



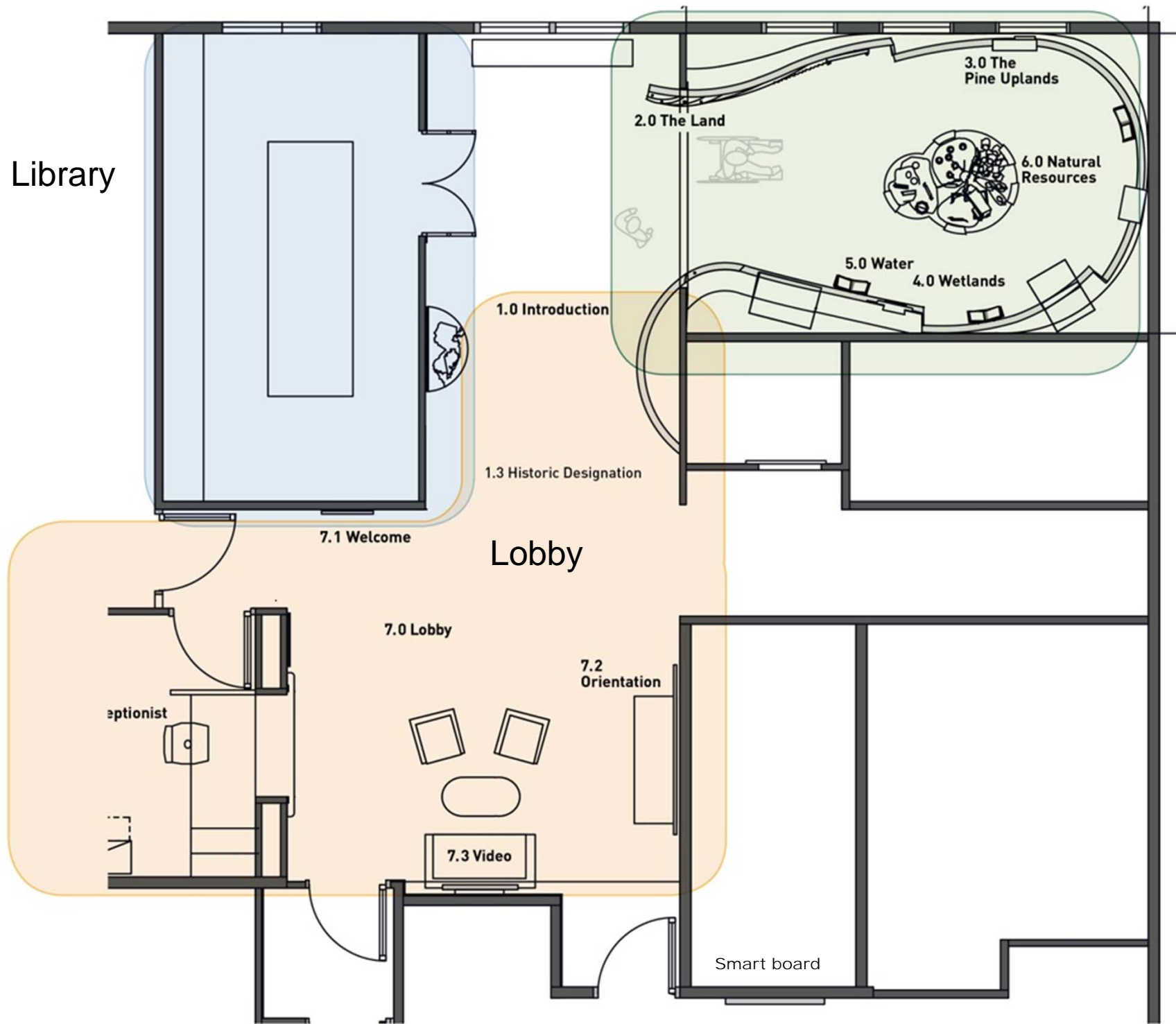
# NJ Pinelands Commission

## *R.J. Sullivan Center Exhibits*



Library

Exhibit

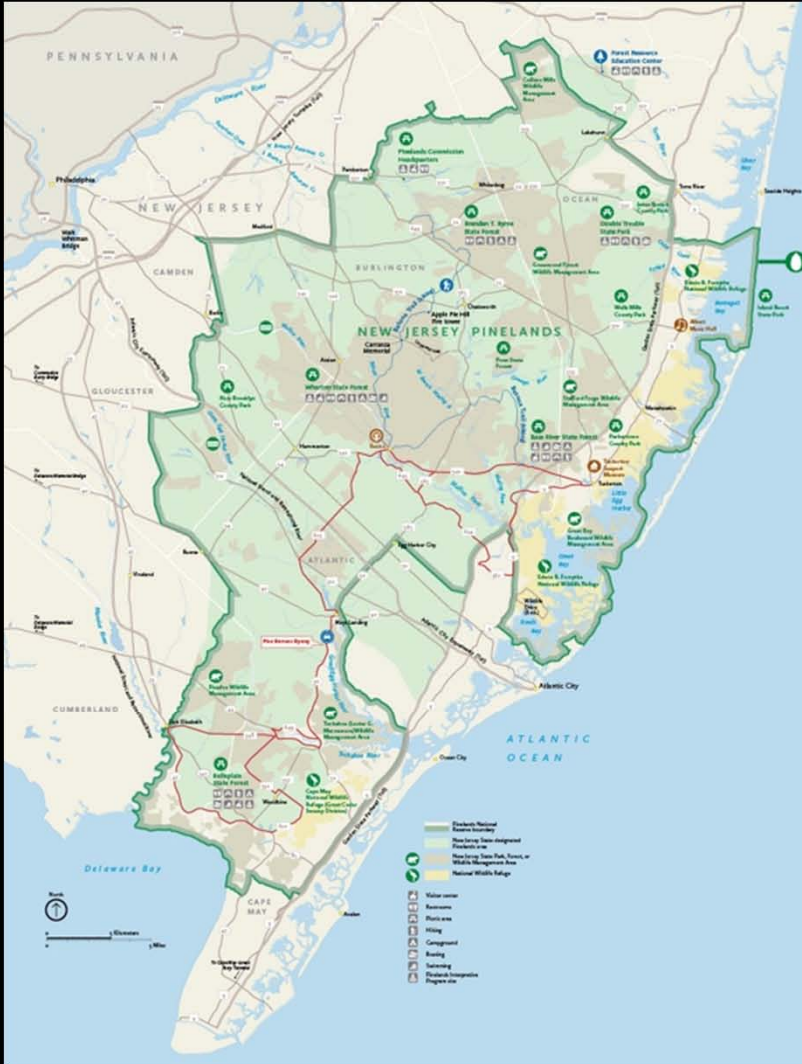


# *Welcome* to the New Jersey Pinelands.

The New Jersey Pinelands Commission –  
Preserving, protecting, and enhancing the  
natural and cultural resources of the  
Pinelands National Reserve.



# Orientation Map & Brochure Rack



## The New Jersey Pinelands

*A place like no other*

### Nature



**Pinelands National Reserve**  
Explore 1.1 million acres of private and public land where rivers, trails, and roads lead to wetlands, dwarf forests, mysterious ruins, and ghost towns.



**National Wildlife Refuge Areas**  
Observe native and migratory wildlife in a variety of grasslands, salt marsh, bog, and coastal habitats.



**Scenic & Recreational Rivers**  
Accessible by kayak, canoe, or boat these Pinelands rivers among America's most pristine.



**State Parks & Forests**  
Walk through former villages and historic landmarks surrounded by jagged pines and cedar swamps. Camping, mountain biking, horseback riding and cross-country skiing offer year-round outdoor opportunities.



**State Wildlife Management Areas**  
Encounter diverse wild lands where over 43 animals listed as endangered or threatened make this their home. You might see bald eagles, owls, vireos, river otters or bees.



**County Parks**  
Enjoy open space for picnics, hiking, golfing and scenic views. Programs include music festivals, crafts and environmental education. James Branch is called The Gateway to the Pine and Walls Mills hosts the annual Pine Barrens Jamboree.

### Culture



**Albert Music Hall**  
An institution for over 90 years, and now home to 30-in-a-row concert hall, Albert Hall is the cradle of traditional Pinelands music. Check schedules for performances and weekly jam sessions.



**Historic Villages**  
Visit an active historic village at Batsto or a deserted village in Atison. Explore the ruins of Hammonds, Weymouth Furnace and Esterville.



**Tuckerton Seaport Museum**  
Relive the unique coastal heritage of the Jersey Shore. Observe local craftspeople, boat builders, and live aquatic displays.

### Venture



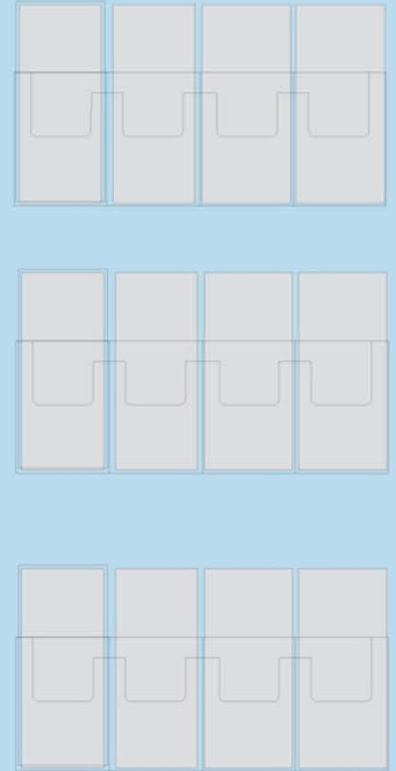
**Batsto Trail**  
Winding over 30 miles this easy trail passes through forests, crosses streams, and connects once thriving historic towns. Don't miss the view from Apple The Hill and the history of Batsto Village.



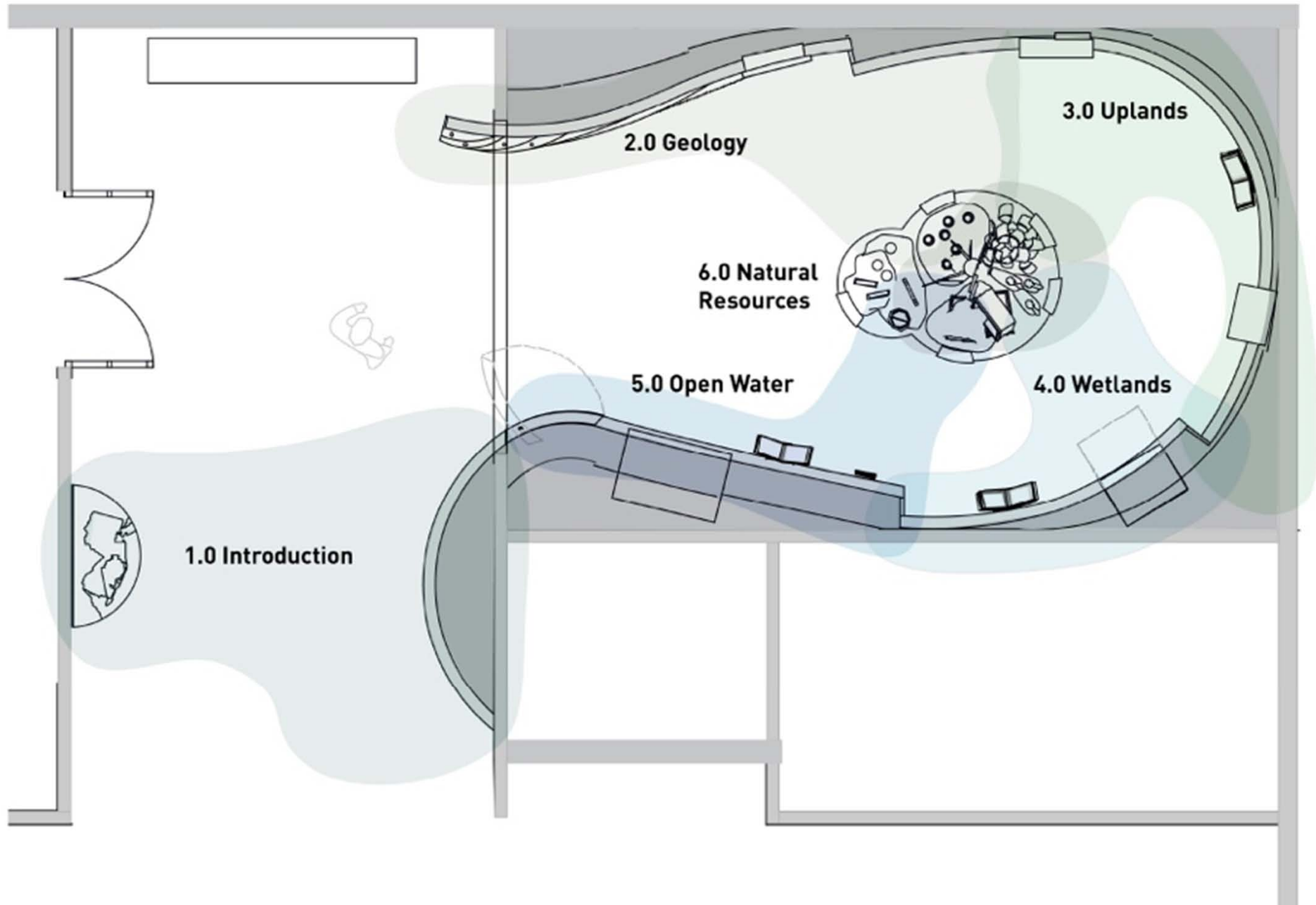
**Forest Resource Education Center**  
Explore the forests and learn about wildlife through indoor and outdoor exhibits, and environmental education programs.



**Pine Barrens Byway**  
Drive 130 miles through the undiscovered pure scenic beauty and historic heritage of the pinelands from Batsto and Tuckerton in the north to Dennisville and Port Elizabeth in the south.



# Exhibit Content Plan





# 1.0 Introduction

## The New Jersey Pinelands

*A place like no other*

You may be in the middle of the nation's most densely populated state, but you're also on the edge of a surprisingly vast wilderness—the million-acre Pinelands National Reserve. It's a fragile and unique ecosystem—a patchwork of forests adapted to fire, wetlands full of rare species, slow-moving rivers, abandoned industrial sites, active farms, and modern towns.

The Pinelands is a place worth understanding and exploring. You can find out about it here and then wander the sand roads to discover some of its many wonders.

### Pinelands National Reserve

The Pinelands National Reserve covers 1.1 million acres of New Jersey, or about 1 percent of the state, and includes some of the largest tracts of forest in the Northeast. Established in 1978 in the Pinelands National Reserve, it was designated as a National Historic Landscape. You can learn more here.

### State Pinelands Area

The State Pinelands Administration is the New Jersey Pinelands Protection Act of 1978, encompassing 900,000 acres, and is the largest forested area in the state. The area includes parts of seven counties and 75 municipalities.

### Pine Plains

The Pine Plains area is the largest pine forest in the country and the last remaining of this type of ecosystem.

### Wildlife Corridor

There are more than 20 miles of Pinelands Wildlife Corridor, including important historic villages that were founded from 1680s through 1800s, and other structures and earth.

### National Wetland & Scenic Rivers

Some of the New Jersey Pinelands have systems designated National Wetland and Scenic Rivers: The Great Egg Harbor River, National Scenic and Historic River, and the Manasquan National Scenic and Recreational River.

## More than just pines

*Discover the secrets of the Pinelands*

It may look like just pine trees and sand, but investigate a little further and you'll encounter a fascinating natural and cultural landscape. The Pinelands is a vast mosaic of forests, streams, and wetlands, plus farms, villages, and homes—some long abandoned and some modern and vibrant.

We invite you to discover what's beneath the surface.



# Topographic map





# More than just pines

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View from Apple Pic Hill Fire Tower

F  
Rich Folklore

D  
Best Stops

J  
Jacks

Z  
A Pioneering Healer

A  
Endangered Plants

E  
Old Industries

K  
Legendary Robbers

W  
A Boat Building Tradition

M  
Nature Trails

O  
A Wilderness to Enjoy

L  
A List

L  
Roosting Birds

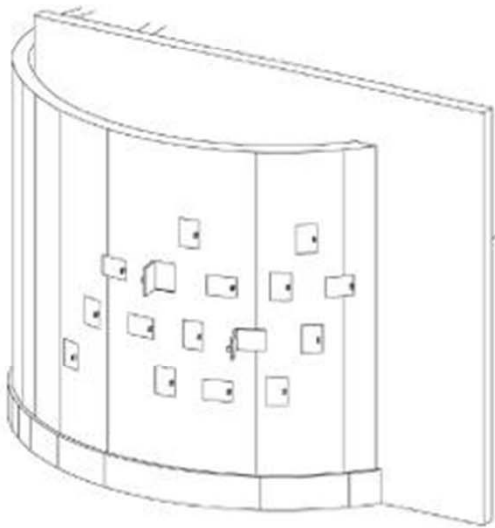
H  
Unusual Plants

Q  
Our Own Cultural Flare

V  
An Enormous Aquifer

# Hidden Wonders

## *Eastern Timber Rattlesnake*



Endangered Animals

## A Sandy Foundation

*The unique character of the Pinelands begins underground*

The light-colored sand you see in Pinelands roads and under the trees provides a peek into what makes the Pinelands so unique. The soil is almost pure quartz sand. It holds little moisture near the surface and few minerals or nutrients. European settlers discovered that their crops wouldn't grow here and called the area "barren," but many unusual plants thrive here.

If you could look below the usually dry surface, you'd discover a vast reserve of water held in deep layers of sand. This is a resource like no other—more than 12 billion gallons of fresh water that feeds Pinelands rivers, wetlands, and wells.

Pinelands Uplands



Particle size matters



Uplands

Upland Forest  
Fire shape



# 2.0 Geology

## A Sandy Foundation

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### Pine-Oak Uplands

These rolling hills are covered in pine and oak trees. The soil is sandy and well-drained, making it ideal for agriculture.

### Homes

Many homes in the Pinelands are built on sandy soil. The soil is well-drained, making it ideal for agriculture.

### Wetlands

Wetlands are areas of land that are saturated with water. They are important for wildlife and water purification.

### Surface Water

Surface water is water that is on the surface of the earth. It can be found in rivers, lakes, and streams.

### Gravel

This layer has mostly rounded pebbles, but you can see a lot of shells in the upper part. It is the upper part of the Kirkwood Formation and has been deposited by the Hudson River.

### Coarse Sand - The Cohansay Formation

This layer is the surface or shell of the Pinelands. It is composed of coarse sand and silt. It is the upper part of the Kirkwood Formation and has been deposited by the Hudson River.

### Fine Sand - The Kirkwood Formation

This formation carries from one to two feet thick. It contains the non-porous, granular sand with clay in places.

### Clay

The thin particles of clay in this layer prevent water from penetrating. The formation acts like the bottom of an immense bowl, keeping water in the sand layers above.

### The shore of an ancient sea

The thick layer of sand that lies beneath the surface is the shore of an ancient sea. It was deposited by waves that came from the Hudson River and the Atlantic Ocean. The sand is well-drained and porous.

### A world-class natural reservoir

The sandy soil beneath the Pinelands is the Kirkwood and Cohansay formations. They are made of sand and silt. They are well-drained and porous. They are a world-class natural reservoir.

The sand in the Pinelands is especially good at storing up groundwater. It can store up to 100 gallons of water per cubic foot. It can store up to 100 gallons of water per cubic foot.

### Aquifer Water Cycle

## How an aquifer works



### Where does the water go?

When the ground is wet or an aquifer is full.

What happens? At first the water collects on the surface, forming a temporary pond, but eventually it flows into the aquifer below. The water fills the spaces in between the coarse gravel and sand layers. It remains there, trapped by the lower clay layer like the bottom of a trap, ready for us to pump and use.

## Pine-Oak Uplands

Thousands of years ago, the Pine-Oak Uplands were a vast, flat plain. The Hudson River, which flows through the area, has since eroded the land, creating the hills and valleys we see today.

### Gravel

This layer has mostly eroded away, but you can see it on top of hills. It is the most recent formation and may have been deposited by the Hudson River.

### Coarse Sand - The Cohansey Formation

The layer at the surface in most of the Pine-Oak Uplands is this one. It is composed mostly of whitish coarse-grained quartz sand and reached an average depth of 300 feet. This layer's loosely packed, similar-size sand grains excel at soaking up and storing rainwater.

### Fine Sand - The Kirkwood Formation

This formation varies from 100 to 300 feet thick. It is composed of fine-grained sand with clay in places.

### The shore of an ancient sea

The thick layers of sand that lie beneath the Pine-Oak Uplands were deposited by ancient coastal seas. About 10 million years ago, the sea was at its peak. The sea's edge, or shoreline, was made of sand particles. This thick layer of sand is called the "Cohansey Formation" and is made up of sand grains of similar size. The sea's edge was a flat plain, and it is now a hill.

### Aquifer Water

Water from penetrating rain soaks into the sand and stays there. Keeping water in the sand is called "storing" it.



# How an aquifer works



## Where does the water go?



Press the button to see an aquifer in action

What happens? At first the water collects on the surface, forming a temporary pond, but eventually it flows into the aquifer below. The water fills the spaces in between the coarse gravel and sand layers. It remains there, trapped by the lower clay layer like the bottom of a cup, ready for us to pump and use.

# Uplands



# 3.0 Uplands

## Uplands

### Upland Forests

Fire shaped these unique woodlands

Take a sandy trail into the upland forests of the Pinelands, and you enter a unique wilderness. Only certain kinds of plants can thrive in the dry, acidic, nutrient-poor sand of the uplands. These plants can also withstand regular wildfires.

For centuries, wildfires have routinely burned through the Pinelands, resulting in the dominance of pitch pine over the other pines and oaks that accompany it. Pitch pine stands out among plants as especially adapted to fire. It is the most abundant tree in the Pinelands and a fitting symbol of this unique place.

#### Pitch Pine: The anatomy of fire resistance

1. Thick, leathery bark helps protect and insulate the trunk. The resinous bark under the bark is highly resistant to fire damage. After a fire, the tree will not need to put a lot of energy into growing new bark.

2. Pitch pine has a very low growth rate. This means that it can survive in a fire-prone area for a long time before it is replaced by a faster-growing species.

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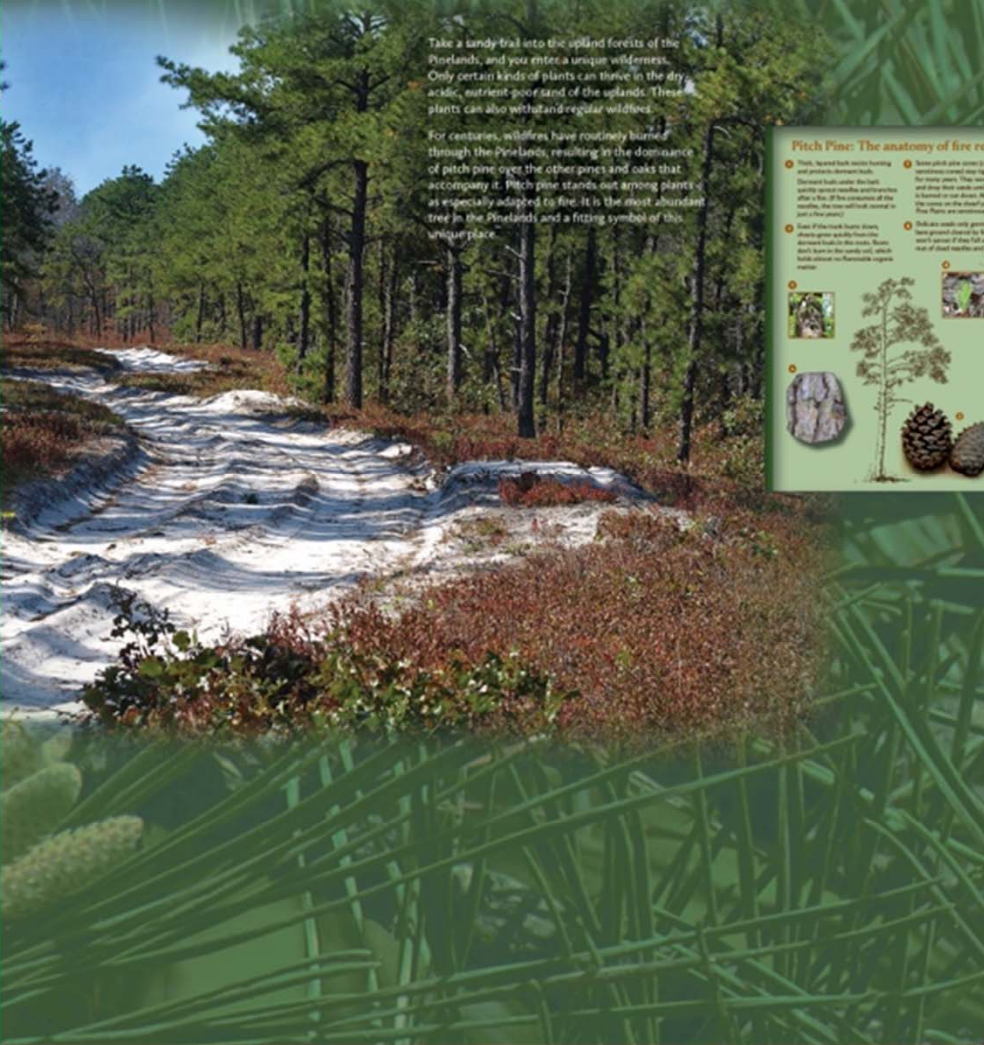
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#### Pine-oak or oak-pine: the influence of fire

When the heavy, resinous pitch pine, joined from the uplands, the pine-oak forest has a different character. The trees are shorter and the ground is covered with a thick layer of pine needles. The forest is a fire-prone area, and the trees are adapted to survive in a fire-prone area. The forest is a fire-prone area, and the trees are adapted to survive in a fire-prone area.





# 3.0 Uplands



## Pine Plains: the dwarfed forests of the Pinelands

The Pinelands are one of the few places in the world where you can see the dwarfed forests of pine, ground cover, and scrub. Typical Pinelands vegetation is low-lying and dense, and the ground is often covered in a thick layer of pine needles. The Pinelands are a unique and important part of the South Carolina landscape.

## Extensive forests host diverse species

The Pinelands are home to a wide variety of plants and animals. Some of the most notable species include the Carolina parakeet, the Carolina chickadee, and the Carolina wren. The Pinelands are also home to many rare and endangered species.



## Blueberry Pioneer

The Pinelands are home to a wide variety of plants and animals. Some of the most notable species include the Carolina parakeet, the Carolina chickadee, and the Carolina wren. The Pinelands are also home to many rare and endangered species.

*"At all seasons there is a peculiar restfulness in these quiet stretches, over which the pines stand as silent sentinels."*  
— Wilmer Stone



## The forest-fueled Pinelands industries

The Pinelands are home to a wide variety of plants and animals. Some of the most notable species include the Carolina parakeet, the Carolina chickadee, and the Carolina wren. The Pinelands are also home to many rare and endangered species.



## Pitch Pine: The anatomy of fire resistance

- 1** Thick, layered bark resists burning and protects dormant buds.  
Dormant buds under the bark quickly sprout needles and branches after a fire. (If fire consumes all the needles, the tree will look normal in just a few years.)
- 2** Even if the trunk burns down, shoots grow quickly from the dormant buds in the roots. Roots don't burn in the sandy soil, which holds almost no flammable organic matter.



- 3** Some pitch pine cones (called serotinous cones) stay tightly closed for many years. They won't open and drop their seeds until the tree is burned or cut down. Almost all the cones on the dwarf pines in the Pine Plains are serotinous.
- 4** Delicate seeds only germinate on bare ground cleared by fire. They won't sprout if they fall on a thick mat of dead needles and leaves.



[Fire video](#)

Pinelands forests  
kept the pygmy

# Eastern Spadefoot

# Box Turtle

Owls and woodpeckers nest in the hollows of trees. Trees killed by fire are good places to nest. With shorter than average wings (for a hawk) the Sharp-shinned Hawk is uniquely adapted for fast forest flying. Warblers, Towhees, and Common Yellowthroats respond to forest fires by doing one of the things they do best: flying away from danger!

Frequent fires in the Pine Plains keep the canopy open and the trees stunted and small. Broom Crowberry thrives in the open space, so does Pine Barrens Reed Grass, a globally rare plant that needs fire to be successful. Colonies of sun-loving Turkey Beard take hold and bloom in the light gaps created by fire.

feeds only on  
Pinelands savannahs  
Pinelands shelters one  
butterflies.



Sharp-shinned Hawk

Steve Pearl



Barred Owl

Michael Hager



Red-headed Woodpecker

USFWS



Turkey Beard

USFWS



Eastern Fence Lizard

USFWS



Broom Crowberry

USFWS



Gulf Grass Skipper Butterfly

USFWS



Christian's Sparrow



# 4.0 Wetlands

## Wetlands

### Wetlands

#### Habitats brimming with diversity

Visit the wetlands to see some of the Pinelands' most spectacular and unusual sights. These habitats make up more than 380,000 acres, or 35 percent, of the Reserve and provide habitat for most of its rare species. There are insect-eating plants, globally rare Atlantic White Cedars, orchids, and flowers found nowhere else in the world.

Wetlands of different types occur where the groundwater meets the surface, either seasonally or year-round. These swamps, savannas, and vernal ponds prevent flooding and filter runoff before it enters streams, rivers, and the underground water supply.

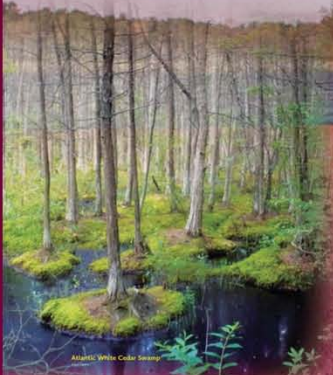
#### Cedar swamps: rare and vulnerable

Walking into a cedar swamp is like entering a cool, moist sanctuary. Atlantic White Cedar trees rise 50 or 60 feet with few branches at eye level. Overhead, their dark canopies silently shade the ground.

No other trees, not even young oaks, can survive in the shade, but where the sun shines through openings in the canopy, some unusual plants take root. Sphagnum Moss grows in big, spongy patches.

You might also find the carnivorous Pitcher Plant, the rare Curly Grass Fern, an orchid or two, and other plants adapted to the acidic water and soil.

Cedar swamps used to extend for thousands of acres in the Pinelands and across New Jersey. Today, these rare habitats are protected.



Atlantic White Cedar Swamp

#### Pine Barrens Treefrog

You can hear this tiny, beautiful symbol of the Pinelands calling loudly from its breeding areas around shallow temporary pools in the late spring. Unlike most amphibians, it thrives in acidic environments like the Pinelands' cedar swamps. It's restricted to New Jersey because its habitat is so limited. The only other population are in the foothills of the Carolina and the Florida panhandle.



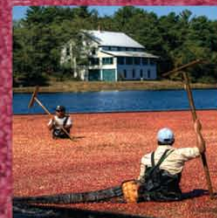
Pine Barrens Treefrog



A beaver dam in a swampy area of the Pinelands.

#### Taming the wild cranberry: an industry takes root

Over 100 years ago, wild cranberry bogs and swamps of the Pinelands were the source of wild cranberries. As the industry grew, it began transforming cranberry bogs to other wetlands, sometimes where beavers had been causing damage. Today, 80 percent of the 100,000 acres of cranberry bogs are now planted.



A cranberry bog in the Pinelands.



A narrow boat on a waterway in the Pinelands.



A person working in a field in the Pinelands.



#### A sneaky boat design

The Boatwrights' design is a unique blend of traditional and modern. It's a narrow boat that can fit through the tightest of passages.

#### The Pinelands' wetlands are home to many diverse and rare species

Most of the region's natural diversity can be found in its wetlands. At least 100 plant species were first discovered here, and at least 100 more are still being discovered. Many plants and animals are listed as threatened or endangered because so much of their habitat has been lost.



Pekin Pond

Pine Barrens Treefrog



# Terrarium

## Pine Barrens Treefrog

You can hear this tiny, beautiful symbol of the Pinelands calling loudly from its breeding areas around shallow temporary pools in the late spring. Unlike most amphibians, it thrives in acidic environments like the Pinelands' cedar swamps. It's protected in New Jersey because its habitat is so limited. The only other populations are in the Sandhills of the Carolinas and the Florida panhandle.



...sting and packaging of the sphagnum moss that grows in the  
 ...erates a moss press, to the right William Wasiowich harvests









## The Pinelands' wetlands are home to many diverse and unique species

Most of the diversity of the Pinelands is found in its wetlands. At least 24 plant species were first discovered here, and at least 3 live nowhere else. Many plants and animals are listed as threatened or endangered because so much of these habitats has been lost to development.



**Rare Plants:** A surprising number of rare plants are found in the Pinelands. It is able to grow in a wide range of sunny and shady, moist wetland habitats give rise to a wide range of snakes, frogs, toads, and other reptiles and amphibians. The Northern Spring Peeper congregates where trees and shrubs stand in water. Southern Leopard Frogs prefers shaded, shallow water. Green Frogs range from brown to green color and can be found in freshwater.

**The Northern Water Snake is the most common snake in New Jersey. Many mammal species patrol the wetlands with webbed feet and wings. Big Brown Bats and Little Brown Bats scoop up the abundant mosquitoes, flies, and dragon flies that take to the air in the clear skies above the wetlands.**

 Spadefoot Toad	 Green Frog	 Little Brown Bat	 Big Brown Bat
 Spotted Leaf Frog	 Northern Spring Peeper	 Northern Water Snake	
 Southern Leopard Frog			

# Water riches

Abundant water is the Pinelands' greatest resource

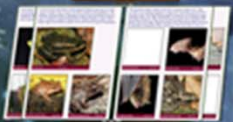


The water's dark hue

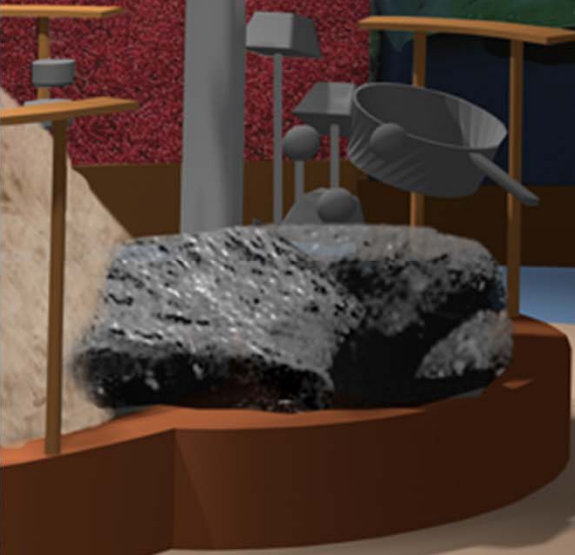
What makes the water brown?



Cedar water: dark but sweet



In Pinelands, water is the key to many plants and animals.



# 5.0 Surface Waters

## Surface Waters

### One of the Pinelands' greatest resources

One of the best ways to see the Pinelands is by canoeing one of its many rivers and streams. These slow-moving waterways mostly start in the Pinelands and flow out, feeding the marshes and bays of southern New Jersey.

Pinelands rivers attracted settlers to this area. They built dams and waterwheels to operate mills, forges, and furnaces; transported natural resources and products on Pinelands waterways; and established towns and villages near rivers and industrial sites.

#### The aquifer's "back door"

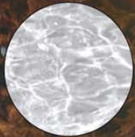
Pinelands surface waters link directly to the Kirkwood-Galloway aquifer. Southern New Jersey's vast underground water supply. Pollutants like chemicals and fertilizers that drain into surface waters can easily enter the aquifer and contaminate groundwater throughout the region. Likewise, pollution that enters the groundwater from inland sources can travel into wetlands and streams.



Pinelands lakes offer a peek into the past. All lakes in the Pinelands were created by people. Some were formed when settlers dammed streams to harness water power; others are former cranberry bogs or mine sites.

#### What makes the water so dark?

Wetland plants like cedar trees and sphagnum mossy break to tannin water acids. Dry cedar tannins leach into the water. A phalar grasses and compound grasses like its color. Combined with dissolved iron and organic matter, the tannins make the water very dark.



#### Cedar water: dark but sweet

Pinelands tea-colored "cedar water" was naturally good tasting. Sea captains used to fill their casks with it because it stayed fresh longer than any other water they could find and actually tasted sweet. Today, you surface water is guaranteed drinkable, because it may contain harmful microorganisms.

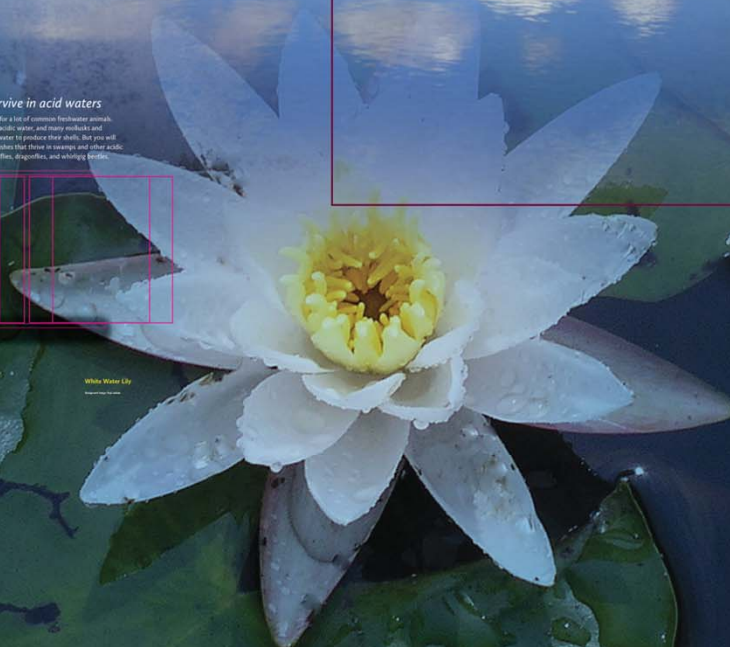
#### Rare species survive in acid waters

Pinelands water is too acidic for a lot of common freshwater animals. Some fish can't reproduce in acidic water, and many mollusks and invertebrates need less acidic water to produce their shells. But you will find water bugs, toads, and fishes that thrive in swamps and other acidic waters. The water of damselfish, darters, and whitefish.

Black-headed Sunfish



White Water Lily



#### Rich opportunities for recreation

You can canoe, fish, or watch wildlife in a Pinelands lake or bay. Any of its rivers through the wild beauty of this vast reserve.



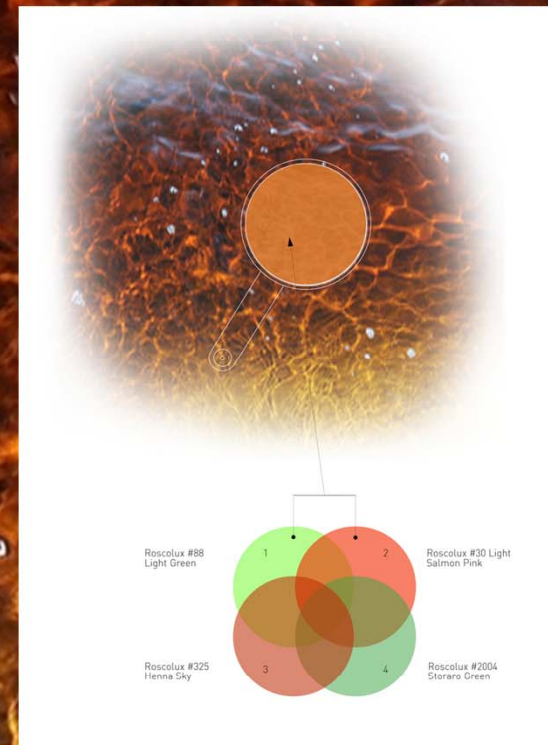
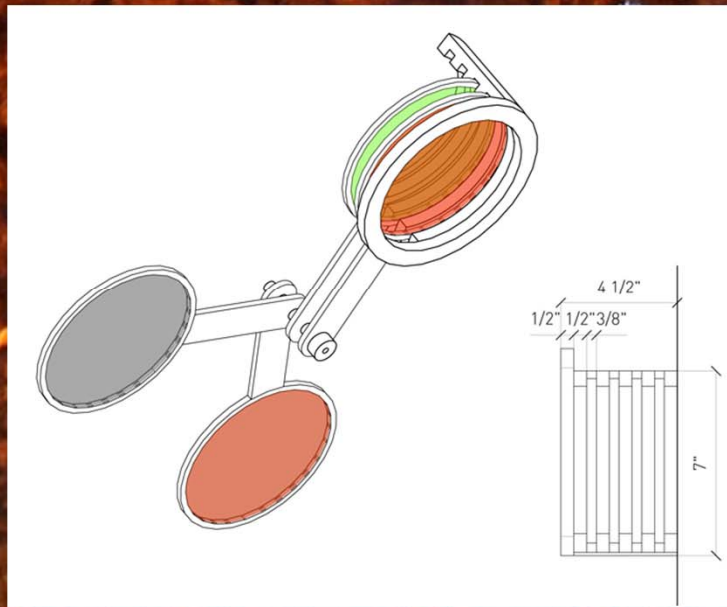
Skeleton Pond

This is an example of an interesting pond — sometimes it is there, sometimes it is not.



# Cedar Water Interactive

*What makes the water brown?*





The higher the dune, the greater the diversity of bird species.



There is a peculiar  
small stretch, over  
and as inland as possible  
- John Muir



### Wetlands of the Pinelands

Unique habitats brimming with diversity

- The Pinelands wetlands are a unique and diverse ecosystem.
- They provide a home for many rare and endangered species.
- The wetlands are also important for water quality and flood control.
- They are a vital part of the Pinelands landscape.

HERE LIES DANCIN'  
JOE MULLINER

# 6.0 Pinelands Resources

