What is the Future of Williams Woods?

The Nature Conservancy believes in allowing natural processes to run their course. The goal of The Nature Conservancy is to protect this rare natural community type, while providing an enjoyable experience for visitors.

However, there are still unintentional human disturbances visible. Have you noticed two shrubby plants common throughout the preserve? These non-native invasive plants—common buckthorn and honeysuckle—are considered a nuisance, because they out-compete our native plants and reduce biological diversity. We actively control these non-native species on our preserves.

Also, there are two pests affecting the health of this forest that have been unintentionally introduced by humans: the hemlock borer and beech bark disease. As you walked along the trail, you may have noticed trees that have been stripped of their bark. These hemlocks are infested with an insect called the ‘hemlock borer’ living in their bark. Woodpeckers attack the bark, because they especially like the insect. The other disease that can now be seen throughout Vermont is the beech bark disease. American beeches are first invaded by a tiny scale insect whose borings provide habitat for a fungus called Necraria coerulea, which ultimately kills the tree.

Congratulations!

You have finished the trail loop at Williams Woods. We hope that you take with you what you have learned from this brochure and apply it to other forested landscapes in New England. Good luck and thank you for visiting Williams Woods Natural Area.

Welcome to the Williams Woods Natural Area!

This 63-acre preserve is owned by The Nature Conservancy. The forest at Williams Woods belongs to a natural community type called Valley Clayplain Forest. Although they once covered thousands of acres in the Champlain Valley, these forests are now rare due to extensive clearing for agricultural purposes. Because of visitors like you, who support and value natural area preservation, this clayplain forest will continue to flourish for generations to come.

The purpose of this brochure is to teach the visitor basic skills to interpret a forest’s history. In order to do that, the brochure will provide you with information about the various natural forces and human disturbances that have molded this forest. We hope that you will be able to apply the interpretive skills that you learn here to other natural areas. Please respect the animal and plant life as you proceed. We hope that you enjoy your walk through this beautiful natural area.
The Glacial Past of the Champlain Valley

The Champlain Valley is characterized by its physiography, soil, and climate, as well as its vegetation types and animal populations. The Champlain Valley is a flat, low-lying basin bounded by mountains to the east and west, and includes portions of Vermont, New York, and Quebec. The last ice age, called the Wisconsin Glaciation, occurred between 10,000 and 20,000 years ago. Several episodes of ice advance and retreat during the Wisconsin glaciation created large bodies of water, larger than Lake Champlain, that have long since disappeared.

The Champlain Valley was inundated first by fresh water, Lake Vermont (10,000–12,000 years ago), and then by salt water, the Champlain Sea (8,000–10,000 years ago).

Year after year, large silt and clay deposits were brought down by rivers to the large ancient Lake Vermont and the Champlain Sea. These large deposits of silt and clay on the floor of the Champlain Valley resulted in what we know today as claysplains.

What is a Clayplain Forest?

A natural community is an assemblage of plants and animals that recurs across the landscape under similar conditions where natural processes dominate, rather than human disturbances. Classifying natural communities across a landscape provides a strong tool for understanding our natural environment.

Did you know that the Champlain Valley has the warmest climate in Vermont, with a growing season of up to 150 days? This is one of the major environmental factors that aids the formation of the clayplain forest as the dominant forest type on the silt and clay soils of the valley. This natural community type occurs nowhere else in Vermont.

What does a clayplain forest look like? A characteristic clayplain forest has a multi-layered canopy which is made up of scattered, tall white pine, a diversity of hardwood species such as red maple and white oak, a layer of understory trees such as muscelwood and hop hornbeam, and dense herb growth covering much of the forest floor. Clayplain forests host a diverse community of herbs. Species that you can see as you walk through Williams Woods include barren strawberry, slender sedge, hog peanut, sensitive fern, and dwarf raspberry.

The History of the Champlain Valley Clayplain Forest

The Champlain Valley has a long history of human settlement beginning approximately 10,000 years ago when Native American hunters and gatherers inhabited the area. The earliest European settlement began in the 1600s. Most of the clayplain forests were cleared for agriculture by 1850. The silt and clay soils were valued for agriculture because of their high fertility and general lack of stones.

The landscape of Addison County, just south of here, provides a good example of the loss of clayplain forests. There are approximately 206,000 acres of ancient clayplain soils in the county, yet today there are only 1,700 acres of fragmented clayplain forest, or less than 1% of the original. These statistics show that the clayplain forest is a rare natural community type and, while clayplains are still used for agriculture today, there is a growing interest in conserving the remaining clayplain forests.
Was Williams Woods Ever Cleared for Agriculture?

The history of ownership at Williams Woods dates back to 1793, when town records were first kept. The current 63-acre parcel was purchased as two separate lots, the south half in 1837 and the north half in 1843. They were owned by the Carpenter family who had a farm elsewhere. The Williams family, for which the property is named, came to own the parcel in 1912 when Polly Carpenter deeded the property to her daughter Anna Williams.

As you walk through Williams Woods, you will notice the large size of some of the trees, and you may wonder if it was ever completely cleared for agriculture like most of the clayplain forests were. All of the families who owned Williams Woods had residences elsewhere and used the property for different reasons, such as a sustainable woodlot for firewood or land for grazing animals. As you look around Williams Woods, you will also notice that the land undulates throughout, leaving no large portion of flat land that could be cleared and farmed efficiently. The majority of the forest is approximately 80-100 years old, while there are some areas much younger and other areas with scattered trees that are up to 275 years old. Williams Woods was never completely cleared for agriculture, but the vegetation patterns in the forest give us clues as to the past land use.

Reading the Landscape

There are five different vegetation types within Williams Woods. The plants within each area tell us a different story about the past land use. This brochure acts as a guide to deciphering the assorted forest patterns within Williams Woods. Most of the time, these patterns within a forested area will be the outcome of differing forest disturbance histories—the impact of logging or fires, for example. The changes in vegetation that follow a disturbance are called plant succession. Both disturbance and succession are important to understand, in order to interpret Williams Woods’ diverse forest cover.

WHITE PINE and HEMLOCK STAND

As you walk into Williams Woods along the trail loop, the first vegetation type you come to is dominated by white pine and hemlock trees. Look out into the trees: do you notice anything unusual about the forest floor? The ground underneath the hemlocks and pines is highly irregular, covered with depressions and mounds which are often called pillows and cradles.

Pillows and cradles are the result of a natural disturbance, such as water or wind. The pillows and cradles that you see here are the result of both wind and water. Williams Woods is located in the Champlain Valley where the wind speeds can get very high. When the wind is strong, it can topple and uproot live trees. Trees that fall in this manner are called blowdowns. The removal of the tree and its roots creates the pit or cradle, and over a few decades, the roots decay and drop the excavated earth next to the depression creating the mound or pillow.

The soil here is saturated almost all the way to the surface, causing the trees to grow on raised mounds called hummocks. Hummocks first form when trees sprout on downed logs or stumps. The roots slowly replace the original material to create the hummocks. The hummocks are found above the water table and therefore allow the trees to get the oxygen they need to grow.

As you continue along the trail loop, Thorp Brook comes into view on the right. If you are visiting Williams Woods in the springtime, Thorp Brook should be running very fast from all of the snowmelt, but the rest of the year it hardly runs at all.

In conjunction with the clay soils, Thorp Brook makes Williams Woods a very wet place! Off in the woods, you can find vernal pools. Vernal pools are temporary bodies of water which occur in woodland depressions and provide important habitat to many species of wildlife. Vernal pools dry up slowly during the early summer months and are important breeding grounds for a number of amphibians. Since vernal pools are not part of a stream, they do not contain a lot of these species’ predators such as small fish. Williams Woods is home to a number of amphibians, such as the blue-spotted salamander, the grey treefrog, and the red-spotted newt.

MIXED HARDWOODS

As you’ve been walking, you may have noticed that the trees around you are changing from hemlocks and pine to a mixture of hardwoods. From the trail, you will begin to see some pretty big trees. What do you notice as you look out at the large trees? What is missing?

There are some very big trees and some very small trees, but there are no medium-sized trees. This is called an age discontinuity. One thing that can cause this is a disturbance to an older forest. This area used to be a pasture where animals grazed.
REGENERATING FIELD

The last vegetation type that was heavily disturbed is the regenerating field. It is not visible from the trail loop but is located on your trail map. It is the youngest part of Williams Woods and is dominated by shrubs, grasses, and sedges. The other clue that gives away its land use history is not visible by just looking at the area. This area of Williams Woods was plowed. Naturalists can tell this by digging a soil pit. The soil profile here exhibits what we call a plow layer. Due to tilling of the land for cultivation, the soil horizons have been mixed together.

The Stormy Past

The fallen trees throughout Williams Woods are a link to Vermont’s stormy past. Williams Woods is especially affected by storms for two reasons. The water table is high within Williams Woods, therefore the trees are shallow rooted, making them very susceptible to wind throw. The second reason is that Williams Woods is surrounded by open land on every side, giving it no protection from the wind. There is evidence of at least three major storms within Williams Woods: the Great Hurricane of 1938, the Ice Storm of 1998, and Hurricane Floyd of 1999. How can you tell which storm caused each blowdown?

MARSH

The vegetation type beyond the pine stand is a marshy area along Thorp Brook. Grasses and sedges dominate the marsh vegetation. The soil here is too wet for most tree species to grow.

What is missing?

Most of the forest was cleared, but a few of the trees were left to provide shade for the animals. These trees grew out instead of up, because they did not have to compete with other trees for sunlight. Some people call these wolf trees, because these open-grown trees often stand alone. The largest trees today are remnants from the old pasture, and the younger trees did not get started until grazing ceased.

YOUNG WHITE PINE STAND

The next vegetation type you will wander into is hard to miss. As you come out from the mixed hardwoods, you will find yourself in a fairly young pine stand. Why is this area dominated by white pine?

Young White Pine Stand

This area was cultivated in the past and has now returned to a young forest dominated by white pine. Many of our local tree species produce a huge crop of seeds every few years. These are called mast years; mast is another term for nuts, seeds or berries. The trees have adapted this strategy to successfully establish their offspring. The timing of the mast year is controlled by the regional climate, so many members of a species within a large portion of Vermont will mast at the same time. The birds or mammals that eat the seeds have an overabundance of food, leaving plenty of seeds to develop into young trees. It may have been a mast year for white pine when this part of Williams Woods was abandoned by farmers and allowed to regenerate.

With the exception of tornadoes, all blowdowns share one common characteristic: they overturn trees so that they lie in the general direction of the storms. During the spring or summer, thunderstorms cause blowdowns with concentrated bursts of wind which hit the forest and then radiate out in a semicircular pattern. Since thunderstorms usually come from the west, toppled trees form an arc pointing northeast to southeast.

Trees that fall to the south-southeast direction are usually the result of fall and winter arctic air masses coming down from the northwest. Both northeasters and summer/fall hurricanes are strong cyclonic storms with a counterclockwise rotation. Trees that fall toward the western side of a north-south axis are usually the casualties of either winter northeasters or summer/fall hurricanes.