

1 East white pine timber

In 1915 the Pine Acres Farm crew planted a pine stand that the 1938 hurricane destroyed. Between 1939 and 1943 the crew replanted a mixed forest of eastern white pine (*Pinus strobus*) and regionally non-native red pine (*Pinus resinosa*). Trees planted at the same time are “even-aged” timber that grow together to produce a stand of high quality “sawlogs.” To make room for more promising trees, four separate thinnings harvested trees that were shorter—part of the “understory,” lower quality, or diseased.



Pinus strobus



Pinus resinosa

Left on the ground, “slash,” unused parts of the trees cut during thinnings, enriches the soil, provides animal habitat, and shelters new growth from browsing deer. The remaining trees will rapidly grow straight and tall with large, healthy crowns and thick trunks of high timber value. They will form the “overstory.” Trees’ “crowns” are the treetops in the forest canopy you would see flying over the forest

2 Regeneration

In 1993 and 2016 commercial timber harvests encouraged progressive regeneration in this stand. The first harvest removed the remaining living red pines that invasive Asia insects, red pine scale and red pine adelgid, decimated. The second encouraged continuing regeneration by harvesting both pine and deciduous trees to create canopy openings where sunlight reaches the ground. Wind and animals carry nuts and seeds to these areas where sun-loving sprouts of pine, oak, and others crowd. The densely packed, over 40 foot pines sprouted after the 1993 harvest. Growing straight up, they compete for sunlight forming a whorl of branches with pine needles at their crowns each year while the shaded branches below die. Few plants grow in the shade beneath the dense stand. Stumps of harvested deciduous trees regenerate by resprouting. Deciduous roots survive after the tree is cut. Resprouts ring the stumps and will regrow into trees with multiple trunks. After the pines are harvested, deciduous trees will dominate this stand.

3 Changes in forest type

Over the next hundred feet, the kinds of trees and shrubs change with soil conditions. Protected from winds of the 1938 hurricane, the tall pines have grown since 1915. Beyond them to your left, the pines give way to naturally generated oaks, and as the soil becomes wetter, red maple (*Acer rubrum*) also called swamp or soft maple. Pines were planted in the higher ground with lower water tables. Oaks naturally generated nearby. As the soil moisture increases, shrubs spicebush (*Lindera benzoin*) with its tiny yellow spring flowers and summer sweet (*Clethra alnifolia*) with fragrant masses of white blossoms dominate the sunlit understory.



Hay-scented, ostrich, and cinnamon ferns unfurl in the spring to carpet the ground beneath. Red maples with spring red flowers and twigs and scarlet fall foliage dominate the wettest area.



4 Witch Hazel (*Hamamelis virginiana*)

Native Americans taught settlers about the healing qualities of witch hazel. Since before the Civil War, manufacturers have distilled its wood into an astringent used in medicines and cosmetics. Nearly 100% of the world’s supply is made in Connecticut.

The witch hazel shrub rarely grows taller than 15 feet. After most deciduous plants are dormant, its flowers with long narrow yellow petals in late fall as its yellow leaves fall. After the seed pods mature, they burst ejecting their two seeds as far as 40 feet from the parent. Witch hazel grows along the trail through the slash among the young birch, oak, and other trees. As the trees grow, they will “overtop,” grow over, the witch hazel and leave it in the understory below.



5 Harvesting



Log skidder

The relatively open trek was a “skid trail.” Timber harvesting equipment moved loads of harvested logs on the skid trail. Log “skidders” used winches or grapples to drag loads of logs behind them, and



Log forwarder

log “forwarders” used hydraulic grapple arms to lift and carry the logs. Both machines brought tree-length logs to a “landing” where they were “bucked” or cut into desired lengths and loaded into trucks going to the sawmill. The bucked debris was left on the ground as “slash” to naturally fertilizer, provide habitat, and shield sprouts from hungry deer.

6 Red maple wetland

This wetland has rich, humusy, poorly drained soils, high water tables, areas of standing water and frequent flooding. It is a naturally developing rich habitat, home to a wide variety of animals and plants. It aids in controlling flooding and maintaining water quality.



Rich, humusy, moist soil

Red maples tolerate wet conditions and grow quickly but rarely reach 50 feet even after 100 years. High water levels limit their roots’ access to air that they need. Root systems grow shallowly above the water table limiting the support for trees as they grow tall. Winds uproot the tallest, creating hummocks, mounds higher than the surrounding area providing a raised area for resprouts from stumps. Sphagnum moss, decaying plants, grasses also form raised hummocks and tussocks. These raised areas give plants and trees the advantage of developing more extensive root systems above the water table.



Here skunk cabbage (*Symplocarpus foetidus*) thrives on a hummock of sphagnum moss. The spathe, its outer covering, protects its flowers until they bloom in snowy late winter. To deal with the cold, the plant generates heat and contracts parts of its massive root system.

7 The Blue Blazed Trail System Go right (east)

The Connecticut Forest and Park Association (CFPA) volunteers maintain over 825 miles of Blue-Blazed Trails including the Natchaug Trail that we are joining. A comprehensive trail guide, the Connecticut Walk Book is available in print and online at www.ctwoodlands.org. If you were to follow the Natchaug Trail left (west) for 19 miles, you would merge with the Nipmuck Trail in Eastford, but please go right (east) to continue the self-guided hike. From here follow the red and blue “blazes” or trail markers back to the Goodwin Center.

8 Forest type boundary

On the right (south) is an early woods road made by the Pine Acres crews. It runs between two forest types growing on rich soil with a favorable aspect or lay of the land. On the left (east) is a pine stand planted after the 1938 hurricane. On the right (west) is a naturally growing forest of oak, maple, and other deciduous or hardwood trees. Goodwin foresters have continually managed both forests to favor the tallest, most valuable, overstory trees. The healthy, full-crowned, overstory oaks produce a tremendous acorn crop or “mast,” an important winter food for wildlife. The two forest types will continue to merge as white pine and hardwoods grow in the understory of both forest types sprouting where thinnings increase sunlight reaching the forest floor.

9 Pond Acres Pond

The pond is 90 acres large and almost two miles long. In 1933 James Goodwin dammed Cedar Swamp Brook to create a shallow pond from the white cedar swamp. Water lilies and water shield, “emergent” vegetation, emerge on the pond’s surface each summer and provide habitat for frogs, turtles, birds, and fish. Periodically beavers build dams on streams flowing into and out of the pond varying water levels.

Along the trail are oblong mounds on which ferns and other plants grow. They are the remains of “windthrown” trees. Near the pond the water table is high, and tree root systems shallow. High winds blew over trees and pulled up their roots. After the roots rotted away, a pile of soil and stones remain near a decomposing trunk. These record how the wind blew. The trunk falls in the direction opposite the source of the wind, and the longer side of the mound is perpendicular to it.



10 Red pine mortality

From the 1920’s through the 1940’s, the Pine Acres crew planted a stand of regionally non-native red pines (*Pinus resinosa*) for commercial harvest. Beginning in the 1980’s, two invasive insects, red pine scale and red pine adelgid, infested the stands killing many red pines. Timber harvests salvaged most of the pines. The rest were cut down as a safety measure.



The rotting logs are red pines. They provide shelter for snakes, salamanders, insects, and other animals. They act as nurseries for sprouting trees and other plants. Their death allows more sunlight on the forest floor enabling sweet pepperbush, high bush blueberry, and other native shrubs to grow.

11 Species diversity

Here fertile soils support a rich and diverse mix of plant species in a mature forest. It shows how diversity increases with age. At least ten different species of trees are around you. Tulip poplar and yellow birch can only sprout in direct sunlight and are “shade intolerant.” Sugar maples, white ash, American elm and hemlock can sprout in shade and are “shade tolerant.” As the forest ages, shade tolerant species will dominate unless storm, infestation, fire, or harvest remove taller overstory trees

12 Early succession and grassland habitats

Forests are Connecticut’s natural land cover. Stop mowing a lawn, and a forest will regrow from wind-blown and animal-carried seeds. In pre-colonial Connecticut wildfires and controlled burns by Native Americans created grassy areas. Many native species depend on early succession habitats—herbaceous grasses, forbes and shrubs—that are increasingly rare for we protect our lands from fire so well. In this area Goodwin actively maintains grassy and shrubby areas by cutting and burning so that the American woodcock can reproduce and thrive.

In this field in early spring, woodcock perform a unique mating ritual before they build their nests in the nearby forest. When their “poults” are ready to leave the nest, the young birds are lead into the nearby dense brush to find food while hidden from predators.



