STATION 1 Alien Plant Species

Notice the large woody shrubs growing along both sides of the path. Two species dominate – common buckthorn and honeysuckle. Common buckthorn has grey-black bark, scattered thorns at the ends of its twigs, smooth oblong leaves that are opposite (or nearly so), and persistent berries that turn from green to black as they ripen. Honeysuckle has greyish bark, smooth oval leaves, and yellow, white, or pink flowers and bright red berry-like fruit.

Common Buckthorn

These two non-native species were introduced to North America from Europe and Asia. They are aggressively invasive, creating dense thickets which displace native plants and reduce an area's biological diversity. The seeds they produce are not suited to native wildlife. Because of this, they have been removed from the area behind where you are standing, and native shrubs of witchhazel, winterberry, and shadbush (seen here) planted to help the forest convert back to its original character. The native natural community on this site is the biologically rich Valley Clayplain Forest.

Honeysuckle

A little further along the trail, watch for a sign indicating a "Wise On Weeds" cooperative project with The Nature Conservancy started in 2008 to control these, and other invasive alien plants.

STATION 2 Old Field Succession

What can you tell about past land use by looking at trees? The white pine, paper birch, poplar, and red cedar here give us clues.

Paper birch and poplar are short-lived trees that need lots of sunlight. These pioneers are usually the first trees to colonize an area after a major disturbance such as a clearcut or windstorm. White pine is an old-field invader. Its winged seeds are some of the first to arrive after a field is abandoned. Red cedar is often found in overgrown pastures where sheep and cows will avoid eating its prickly twigs. From the trees here, and the pits and mounds in the soil we can surmise this was an open area some years ago, used for pasturing and some limited cropping.

STATION 3 Cedar-Apple Rust and Other Tree Diseases

See if you can find small growths on the twigs of these red cedars. They look like tiny shrunken apples and are caused by a fungus – cedar-apple rust. In the spring, these fungal balls sprout showy bright orange tendrils called telial horns that spread the fungal spores. The spores need to have apple trees as hosts to grow into their next stage, and abandoned apple orchards in this area provide such hosts.

Fungi that harm, kill, or decompose trees are called forest pathogens. In a healthy ecosystem they act as natural regulators, removing weak trees and providing room for new trees. If a pathogen is introduced from another part of the world however, our native trees may have little resistance, such as was the case with the majestic chestnuts and elms which were once common but now have all but disappeared from Vermont because introduced pathogens killed them. At Station 8 you will see butternut trees which are unhealthy due to an introduced pathogen, and before long this species also will probably disappear from Vermont forests.

STATION 4 Pasture Trees

Have you noticed the large old maple tree? The wide-spreading lower branches tell us that this tree did not grow in a closed forest where light competition would result in natural pruning and a much narrower crown. Instead, it grew in the open with sunlight reaching the sides as well as the top. Why would this old tree still be standing here while the rest of the forest is so much younger? The answer lies in the history of this area's land use.

This site was most likely pasture 40-50 years ago. This huge maple tree and several others like it in the Park survived logging and then grazing – either by chance, for shade, or for marking a boundary. Note the abundant sugar maple seedlings here. What is the probable source of this reproduction?

STATION 5 Holmes Creek

You are on the bridge over a tributary to Holmes Creek which flows on into Lake Champlain. The many streams that discharge into Lake Champlain are the major determinants of its water quality. Unfortunately, the Lake has serious water quality problems – mainly from sediment, agricultural fertilizer and pesticides, herbicides from farmland or lawns, and improperly treated waste water from homes, industries and cities. The land cover of the Charlotte Park and Wildlife Refuge (forest, shrubland and farmland) is being managed so as to keep harmful runoff of soil, fertilizer and other agricultural chemicals to a minimum. (Station 10 has more information on this.) The watercourse here is modest, but it supplies important drinking water for all kinds of wildlife and is essential habitat for aquatic species: fish, amphibians and insects. This stream, and the wetlands of the Park are key elements of the area's ecology.

STATION 6 Amongst the Birds

The Park is a popular bird-watching area. How many species of birds have you seen or heard so far? Sit down and listen and look. What do you think makes this such good bird habitat? In part it's the small trees and woody shrubs, which provide protection and nest sites for small birds. Shrubland habitat is scarce in the Lake Champlain Basin, and the Park maintains its shrublands for this reason.

If you are visiting in winter, look on the snow for the cross-shaped tracks of ruffed grouse, and listen for the "*chickadee-dee-dee*" song of the chickadee. In spring the "*drink your tea*" song of the tow-hee and the "*witchity witchity witchity*" song of the common yellowthroat warbler fill the air. And watch for the yellow flash of a warbler or goldfinch which may be nesting in nearby shrubs. Did you know that Vermont Fish and Wildlife lists 268 bird species that regularly visit or live in Vermont?

STATION 7 The Old Oak Tree

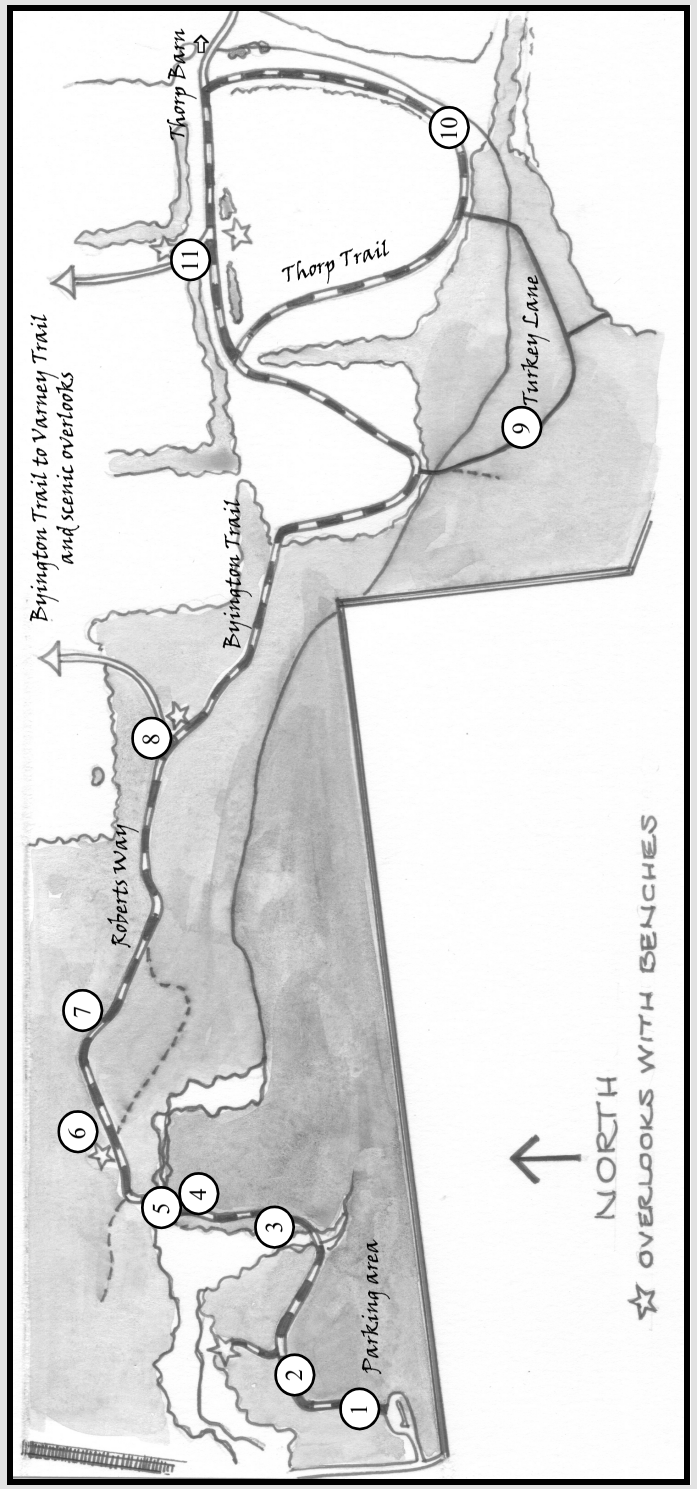
This is one of the three largest oaks in Charlotte. It is 58 feet high and 152 inches (12ft.6ins.) in circumference! It may be more than 200 years old. You may find a few acorns, with mossy scale cups on the nuts. These are very sweet acorns, eagerly sought after by deer, birds, mice, grouse and other wildlife. This oak is a bur or mossycup oak. Along the path there are some younger bur oaks with their ridges of corky bark along the twigs. Observe the large, spreading branches low on this tree. Trees with strong wood like the oak can withstand the weight of large lateral branches, unlike the fast-growing birches and poplars that support few thick lateral branches. Oaks

are much valued as furniture and flooring material, and as majestic senior members of the forest.

STATION 8 Rich Clayplain Forest

There are several butternut and bitternut hickory trees close to you. They are called "indicator species." Their presence is an indication that this is a rich site, high in calcium and other plant nutrients. While the continents were still shifting more than 500 million years ago, this area was covered by a huge, shallow ocean. Calcium settled out of the ocean water as a precipitate and also from the shells of ocean creatures. Later these rich sediments were metamorphosed into quartzite and dolostone rock. Much later, additional rich sediments washed down from glacial meltwater and covered this area, making it ideal for farmland, once the native Clayplain Forest was cleared. So much of this was cleared that now only small patches of this forest remain, and they are a priority for conserving and restoring. Other characteristic trees of the Clayplain Forest are red maple, American elm, swamp white and bur oaks, shagbark hickory and white pine.

In winter, look for the sulfur yellow buds of bitternut hickory and the fuzzy, pale yellow buds of butternut. Notice that the butternuts in the Park (also known as white walnut), are unhealthy. It is likely that butternuts will soon permanently die out of our forests due to a non-native pathogen.



Nature Trail Stations:

1 Alien Plant Species
2 Old Field Succession
3 Cedar-Apple Rust and Other Tree Diseases
4 Pasture Trees
5 Holmes Creek
6 Amongst the Birds
7 The Old Oak Tree
8 Rich Clayplain Forest
9 Turkey Lane Woods
10 Riparian Buffer
11 Grassland Birds

The distance between Station 1 and Station 11 is approximately one mile.

STATION 9 Turkey Lane Woods

Look up at the canopy. If it is summer, the leaves will blot out most of the sky. In the winter, twigs will interlace. This kind of closed canopy indicates a mature upland forest where the trees have positioned their branches to best capture the sunlight. Another indicator of a mature forest is standing dead trees, or snags, like the one in front of you. This American beech snag has barbed wire in it from when it supported a pasture fence. But in some ways it may be even more valuable dead than alive. Dozens of bird species nest in dead trees: chickadees, woodpeckers, kestrels, great crested flycatchers, tree swallows, purple martins, owls, wood ducks, and the popular eastern bluebird. Eagles and ospreys build big platforms of sticks to nest in the tops of large dead trees. Birds aren't the only creatures that need dead trees. Bats, flying squirrels, and raccoons find shelter in their cavities. The pupae of butterflies and other insects winter under their loose bark. Mushrooms thrive on their rotting roots. Ants turn them into castles. In fact, the dead tree just might be the most valuable tree in the landscape.

Behind you young sugar maples are creating their own closed canopy. If this forest were managed as a sugar bush, in a few years they would be big enough to tap. Did you know that Vermont ranks first in the nation in maple syrup production? Collecting sap and boiling down maple syrup was one of the things Native Americans taught European settlers.

As you leave the forest, proceed up-slope on the Thorp Trail for Stations 10 and 11 and to take in the magnificent sweeping views of the landscape on both sides of Lake Champlain.

STATION 10 Riparian Buffer

You are near the headwaters of the Holmes Creek tributary you crossed at Station 5. A row of native woody shrubs has been planted along both sides of it to promote the development of a permanent vegetative buffer between the adjacent agricultural fields and this stream. The 250 winterberry, pussy willow, elderberry, summersweet clethera, and three varieties of dogwood and viburnum (planted in 2011 by volunteers) will also provide valuable wildlife food, cover and shelter. Park policy discourages the use of non-organic herbicides and pesticides on Park land, and requires good record-keeping of fertilizer application and use of other soil amendments. A riparian buffer here will effectively capture erosion from the fields, and trap nutrients from any excess fertilization and other agricultural chemicals.

STATION 11 Grassland Birds

The mosaic pattern of forest, shrubland, grassland, wetland and fields you experience in the Park landscape is not only productive, but scenic. Pause here to take in the sweeping view provided by the Park of the beautiful Champlain Valley landscape.

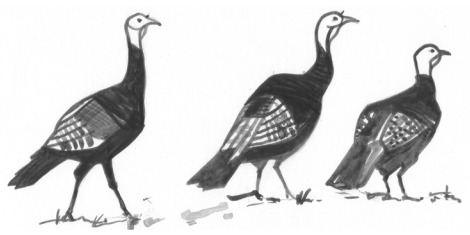
Bobolink, meadowlark, Savannah sparrow, northern harrier have been regular summer residents in Charlotte, thanks to the numerous hayfields and other open grassy areas of 20 acres or more found here. Grassland birds nest on the ground and are dependent on these areas remaining safe and uncut for at least 65 days so they can reproduce successfully. Unfortunately, in Vermont and beyond, grassland habitat is being converted to other uses, and populations of these special birds are in steep decline. Vermont Audubon is assisting the Park and private landowners in the surrounding area to maintain grassland bird habitat and provide safe haven for these very special birds.

Congratulations!

You have visited all 11 stations of this nature guide. From here you can explore other Park trails or loop back to the parking area. As you walk back, remember what you learned about the history and ecology of this area and why it is special.

Thank you for visiting the Charlotte Park and Wildlife Refuge. Please come again!

Keep this brochure or return it to the box for others to use.



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Charlotte Park and Wildlife Refuge

NATURE TRAIL GUIDE

Welcome!

This 290 acres of cropland, pastures, hay fields, abandoned farmland in various stages of rewilding, woodlands, and wetlands are an important part of Charlotte's rich natural and cultural heritage. The Park is an excellent place for nature study.

This guide provides information about some important aspects of the ecology of this landscape, and will familiarize you with some of its diverse flora and fauna. The 11 stations along the trail point out natural patterns and processes which influence what you can see, hear and experience here.

Please respect the animal and plant life as you proceed, and follow the Park Code of Conduct posted at the entrance. Enjoy your walk through this beautiful natural area!