

# Horatio Colony Preserve



Keene, New Hampshire

# Horatio Colony Preserve ~ Trail Map ~ Scale: 1" = 1600'



## *Short Species List:*

### *Trees:*

- Eastern Hemlock
- American Beech
- Red Oak
- Yellow Birch
- Red Spruce
- Sugar Maple
- White Pine
- Black Ash

### *Herbaceous:*

- Wild Sarsaparilla
- Sessile-leaved Bellwort
- Evergreen Woodfern
- Indian Cucumber-root
- Pennsylvania Sedge
- Marginal Woodfern
- Shining Clubmoss
- Wintergreen
- Partridgeberry

### *Amphibians:*

- Wood Frog
- Jefferson's Salamander
- Green Frog
- Spring Peeper
- American Toad

### *Birds:*

- Black-capped Chickadee
- Blue Jay
- Ovenbird
- Myrtle Warbler
- Hermit Thrush
- Hairy Woodpecker
- Pileated Woodpecker
- Brown Creeper
- Tufted Titmouse
- Wild Turkey
- Barred Owl

### *Mammals:*

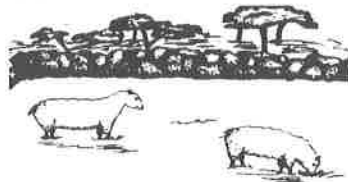
- White Tailed Deer
- Black Bear
- Raccoon
- Fisher
- Mink
- River Otter
- Coyote
- Red Fox
- Gray Fox
- Red Squirrel
- Porcupine
- Snowshoe Hare
- Southern Flying Squirrel
- Eastern Chipmunk
- Eastern Gray Squirrel

- SITE 1 -  
*THE CROSSROADS OF THREE CENTURIES*

Look around you. From where you are standing, you can see evidence of three centuries: 18th, 19th and 20th. Each of the clues come together here. Can you see them?



The road that you are standing on was laid out in 1763. It was named Daniel's Hill Road after Samuel Daniels, the first homesteader in this region. It was the first road in this part of Keene, and eventually went to Chesterfield.



The 19th century is in front of you. The stone walls, built in the early 1800's, represent a historical way of life. The stones were painstakingly lifted from the soil when the land was clear for pasturing sheep. This wall helped to fence in sheep and served as a boundary line between two neighboring farms. The stones were often called "New England potatoes." Can you figure out why?



The cabin represents the 20th century. It was built by Horatio Colony (1900-1977) in the 1930's, who enjoyed the natural solitude of West Hill. He was named after his grandfather, first mayor of Keene and cofounder of the Colony-Faulkner Mill, who bought the land in 1892. Younger Horatio enjoyed writing and the cabin provided solitude and inspiration for many poems and essays.

As you walk to the next trail sites,  
look for evidence of history.  
You will see clues like the ones  
above.

~ SITE 2 -  
SITES AND SOUNDS OF THE SEASONS

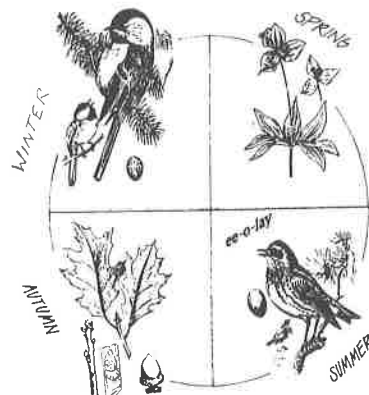
Look at the forest around you. Trees that lose their leaves are called *deciduous* trees. They are part of what is known as a *transitional forest* - trees from both northern and southern climates. For example, Red Oak is a southern tree and White Birch has a northern affinity. Here they grow together.

Each season of the year, you can find unique sights and sounds. In the fall, the leaves are shed and digested by mushrooms in the soil. The light and dark greens of summer give way to brilliant yellows, reds, oranges and golds of autumn. The "Kuk Kuk" of chipmunks punctuate the rustling of dry leaves in the wind.

In the winter, The Black-capped Chickadee calls its own name: "Chick-a-dee-dee-dee." Winter is also a good time to look for the tracks of the many four-leggeds that wander through the preserve.

In the spring, dazzling arrays of wildflowers grow here. Before the trees leaf out, flowers blossom in the sunlight that shines on the forest floor. Listen for the Barred Owl who says "Who cooks for you? Who cooks for you all?"

In the summer, the Ovenbird sings "teacher, teacher, teacher!" At dusk listen for the "e-o-lay" of the Wood Thrush. Summer is a great time to learn the names of trees. The species checklist (in the front of the guide) gives you a hint of what grows here.

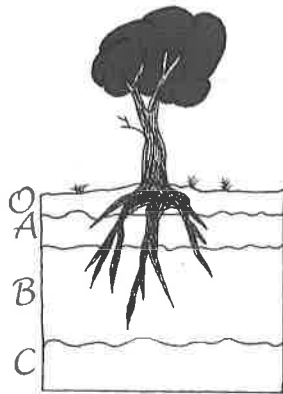


Birders use *phonetics*, by translating bird songs into everyday language. It may help you to remember who is who!

- SITE 3 -  
THE SOIL PIT

Have you ever looked closely at soil? Decaying leaves and twigs, roots, rocks, sand, clay, insects, and microscopic organisms all make up the soil you are standing on. Can you find some of these elements?

Soils play an important role in the life of a forest. The soil and the forest depend on each other for their health and well being. The forest holds the soil together with its roots and replenishes it with organic debris. Microscopic organisms break down the debris into nutrients that plants absorb.



Soil Horizon	Description
O	organic layer made of plant and animal parts
A	fertile top soil made of scattered rocks, fine sandy particles and decomposed plant/animal remains
B	subsoil containing rocks, fine sand, silt particles and mineral nutrients leached from O and A layers
C	parent material, made from non-living elements of the soil; at this site, it is made of compacted sand

In front of you is a soil pit. Soil pits are used by scientists to determine the type and characteristics of soil. Look at the *horizons or layers of soil*, their color, particle types and other characteristics. The markers show the four different horizons of soil: O, A, B, and C. The drawing above shows where they are located and what the layers are composed of.

Nutrients combine with sunlight and water to help the forest grow. This process is called *photosynthesis* and the study of the relationships between organisms and their environment is called *ecology*. As you move up the trail, you will see rock outcrops. How might rocks be involved in the ecology of West Hill?

- SITE 4 -

## GNEISS OUTCROP AND SIDE TRAIL

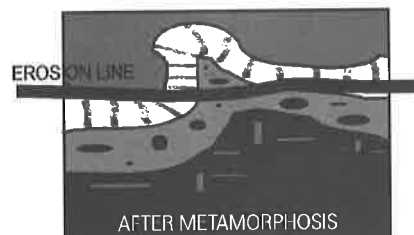
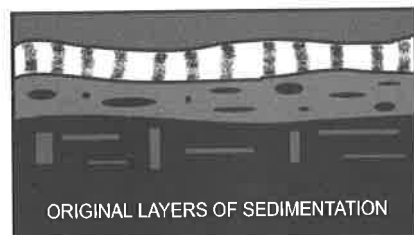
The rock type to your left has undergone many changes through time. Millions of years ago, the rock was volcanic ash that fell upon a shallow sea. After years of accumulation, the layers of ash hardened. Then, periods of extreme heat and pressure changed the layers into a different rock type. This process is called *metamorphosis*.

Can you see the light and dark bands of minerals? Feel the texture of the rock. This rock is called *gneiss*, a common metamorphic rock. Metamorphic rocks like gneiss are very resistant to erosion and are abundant on the preserve. They help to explain why West Hill is still a hill.

### -Side Trail -

Follow the short side trail on your right, marked with blue. This side trail can be difficult, so watch your step. The outcrop at the end exposes *pegmatite*, a new rock type with a different origin. Pegmatite is an igneous rock.

Igneous rocks are formed in two ways: above the ground, as in a lava flow, or below ground, as it was here. Millions of years ago, folding and uplifting of the existing bedrock created cracks that were filled with magma from the Earth's interior. After a slow cooling process, it became the pegmatite we see here today. At less than 160 million years old, it is the youngest rock on the preserve.



Can you find the three minerals which make up the pegmatite?

**-Quartz-**

knobby and smoky

**-Mica-**

shiny silvery-gold books that sparkle

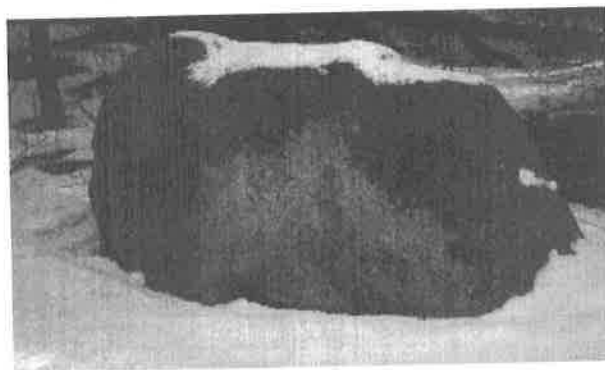
**-Feldspar-**

white to orange chalky chunks

- SITE 5 -  
THE ERRATIC BOULDER

How do you think this boulder got here? What force has the ability to lift and move huge rocks? It was the glacier of the last ice age that rounded off its rough edges and placed it high on this hill. This is an example of a *glacial erratic*. When the last glacier retreated 12,000 years ago, thick ice sheets dropped boulders all over the hills and ridges of New England.

This boulder has many interesting features. Look at the formation of it. Do you see light and dark bands of mineral? Have you seen this before? This is another example of *gneiss*, this time the mineral bands are thick and wavy. This rock is younger and softer than the volcanic ash gneiss we saw before. Most of the valley of Keene is underlain by this rock type.



What do you see on the boulder's surface?

Look very closely.

There are many types of small organisms living on the rock.

They are called *lichens* and have an interesting way of life.



Actually, lichens are two or three organisms living together: an alga a cyanobacterium and a fungus. The alga or bacterium provides the food through photosynthesis and the fungus secures the water and the minerals. The fungus also provides a place to live.



Lichens can grow on a variety of surfaces and flourish under extreme conditions. How many different types of lichens can you detect? As you walk on, look for lichens around you. You'll be amazed at where they can grow!



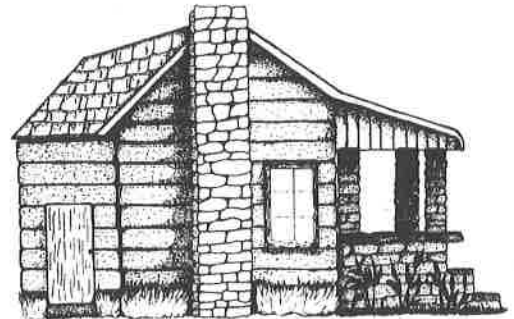
- SITE 6 -  
THE SUMMER CAMP

You have reached the top of the hill! The view you see is the west part of the city of Keene with the High School below you. In the distance is Surry Mountain.

This is the site of grandfather Horatio Colony's summer cabin, the Tip-Top house. Colony was a respected resident of Keene and served as its first mayor in 1872. He also was co-owner of Faulkner and Colony woolen mill, now known as the Colony Mill Marketplace. Over the years, Colony bought tracts of land on West Hill. They eventually became the preserve you are on today.

Built in the late 1800's, the cabin was used for summer and weekend retreats. The family would ride their horse and buggy up the trail to the base of the steep ledgy area and walk the rest of the way. They also used "the back way," up from the Old Swanzey Road, next to the Snowman's house. You can still see the carriage route in April, after snowmelt, where it diverges left from the Red Diamond trail.

This summer cabin had a front porch that faced Keene. Can you find the old wood posts? There was a woodshed attached to the house and a stable nearby... can you find them?



Eventually, the cabin fell into disrepair and was left to the forces of weather. A significant weather event in the 1930's brought the end of the cabin. This event also changed the nature of the forest. As you walk to the next site, can you see the evidence? What is different about the ridge top forest compared to the forest on the way up the hill?

- SITE 7 -  
*ROTTING LOGS AND FOREST HEALTH*

Have you noticed the decomposing logs at this site? They all seem to be lying in the same direction. Most of the tall white pines that once grew along this ridge top were blown down in the hurricane of 1938.

But there is more to these old, dead logs than meets the eye! Right here at your feet are the homes of an amazing parade of organisms - the recyclers of the world.

When a tree dies, its energy and nutrients are sought after by a variety of fungi, bacteria, plants and animals. Their complex relationships can be discovered in the rotting logs you see in front of you. Over the years, the logs go through various stages of decay. Each stage becomes the habitat for many different organisms. The log provides food, moisture and shelter, as well as a nursery for the plants and animals. A single log may host over 300,000 insect eggs alone!



The creatures that live on and inside the log rely on fungi and bacteria to help in this recycling process. Moisture, temperature and climate help to determine the rate of growth of these decomposers. Both fungi and bacteria growing in the soil and on the wood also feed thousands of organisms. The forest's health that we take for granted depends on what takes place in these invisible microhabitats!



## - SITE 8 - CELLAR HOLE

If you were an early homesteader, why would you settle here? Look around and take in the landscape. Can you see the factors homesteaders relied upon?

This area was chosen by Japhet Parker in the early 1800's. Japhet thought the land was flat and plowable, in addition to having a good water supply and exposure to the sun. All of these factors were important to a farmer.

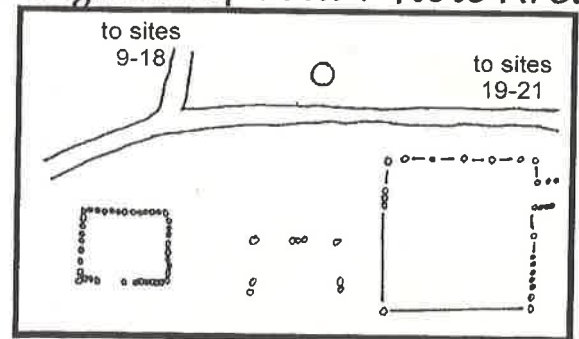
During this time period, there was a lot of activity on West Hill. The surrounding hilltops of the area were alive with farms and homesteaders. The valleys slopes, and area's ridges were cleared for sheep production. The farms were self sufficient, although they relied upon a network of old roads which are commonly visible in our woodlands today.



Every homesteader had a house, a barn and a well. Can you find evidence of them here? Use the map as a guide.



*Diagram of Cellar Hole Area*



Even though Keene and much of central New England held promise for agriculture at that time, the acidic soils of the hill top farms could not compete with the productive deep soils of the Midwest. As new roads, the Erie Canal and the railroad fueled westward expansion, wool, grain and other foods became cheaper to import. This added to the eventual demise of ridge-top farming in the Northeast.

## POLYPORES AND HOBBLEBUSH

Look to the left side of the trail. What trees do you see? Are any of them dying? The rotting birch trees are hosting a number of fungal organisms that help them decompose. Called *polypores*, these fungi look like shelves. When the fungus dies, it returns its nutrients to the soil as well.



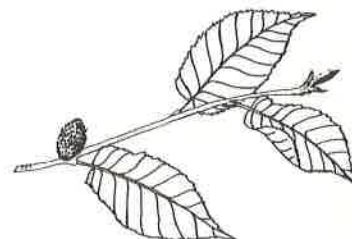
Do you see any low bushes? Look closely on the right side of the trail for leaf buds that look like praying hands. Hobblebush is an eco-indicator plant for cool, moist areas. Its buds are exposed, meaning they have no protective covering. You can actually see the young leaves.



What animals might eat hobblebush? This is a high traffic area for deer. Deer love to browse on hobblebush. Evidence of the browse can be seen on the tips of the branches. Can you see any ripped off buds? Look around for tracks as your walk continues.

- SITE 10 -  
PLANT COMMUNITIES

The birches are dying here because conditions are not favorable for them. These birches require a lot of sunlight in order to grow well. The oaks and pines above them are providing too much shade. Soon, the birches will die out and be replaced by species that prefer shade.



Groups of plants that grow together and prefer similar habitat conditions are called *plant communities*. You can observe two different types of plant communities at this site. To the east is a ledge of rock that supports a Hemlock-Black Birch community. These plants are able to live in thin, poorly drained soils. Surrounding you is the Pine-Oak community which is suited for deep, well-drained and less rocky soils. These are examples of how soil conditions help to create the plant communities above them. Soils and plants continually interact to create diverse ecological communities.



- SITE 11 -  
THE SILL RIB

What is covering this large rock formation? It is covered with water-loving plants known as *Bryophytes*- mosses and liverworts. *Bryophytes* have lived on earth for over 400 million years. Trees such as Oak and Maple have only been around for about 150 million years. These small green plants produce their own food like other plants, but do not have a true root system. Instead, they take in water directly through their stems and leaflike structures. Mosses are able to absorb almost 95% of their weight in water. This is a good reason why they grow well where water runs along the surface, as it does here. Where do you think the water that is not absorbed by the bryophytes goes?

The smooth rock face towering above you was formed during the same period of time that the pegmatite legs formed in Site 4. Also an igneous rock, the sill rib magma filled horizontal and vertical cracks or fissures in the overlying bedrock. This particular rock formation was a horizontal chamber, known as a *sill*. After its formation, geologic forces eroded the surrounding rock and tilted the sill upward so that it has steep east and west facing edges. This rock formation is actually standing on its edge!



Did you see the smoky rose colored quartz vein in the granite? It poured through the cracks soon after the sill's formation and now runs vertically. It is known as a "younger intrusion" to the rock formation.



- SITE 12 -  
VERNAL POOL

In the spring, you may notice a pool of water in front of you. If you look closely, you could see egg masses of the Wood Frog and the Spotted Salamander floating in the water. This pool of water is known as a *vernal pool*. A vernal pool's life begins with snow melt in the early spring. Wood Frogs will lay their eggs on the surface of the water to trap the sun's heat in order to speed up hatching. The Spotted Salamander attaches its eggs lower down and relies on a slower period of warming for its egg development. Over the course of the spring, you can see the salamander and frog eggs hatch, grow and emerge from the pool. Where do you think they go?



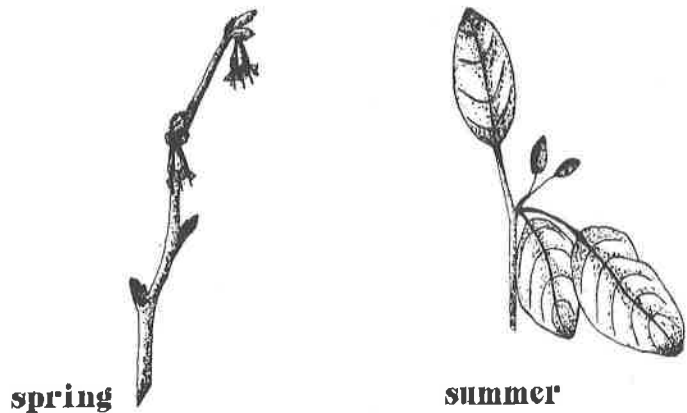
Surrounding the pool is a Red Maple swamp that was formed by beavers. The many standing dead trees are a clue to the flooding that occurred several years ago. How long has it been since the beavers were here? Can you see any sign? Most of the plants in this swamp that *eco-indicators*. The presence of Red Maple, Royal Fern and Buttonbush tells us the conditions are wet.

Ferns are the largest group of seedless vascular plants in the world. They reproduce through the release of spores which are stored in clusters on the underside of the leaves. The spores fly in the wind, settle onto moist soil, and germinate into small "prothalli." These develop male and female parts, which upon their union, grow into new fern plants.



- SITE 13 -  
**LEATHERWOOD HOLLOW**

The site marker is adjacent to a small shrub that is near the northern limit of its growing range. It occurs mostly south of New Hampshire. Known as Leatherwood or "wicopee," this plant has oblong leaves with very short leafstalks that entirely cover brown, velvety buds. It has very tough, flexible stems that were once used by the Abenaki Indians of the Algonquin tribe of New England, to make thongs for their feet. The bark was also used as a pain reliever for headaches.



Leatherwood prefers to grow along stream-banks in areas that are moist and nutrient rich. It is an eco-indicator of a rich woods habitat. The pattern of drainage in this hollow allowed nutrient rich sediments to be deposited here over time, creating ideal conditions for the leatherwood plant to grow.

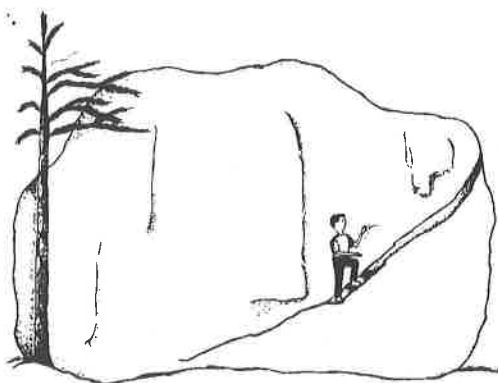


- SITE 14 -  
THE GREAT LEDGE

This great ledge is a fine exposure of one of the underlying bedrock formations of the area. It is composed of metamorphic rock known as *quartzite*, but has a different origin from the gneiss of site 4.

Quartzite is formed from *sandstone*, a relatively soft sedimentary rock. Tremendous forces of heat and pressure changed the *sandstone* into its present structure with a rose to whitish appearance. Notice the large boulders at the base of the ledge. This is evidence of how the harder *quartzite* erodes by breaking off into chunks from the ledge face.

For the adventurous type, the ramp that leads to the top of the ledge will reveal traces of glacial polish. This is a remnant from the last glacial period, when sand-embedded ice scoured the rock surface to a shiny smoothness as it passed over.



Why is there a Hemlock community growing here?  
Hemlocks are tolerant of thin, poorly drained soils. But don't be deceived, Hemlocks are not restricted to sites such as this. They are generalists, which means they can grow in a variety of conditions: from acidic to moderate, and from moist to wet.

- SITE 15 -  
TUPELO SWAMP

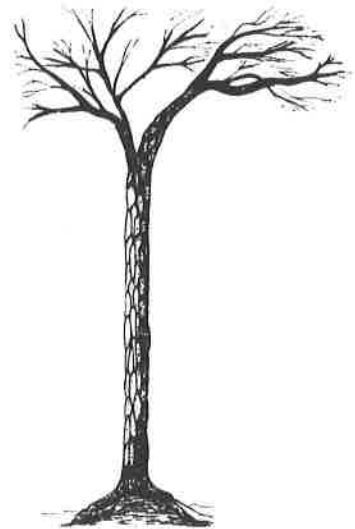
You have reached the Tupelo Swamp!! Doesn't it have an enchanted feel? Notice how dark the swamp is compared to the open swampy areas you passed earlier.

Its origin likely had its beginnings during the glacial period. The swamp is composed of over three feet of mucky peat on top of fine gray sand. Thousands of years must have passed since the first layer of sphagnum moss covered the water surface, forming the peaty mat of organic debris we see today. Gradual filling in of the shallow pond favored growth of northern species like Red Spruce, Red Maple and Yellow Birch.

The lack of logging disturbance here has allowed the trees to grow to maturity and the wildlife to flourish. The swamp is located between the two watersheds to the east and west. This makes a crossing area for many animal inhabitants of the ridge. Tracks and sign of deer, mink, otters, weasel and snowshoe hare are commonly found in the area. Can you see any signs of these animals?

The tree with the heavily cracked bark and flattened crown is the Tupelo or Black Gum tree. It is a common southern species and is unusual for areas this far north. How did it get here?

The blue blazes head to sites 16 and 17, turn around for the *Lead Mine Loop*.



- SITE 16 -  
*HURRICANE OF 1938*

The red oak tree hanging over the trail is a clue to a very stormy past. The tree only fell part of the way down and sent sprouts skyward. These sprouts probably began in the spring, following the powerful hurricane that struck on September 21, 1938.

The highest winds in New Hampshire blew from the southeast. The winds across the Connecticut River in Vermont blew from the northwest. Consequently, here you find the blowdown trees pointing towards the northwest. Which direction would the trees point in Vermont?

The storm covered a diameter of 200 miles. The winds that passed over this hill were over 100 mph. They pulled the leaves off the trees and churned them into a pulp that caused white houses to turn green. Extensive flooding occurred throughout the region. If the amount of rain fell as snow, it would have covered the region with 10 feet of it.

It has been estimated that this hurricane uprooted or broke over 275 million trees in New England. Many of these trees were salvaged for lumber. But Horatio Colony Jr. believed in allowing nature to run its course, and throughout the preserve you may find downed trees from this destructive storm.



New England has experienced similarly brutal hurricanes in 1635 and 1815. Weather records show that the region averages five to ten hurricanes a century. About every 150 years, however, we have one that is especially fierce like the hurricane of 1938.

- SITE 17 -  
SLICKENSIDE FAULT ZONE

Why is west hill a hill? The answer is in the history of the continents. 370 million years ago, the European and African continental plates collided with the North American plate to create a great mountain range here. The plates were fused together until about 180 million years ago, when they began drifting back. The breaking or rifting apart of the continents cause blocks of material to drop near fault lines. These fault blocks are locally called *grabens*. The rock cliff here is powerful evidence of these fault lines.



The surface appears to be sanded smooth and burnt in some places. The rocks that formed these areas are called slickensides. What do you think the burnt areas were caused by? Could it have been caused by organisms living on the rocks? Feel the verticle grooves. What does the smoothness remind you of?

Because West Hill was so far beneath the ground, it remained intact until about 60 million years ago when it finally became exposed. The softer material eroded away and left the resistant rock that comprises West Hill. The large boulders below have fallen from the cliff face. Can you visually fit the boulders back into their original place?

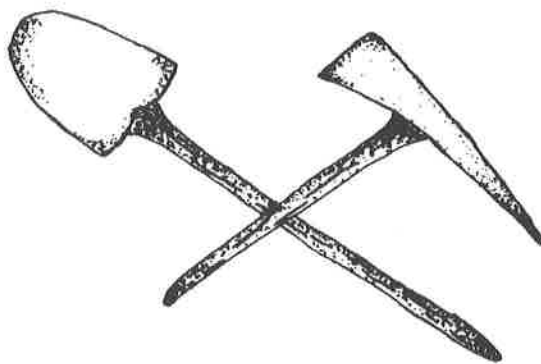


- SITE 18 -  
BLACK LEAD MINE

This water filled hole is what remains of the mining era on West Hill. From the 1830's to the Civil War, black lead - plumbago or graphite, was mined here. Black lead was formed from the metamorphosis of carbon rich plant materials contained within the surrounding rock formation.

Black lead mines were located all over New England at one time. The graphite was used to make melting pots for copper factories. Pencil graphite came from elsewhere. Ownership of the mine passed through many hands until the cost of mining became too expensive. The deeper the miners went, the more costly it was to pump out the excess water and extract the black lead. After the Civil War, the New England economy declined and mining activities ended.

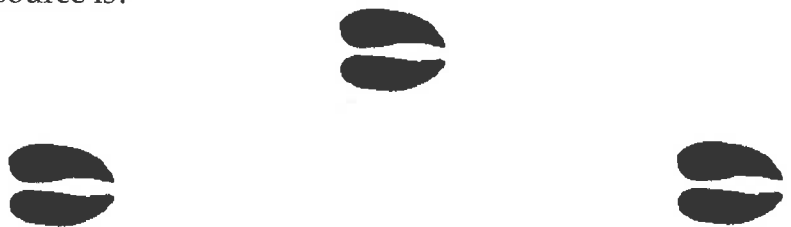
Examine the rocks surrounding the mine for pieces of black lead. You may also be able to find the mounds that were left as a result of the mining operation.



- SITE 19 -  
DEER YARD

This site has many young to medium sized Hemlocks. This is a factor that contributes to making west Hill an excellent habitat for deer. The hemlock habitat can function as a wintering habitat for deer, called a deer yard. Snow and wind are reduced under the cover of Hemlocks. This provides the deer with protection against harsh weather. The deer yard provides shelter, but lets about 30% of sunlight through to the forest floor.

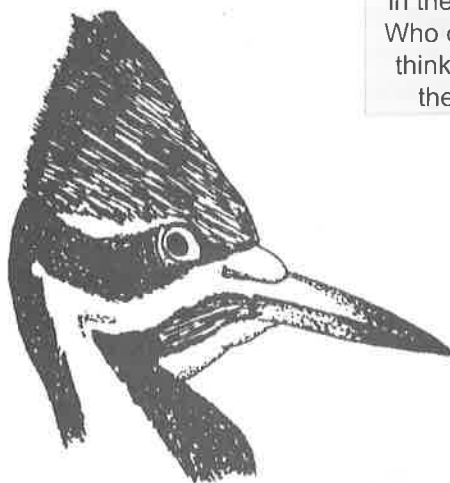
Another factor that promotes deer habitat in this area is selective cutting in recent years. This promoted stump sprouts, and young trees and shrubs. The tender shoots make excellent foliage for deer. The abundance of red oaks produce acorns that deer also use for food during the fall and early winter. A water source is an important factor in a good deer yard. A spring or stream nearby can supply the deer with water through the winter. Can you find where the nearest water source is?



- SITE 20 -  
SNAG TREE

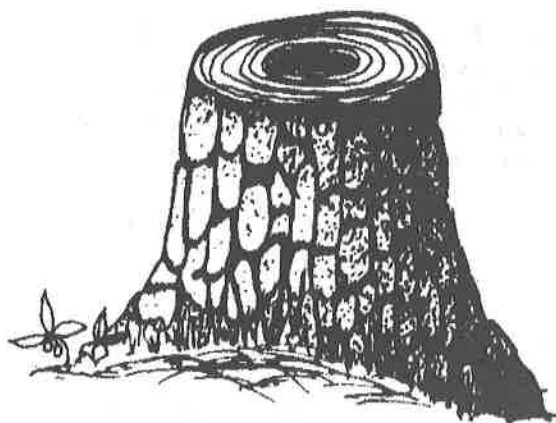
On both sides of the trail are large standing dead trees called snags. Snags are used by many members the forest community. The large holes in the trunk were created by woodpeckers in search of insects in the snag. Woodpeckers also live in snags, pecking holes to create nest cavities. Other species of birds such as the Chickadee and White-Breasted Nuthatch also excavate the cavities to raise their young. Once a cavity is vacated, it is used by other animals of the forest such as Flying Squirrels, Owls and Raccoons. Without woodpeckers and other cavity builders, cavity nesters would have trouble finding suitable nesting sites.

Look for  
other snags  
in the area.  
Who do you  
think uses  
them?



- SITE 21 -  
LOGGED AREA

You are walking through an area that was selectively cut or logged in 1985. What is different about this area compared to an undisturbed forest? It is more open here. Plants that can tolerate the warmer, exposed conditions are beginning to grow. There are also stump sprouts competing for the greater amount of sunlight.



Logging can be viewed as an advantage or disadvantage to wildlife habitat. It can be beneficial for many species of wildlife such as deer and grouse. It increases the available foliage at all levels of the forest. However, species such as fisher and barred owl prefer mature forests and may not benefit from the elimination of large trees. Logging practices that remove too many trees and leave heavily damaged canopies may have serious effects on wildlife for years to come. Did the loggers improve the forest health at this site, or not? Which animals do you think benefitted and which have suffered?



## *Leaf Stirring*

By Horatio Colony Jr.

But one leaf stirs upon the silent brush.  
Does it move for pleasure, or does warm breath push  
Back and forth, or is it gently fanned  
By magic, not so rare in this wide land?

It taps and strikes and thumps like the mind's wish.  
It makes one think of secrets in the air,  
Of gusts that move on narrowly and selfish  
Coming to rest most and place,  
Making the bush of this one leaf aware.

Nor can this green leaf halt or stand or sleep  
But goes each way by witless motion called  
Against the leaves cut out of emerald,  
Against that mass of green in a tall heap.

### *- Horatio Colony Preserve - Acknowledgments*

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