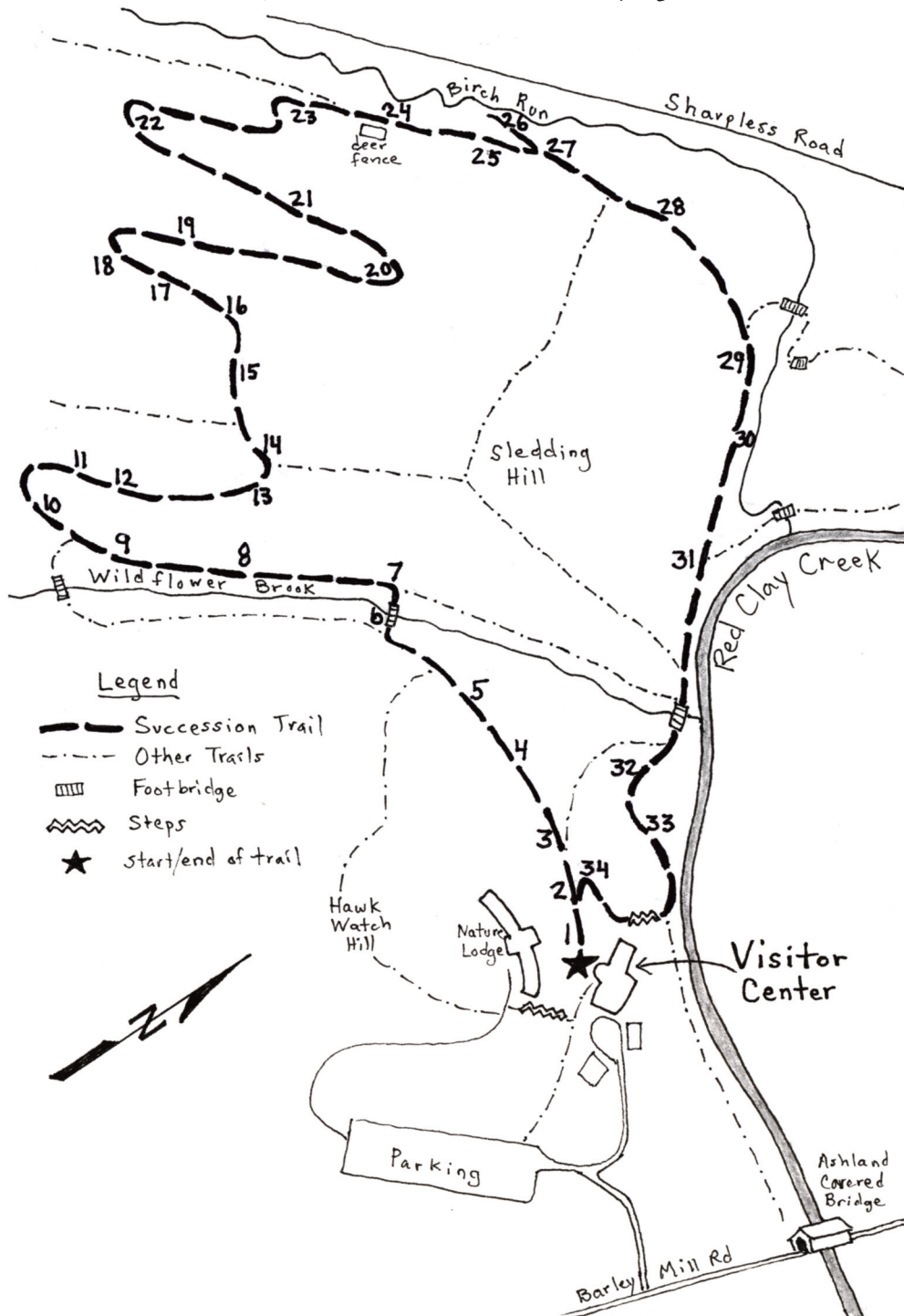


Succession



An Ashland Nature Center Trail

Succession Trail



About the Trail

*This trail has been designed to illustrate the process of **ecological succession**. Succession is the gradual change in the composition of a natural community over time; for example, the change from an old field into a forest.*

*The trail winds through fields, shrub areas, a pine forest, a young woods, and a mature deciduous forest before leading back along the floodplain of the Red Clay Creek. Along the way, **34 orange numbered markers** illustrate various stages of succession and some of the factors which bring about ecological change. You will see how human activities can both speed up and slow down the process of succession.*

Enjoy your walk!

SUCCESSION TRAIL

Trail Length - 1.25 miles

Difficulty: Moderately strenuous, due to one significant hill

Approx. Walking Time (w/booklet) - 1 hour

1

Upland succession in this part of the country often begins with **abandoned farmland**. Did you know that the Ashland Nature Center and surrounding lands were part of a working farm until the 1970s? The wooden posts and gate structure here along this old farm road functioned as a horsegate – the gate could be opened by pulling a chain while riding on horseback. The Ashland Nature Center itself is built on the site of the former barn. The old stone wall behind the Nature Center building and the silo are all that remain of the barn structure, built in the mid 1800's. The silo (reconstructed in 1942) now holds a spiral staircase that connects the Visitor Services area on the upper level with the offices on the lower level.

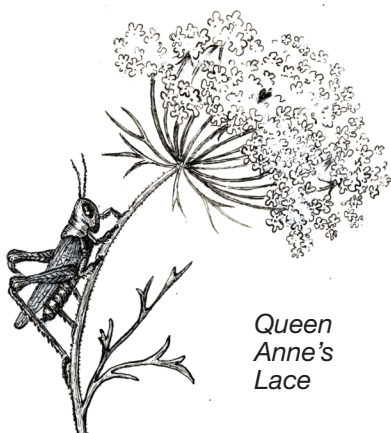
2

Herbaceous (Field)

Stage: Grasses and other herbaceous (non-woody)

plants usually dominate an area for the first few years after farmland has been abandoned. The hillside between this trail and the Nature Lodge represents the herbaceous stage. Once an agricultural field, this hillside is now maintained as a meadow by yearly mowing, which prevents woody plants from taking hold.

In the spring of 2006, seeds of native, warm-season grasses, including big blue-stemmed grass, little blue-stemmed grass, Indian grass, and tall purpletop fluffgrass, were planted here in an effort to produce a meadow composed of native (rather than alien) species. It takes a few years for these native grasses to become established. Be-



Queen
Anne's
Lace

sides grasses, wildflowers such as common milkweed, Queen Anne's lace, thistles, goldenrods, and asters can also be found here.

3

The **grasses** in the trail itself are kept short by regular mowing, aided by the regular trampling of human feet. Both mowers and trampling feet hinder the process of natural succession, and prevent other plants from taking hold here. Grasses also have dense, fibrous root systems that make it difficult for other plants to grow among them.

4

Succession can be accelerated under human influence. In 1976, the Delaware Nature Society planted the **black walnut trees** along this trail as part of a bi-centennial project to restore the once-abundant native species. Now, decades later, the original planted trees have matured, producing an abundance of nuts in the fall. Can you see any younger (second generation)

Black Walnut



walnut trees growing underneath or near the large parent trees? (Note: walnuts are edible, but caution should be taken when handling the nut husks because they produce a yellow-brown stain).

5

Shrub Stage: This area has been left unmowed for many years, allowing woody plants to grow and begin to gradually shade out (i.e., replace) the grasses and other herbaceous plants that made up the field. Black raspberry and wineberry are two types of berry briars that grow here – their edible fruits are eaten by many different animals as well as by humans. Also growing here are wild grape and oriental bittersweet – both woody vines that wrap around other plants as they reach up for the sunlight. The brambly thickets and vines provide cover and nesting sites for Gray Catbirds, Northern Mockingbirds, and Eastern Cottontails (rabbits).

6

A **steep stream valley**, like this one along Wildflower Brook, usually supports trees even in cultivated areas because it is difficult to mow the steep slopes. Green ash (e.g., the large tree 10 feet to the left of the bridge) and red maple (e.g., the tree on the

right side at the far end of the bridge), two moisture-loving trees, are the most abundant large trees growing along this creek. Their shade helps keep the water temperature cooler, improving habitat for aquatic organisms, and their roots help hold the soil in place.

Note: Watch out for the stinging nettle growing along the trail in the spring, summer, and fall. The leaves and stems of this herbaceous plant are covered with needle-like hairs that produce an unpleasant stinging sensation when touched.

7

In an attempt to accelerate succession and to replace a once fairly common native species, hundreds of young **Eastern hemlocks** were planted on this slope by the Delaware Nature Society in the 1970's. However, less than a



Eastern Hemlock

dozen trees remain here of the many planted. What became of all the hemlocks? Planted during the early field stage, many of the young trees were killed by Meadow Voles girdling their stems at ground level and feeding on their roots during the winter. Additional young hemlocks were destroyed by White-tailed Deer and Eastern Cottontails browsing on the young twigs. Even the few large hemlocks that remain here are now threatened by the Hemlock Woolly Adelgid, an aphid-like insect pest that kills the needles and prevents new growth. Human attempts to help along the succession process are not always successful!

As you continue on this trail, you'll notice that a more **recent reforestation project** is underway. A variety of native deciduous tree saplings (e.g., oak, maple, and ash species) have been planted here to accelerate the reforestation of this valley. Wire cages around the trees prevent White-tailed Deer from browsing on the tender young twigs.

8

The large **black cherry trees** to the right of the

trail are examples of trees that colonized this area on their own (i.e., they were not planted). Black cherry is an early woody pioneer, meaning that it is often one of the first tree



Black Cherry

species to take root and grow in old fields and shrub areas. It grows in almost any type of soil and also is tolerant of both sun and shade. Drooping clusters of white flowers in May develop into small black cherries (edible but bitter) by late summer. The cherry seeds are spread by birds and other animals that eat the fruit and pass the seeds unharmed through their digestive systems.

Notice the large **vines** growing up the black cherry trees. How did these vines get up into the high tree branches? Did they grow down from the top or up from the bottom? Like the trees, the vines have their roots in the ground and therefore grew “up from the bottom”, just like the trees. The vines started growing on the trees when the trees were still small, and over the years they grew into the thick, Tarzan-style, ropey vines that you see hanging from the branches today.

9

Alien plants are plant species that are not native to the United

States. Many alien plants are also considered “invasive”, meaning that they are aggressive and can out-compete and displace the native species. This displacement disrupts the natural web of life that native plant, animal, and decomposer species evolved with and are dependent on for survival.



Porcelain Berry

Unfortunately, alien plants can be very difficult to manage and control. For example, a dense thicket of the invasive alien shrub called multiflora rose (originally from Asia) bordered this trail until it was

carefully sprayed with select herbicides in the 1990's. The multiflora rose was effectively removed; however, several other invasive alien plants, including garlic mustard, Japanese stilt grass, and porcelain-berry, soon became established here. Ongoing monitoring and careful plant control is required to ensure that native woody plants will eventually come to dominate this area.

Below is a list of some of the common native and alien plants growing in this valley:

Native Species

black cherry
black walnut
tuliptree
red maple
green ash
pokeberry
black raspberry
wild grape (vine)

Alien Species

garlic mustard
multiflora rose
Japanese stilt grass
wineberry
Japanese honeysuckle (vine)
oriental bittersweet (vine)
porcelain berry (vine)

10

These evergreens are **white pines**. Did they grow here naturally or were they planted? The even spacing between trees indicates that they were planted. White pine was native to Delaware in colonial times, but the southern boundary of its range has since retreated to northern Pennsylv-

ania. It is thought that with the large-scale clearing of forested land in the 19th century, the tempering effect that forests had on local climate was lost. Global warming in recent times may have also played a role. Subjected to higher summer temperatures, white pines could no longer naturally reproduce successfully. These trees will grow in Delaware, but only if properly planted and cared for. Therefore, the white pine forest does not represent a natural plant community in Delaware.

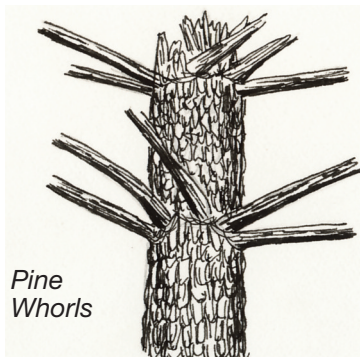


White Pine

11

How old are these pine trees?

One way to determine the age of pines is to count the number of branch whorls along the trunk, adding about five years to account for seedling growth years. These pines were apparently planted in the early 1960's. Looking at all those brown, dead branches you might think that the pines are dying, but they are not. Pines are shade-intolerant; hence, the shaded inner branches die due to lack of sunlight. Notice that the upper, outer branches are healthy and green.



Pine Whorls

12

Not as many animals live in the pine forest as in the fields and thickets.

The soft, pine needle-covered ground is shady, acidic, and poor in nutrients. This allows few plants to grow and consequently offers little food or shelter for animals.

However, some birds, such as Carolina Chickadees, White-breasted Nuthatches, Eastern Screech Owls, and Great Horned Owls, find shelter in the branches, while Red Squirrels and Southern Flying Squirrels build nests of leaves, twigs, and pine needles in the boughs or in tree cavities. In addition, Red Fox sometimes make their underground dens in this pine forest.

Chickadee



13

This relatively flat, hilltop area was maintained as an agricultural field until the 1970's. Since

that time, a wide variety of woody plant species have been able to grow here, such as the **tuliptree** (formerly called yellow or tulip poplar). Although some of the tuliptrees here are taller than the white pines planted in the pine grove, the

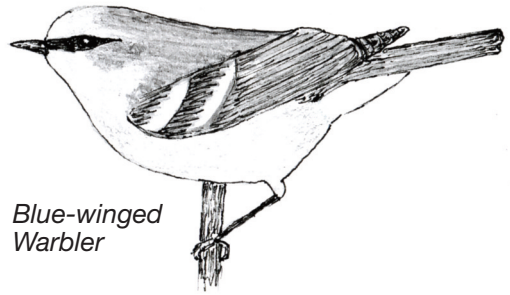
Tulip Tree



tuliptrees are actually younger by several decades. A sun-loving tree, the tuliptree grows tall quickly in areas like this where there is no shade or competition from other kinds of trees. Once this area reverts completely to a forest, however, young tuliptree seedlings will no longer be able to compete here, and other tree species such as oak and hickory will gradually become dominant.

14

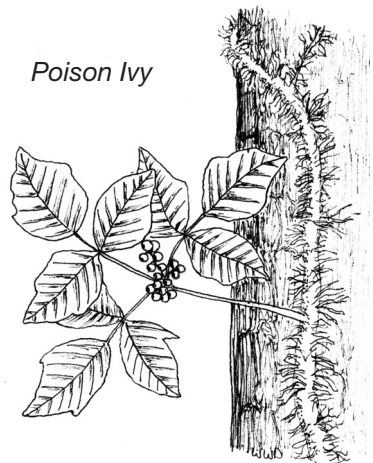
Shrub → Young Woods Stages: At this point in the successional process, we see mostly woody plants, including trees of various sizes, shrubs, and woody vines, and to a lesser extent, some herbaceous plants (grasses and wildflowers). The wide variety of plant species of various sizes provides great habitat for birds. Blue-winged Warblers, Common Yellowthroats, and Indigo Buntings nest here in the spring and summer while Eastern Towhees, Northern Cardinals, Song Sparrows, and Downy Woodpeckers can be seen here year-round.



Blue-winged Warbler

15

Don't touch! Can you see the thick "hairy" vines climbing up the large trees to the right and left of the path? These vines are **poison ivy**- a plant that all outdoor enthusiasts should learn to recognize and avoid. All parts of the plant, including the fibrous, aerial roots on mature vines, contain skin-irritating oil that can cause an itchy rash upon contact. Besides growing as a vine, this common plant may also be found in woods and fields growing on a hairless, woody stem typically about 1 foot tall. Poison ivy is best recognized by its three-parted, smooth leaves, which are variably toothed (notched), with the end leaflet growing on a longer stalk than the two side leaflets. The new leaves are often quite shiny and reddish when they emerge in the spring, usually becoming dark green and duller before summer. In



Poison Ivy

the fall the leaves turn a beautiful yellow, orange, or red. Mature plants produce small, greenish flowers in the spring and white berries in the fall that are well-liked by wildlife.

16

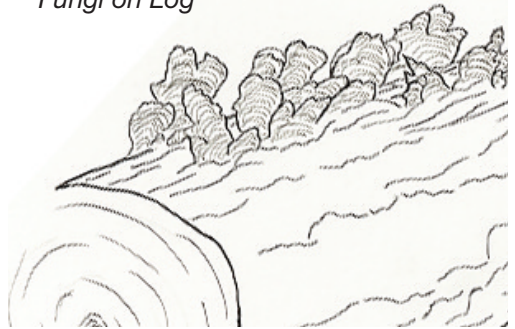
Look up at the tall trees growing in the **deciduous forest**. The upper branches of these trees intermingle, creating nearly complete shade underneath in the summertime. During the process of ecological succession, as young hardwoods mature and take over, an older forest with several layers of vegetation is formed.

Oak, hickory, and beech trees dominate here, and their intermingling crowns form the forest **canopy**. Below the canopy, younger trees and smaller species over ten feet in height make up the **understory**, mostly ironwood, American beech, red maple, and flowering dogwood. The **shrub layer** is composed of shrubs like mapleleaf viburnum, arrowwood viburnum, witch hazel, and spicebush, as well as sapling trees. Ferns and wildflowers comprise the **herbaceous layer**. Mosses and fungi along with fallen leaves, branches, and nuts make up the **litter layer**.

17

Throughout the forest you can find **fallen trees** and decaying logs. When large trees fall, they allow extra light to reach the forest floor and new growth can take place. Sometimes shade-intolerant species begin to grow in the new sunlight.

Fungi on Log



The fallen tree will gradually decay (aided by the action of bacteria, fungi, insects, and other invertebrates) and will return valuable organic material to the soil, creating a good place for other plants to grow.

18

This forest is developing toward a **climax forest**. Theoretically, a climax forest contains only plant species that can reproduce in shade. If free from major disturbances, the climax forest experiences only small-scale changes as individuals die and are replaced. The deciduous forest of beech, oak and hickory is the climax stage for uplands in northern Delaware.

The forest you are standing in has not yet completely recovered from being disturbed by farming and logging in past centuries. The presence of shade intolerant species, like the large tuliptrees seen here, indicates that the climax forest has not yet been reached.

19

To the left of the trail is an **American Beech** with its distinctive smooth, light-grey bark. It is a shade-tolerant species, and it retains its lower branches while most other forest trees lose theirs. Over the years, people have carved their names in the bark of this tree, perhaps not realizing that their actions make the tree more susceptible to the harmful effects of insects and fungi, not to mention unsightly.

20

A stand of **witch-hazel**, an understory shrub or small tree, grows here at the bend in the trail. Witch-hazel has distinctive, wavy-toothed leaves that are uneven at the base and it has straggly yellow flowers that appear in late fall. When the seeds reach maturity the following summer or fall, they are forcefully ejected from the seed capsules, sometimes landing as much as 25 feet away. The bendable branches of the witch-hazel were once a favorite among dowsers, who would use a forked branch as a divining rod to indicate underground water.

21

Can you find the **eastern hemlocks**?

They are scattered throughout the forest, some along this section of the trail. They were planted at the same time as the hemlocks at the field edge (described at Post # 7), but although more hemlocks survived here, they have not grown as large as the ones in the field because they receive less sunlight.

*Eastern
Gray Squirrel*



Eastern hemlocks once occurred naturally in northern Delaware but are now very rare, except where planted. In prior centuries the mature trees were over-harvested and the species (like the white pine) was unable to regenerate itself in our forests. Unlike deciduous species that can reproduce by sending up new shoots from old stumps, these conifers must begin anew from seed.

22

Why does the trail zigzag? Bends or **switchbacks** are used in the construction of trails on steep grades to minimize erosion. If the trail went steeply down a hillside like this without using switchbacks, runoff water would rush down the path, carrying away much soil and creating gullies. Please don't shortcut the switchbacks!

23

Sweet birch (also called black or cherry birch) grows tall and straight in rich, well-drained upland soil. The gray bark is tight, with horizontal lines, similar to the bark of a black cherry tree. Its hard, heavy wood is frequently made into furniture. The sap, which flows in the spring, was once used as an ingredient in birch beer.

Sweet
Birch



24

Although **eastern hemlocks** were planted throughout this forest, most of the ones planted on the higher slopes have gradually died. Yet here near the bottom of the forest slope, many of the planted eastern hemlocks are still thriving. Why have so many more hemlocks survived here in the lower forest than in the upper forest? There are several probable reasons, including: 1) there is more moisture retained in the lower forest, producing a more favorable microclimate for hemlocks; and 2) the very steep slopes seen where the hemlocks are growing the thickest prevent easy access to browsing White-tailed Deer.

To the right of the trail is a **deer exclusion fence** that was installed in the summer of 2008. The plants inside the fenced area are now able to grow without being browsed by White-tailed Deer. Over time, differences in the vegetation between the fenced and unfenced areas will become more apparent.

25

Animals inhabit each layer of the forest. Songbirds can be heard in the canopy. Woodpeckers search the trunks of mature trees for tasty invertebrates. White-tailed Deer browse on twigs of young trees in the understory and shrub layer. On the forest floor, Eastern Gray Squirrels gather acorns and Eastern Box Turtles, American Toads, and Eastern Red-backed Salamanders prowl in search of worms and insects.

Note: Trail marker #26 is reached by following a short spur trail. Look for the spur trail just before trail marker #27.

26

Birch Run, named after the sweet birch trees in these woods, is a tributary of the Red Clay Creek. This stream is used by many forest animals that come to the water to drink and/or search for food. In the spring and summer, mayapples, white wood asters, and New York ferns can be seen on the slopes along the trail here, while skunk cabbage grows in the wet soil near the water's edge.

27

This pair of **old fence posts** marked the forest edge in the 1950's. Since then, the forest has crept out more than 50 feet into the field. How did this happen? First, fallen tree limbs restricted mowing along the field edge and then tree seeds, carried there by birds, small mammals, and the wind, took root and began to grow.

28

In the summer, goldenrod, aster, thistle, Queen

Anne's lace, and milkweed are among the many wild-flowers seen growing in this **field**. A wide variety of animals live here too. Butter-

flies, leafhoppers, grasshoppers, crickets, and beetles abound in the grasses. Meadow Voles, Northern Short-tailed Shrews, Least Shrews, Eastern Moles, and Star-nosed Moles, burrowing beneath or

in the grasses, attract predators like Eastern Ratsnakes, Red Fox, American Kestrels, Red-tailed Hawks, and Great Horned Owls. Eastern Meadowlarks, Field Sparrows, and Song Sparrows nest here. Eastern Cottontails and White-tailed Deer also feed in the field, leaving trails and tracks seen year 'round, and Woodchucks (groundhogs) dig burrows throughout the field. This field is mowed every few years to curb the growth of woody plants, thus preventing the natural succession from field to forest. It is mowed in late winter when birds and other animals are less active in the fields.

Milkweed



*Shrew with
Grasshopper*



29

The **edge effect**: On your walk, you have seen several “edge” habitats – field and shrub; shrub and forest; forest and field. Edge effect occurs wherever two or more vegetation communities come together; the edges between the communities support a greater number and variety of plants and animals than any single community alone.

Edge habitats have abundant wildlife because they provide animals with places to feed, rest, play, reproduce, and escape their enemies. For example, in the summer, Eastern Cottontails feed in the field close to the protective thickets, enabling them to easily escape predators when necessary.

30

Floods: If you had been standing here on September 15, 2003 you would have viewed a raging torrent of water sweeping across the large, flat floodplain of the Red Clay Creek below you! On that day, remnants of tropical storm Henri dropped 7 to 10 inches of rain in Kennett Square, Pennsylvania, and nearby Delaware, causing the Red Clay Creek to swiftly overflow its banks. The raging water tore through the community of Yorklyn, Delaware (~ 1 mile upstream from here) and destroyed the tracks and bridges of the Wilmington & Western Railroad before crossing over Sharpless Road to cut across the floodplain in front of you. The raging floodwaters carried along slabs of asphalt, massive wooden beams from the railroad trestles, propane tanks, uprooted trees, and countless other items, as well as tons of sand and gravel from upstream locations. The large debris has since been removed, but several feet of sand and gravel that were deposited on the floodplain remain, smothering acres of meadow wildflowers and other plants that once grew in the floodplain. Gradually, the open floodplain is being revegetated and the process of natural succession will likely continue until the next large flood event.

In addition to being revegetated through natural succession, the floodplain below is also part of a massive tree planting effort. You may have noticed that there are numerous **plastic tubes** sticking up on the part of the floodplain closest to the Red Clay Creek. In 2006, thousands of tree seedlings were planted on the floodplain at Ashland to help establish a forested buffer, or “riparian buffer”, along the Red Clay Creek. The plastic tubes allow sunlight to penetrate, while protecting the young trees from being browsed by White-tailed Deer, Eastern Cottontails, and other animals. The term “riparian buffer” refers to a corridor of vegetation along the bank of a stream, river, or other natural waterway. These vegetated corridors are important for numerous reasons, including the following: reducing the severity of floods; holding the soil in place and preventing erosion; reducing the impact of pollutants entering the stream; maintaining cooler water temperatures; improving water quality for aquatic organisms; and providing forested floodplain habitat for a wide diversity of animals.

31

A **lightning strike** is another natural phenomenon that can affect succession in a plant community. In the early 1980’s, this area was part of a regularly-mowed field with a single, large tuliptree growing on the hillside nearby. When lightning struck the tree in the 1980’s, a large limb fell down, preventing mowing underneath the tree. In time, birds sitting in the tree deposited seeds of various woody plants –including blackberry, Japanese honeysuckle, oriental bittersweet, and wild grape. The tangle of initial vines and brambles grew thick and allowed other woody plants, such as shrubs and tree seedlings to take hold. Now a thick growth of black walnut, black cherry, ashleaf maple, and bitternut hickory are growing here and ecological succession will continue – all thanks to a single bolt of lightning.

32

Pigs and other **farm animals** were once kept in a fenced area here on the floodplain. When the farm was abandoned, the old animal pens became overgrown gradually through the process of succession. First, annual plants like grasses became established. Then perennial plants took over, and finally woody plants, including tree seedlings, took root and began to grow. With numerous large trees now present here, this area is well on its way to developing into a mature floodplain forest. Look for remnants of the old wire farm fence, largely hidden by vegetation, as you continue on the trail.

33

The **trees** which grow on the floodplain are different from those found on the hills and uplands. Oaks and beeches cannot tolerate these damp lowlands. Instead, we see the moisture-loving black willow, green ash, ashleaf maple (or box elder), and sycamore.

It is clear then that the floodplain climax forest will differ from the hillside or upland climax forest. The particular species that occur at different stages of succession in a given location are determined by many environmental factors, including moisture and soil type.

34

Trail's End: On your walk, you have seen examples of plant communities in various stages of ecological succession. You have seen mowed grassy paths, fields, shrub areas, young woods, a white pine forest, a mature deciduous forest, and a wooded floodplain.

It is important to remember that the orderly progression from one stage to another can be disrupted at any time by a natural or man-made disturbance. Natural disturbances include fire, flood, wind, lightning, disease, and insect pests; manmade disturbances include mowing, clear cutting, timbering, and spraying of herbicides. Even the "climax forest" is not permanent or unchanging, but continues to be effected by both natural and manmade disturbances.

We hope you have enjoyed your walk and will come back again to visit the Ashland Nature Center. Please deposit \$1.00 in the box if you would like to keep this booklet; otherwise return the booklet to its box.

SCIENTIFIC NAMES OF SPECIES MENTIONED IN TEXT
(common names of plants are not standardized so they are not capitalized)

TREES:

Ashleaf maple (or box elder) (*Acer negundo*)
Red maple (*Acer rubrum*)
Sweet birch (or black or cherry birch) (*Betula lenta*)
Ironwood (or American hornbeam) (*Carpinus caroliniana*)
Flowering dogwood (*Cornus florida*)
American beech (*Fagus grandifolia*)
Red oak (*Quercus rubra*)
Bitternut hickory (*Carya cordiformis*)
Black walnut (*Juglans nigra*)
Tuliptree (*Liriodendron tulipifera*)
Green ash (*Fraxinus pennsylvanica*)
White pine (*Pinus strobus*)
Eastern hemlock (*Tsuga canadensis*)
Sycamore (*Platanus occidentalis*)
Black cherry (*Prunus serotina*)
Black willow (*Salix nigra*)

SHRUBS and WOODY VINES:

Poison ivy (*Toxicodendron radicans*)
Japanese honeysuckle (*Lonicera japonica*) – Invasive Alien
Maple-leaved viburnum (*Viburnum acerifolium*)
Southern arrowwood viburnum (*Viburnum dentatum*)
Oriental bittersweet (*Celastrus orbiculatus*) – Invasive Alien
Witch-hazel (*Hamamelis virginiana*)
Spicebush (*Lindera benzoin*)
Multiflora rose (*Rosa multiflora*) - Invasive Alien
Blackberry (*Rubus allegheniensis*)
Black raspberry (or thimbleberry) (*Rubus occidentalis*)
Wineberry (*Rubus phoenicolasius*) - Alien
Porcelain-berry (*Ampelopsis brevipedunculata*) – Invasive Alien
Wild grape (*Vitis* sp.)

HERBACEOUS PLANTS:

New York fern (*Thelypteris noveboracensis*)
Queen Anne's lace (or wild carrot) (*Daucus carota*) -Alien
Skunk cabbage (*Symplocarpus foetidus*)
Common milkweed (*Asclepias syriaca*)
White wood aster (*Aster divaricatus*)
Thistle (*Cirsium* sp.)
Goldenrod (*Solidago* sp.)
Mayapple (*Podophyllum peltatum*)
Garlic mustard (*Alliaria petiolata*) – Invasive Alien
Pokeweed (*Phytolacca americana*)
Stinging nettle (*Urtica dioica*) – Alien
Japanese stilt grass (*Microstegium vimineum*) – Invasive Alien
Big blue-stemmed grass (*Andropogon gerardii*)
Little blue-stemmed grass (*Schizachyrium scoparium*)
Indian grass (*Sorghastrum nutans*)
Tall purpletop fluffgrass (*Tridens flavus*)

AMPHIBIANS AND REPTILES

Eastern Red-backed Salamander (*Plethodon cinereus*)
Eastern American Toad (*Bufo a. americanus*)
Eastern Box Turtle (*Terrapene c. carolina*)
Eastern Ratsnake (*Elaphe alleghaniensis*)

MAMMALS

Northern Short-tailed Shrew (*Blarina brevicauda*)
Least Shrew (*Cryptotis parva*)
Eastern mole (*Scalopus aquaticus*)
Star-nosed Mole (*Condylura cristata*)
Eastern Cottontail (*Sylvilagus floridanus*)
Eastern Gray Squirrel (*Sciurus carolinensis*)
Southern Flying Squirrel (*Glaucomys volans*)
Red Squirrel (*Tamiasciurus hudsonicus*)
Woodchuck (*Marmota monax*)
Meadow Vole (*Microtus pennsylvanicus*)
Red Fox (*Vulpes fulva*)
White-tailed Deer (*Odocoileus virginianus*)

BIRDS

Red-tailed Hawk (*Buteo jamaicensis*)
American Kestrel (*Falco sparverius*)
Eastern Screech Owl (*Megascops asio*)
Great Horned Owl (*Bubo virginianus*)
Downy Woodpecker (*Picoides pubescens*)
Carolina Chickadee (*Poecile carolinensis*)
White-breasted Nuthatch (*Sitta carolinensis*)
Gray Catbird (*Dumetella carolinensis*)
Northern Mockingbird (*Mimus polyglottos*)
Blue-winged Warbler (*Vermivora pinus*)
Common Yellowthroat (*Geothlypis trichas*)
Eastern Towhee (*Pipilo erythrophthalmus*)
Field Sparrow (*Spizella pusilla*)
Song Sparrow (*Melospiza melodia*)
Northern Cardinal (*Cardinalis cardinalis*)
Indigo Bunting (*Passerina cyanea*)
Eastern Meadowlark (*Sturnella magna*)

ABOUT THE DELAWARE NATURE SOCIETY

People of all ages learn about nature and the environment through the Delaware Nature Society's programs at Ashland & Abbott's Mill Nature Centers, Coverdale Farm, Cooch-Dayett Mills and the new DuPont Environmental Education Center at the Wilmington riverfront. DNS has helped preserve thousands of acres of land and advocates for conservation of our natural resources. We own or manage more than 1000 acres of wildlife habitat for education and biodiversity and DNS is the Delaware affiliate of the National Wildlife Federation.

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