



REWHC



Raytheon Employees  
Wildlife Habitat Committee

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# Interpretive Trail System

Portsmouth, RI Facility

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## Portsmouth Zone Map and Description

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The REWHC site in Portsmouth, Rhode Island hosts multiple ecosystems, each with individual wildlife accommodations. To better understand the relationship of our activities to these ecosystems, we delineate them based on zones on a map. Our activities, observations, and surveys are therefore by zone.

1. **Meadow Fields**—This area is bounded by the woods on the south, West Main Road on the east, Chase farm on the North and part of the west, and the parking lot on the west.
2. **Eastern Woodland**—This area is bounded by Raytheon roadways on the south and west, by open fields on the north and West Main Road on the east.
3. **Manicured Lawns**—This area is bounded by Lawton Valley on the south, West Main Road on the east and Raytheon Roadways on the north and west.
4. **Lawton Valley**—This area is bounded by Lawton Brook on the south, West Main Road on the east, the fence behind Building 4 on the north, and the end of the graveyard on the west.
5. **Western Woodland**—This area is bounded by a fence on the south, Raytheon roadways on the east, parking lots, and Raytheon roadways, and fencing on the north, and Burma Road on the west.
6. **Manicured Lawns**—This area is bounded by woods on the south and west, by a fence and meadow fields on the north and Raytheon roadways on the east.

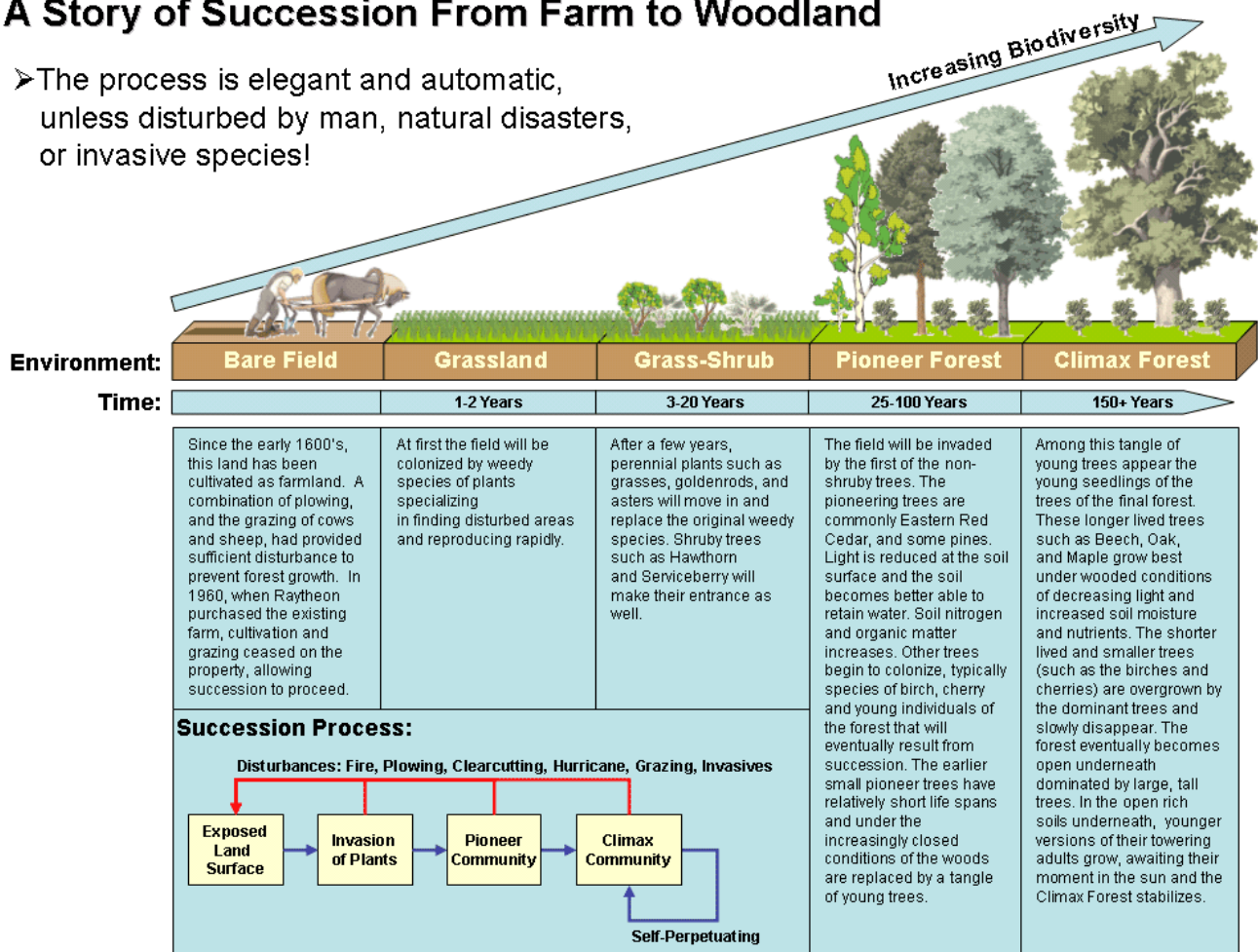
## Introduction

### Introduction

Presently, the Western Woodland has an interpretive trail called the Woodland Wander. It is our first truly wild trail on the campus and provides access to a forest which has overgrown the pastures and fields of old farming homesteads. This “Emerging Forest” is the heart of our Western Woodland ecosystem, providing food and cover for a host of wildlife. Understanding the emerging forest, requires us to look to the past and the future.

### The Emerging Forest: A Story of Succession From Farm to Woodland

- The process is elegant and automatic, unless disturbed by man, natural disasters, or invasive species!

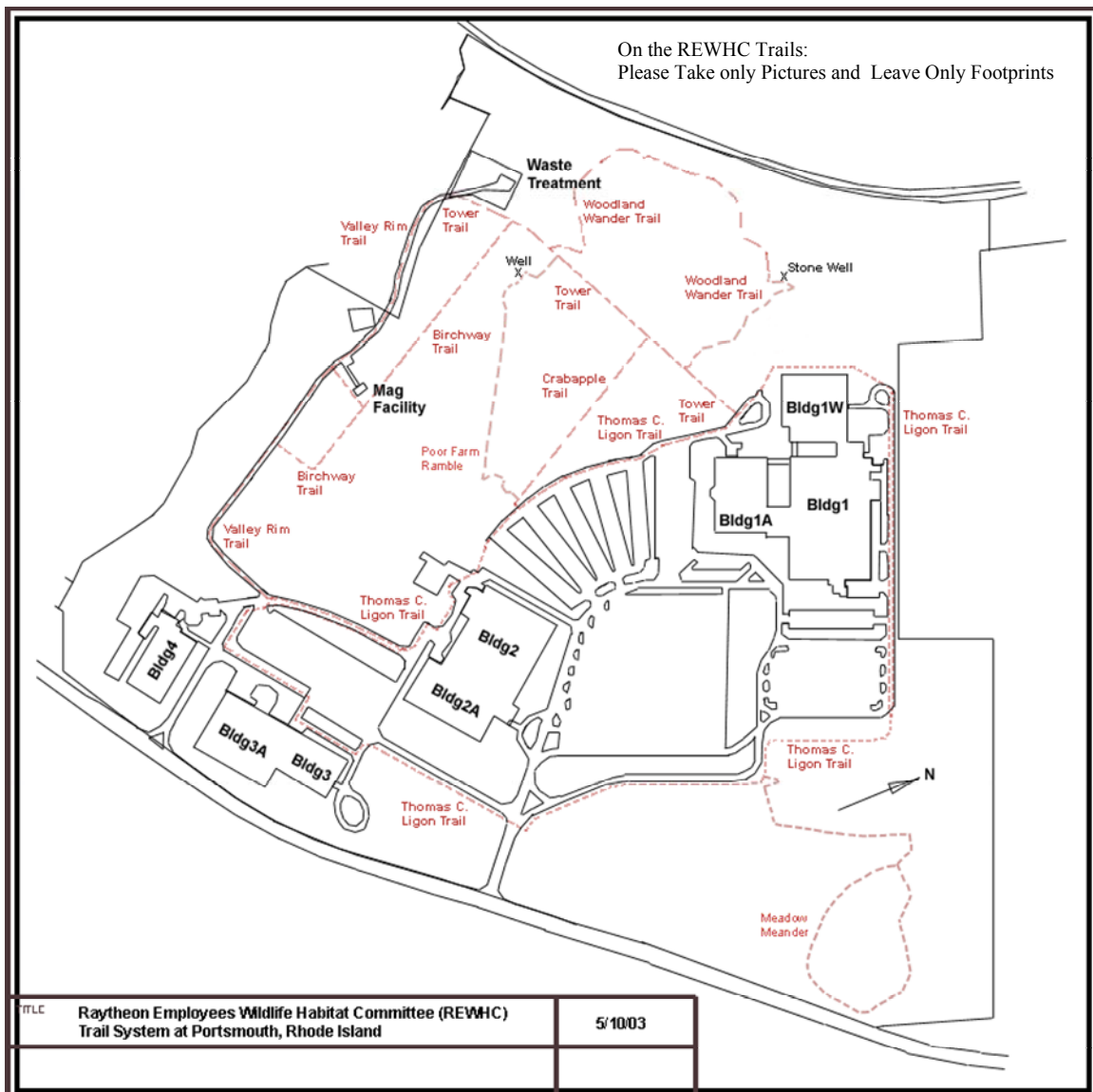


The old stone walls reflect an earlier agricultural era for the Western Woodland, dating to the time of Galileo. Remnants of its agricultural past still haunt the darkened woods. Pear trees, apple trees, wild garlic, and cherry dot the forest, possibly ghosts of plantings past. Wolf trees, left along stone walls, continue to grow unimpeded. Open areas in the woods, however,

## REWHC Trail System

show the trend toward a “Climax Forest”, where large trees will eventually dominate the canopy. This succession from bare field to climax forest is a natural one, driven by time and competition in emerging ecosystems. Disturbances by man or nature can set back the clock on the succession process. Man made disturbances include clearing, paving and farming. Natural disturbances include floods, hurricanes & influence of invasive species. Raytheon, in purchasing the property around 1960, halted the farming disturbance to the Western Woodland. This places our trail about 40+ years into the succession.

### REWHC Trail Map





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## Woodland Wander Trail

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### Woodland Wander Trail

Length: 0.36 Miles

Interpretive Theme: The Emerging Forest

Description: The Western Woodland was not always wooded. From the 1630's to the 1950's, it was cleared and farmed, stone walls bordering the many fields for livestock and planting. When the property became Raytheon in the early 1960's, portions of the land began its natural transition into an "Emerging Forest". Important concepts to be learned on this trail are propagation mechanisms, competitive selection, wildlife food value, and historical and current uses of the trees and plants of the Emerging Forest. Starting at an intersection near the top of the Tower Trail, The Woodland Wander Trail enters a predominantly Red Cedar forest.



Eastern Red Cedar

### Eastern Red Cedar

*Juniperus virginiana*

40' to 50' High

This widespread native conifer provides food, cover and nesting for numerous birds and mammals and is particularly important for pheasant and white-tailed deer in the winter. Some exceptional specimens can grow up to 120 feet in height.

Male and female seed cones grow on separate trees and pollination occurs with the help of the wind.

Female seed cones ripen to pale blue berries high in fat, fiber and carbohydrates. These berries are eaten

by birds who pass the seeds intact through their digestive

systems, thus dispersing the tree population over a wide area. Typically Eastern Red Cedars are the first trees to appear on abandoned farms.

Native Americans used the Eastern Red Cedar for spiritual and medicinal purposes, as well as in the construction of lance shafts, bows, and flutes. The



Red Cedar Berries

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## Woodland Wander Trail (Continued)

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bark peels easily into long strips and was used for bedding, mats, and infant diapers as well as shredded for tinder with which to start fires.

The Eastern Red Cedar is commercially harvested for aromatic oils, cooking spice, landscape plantings, and timber. Typical products of this richly colored red wood include hope chests, pencils and fence posts. Unfortunately, the Eastern Red Cedar is an alternate host for cedar-apple rust, a fungal disease that damages Apple Trees.



Red Cedar Bark

The trail, curving to the right, gradually descends a hillside softly carpeted by generations of Cedar needles. On the right, a Black Cherry tree can be seen.



Wild Black Cherry

### **W**ild Black Cherry

*Prunus serotina*

60' to 80' High (129' Record)

This rose family member is widespread and is the most important native cherry.

The bark on young trees is olive/red brown and smooth; on older trees it becomes black and fissured like burnt

cornflakes. Both foliage and bark are pungently bitter in taste and odor.



Black Cherry Bark

The Wild Black Cherry is pollinated by insects and propagated by the birds and animals that eat its fruit. It also readily sprouts from stumps and its rapid early growth establishes it as a crown tree. Although the leaves contain cyanide, the sprouts and seedlings of

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## Woodland Wander Trail

### (Continued)

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Black Cherry Leaves

the Wild Black Cherry are a food source for rabbit and deer. Domestic animals, however, may occasionally consume toxic doses.

Native Americans sometimes used fresh cherries, but more commonly the cherries were dried, pulverized, pressed into cakes and cooked in a fire. Animal fat was then added to make pemmican. The bark of the tree was used as an antispasmodic and a sedative.

Early American pioneers sometimes flavored their rum or brandy with the fruit to make a drink called “cherry bounce.”

The valuable wood of the Wild Black Cherry is harvested commercially to make furniture and paneling. The bitter cherries are used in jelly, wine and other alcoholic beverages. The bark yields hydrocyanic acid, which is used as a sedative and as an ingredient in cough syrup.



Black Cherry Fruit

Continuing onward on the left, a good example of Highbush Blueberry can be seen just off the trail.



Highbush  
Blueberries

### **H**ighbush Blueberry

*Vaccinium corymbosum*

8' to 12' High

This native shrub is the basic stock of numerous cultivated varieties in the northern states. It is the only head high blueberry species north of New Jersey. The Highbush Blueberry is shade tolerant and its dark green leaves turn bright red in the fall.

The Highbush Blueberry produces bell-shaped red



Blueberry Flowers



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## Woodland Wander Trail (Continued)

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and white flowers in late spring. The dark blue-to-black berries begin to ripen in early summer. Many birds and animals eat these berries, including bears, which we do not have here on Aquidneck Island. The shrub suckers from its base and deer and rabbits browse its foliage and twigs.



Blueberry Leaves

Native Americans ate the berries of this shrub and made a tea with its leaves that was used to treat sore throats, poor appetites, urinary tract infections and diarrhea. (It is important to note, however, that the raw fruit itself can cause diarrhea.) Today the Highbush Blueberry is extensively farmed for its berries and also used for ornamental landscaping

Proceeding through an opening in an old stone wall, we come to an area abundant with fruit trees including silver cherry, wild black cherry, pear, and Common Apple.



Common Apple Tree

### **C**ommon Apple

*Malus sylvestris*

30' to 40' High

This West Asian native has been cultivated since prehistoric times. It was introduced to Old World Europe and later brought to the United States. The first seeds were planted in New England by the Massachusetts Bay Company around 1629.



Apple Flowers

The Apple Tree produces white flowers which are pollinated by insects. It is a poor competitor,

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## Woodland Wander Trail (Continued)

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Apple Bark

growing wild in mixed hardwood forests only rarely and then typically only on the fringes. The fruit of the tree is eaten by both man and animal, though the seeds are laced with cyanide and can be toxic if eaten in large quantities.

Apples were important to English sailors both as a cure and as a preventative for scurvy. American colonists used them to manufacture hard

cider and applejack. William Blackstone, the first settler in the Blackstone River Valley, planted numerous Apple Trees in the colonies, preceding Johnny Appleseed by 150 years!



Apple Fruit



Apple Leaf

The decorative wood of the Apple Tree is used to make furniture, handles and other hardwood products. It is a good fuel and in many country districts it is commonly employed for smoking meats. Apples, a major food crop worldwide, are eaten raw, crushed for juice, partially fermented for hard cider or fully fermented for vinegar.

The trail winds to the left in a hairpin curve down a series of stone steps. At the bottom of the switchback is an old Stone-Lined Well dating back to the 1700's. To the right of the well, a Black Gum Tupelo tree is found.

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## Woodland Wander Trail

### (Continued)

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Tupelo Tree

### Tupelo

*Nyssa sylvatica*

30' to 40' High (Up to 120')

“Tupelo” is a Native American Creek name meaning “tree of the swamp;” “Nyssa” was one of the ancient Greek water nymphs. This native tree has a wide growing range that encompasses the eastern half of the United States and may also be found on ridge tops. Its bright green leaves in the spring and changing colors in the fall, beginning with mottled yellow, moving to orange and red and later becoming scarlet, make it an ornamental favorite. The Tupelo is also known by the common names “Pepperidge,” “Sour Gum,” and “Black Gum.”

Both male and female flowers occur on the same tree, are rich in nectar, and are pollinated chiefly by bees. Its fruit is a small, bitter, dark blue berry. The tree’s berries, together with its twigs and foliage, provide food for many animals and birds. A mature Tupelo is very hardy and fire resistant. Its older limbs will fall away leaving rotted cavities behind that can be used by small animals and bees.



Tupelo Leaf



Tupelo Fruit

American pioneers used the particularly tough, hard-to-split wood of the Tupelo to make wheel hubs. They also used it as a “witness tree” when surveying and recording early deeds; its long life and lack of other uses assured it would remain.

Today the Tupelo is used commercially in



Tupelo Bark



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## Woodland Wander Trail

### (Continued)

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landscaping, as firewood and in the manufacture of boxes, pallets, rough flooring, bowling pins and railroad ties.

Continuing onward, the trail passes back through an opening in the stone wall where wild garlic may be seen on both sides of the trail. The trail bends sharply to the right then continues gradually down and to the left. Proceeding leftward, the forest opens, allowing Jewelweed ground cover on both sides of the trail to thrive in season.



Jewelweed Leaf

### **J**ewelweed

*Impatiens spp.*

2' to 6' High

A tall gangly plant with translucent, succulent stems. The flower is either yellow (Pale) or golden-orange, spotted with reddish-brown and hangs from the middle of a single stem. The fruit is a swollen elliptical capsule that pops open, hurling the seeds some distance.

Besides the pretty flower, the one reason Jewelweed got its name becomes apparent if you take one of the leaves and put it underwater. The silvery look is very jewel-like. Jewelweed leaves are waterproof. Water beads across their surface, kept from touching the leaf by a thin layer of air trapped in microscopic hairs on the leaf. The reason for the plant's nickname, Touch-me-not, is related to the seed capsule's means of disbursal. Jewelweed seed capsules hold the seeds under tension, and they split and coil when triggered by the wind or by a touch, sending the seeds catapulting up to four feet away. Jewelweed generally occurs in large stands, owing in part to its unique method of disbursing seeds. Bees



Jewelweed Flower



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## Woodland Wander Trail

### (Continued)

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and butterflies are the main pollinators, but hummingbirds have been known to visit.

Scientific tests have given credence to Jewelweed's anti-fungal and skin-soothing properties. Interestingly, it can usually be found in most areas where Poison Ivy grows and is a decent 'antidote' for it. Crush the watery stems and leaves in your hand and rub vigorously on the affected area. It soothes and helps prevent spreading of the poison Ivy oils. Native Americans used jewelweed in treating stomach cramps, and they boiled the juice of the plant to make a yellow-orange dye.

Up ahead on the right side of the trail, a series of hairy vines climb their way up the trees. This vine is Poison Ivy.



Poison Ivy Bush

### **Poison Ivy**

*Toxicodendron radicans*

Low Bush or 10' to 20'

High Vine

**“Leaves of three,  
leave it be.”**



Leaves of Three . . .

French Canadians refer to Poison Ivy as “L’herbe a’ la puce,” the “herb of the flea.” This common native plant, however, is best known for the itchy red rash it causes. 85% of all humans are allergic to urushiol, the sticky yellow oil that is found in all parts of the plant and remains toxic during its winter dormancy.

Urushiol easily transfers to anything it touches, even clinging to smoke particles when the plant is burned.

Poison Ivy varies between a low bush and a climbing vine, with leaves that turn beautiful shades of red in the fall. The leaves radiate out in groups of three from a central point, thus forming the plant’s most distinctive feature.

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## Woodland Wander Trail

### (Continued)

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Poison Ivy Vine

including Jewelweed, which was crushed and used as a poultice.

Today, homeopaths take advantage of the urushiol present in Poison Ivy by extracting it for use in a variety of home remedies.

Descending slowly, the trail turns sharply to the left at the site of a fallen Red Cedar. A Red Maple may be seen on the left.

Poison Ivy blooms in June and produces small off-white berries in the late summer and early fall. These berries are eaten by birds who then help spread the seeds by passing them through their digestive tracts. Rabbits and deer also feed on Poison Ivy--only humans seem to be affected by its poison!

Stories of Native Americans' immunity to the adverse effects of Poison Ivy are untrue. In fact, they had many remedies for its rash



Poison Ivy Berries



Red Maple

### Red Maple

*Acer rubrum*

50' to 80' High  
(125' Record)

This widespread native, known for its brilliant red and orange fall foliage, is the state tree of Rhode Island. In 1890, students over the age of ten selected the Red Maple from a list of popular tree names; their selection was

officially adopted in 1964. Because the Red Maple is frequently found in wetland areas it is often called by



Red Maple Bark

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## Woodland Wander Trail

### (Continued)

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Red Maple Flowers



Red Maple Fruit

the common name “Swamp Maple.”

The Red Maple matures in as quickly as four years. It can be either male, female, or both (though on separate branches) and is pollinated with the help of the wind. Its light winged seeds are connected in pairs and have the ability to travel long distances, spinning as they fall. The Red Maple also sprouts from stumps and roots and is very tolerant of shade and floods. Its new growth is an important food source for deer.

Native Americans used the bark of the Red Maple as an analgesic, a wash for inflamed eyes and cataracts and a remedy for hives and muscular aches.



Red Maple Twigs/Buds

Today the Red Maple is commercially harvested for lumber (semi-hardwood), maple syrup and landscape plantings.

Continuing on, Red Cedar are dominant along with a few Highbush Blueberry. Exiting the grove, a Sycamore Maple can be seen on the left.



Red Maple Leaf



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## Woodland Wander Trail

### (Continued)

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Sycamore Maple

### Sycamore Maple

*Acer pseudoplatanus*

40' to 100' High

This European tree was brought to America long ago and is now common in both Newport and Middletown. In fact, Rhode Island's first "Liberty Tree" was a Sycamore planted in Newport in 1766.

(The British cut this tree down and a Beech, planted in 1897, stands there now. A mystery tree that died of disease, inhabited its space in the interim.)



Sycamore Maple Leaf

The Sycamore Maple is frequently planted in parks because of its hardy rapid growth, the fact that its fruit does not attract wildlife, and its high tolerance to salt and air pollution. The tree's large dense canopy does not display autumn colors, but does create a dry, shady, barren

understudy.

The flowers of the Sycamore Maple have greenish-yellow petals, are of both male and bisexual orientation and produce paired seeds with long wings that are easily scattered by the wind. Although cultivated as an ornamental tree, the Sycamore Maple is very invasive and hard to limit to its planting.

Utensils made from this valuable close-grained hardwood have been found in some European Stone Age settlements. Today the tree is used commercially for veneers, carving, flooring and furniture. In addition, the bark is used in herbal medications as



Sycamore Maple Bark



Sycamore Maple Fruit



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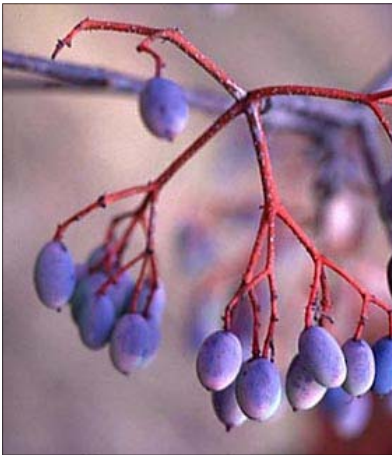
## Woodland Wander Trail

### (Continued)

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a wash for skin problems, sore eyes and wounds.

Continuing onward, the trail ascends past an Arrowwood tree on the left.



Arrowwood Berries

### Arrowwood

*Viburnum dentatum*

5' to 10' High

This fast growing, native shrub is extremely durable and tolerates partial to full shade. The dense stems growing from its base are long and straight. In the fall its leaves turn a glossy red, purple and orange.

The Arrowwood produces small white flowers that ripen into bluish-black

berries in late fall, lasting into winter. These berries are preferred by many kinds of wildlife, including deer, squirrels, chipmunks, foxes, cedar waxwings, sparrows, cardinals, bluebirds, robins, mockingbirds, ruffed grouses and brown thrashers. Rabbits and deer also browse the twigs, foliage, and sprouts that sucker profusely from its base, while birds nest in its branches.



Arrowwood Flowers



Fall Colors

Native Americans used Arrowwood stems as arrow shafts and smoking pipes. (The center of the stem has a soft pith that can be picked out.)

Commercially this shrub is used for landscaping. In aromatherapy, Arrowwood “essential oil” is said to give “clarity of direction and purpose and purity of intent, guiding one straight to the heart of the matter.”

The Gray Birch, on the left, is a pioneer species

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## Woodland Wander Trail

### (Continued)

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which often inhabits burned areas or abandoned farms.



Gray Birch

### Gray Birch

*Betula populifolia*

20' to 30' High

The Gray Birch is a fast-growing and short-lived native tree, living an average of only 20 years. It has been nicknamed “Poverty Birch” because of its ability to thrive in poor soils. It has a decorative gray-white bark, an extremely flexible trunk and green leaves that turn a pale translucent gold in the fall.

The Gray Birch is simultaneously both male and female. Its male flowers are borne on yellow catkins hanging from twigs; its female catkins are erect on stems and develop into drooping, stalked cones with prolific clusters of light winged seeds. Although the Gray Birch has little fire resistance it can sprout from its surviving roots or seed banks in the soil. It is a pioneer species which often inhabits burned areas or an abandoned farms. It acts as a nurse tree, protecting the seeds of longer-lived trees that eventually shade it out. Birds and animals do not prefer it as a food source.



Gray Birch Cones



Leaves

The Gray Birch is not the legendary birch used by Native Americans in the making of canoes and decorations, for the bark is thin and does not peel easily.

Today the poor wood is harvested commercially for charcoal and firewood, as well as to make woodenware and spools



Fall Leaves

The trail continues past a patch of Ferns on the right. The



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## Woodland Wander Trail

### (Continued)

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trail continues slowly upward passing a Pin Cherry on the left and emerges at an intersection with the Tower Trail. (There is some controversy whether this cherry is actually a silver cherry tree. The jury is still out.)



Pin Cherry Tree

### **P**in Cherry

*Prunus pensylvanica*

25' to 40' High

The Pin Cherry is a small common tree that inhabits a great variety of lands in the northern United States and Canada. (The trees on this trail are of exceptional size!) The Pin Cherry's seeds (pits), leaves and bark contain hydrocyanic acid and can be toxic if consumed in large doses.



Cherry Fruit

The Pin Cherry produces white flowers in the spring which later ripen into small cherries. These cherries are dispersed by gravity, birds and small animals and their seeds can lie dormant in the ground for 50 to 150 years until the overstory is broken. (Germination is eventually triggered by greater temperature cycles of the exposed ground.)



Cherry Flowers

The Pin Cherry is sometimes called the "Fire Cherry" because of its value as a reforesting tree after a fire. It provides shade for seedlings of slower growing species, then dies off after about 30 years, making way for the new trees.



Cherry Bark

Another name for the Pin Cherry is the "Bird Cherry" because so many types of birds eat its fruit. In hard seasons, when preferred foods are unavailable, deer will browse its foliage and twigs, and beaver gnaw its bark.

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## **Woodland Wander Trail**

### **(Continued)**

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Native Americans ate the fruit of the Pin Cherry and used the bark for decorating baskets. Today the soft porous wood is of little commercial value except as fuel and sometimes pulpwood. The Pin Cherry's fruits are tart but tasty and make excellent jellies and syrups.



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## Identifying Leaves

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### Identifying Leaves

The leaf of a tree contains the biological engine that makes life possible for the tree. The leaf receives the raw materials that Nature provides, and it makes food for the tree. Although leaves function in similar fashion, the leaves of most trees are distinctive. And each kind of tree makes its own kind of leaf.

A Red Maple tree always makes Red Maple leaves, and a Pin Cherry tree always makes Pin Cherry leaves. The leaves on one kind of tree usually differ from those on another kind of tree. Closely related trees typically have similar leaves, and sometimes they are very similar and hard to distinguish. Trees that are distantly related usually have noticeably different leaves. This is convenient and helpful for you when you try to identify a tree.

A word of caution! Some trees produce leaves that don't all look alike, and the leaves on one particular kind of tree may seem to mimic those of another.

There are two major kinds of leaves on the common trees of Rhode Island:



NEEDLES and SCALES are familiar on "evergreen" trees. Most of the trees with these leaves hold them throughout the winter season.

BROAD, FLAT leaves are what we see on trees that typically change color and drop their leaves after the summer's growing season is over. Needles are of varying lengths. They are narrow and often pointed, and they may be more or less ROUND in cross section, or FLATTENED. They grow either singly or in bundles. SCALES are short, flat and lie close to their stems.

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## Identifying Leaves

### (Continued)

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#### **SIMPLE LEAVES:**



There are two major kinds of broad leaves: **SIMPLE** leaves, and **COMPOUND** leaves.

A **SIMPLE** leaf has a single leaf blade on its stalk. The stalk in turn is attached to a woody twig. When the stalk is removed from the twig a distinct scar is left on the twig.

#### **COMPOUND LEAVES:**



A **COMPOUND** leaf has more than one leaf blade on a stalk. These multiple leaf blades are called leaflets. The leaflets that make up a single leaf are attached to a single stalk. As with the simple leaf, when that stalk is pulled away from its woody twig it leaves a scar on the twig.

The other main thing to look for in broad leaves is the arrangement of leaves on a twig. In some trees, leaves occur **ALTERNATELY** along the stem. In other trees, leaves are arranged in **OPPOSITE** pairs along the stem.

#### **ALTERNATE LEAVES:**



To use of this characteristic you will need to know how the leaf stalks are attached to their stems. Be certain to look at its tree and note the arrangement of those leaves.

#### **OPPOSITE LEAVES:**



Since both of these arrangements can be found with both simple and compound leaves, there are four possible combinations:  
simple and alternate,  
simple and opposite,  
compound and alternate, and  
compound and opposite.

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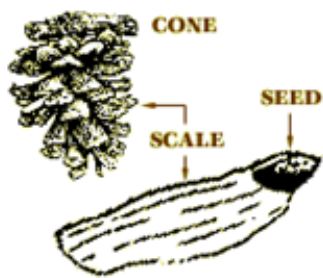
## Identifying Fruit

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### Identifying Fruit

The fruit of a tree is part of the mechanism by which the tree reproduces itself. The fruit contains seeds. Under the right conditions each seed can produce a new tree of the same kind.

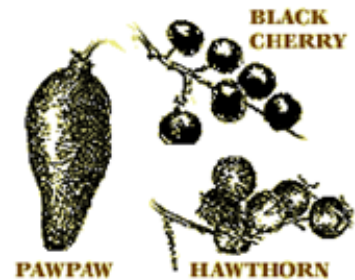
Some people think of fruits only in terms of what they buy in a market to eat. If so, they may be surprised to learn that a pine cone is a fruit, and that the maple "wings" that glide to earth in the spring are fruits. Fruits are not just what we humans eat. Many animals eat fruits, including some that we would find most distasteful if not actually poisonous.



Each kind of tree makes its own kind of fruit. Often, you will be able to identify a tree by carefully examining its fruit.

Rhode Island's conifers, the trees that we sometimes call "evergreens," produce CONES. Each CONE consists of a number of SCALES. Each SCALE carries a SEED. Unlike the fruit of other trees in Ohio, the seeds lie naked on the scales. They are not enclosed by a surrounding structure.

In the case of certain fruits the seeds are covered by a FLESHY material. With some each fruit contains a single seed. With others a single fruit may contain many seeds. Examples of these are Black Cherry, Pawpaw, and Hawthorn. Often these fruits are eaten by animals or humans.

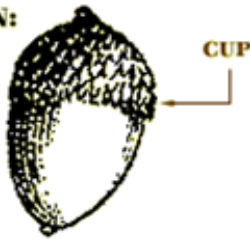


Some seeds are contained within CAPSULES that split open at maturity. An example of this is the Big-tooth Aspen.

The seeds of locust trees are contained in long, bean-like PODS. The familiar ACORNS are products of oak trees. The nut which contains the seed is

## Identifying Fruit (Continued)

**ACORN:**



partially enclosed in a husk, often called a "cup."

**WINGED FRUIT:**



Other trees produce fruits in which the nut is entirely enclosed in a HUSK. With different kinds of trees these HUSKS can be highly variable. Some are spiny or prickly ("bur"), some are smooth. Some are thick, and some are thin. Examples include hickory trees and the American Chestnut. Maples, ash, and elm trees produce distinctive fruits with membranous "WINGS" that extend from the seed cover. These thin WINGS surround the seed cavity or extend from one end.

**PINE CONE**



**ACORN**

**PAIRED MAPLE FRUIT**



**NUTS IN A HUSK:**



**AMERICAN SYCAMORE**



The Sycamore tree produces a small, plumed fruit, each with a single seed. A great many of these fruits are tightly PACKED together in a characteristic ball. Upon maturity, these fruits fall away from the ball and are dispersed by the wind.



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## Activities On and Off the Trail

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### Activities On and Off the Trail

Whether for exercise alone, or for appreciation of the environment, hiking with family and friends is one of our more enjoyable pastimes. Interpretive trails provide an environmental awareness and educational perspective on the hike. To receive the maximum benefit from the experience, activities may be planned to enhance the trail's educational elements. Examples of activities include lessons, vocabulary games and checklists for capturing wildlife sightings.

### Checklists

Available for download from the REWHC website, or available in the lobbies, are wildlife survey checklists. Hikers are encouraged to use these checklists to record species they encounter and enter the resulting information in our online databases.



Wildlife Checklists in Lobbies or Downloaded From REWHC Website

### Lesson Plans

In keeping with the interpretive themes of the Woodland Wander trail, three lesson plans were selected for:

1. Forest Succession: Forest in a Jar,
2. Forest Food Chain: Food Chain/Food Web,
3. Forest Fauna: Oh Deer!

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## Activities On and Off the Trail (Continued)

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### Forest in a Jar

Author: Cindy Cook, Ririe Elementary, Ririe, Idaho

Grade Level(s): Kindergarten, 1, 2, 3, 4, 5, 6

Subject(s): Science/Ecology

**OVERVIEW:** Succession is a term used to describe the ever- changing environment and the gradual process by which one habitat is replaced by another. Many habitats that appear to be stable are changing before us. In this activity, students will be able to see in miniature how a swampy area can be succeeded by a forested habitat.

**PURPOSE:** The major purpose of this activity is for students to recognize the process of succession.

**OBJECTIVES:** Students will be able to: 1) observe and describe succession; and 2) summarize what they have learned about how environments can change.

**METHOD:** Students conduct an experiment using soil, water, seeds, a plant, and a jar; and then draw a poster to represent their observations and findings.

**RESOURCES/MATERIALS:** Pint or quart jars (one per student or small groups of students, or one for the entire class), water, soil, aquatic plants (one per jar), two cups bird seed.

#### ACTIVITIES AND PROCEDURES:

1. Place two inches of soil and three inches of water in a jar. Place the jar at a window, without a lid, and allow it to settle overnight.
2. Plant an aquatic plant in the jar. It should grow well in this environment. If your classroom has no windows, substitute a grow-light.
3. Do not replace the water that evaporates from the jar.
4. Once or twice a week, have students add three or four bird seeds to the jar. While there is water in the jar, the seeds should germinate and then rot. Continue adding seeds even after the water evaporates.
5. As the water evaporates down to the soil, the aquatic plant will die. The bird seeds will now find the environment suitable for successful growth. Sunflower seeds, which grow large, can be added to represent forest trees. You will now need to add water, as a substitute for rainfall, to keep the soil damp to keep things growing.
6. Have each student make a poster, drawing, or other visual representation of what they saw happen to their "pond." Ask them to talk about what they have learned about how environments can change. Introduce the term, "succession," to older students.
7. **OPTIONAL:** Take a field trip to a pond. What plants are growing in the water? What plants are growing on the shore? What parallels are there between this real pond and the "pond" in the jar? Make a second drawing of this real pond. Compare the similarities and differences between the two.

**TYING IT ALL TOGETHER:** Describe three changes you saw happen to what was inside the jar.

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## Activities On and Off the Trail (Continued)

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### Food Chain/Food Web

Author: Stacy and Rhonda Hullett, University of Montana

Grade Level(s): 3, 4

Subject(s): Science/Ecology

Duration: 1-2 45-minute sessions

Description: Students will learn the basics of food chains and food webs through various ways such as whole class activities, journaling, oral discussions, and small group activities. Goals: Students will demonstrate a basic understanding of a food chain and food web and are able to appreciate each as a representation of the life cycle.

Objectives: Students will:

1. recognize the food chain/food web and the living things that are a part of it by journaling
2. successfully put the note cards in order of the food chain
3. complete and turn in the food web worksheet to be graded
4. discuss the elements of a food chain and the impacts of them on the world.

Materials: journal, food web worksheet, note cards, glue, sand/glitter

Procedure:

1. Scientific Explanation: What is a food chain? A food chain is how energy passes from one living thing to another. How is a food chain related to a food web? A food web is formed when food chains overlap. What are the components of a food chain? All living things. How is a food chain formed? From the smallest living things to the largest feeding off one another.
2. Focus Phase: Write the words: sun, green grass, rabbit, and fox on the board. Ask students to journal why they think these four words would be placed together? What do they have in common? They are all in a food chain. Next, hold up a chart of a food chain and ask the students if they recognize what it is? What is a primary producer? An herbivore? A primary carnivore? etc. What animals are in each of the categories? What happens if there are no producers, does the food chain still work? What do you think? Journal.
3. Challenge Phase: Arrange the students in groups of 3-4 and give each group a set of 15 note cards with various living things on them. (each group must have the sun, some plants, and animals. The teacher will make the cards. Try to paste pictures on the cards, but if not, write the word on the card.) Allow 15-20 minutes for the students to put the cards in the proper order, according to the food chain. After the groups have finished, have each group paste the cards on a piece of poster board and share their results with the class. Does everyone agree that is where the salmon fish goes? Is a berry a producer? etc.
4. Concept Introduction: Ask the students to go back to their original journal entries and write the new knowledge they have learned from the activity. Also, have them answer their initial questions if they are able to at this point. Next, have the students write a sentence describing what a food chain is and what items belong in it. Discuss orally. Give the students the food web worksheet to complete with a partner or individually.
5. Concept Application: Show the students different pictures of living things that are in a food chain or food web. Ask the students where each of the living things would go in the food chain and have them provide a rationale for their choice. (have the students tape the animals on the board in the order of a food chain for more student interaction) Next, have the students brainstorm as a class which living things may be in a desert or tropical food chain. (Create a list on board) Finally, ask the students to journal some final questions such as: 1) How is a spider web like a food chain or food web? Threads of a spider web are connected and all living things are connected. 2) How would a drought affect the food chain and food web? Plants would die which would decrease the food supply.
6. Extension: a) Create a spelling list for the week based on the vocabulary used in the lesson such as: primary, secondary, tertiary, producer, consumer, decomposer, food chain, food web, herbivore, carnivore, and omnivore. b) Take animals that are found in a food chain and give one to each student. The students will then create a sand/glitter picture and make a bulletin board with the art.

Assessment: The students will demonstrate science understanding by:

- 1) explaining what a food chain is, its components, and where a food chain may exist.
- 2) correctly predicting what living things would be found in a food chain and where they would be placed in the chain.
- 3) answering the food web worksheet and food chain questions correctly through journaling.
- 4) contributing to class discussions.



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## Activities On and Off the Trail (Continued)

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### Oh Deer!

Author: Patty Dalton, 5th Grade Teacher, Reno, Nevada

Grade Level(s): 4, 5, 6

Subject(s): Science/Ecology

OVERVIEW: This lesson in environmental education is necessary to show children the interdependence of animal life with their environment.

PURPOSE: With our planet in the serious condition it exists today, children need to see the plan of nature so that they can understand the need to preserve and protect our resources.

OBJECTIVES: Students will be able to:

1. identify and describe food, water and shelter as three essential components of habitat.
2. describe the importance of good habitat for animals.
3. define "limiting factors" and give examples.
4. recognize that some fluctuations in wildlife populations are natural as ecological systems undergo a constant change.

RESOURCES/MATERIALS: Project Wild, Western Regional Environmental Education Council

ACTIVITIES AND PROCEDURES:

--Describe the fundamental necessities of animals: food, water, shelter and space in a suitable arrangement.

--Demonstrate to students that without these essential components, animals cannot survive. Do this by playing "Oh Deer!"

--Have students count off in fours, with all those sharing the same number gathering in certain corners of the classroom. (This game is best played outdoors but may be adapted to inside play.)

--Mark off two parallel lines on the playground or floor that are about ten to twenty yards apart.

--Have all the "ones" behind one line and all the rest behind the other line. The "ones" will become the deer.

--The other students will become the components of habitat: food, water, shelter and space.

--When a deer is looking for food, it should clamp its hands over its stomach. When it's looking for water, it puts its hands over its mouth. When it is looking for shelter, it holds its hands together over its head. When it is looking for space, it should hold its arms straight out at its sides. A deer can choose to look for any of these needs during each round, but it cannot change what it is looking for in that round. It can change in the next round if it survives.

--The students who are the components of habitat may choose which they will be at the beginning of each round. They will depict that component in the same manner as the deer.

--The game starts with all players lined up on their respective lines and with their backs to the students at the other side. The teacher asks all students to pick their sign. When they are ready, count:

"One...two...three." At the count of three, the students turn and face each other showing their signs.

--The deer run to the habitat component they are looking for and take that component back to the deer side of the line. (This represents the deer's successfully meeting its needs and reproducing as a result.)

Any deer that fails to find the component it was seeking dies and becomes part of the habitat, joining the students on the habitat side.

--The teacher keeps track of the number of deer at the beginning and ending of each round. Continue play for fifteen rounds.

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## Activities On and Off the Trail (Continued)

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--At the end of fifteen rounds discuss the activity; encouraging the students to talk about what they experienced and saw. The herd grows in the beginning, then some must die as the habitat is depleted. This fluctuation is a natural process unless factors which limit population become excessive.

--Discuss what excessive limiting factors are: drought, fires, deforestation, uncontrolled hunting.

--The teacher should make a line graph of the number of deer alive at the end of each round to show that it is naturally cyclical.

--Have the students summarize what they have learned from the activity.

--If the game is played again, be sure to include the limiting factors. For example, if there is a drought no student on the habitat side can choose water as their symbol.

--A new graph can be made to show the difference made in the natural cycles.

### TYING IT ALL TOGETHER:

When students have played the "Oh Deer" game it helps them to understand the interdependence of animals on their environment. Hopefully, they will see that as human beings they can be a part of the limiting factors which effect our environment. With this knowledge they may become more responsible in taking care of our ecological systems.

## Vocabulary Games

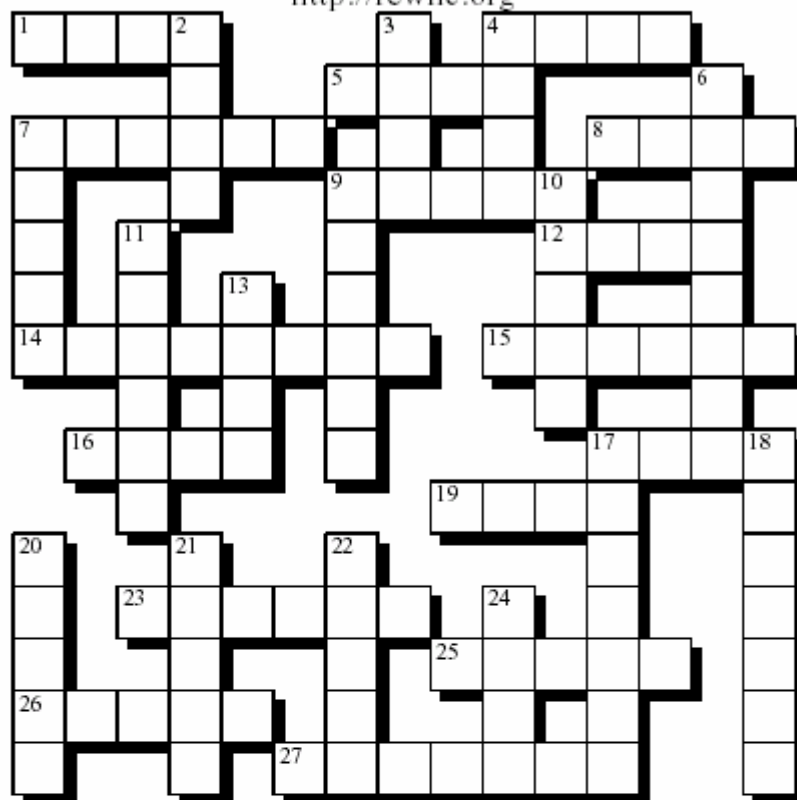
The crossword puzzle is a popular format for testing one's knowledge of both specific vocabulary and subject matter. Three crossword puzzles follow along with their solutions. The first two puzzles are difficult and are considered for mid-teens to adults. The third is less difficult and is considered for children.

## Activities On and Off the Trail (Continued)

### Eco Treasure Hunt Puzzle 1 (Difficult)

#### Eco-Treasure Hunt 2001

<http://rewhc.org>



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REWHC2001001

The trees and plants on the REWHC trails are a treasure of interesting history and features. As we learn about the plants around us, we appreciate them more and are more likely to preserve them. Can you solve this treasure hunt puzzle?

#### ACROSS

- |  |   |
|--|---|
| 1. Eastern Red Cedar fencing product.                | 12. Pioneer hard wood wheel product.        |
| 4. Eastern Red Cedar part used for bedding and mats. | 14. Cakes from dried berries and animal fat |
| 5. Number of needles in Eastern White Pine bundle.   | 15. Eastern Red Cedar writing product.      |
| 7. Apples were a Sailor's Preventative for _____.    | 16. Eastern Red Cedar berry color.          |
| 8. Flighty name for pin cherry.                      | 17. Blueberry flower shape.                 |
| 9. Eastern Red Cedar                                 | 19. Ivy "herb of the _____".                |
|  | 23. Native Creek name meaning "tree of the  |

swamp"

25. Eastern Red Cedar has male and female of these.
26. One of the ancient Greek water nymphs.
27. Sycamore Maple woodworking product.

#### DOWN

2. Pin cherry not sweet taste.
3. Soft center of a stem.
4. Chief Tupelo pollinator.
6. "Sticky, yellow oil, 85% of humans are allergic."
7. Red Maple breakfast topping.
9. First tree to appear on abandoned farms.
10. "leaves of \_\_\_\_\_, leave it be."
11. Gray Birch Catkins which develop into cones.
13. Hot nickname for pin cherry.
17. Pin cherry bark decorated these.
18. Sycamore Maple nickname and statue in New York.
20. Eastern White Pine is state tree of this New England state.
21. "Since it protects the seeds of longer-lived trees, the Gray Birch is sometimes referred to as a \_\_\_\_\_ tree."
22. Eastern Red Cedar musical product.
24. Wild Black Cherry is member of this family.

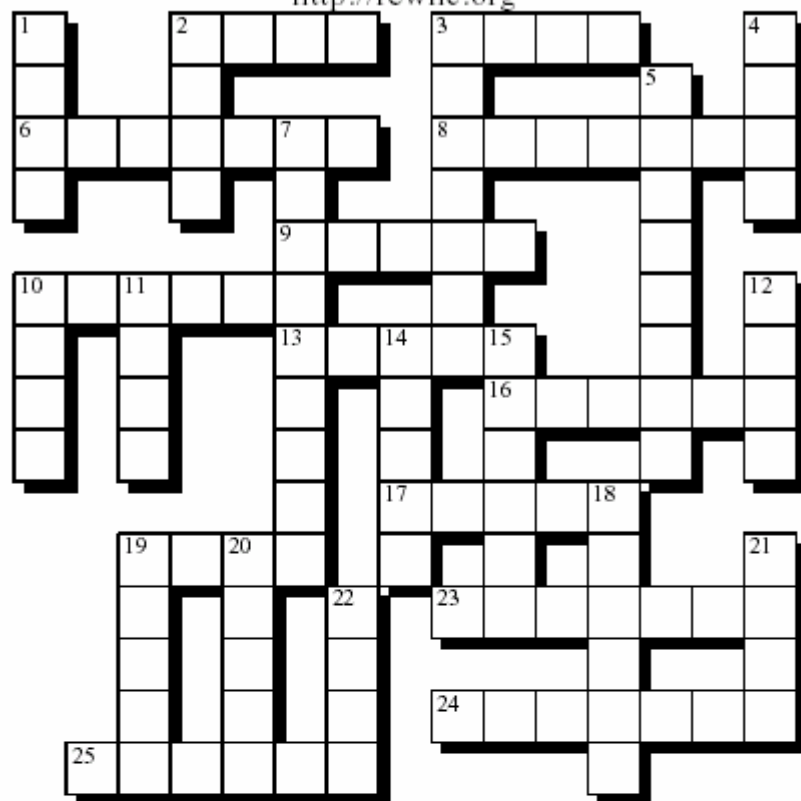


## Activities On and Off the Trail (Continued)

### Eco Treasure Hunt Puzzle 2 (Difficult)

#### Eco-Treasure Hunt 2001

<http://rewhc.org>



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REWHC2001002

The trees and plants on the REWHC trails are a treasure of interesting history and features. As we learn about the plants around us, we appreciate them more and are more likely to preserve them. Can you solve this treasure hunt puzzle?

#### ACROSS

2. Hot nickname for pin cherry.
3. Eastern Red Cedar part used for bedding and mats.
6. Fully fermented apple product.
8. Tupelo used as a \_\_\_\_\_ tree when surveying.
9. Sycamore Maple growth rate.
10. Native Creek name

meaning "tree of the swamp"

13. "Though unflappable, they help seeds to carry long distance."
16. First tree to appear on abandoned farms.
17. Red Maple breakfast topping.
19. Eastern Red Cedar Pollination Helper.
23. Prunus serotina deadly leaf poison.
24. Eastern White Pine

shape.

25. Gray Birch Catkins which develop into cones.

#### DOWN

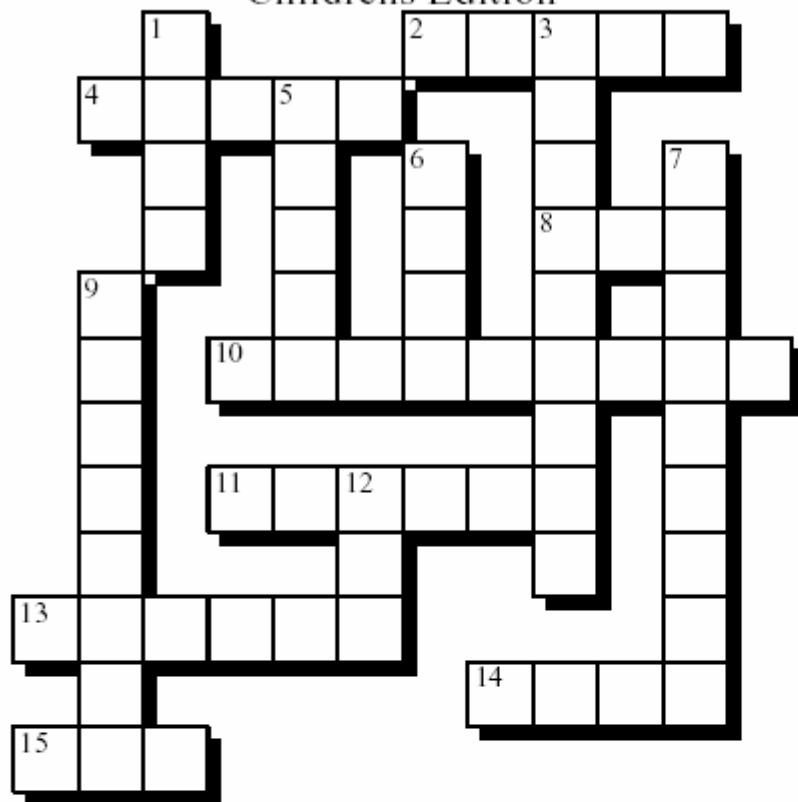
1. Number of needles in Eastern White Pine bundle.
2. Ivy "herb of the \_\_\_\_\_".
3. Tupelo pins.
4. Eastern Red Cedar fencing product.
5. Cakes from dried berries and animal fat
7. "Native shrub, used as arrow shafts and smoking pipes."
10. Pin cherry not sweet taste.
11. Soft center of a stem.
12. Wild Black Cherry is member of this family.
14. "Since it protects the seeds of longer-lived trees, the Gray Birch is sometimes referred to as a \_\_\_\_\_ tree."
15. Apples were a Sailor's Preventative for \_\_\_\_\_.
18. Eastern Red Cedar writing product.
19. Poison Ivy berry color.
20. One of the ancient Greek water nymphs.
21. Blueberry flower shape.
22. Eastern Red Cedar berry color.

## Activities On and Off the Trail (Continued)

### Eco Treasure Hunt Puzzle 3 (Easy)

#### Eco-Treasure Hunt 2001

Childrens Edition



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REWHC2001003

The trees and plants on the REWHC trails are a treasure of interesting history and features. As we learn about the plants around us, we appreciate them more and are more likely to preserve them. Can you solve this treasure hunt puzzle?

#### ACROSS

2. The wild \_\_\_\_\_ cherry is a member of the rose family.
4. The eastern red \_\_\_\_\_ provides food for pheasant and deer in the winter.

8. A night bird.

10. This shrub is an antidote to poison ivy.

11. Tree whose Native American name means "tree of the swamp".

13. ivy - Leaves of

three; let it be!

14. The \_\_\_\_\_ birch is nicknamed the "poverty birch".

15. The \_\_\_\_\_ maple has brilliant red and orange leaves in the fall.

#### DOWN

1. Animal that finds food from the eastern red cedar in winter.

3. Native Americans made arrows and pipes from this shrub.

5. This fruit tree is a West Asian native.

6. The eastern white \_\_\_\_\_ is the largest conifer in the northeast.

7. The highbush \_\_\_\_\_ is a really tall fruit bearing shrub.

9. The \_\_\_\_\_ maple was Rhode Island's first "Liberty Tree".

12. The \_\_\_\_\_ cherry seeds, leaves and bark contain a poison - hydrocyanic acid.

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## **Activities On and Off the Trail**

### **(Continued)**

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#### **Eco Treasure Hunt Puzzle Solutions**

When you're ready, turn the page and view the solutions to the Eco Treasure Hunt Puzzles.

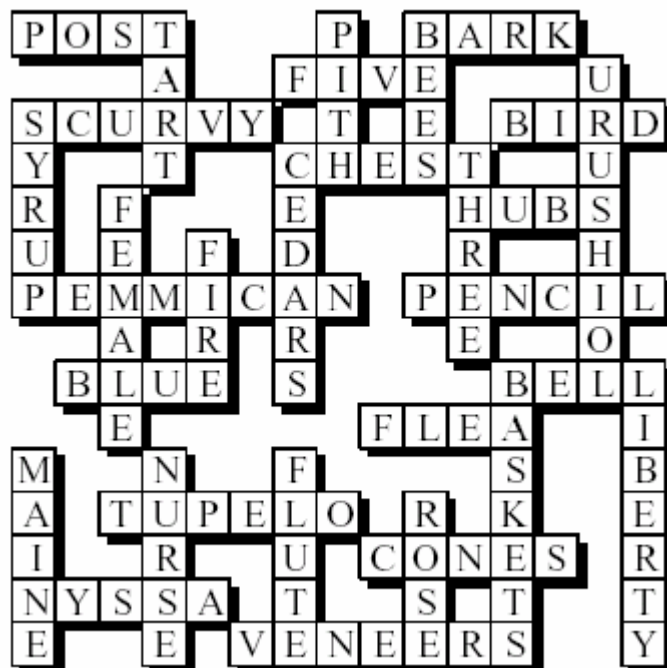


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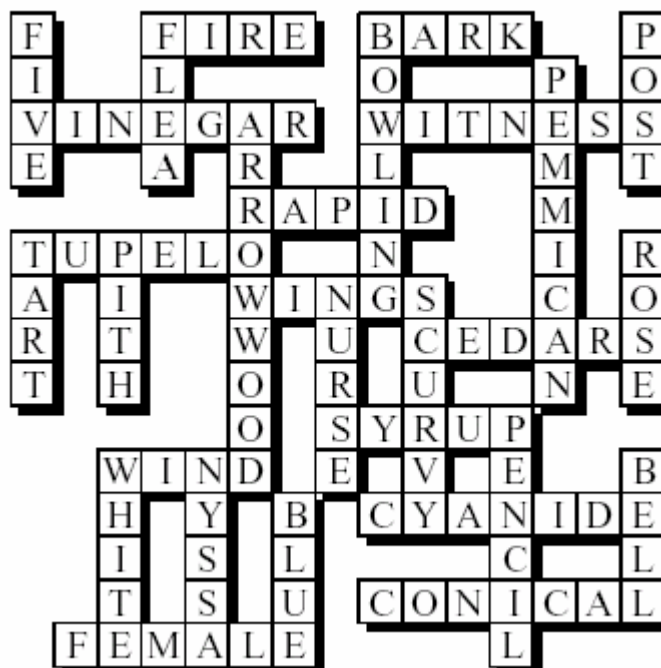
## Activities On and Off the Trail (Continued)

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### Puzzle 1 Solution



### Puzzle 2 Solution



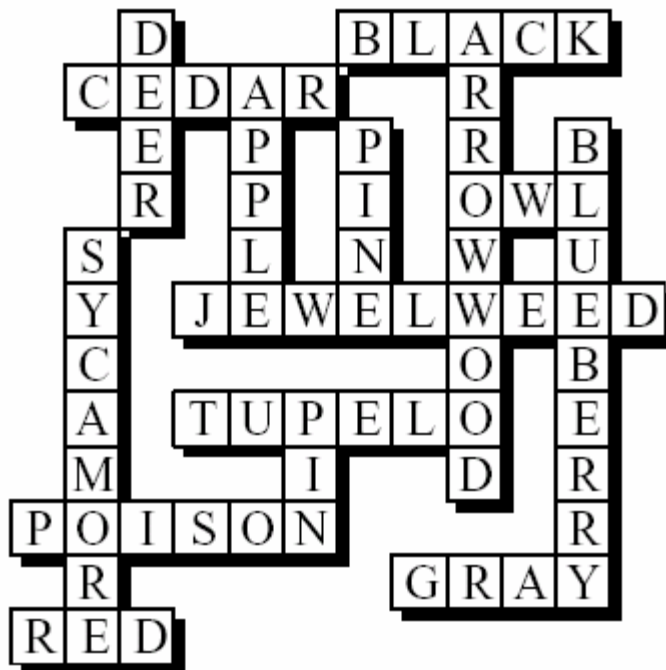
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## Activities On and Off the Trail

(Continued)

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### Puzzle 3 Solution





# Organization



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Form RF008, V1.3 5/10/03

