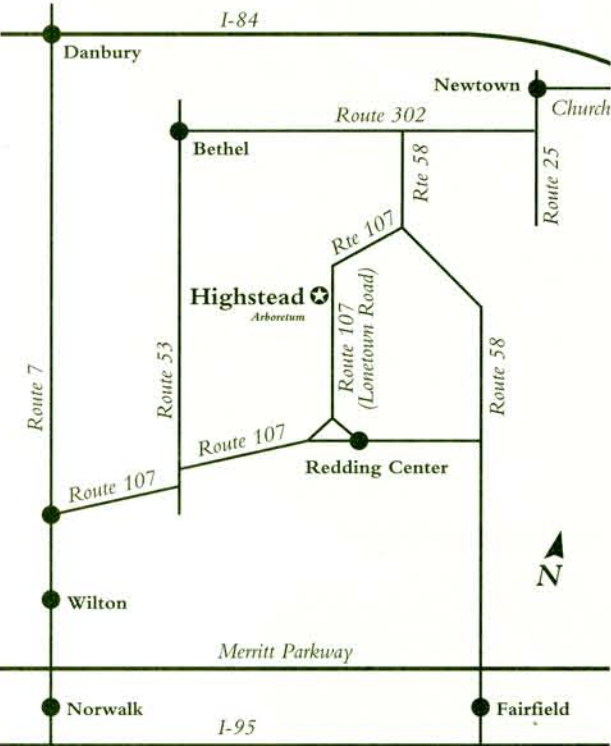


Facility Notes

For the protection of the fragile plant environment, please note:

- No dogs, bicycles, play equipment, food or beverages
- Stay on the paths and boardwalks
- Please refrain from picking plants and flowers
- No smoking

As the Woodland Project site is located in an isolated area, viewing of the site is only offered as a guided walk. Please call ahead to make a reservation, in order to ensure the availability of staff.



Individuals or groups interested in visiting Highstead may make arrangements by writing or calling:

Highstead Arboretum
 P.O. Box 1097
 Redding, Connecticut 06875-1097
 203-938-8809

Introduction

The Woodland

Our present woodlands look as if they have been here “forever,” when actually they are less than one hundred years old. Only our older residents have witnessed the dramatic change of open farmland of the early part of the 20th century to the dense, wooded growth we see today.

As our woodland becomes fractured with more housing developments, land management practices must change. Tree work has replaced field mowing, and although the arborist is quite knowledgeable in the care of trees around the home, little is known about the management of our woodlands. The relative youth of this woodland is providing the Arboretum with fertile ground for research and education.

For these reasons, Highstead has begun a long-term woodland demonstration, focusing on an appropriately sized wooded area, similar in size to the typical building lot of towns in the immediate area. In this way, the local landowner will be able to make an estimate on the viability of such a project on his/her own property.

Establishing Goals

The size of most properties in this area is insufficient for profitable timber or firewood production. Most landowners will be inspired to undertake such a project for aesthetic reasons, but as aesthetics are a personal determination, it is best to further define your objectives. Do you hope to attract a greater diversity of plants or wildlife? Would you like to remove or control invasive, non-native plants? Install a woodland path for contemplation, or simply take an active hand in the stewardship of your property? The more specifically you are able to define your goals, the easier it will be to determine the methods and resources to utilize.

In advance of any action, two books worth reading are: *Working with Your Woodland: A Landowner's Guide*, by Mollie Beattie, Charles Thompson, and Lynn Levine, and *The Woodlot Management Handbook*, by Stewart Hills and Peter Mitchell.

Assessing the Site

Before beginning any property-based project, it is important to assess the site. First and foremost, know your boundaries. A good survey can go a long way in ensuring a peaceful coexistence with your neighbors.

Transferring your site survey to graph paper, and locating major structures, will provide a basis for locating the most significant plant material. Be sure to walk the site in several seasons, in order to avoid inadvertently damaging or destroying any rare or unusual plants.

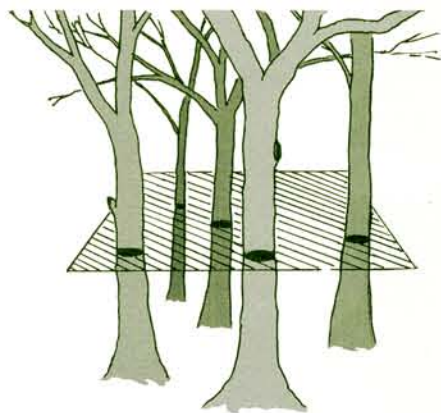
For the truly inspired, a complete stem map of the woody plants may be made, taking time to record the species, size, condition and location of each. Recording this information will be of great assistance when evaluating the site for removals or thinning, and for assessing the results of your management efforts.

Measuring Up

Two methods of measurement used by the forestry industry are diameter-at-breast-height (DBH) and basal area coverage (usually expressed in square feet per acre). It is the relative ease with which these measurements are obtained that helps to account for their popularity.

Diameter-at-breast-height is as straightforward as its name. A measurement of the diameter of the trunk or leader is made at four and a half feet above ground level. If you do not have a calibrated tape measure made for this purpose, a device called a Biltmore stick is just as effective, and easily made. Ask for instructions at the Arboretum office.

Basal area coverage is the sum of the cross sectional area of all trees on a particular acre. This measurement is also taken at four and a half feet above ground level in order to assure uniformity. It is interesting to



The illustration to the left is a visual depiction of basal area coverage at 4 1/2 feet. The darkened circular trunk portions, representing the basal area of each trunk, would be added together to arrive at a one acre basal area coverage value.

note that the number of trees alone do not equate with greater basal area coverage. Using our woodland as an example, Plot C, which represents a thirty year old woodland, has 172 trees with a basal coverage per half acre of 91.81 square feet. Plot A, which represents an eighty year old woodland, has only 70 trees, yet has a basal coverage of 110.44 square feet over the same sized area. There is a point of diminishing return in the woodland, when the basal coverage will begin to decrease again, as age and competition take their toll on the weaker specimens.

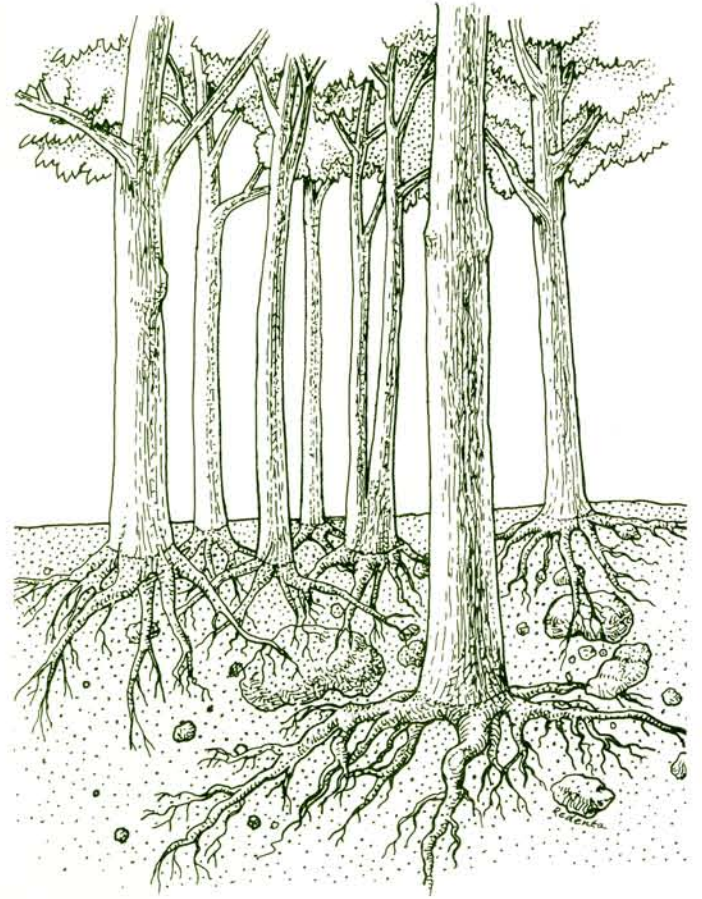
Surely, but Safely

These steps are the beginning of a process of evaluation that should include a decision as to how much of this work you can safely take on yourself, and what is best left to a professional. As a scientific institution, the Arboretum has been able to work closely with the professional staff at Harvard Forest. As a private homeowner, professional advice is best sought from local resources such as a Cooperative Extension Service Forester, a local tree warden, or a licensed arborist.

Remember, the key to the greatest enjoyment of your own property is observation and familiarity. Stewardship is a fortunate link to the woodlands around us, not a burden.

The Woodland Project

A Demonstration of Woodland Management Techniques



Highstead Arboretum

The Demonstration

For a better understanding, please read the introduction on the reverse first.

In preparing for this practical demonstration, the Arboretum contacted Harvard Forest in Petersham, Massachusetts. With the assistance of their foresters, a site was selected and a preliminary design for the demonstration was laid out.

Two one-acre sites were chosen based on proximity to one another and the contrasting ages of plant material on each acre. Each has a uniform population in an undisturbed area on uniform soil. Each one-acre site was then divided in half for control purposes (managed v. unmanaged), and then all four of the resulting sites were bisected by deer fencing (see map). Plots A & B together represent an eighty year old woodland, while plots C & D are thirty years of age. This rough dating has been documented through aerial photographs on file at the State of Connecticut Department of Environmental Protection (DEP).

Clues to the history of this area can be found in the stone walls which are still visible, suggesting that agricultural practices occurred on all four plots. More recently on C & D, which still show the presence of red cedar trees, an early successional plant. These visual clues to the history and age of your woodland can be of great assistance in the evaluation of your site.

In laying out the managed plots, a north to south axis was intentionally selected. With this orientation, any additional light received in a plot due to tree removals will benefit the plot from which the trees were removed. We expect this opening of the canopy to encourage both new seedlings and stump sprouts. This should occur to an even greater extent in the fenced areas, where the plant material will not be subjected to deer browsing.

The deer fence runs east to west in order to bisect all four plots, and is set on the south side of the site so as not to interfere with neighboring properties. The purpose of this fencing is to attempt to determine to what extent browsing by the exploding deer population is hindering the distribution of native plants.

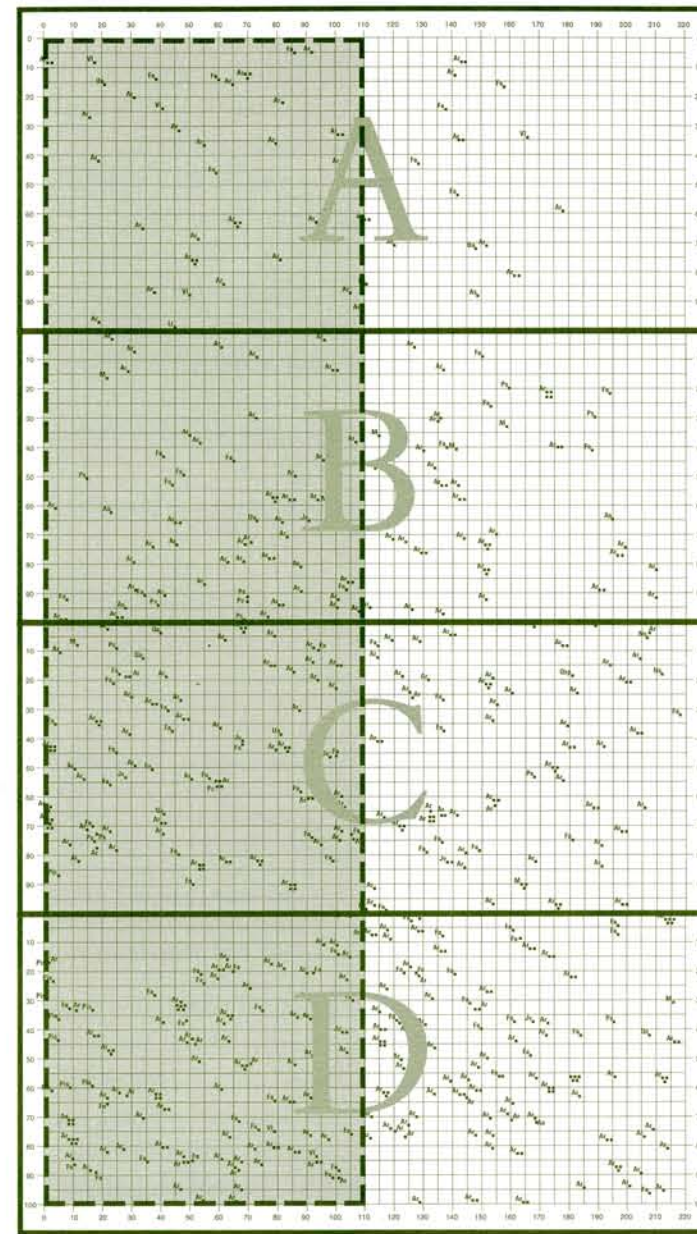
Data was first recorded by staking out the plots, then mapping the individual trees and noting their size, species and general condition. Trees to be removed from the managed plots were selected from this information, ridding these plots of weak, injured and dead plant material. Of the more than sixty trees removed, many were multiple leader trees (a potential indicator of previous cutting). Inherently, these trees are structurally weaker than single leader trees. Due to the preponderance of red maple and ash, these species were taken first when there was a choice between either of those species and another. Keep in mind, some decisions were made for purely aesthetic reasons, including keeping the large red maple found in plot A. In addition to the trees, all invasive, non-native plants (bittersweet, barberry, and multiflora rose) were removed from the managed plots as well.

In order to delineate the borders not enclosed by fencing, straight logs from the selective removals were placed along the edge of the four plots. Stumps were flush-cut for appearance sake.

Within the managed plots, plant litter is removed on a regular basis. This process of cleaning can be viewed as aesthetically pleasing,

Highstead Arboretum's Woodland Project

Original Stem Map 1998



The older stand, comprised of plots A & B, supports far fewer trees, with a more open and stratified canopy than C & D. This open canopy has allowed for an understory composed mostly of spicebush and winterberry. There is also more diversity of species in these plots, some significant indicators of older woodlands such as sugar maple and tulip poplar. This area was probably abandoned at an earlier date, due to the slope, which would have made for difficult mowing.

- Unmanaged
- Nature choosing survivors
- Branch litter left in place

- Managed
- Periodic culling of trees, saving healthiest
- Litter & invasive plants removed

The younger plots, C and D, support a much denser, evenly spaced stand, more uniform in diameter and height. With such a complete canopy, there is almost no understory and very little herbaceous material. Competition is at peak levels, resulting in a forest floor cluttered with dead branches. The plants are actually crowding out one another. Although the initial reaction to viewing this sight is "oh, just red maple," there is some diversity of plant material.

- Managed
- Substantial number of trees culled
- Litter and invasive plants removed

- Unmanaged
- Tree competition at peak
- Litter & invasives left in place

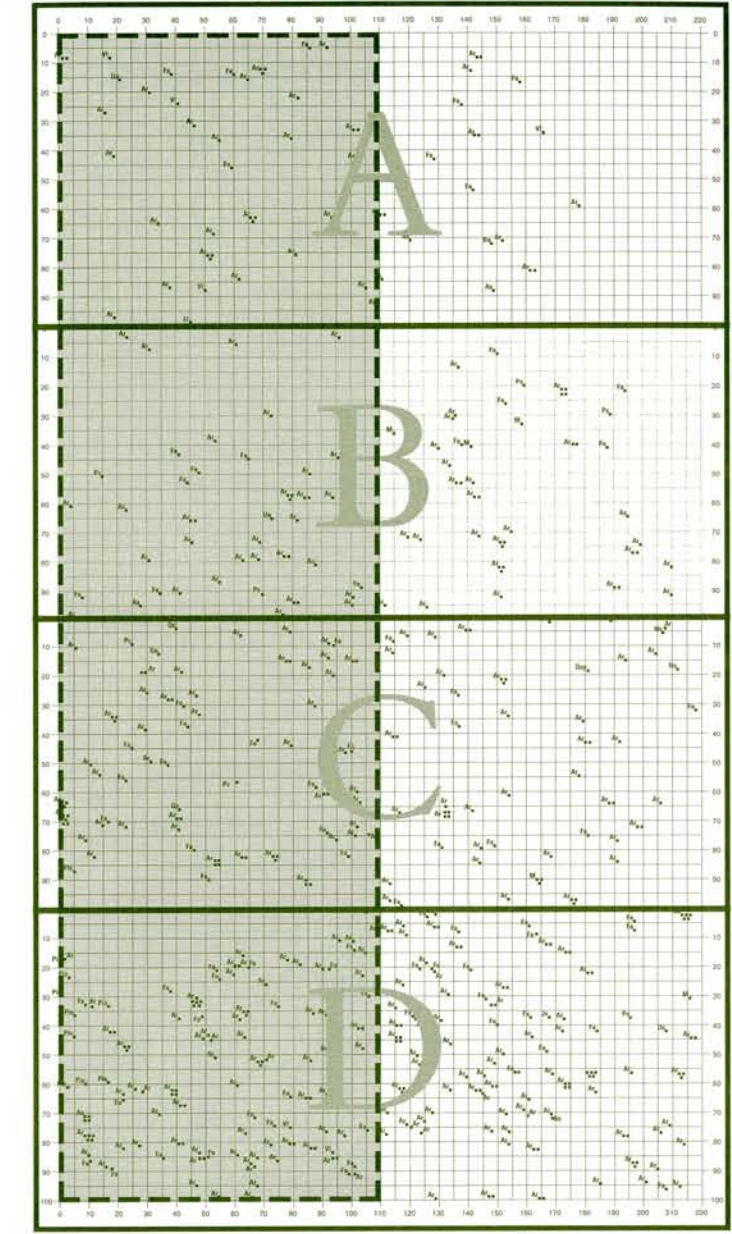


deer fence



north

Post Removal Map



or as a removal of potential wildlife habitats and soil amendments. We have incorporated this as a purposeful part of our study in order to observe and measure the long term effects.

The contrast between managed plot C and unmanaged plot D is dramatic. In this youthful state of overcrowding, where the competing plant material is actually bringing itself down, the contrast between managed and unmanaged is clearly evident. Making a similar comparison between plots A & B is not as clear, since the shakedown of weaker plants has already occurred, and also had sufficient time to break down and return to the soil. The most interesting comparison is between the unmanaged plots of A & D. This comparison shows how nature, over time, has accomplished the same clean up as we have effected in the managed areas.

Stem Count / Basal Coverage (in square feet)

		fenced	unfenced	total
A	original	46 / 72.4	24 / 38	70 / 110.4
	current	---	---	unchanged
B	original	78 / 43.9	61 / 49.7	139 / 93.6
	current	53 / 33.5	55 / 46.5	108 / 80.0
C	original	137 / 66.7	111 / 57.5	248 / 124.2
	current	101 / 53.25	71 / 38.5	172 / 91.75
D	original	153 / 53.7	156 / 85.4	309 / 139.1
	current	---	---	unchanged

To Be Continued

Although this project is at the very early stages of measurement, we can already observe a difference among the plots. As time progresses, we expect to see much greater diversity of plant material within the fenced areas and more sprouting from the flush-cut stumps as well. Affording your property protection from the selective browsing by deer is a personal decision, but it is important to note that there has been a dramatic decrease in herbaceous and woody plant material as a result of browsing. It is also important to note that browsing is not the only problem; the bark damage inflicted as deer remove the felt from their antlers is just as significant, destroying the protective layer of bark, effectively girdling the tree.

We will continue to monitor these results, and stay in touch with Harvard Forest for their professional direction. We look forward to sharing the results of this demonstration with each passing season.