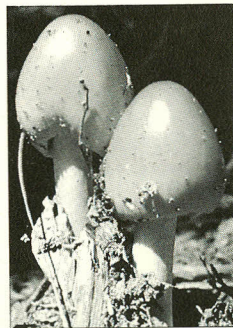
# 24

## MUSHROOMS

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Mushrooms carpet the woods with patches of color when the proper moist conditions encourage their growth. Most species seem to grow during late spring or late fall. The sizes, shapes and colors of fungi seem limited only by your imagination. They usually live on dead or decaying tissue, helping to break it down into its original parts, which are eventually used by other plants. Some live only on one particular type of plant, such as the fungi that grow on magnolia cones. Squirrels, turtles, skunks, armadillos, deer and others may eat mushrooms during the short time they are visible. Although some mushrooms are a popular ingredient in many dishes on the dinner table, others are deadly poisonous. Be sure not to eat any unless they are positively identified as edible.

Man learned long ago to use many items in his natural environment for food, clothing, shelter and medicine. For millenia, he discovered which plants were harmful or poisonous to him by trial and error. Now systematic laboratory studies are done first, lessening dangers.



*fungi*



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# 25

## STAR PATTERNS

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Sweetgum (*Liquidamber styraciflua*) trees have distinctive star-shaped aromatic leaves, and twigs with corky "wings." Spiky sweetgum balls cling to the trees during winter, attracting birds like the Carolina chickadee and tufted titmouse, and squirrels, all of whom feed on the winged seeds. Leaves turn to shades of red and purple in the fall.

Red maples (*Acer rubra*) also have somewhat star-shaped leaves. In early spring, the sound of bees humming will help you locate maple trees, which are one of the first species to bloom. The inconspicuous red flowers produce clusters of double samaras, or winged seeds, soon after blooming. In autumn, brilliant red maple leaves brighten the woods.

Sometimes hidden by fallen leaves, partridge-berry (*Mitchella repens*) forms a

creeping ground cover. Also known as twin flower, it receives its name for the paired, white star-shaped flowers. A red berry with tiny twin crowns appears after each pair of flowers.

Many other patterns occur in nature's communities, if you look for them.

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# 26

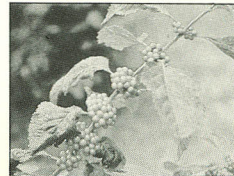
## SHRUB CANOPY

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As you near the end of the trail, do you recognize this community as the same one you first saw on the trail? Let's look at the shrubs in this community.

One of the most numerous plants in the shrub canopy of the forest is a kind of holly called yaupon (*Ilex vomitoria*). The male and female parts occur on separate plants, so only female yaupons bear red berries in the fall. These berries provide food for birds, squirrels, raccoons, and deer, although they are poisonous to man.

American beautyberry or French mulberry (*Callicarpa americana*) likes woods or thicket edges. Several songbirds, and mammals such as the raccoon, armadillo, and white-tailed deer eat the clustered bright violet berries which ripen in late summer.



beauty-  
berry

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# 27

## THE WEB OF LIFE

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In the recent past, man has used this area for many purposes: pioneer homesites, hunting, logging, camping, fishing, canoeing, and nature study, to name a few. Man's activity has altered the many natural communities somewhat. Now in the preserve, these communities are being allowed to return to a more natural state.

On this walk, we hope you have discovered how some of the plants and animals here are dependent on you and how you are dependent on them. If you drew a picture of some of these interrelationships in the Big Thicket community, it might look like a complicated spiderweb.

The same type of picture could be drawn for the interrelationships in the city, and also for the interdependence between the city and natural communities.

We hope you enjoyed walking this trail. Come again - hike a different trail, and experience a different part of the thicket... or come in a different season and experience another of the many moods of the thicket!

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