

Fire's Long History and Influence at Weir Hill

– from the Weir Hill Management Plan, 2006. The Trustees of Reservation, Section 4; pg 5-8

Fire-Influenced Community:

The 80-acre fire influenced community is the property's most significant ecological feature. Once more common, fire and its influence on the landscape has declined as the region has developed and tolerance for wildfire decreased. At Weir Hill, a history of frequent fire is well documented for the latter half of the last century. However, there are clues that allow us to speculate on fire's impact prior to records kept by the North Andover fire department and one could speculate that fire's influence dates back to when indigenous cultures occupied the area. Agricultural practices, accidental ignition associated with railroad operation, and most recently, mischievous youth have helped to perpetuate fire's influence. Regardless of its history, the result is a plant community that is increasingly rare in Massachusetts and Essex County especially. Today, Weir Hill has become a refuge for many plant and animal species that depend on fire-influenced habitats.

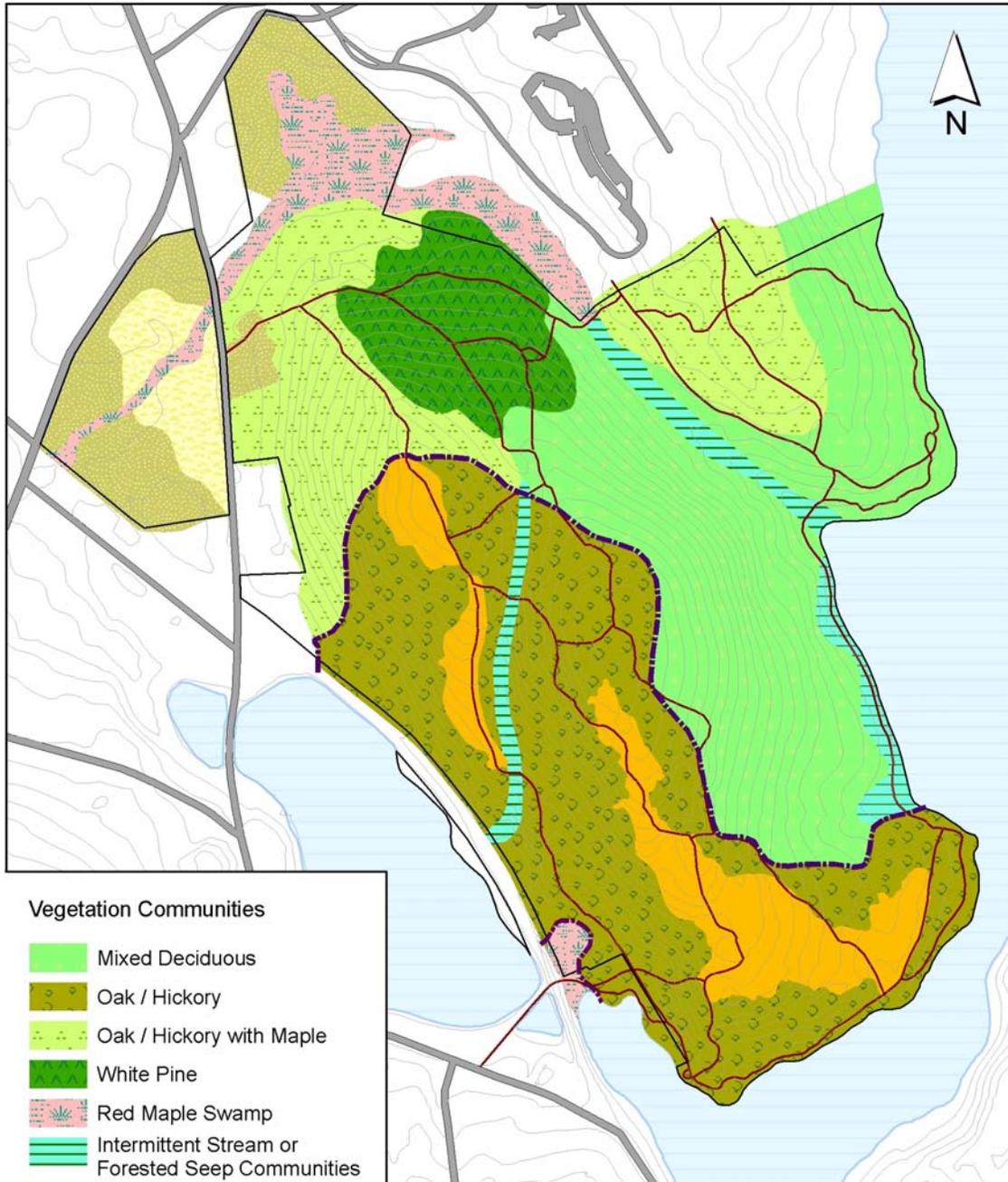
Approximately 80 acres of Weir Hill Reservation show evidence of fire history (Map 6). The last large fire occurred in 1995 when approximately 60-acres burned. This community covers much of the southwestern quarter of the Weir Hill drumlin where south and west facing slopes are more prone to dry wind and warm temperatures, which aids in spreading fire. Multiple fire scarring, dramatic hollow trunks, tree age-class discontinuities, coppice undergrowth, double-trunked trees, and the absence of fire-intolerant species characterize this community. The plant community in this area is a mosaic of black oak-hickory woodland of varying age and development, and open areas maintained as vistas, fields, and fire brakes by annual mowing. The black oak-hickory forest mosaic is typified by a dominance of black oak and a variety of hickories. This community includes a variation of the Black Oak Scarlet Oak Woodland, a S3/S4 Priority community type listed by MNHESP.¹ White oak is occasional and scarlet oak is rare.

Map 6

¹ Natural Heritage uses a "state rank" (SRANK) to indicate level of rarity and threat of plant communities. This section includes the SRANK for communities where they fit the Heritage classifications to illustrate a community type's abundance at the state level.

- S1 = Typically 5 or fewer occurrences in the state. Especially vulnerable to extirpation.
- S2 = Typically 6-20 occurrences. Very vulnerable to extirpation.
- S3 = Typically 21-100 occurrences. Vernal pools are given this rank because of the limited acreage that they represent.
- S4 and S5 indicate communities which are apparently or demonstrably secure in MA"

Weir Hill - Vegetation



Vegetation Communities

-  Mixed Deciduous
-  Oak / Hickory
-  Oak / Hickory with Maple
-  White Pine
-  Red Maple Swamp
-  Intermittent Stream or Forested Seep Communities
-  Upland Field
-  Wet Meadow
-  Early Successional
-  Limit of Fire Influenced Communities

 Trails

0 500 1,000 Feet

Vegetation classes based on Report by F. Clark, 2001. Updated by Trustees' staff.

Map produced March 2006.

These species form a canopy 60-70 feet tall and provide between 40-60% total cover. The crowns of the largest trees are often broadly spreading indicating that they have grown without competition from other trees. The subcanopy is only 10-30 feet tall and includes the same species. In some areas the subcanopy is dense with numerous small trees 4-6 inches in diameter, in other areas the subcanopy is sparse and an ericaceous shrub layer provides 40% cover. Occasionally, fire intolerant species such as white pine and red maple have seeded into areas where fires have not burned recently.

Within this oak-hickory matrix three open areas have been maintained as vistas and fire brakes. These openings vary in their degree of herbaceous versus woody cover in relation to their age and mowing frequency. The most recent addition, along the southwest slope of Weir Hill, was created by and expanded after the 1995 fire which moved through much of the oak-hickory forest. Fire intensity along this southwest slope killed many of the mature trees, opening the canopy along the slope. Property managers have since maintained and expanded the opening by brush-hogging regrowth repeatedly throughout the growing season, to create a fire brake and maintain a more open landscape. The consequence is a mosaic of primarily open land covered with grasses, low shrubs and tree sprouts growing in and around woodlands of black oak, hickories, and more rarely pitch pine. Overall, the community is characterized by successional woody and herbaceous plants. Sprouts of oaks and hickories are frequent to common along with colonies of low growing heaths, such as black huckleberry and lowbush blueberries. Grasses are patchy with little bluestem scattered throughout. Various wildflowers can be found in bloom throughout the year including relatively uncommon to rare plants such as bird-foot's violet, wild indigo, short-toothed mountain mint, toothed white-topped aster, stiff-leaved aster, and various bush clovers. Two species of scrub oaks occur in abundance in this area, and are being excluded from annual mowing in hopes of increasing their ecological value.

Weir Hill Fire History:

It is no coincidence that Weir Hill has, and continues to have a close relationship with fire; a relationship founded in its soil – well-drained sandy glacial deposits, and reinforced by the legacy of human occupancy and floral adaptation to those cultures' most powerful tool – fire. The result is one of Essex County's few remaining fire-dependant communities where locally rare fire-tolerant and dependant plants such as scrub oak, wild indigo, and bush clovers occur in abundance. Fire's influence on a plant community is complex – one affecting soil composition and chemistry, light levels, and species composition. Trying to mimic fire's effect without its use is challenging. Fire removes leaf litter and prevents the buildup of duff layers, releases nutrient back into the soil, and creates the thin, mineral soils required for germination by many fire-dependant plants. In addition, frequent fire reduces competition from non-tolerant species such as white oak and white pine, and maintains an open subcanopy providing light conditions that promote the development of a diverse herbaceous and shrub layer. The plant community that evolves in a landscape shaped by periodic fire disturbance becomes dependent on fire to create and maintain the requisite germination and growing conditions. Many of these species exhibit specific adaptation to fire including thick

insulating bark, the ability to resprout after being damaged by fire, seed release timed to coincide with fire, and a growth habitat that promotes frequent, low intensity fires.

Southeastern Massachusetts, with its warmer temperatures and course-textured coastal plain soils, is more typically associated with fire than Essex County. Forests in Barnstable, Dukes, Plymouth, and Nantucket County are the most flammable in New England and as fire prone as those of southern California. Moving north and inland, elevation and humidity increase and fire frequency decreases substantially. In places like Essex County, fire only occurs with any degree of regularity in areas where steep slopes and shallow soils combine to create physiological drought conditions – conditions typical of the south facing slopes of Weir Hill.

However, soils alone cannot explain the presence of a well developed fire influenced community that potentially pre-dates European contact. What is also required is an ignition source. Lightning, which is usually accompanied by rainfall in the northeast, is not a significant cause of fire in Massachusetts. Instead, 98% of Massachusetts wildfires are started by humans.² Today carelessness and vandalism account for most fire ignitions. However, fire was, until recently, an important tool used to maintain the land and was employed by Native Americans, European Colonists, and in modern agriculture. While there continues to be debate over the extent to which Native Americans used and influenced the Massachusetts landscape with fire, it is clear that certain areas evolved a close relationship with fire due to frequent and repeated burning by native cultures. Weir Hill, which derives its name from the nets used by Native Americans and Colonists to capture the spring alewife runs, has a long history of cultural activity dating back over 6,000 years. The artifact record and area descriptions at contact provide evidence that Weir Hill supported Native Americans over a long period of prehistory. It is likely that the native-people who camped on the shores of Lake Cochichewick set fire to the landscape, and Weir Hill's relationship with fire began with these cultures' occupation. That relationship was perpetuated by colonists who grazed Weir Hill and likely repeatedly burned the land to stimulate herbaceous growth and clear woody debris. The Essex Railroad which traces the southwest toe of Weir Hill and operated from 1848-1926 was also a likely ignition source as sparks blew from the coal-fired trains.

Fire log books from the North Andover Fire Department provide the most detailed account of Weir Hill's recent fire history. These log books describe numerous small-scale brush fires and relatively few large outbreaks. Fires most commonly occurred in the spring, burn for less than two hours, and were caused by children and teenagers playing with incendiary devices. Large fires of note include a 75-acre blaze in April, 1973, a 10-acre fire in May 1973, a 20-acre fire in May 1980, a 13-acre fire in June 1980, a 50-acre burn in 1986, and a 60 acre blaze in May, 1995.

Weir Hill has burned repeatedly in the past. It will continue to do so in the future. One of the challenges for this plan is to manage the property in a way that perpetuates the significant ecological features of this fire influenced community while protecting the surrounding suburban community from fire's potential destructiveness.

² Massachusetts Bureau of Forest Fire Control