

Report on the Protection of Leatherwoods at Hawthorne Valley.

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Figure 1. The delicate, early-spring flowers of Leatherwood, which appear before the leaves unfurl.

Background

Eastern Leatherwood (*Dirca palustris*) is a woody shrub, which occurs throughout much of the eastern US (and a smidgen of southern Canada). *Dirca* is a four-species, solely North American genus, used historically both for cordage and medicine. Its subtle yellow flowers (Fig. 1) and interesting geometry (Fig. 2) make it a distinctive, appealing member of our regional fauna. In Columbia County, where we know it from about a dozen locations (Fig. 3), it is scattered across the landscape in small clumps. (Some have suggested that such clumpiness is due to a missing seed disperser, possibly the now-extinct Passenger Pigeon.) One of the bigger such clumps occurs on relatively moist ground along the Agawamuck at the northwest corner of Phudd Hill on Hawthorne Valley property.



Figure 2. A mature Leatherwood with its interesting, spindly form.

Despite the reported presence of calcium oxalate, the same toxin documented in Skunk Cabbage, Leatherwoods are aggressively browsed by White-tailed Deer. After casual observations in earlier years and the noting of heavy browse damage (Fig. 4) in November 2023, we began weekly spraying with Deer repellent during the winter of 2023/24 (Deer Stopper and Deer Stopper II sprayed alternately). In general, only Leatherwoods were sprayed. In February of 2024, we conducted a survey of Leatherwood stems to document the intensity of Deer damage. A summary of that initial survey was presented in our [Progress of the Seasons blog post for 24 Feb. 2024](#). Extensive evidence of intensive Deer browsing was documented. Deer repellent spraying was repeated during the Winter of 2024/25, and in the Spring of 2025 with the support of PCA funds, a Deer exclosure was erected around the core of the Phudd Hill Leatherwood clump (Fig. 5). This report summarizes the initial monitoring of Leatherwood and herbaceous plants done under this project. The data reported here more or less reflect the condition of the Leatherwood at the time the exclosure was established. They are a baseline, and so document the effect of the Deer repellent spraying, but not yet of the fence. As noted below, there is some suggestion that the herbaceous data may reflect early effects of the fence.

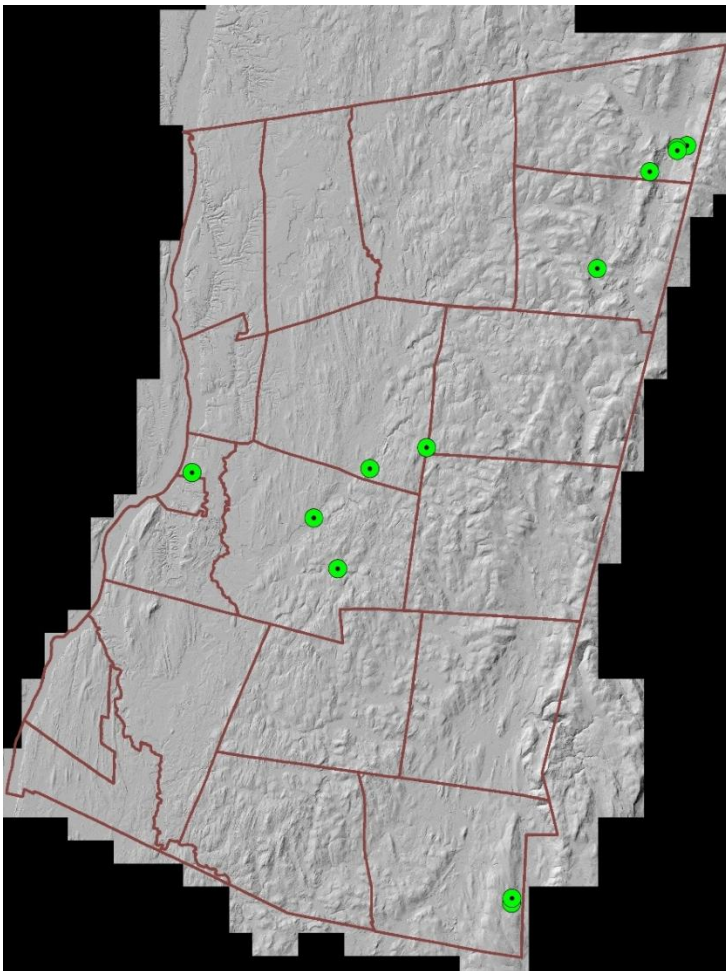


Figure 3. Known locations of Leatherwood in Columbia County, NY.



Figure 4. A Leatherwood showing the relatively thick trunk and low, skinny branches indicative of past Deer browsing. It almost looks as if the plant has been pollarded by gnomes.

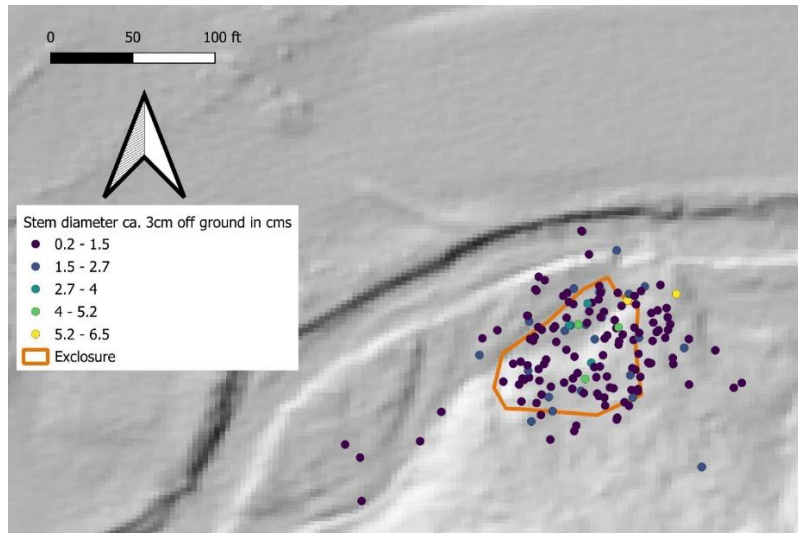


Figure 5. A map of Leatherwoods located just south of the Agawamuck Creek and at the base of a north-facing hillside. The approximate location of the Deer enclosure is indicated. The background image is a LiDAR-derived hillshade.

Methods

In Spring of 2025, Leatherwood stems both inside and outside of the Deer fence were marked with metal tags and re-assessed for Deer damage. (Herbaceous plants were also surveyed, see below). The presence of Leatherwood flower clusters was also recorded at this time.

On 25 April 2025, Deer-browse damage was assessed in two different ways: by using a 0 to 3 scale of recent browsing (with 0 denoting no visible browsing and 3 denoting no evident viable buds remaining) and by comparing stem diameter at thumb height (ca. 3cm above the

ground) to total shrub height. Lower height:diameter ratios (i.e., relatively short and stocky plants) were taken as indicative of historical Deer browsing.



Figure 7. Herbaceous plant sampling transect outside the Deer enclosure.

In the spring of 2025, we also did vegetation surveys comparing the herbaceous plants, inside and outside of the enclosure. These were conducted in the springtime to target spring-flowering plants that are often eaten by Deer. To make this comparison, we set up three transects (with four 1m² plots each) inside the enclosure (Fig. 6) and three more outside in similar conditions to function as controls (see Fig. 7). Within each plot, all herbaceous plants were counted, percent cover was estimated, and the tallest individual was measured to get an average height. Signs of browse and presence of reproductive material (flowers and fruit) were also noted.



Figure 6. Herbaceous plant survey transect within the Deer enclosure.

Table 1. A summary of the Deer browse index for Leatherwoods early in 2024 and 2025. The index was defined as 0 = 0 Deer nibbles, 1 = 1 or 2 apparent nibbles, 2 = more than two nibbles but ample healthy buds remaining, 3 = all or almost all buds removed by browse. The 2.5 used in 2024 indicated heavily browsed plants that nonetheless still possessed several viable buds; this category was not needed in 2025.

Deer Damage Index	Stems with Given Index	
	Feb. 2024	April 2025
0	15	154
1	71	5
2	37	3
2.5	16	0
3	18	1
Total Stems Inspected	157	163

Results & Discussion

Of the 157 individual Leatherwood stems documented during our initial 2024 survey, all but 15 showed clear evidence of Deer browsing, and 71 were moderately to severely browsed (index values 2-3), including 18 which appeared to have no viable buds remaining (see Table 1).

Reflecting the efficacy of repellent spraying, more than 90% of the stems surveyed in 2025 showed no sign of recent Deer browse, and only one plant (accidentally overlooked during spraying) suffered high intensity browsing (see Table 1). A comparison of the 2024 histogram of the height:diameter ratio (Fig. 8) with that for 2025 (Fig. 9) appears to show a trend towards relatively taller shrubs, presumably because of release from browsing. In 2025, at least 72 of these stems bore at least one flower cluster, and 49 had ten or more clusters (flowers were not tallied in 2024).

During the herbaceous plant surveys, we tallied a total of 46 species within the plots. In the enclosure, there were 32 species and, in the controls, we found 37. The total number of species present in the enclosure and the controls is likely higher, and we plan to reassess diversity this in 2026. There was not enough information on herbaceous browse damage for analysis. Browsing on herbaceous plants is different from that on woody plants in that the former can completely remove the browsed plant and so be undetectable. As noted above, browsing on Leatherwood was more easily detected, being visible as browsed twig tips and a lower height:diameter ratio.

We were able to collect data on herbaceous percent cover and plant height, however, we did not find statistically significant differences in either characteristic when comparing the enclosure and the control plots. Below (Fig. 10) are two box-and-whisker plots showing the overlap of the data in both treatment types. The vertical lines, or “whiskers”, on the top and bottom of the box show the complete range of data. In the percent cover plot (left), the two black dots on the enclosure side are outliers. The black bar across the box is the median value and the red diamonds are the averages. When there is a lot of overlap between the two boxes and their whiskers, that means there is not much difference between them. As you can see, there are slight trends towards higher overall height and higher percent cover in the enclosure. This could be because this survey was conducted after the enclosure was erected. So, the vegetation in the controls may have been subject to browsing in the early spring, prior to the survey, while that inside the enclosure was not. This makes our first data collection not a true pre-manipulation baseline but rather an early “Year 1” of the study. However, treatment and control do not differ greatly, and, over time, we will be able to see if this trend of increased percent cover, and higher overall height continues when the pressure of Deer browsing is relieved.

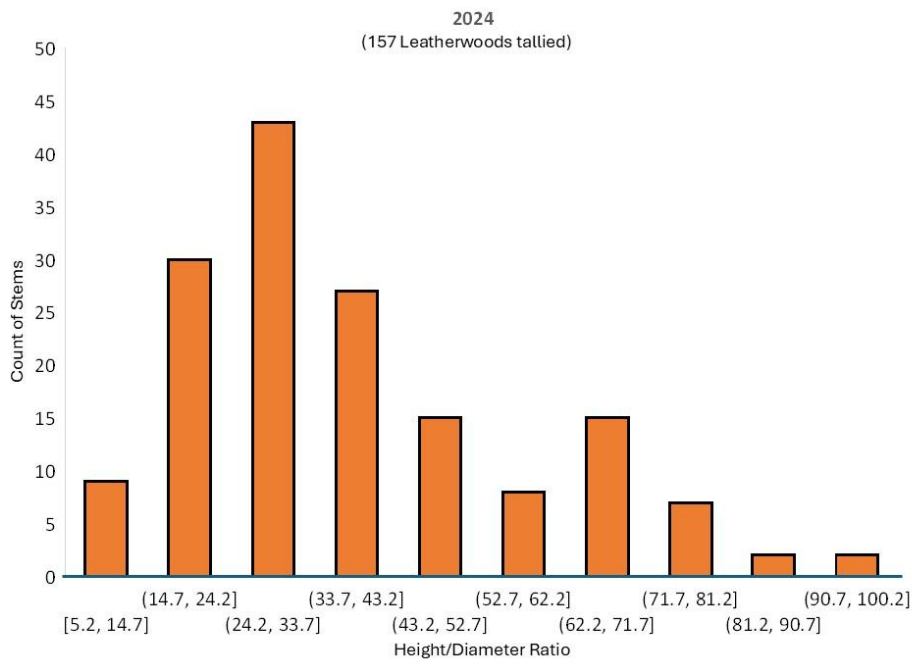


Figure 8. The distribution of the height over diameter ratio for Leatherwoods measured at the site in February of 2024, after a winter of relatively intense Deer browsing. The horizontal axis indicates ranges in the unitless height:diameter ratio, while the vertical axis shows the number of Leatherwood stems whose dimensions fell within the respective ranges. Lower values indicate short, stocky, often browsed stems.

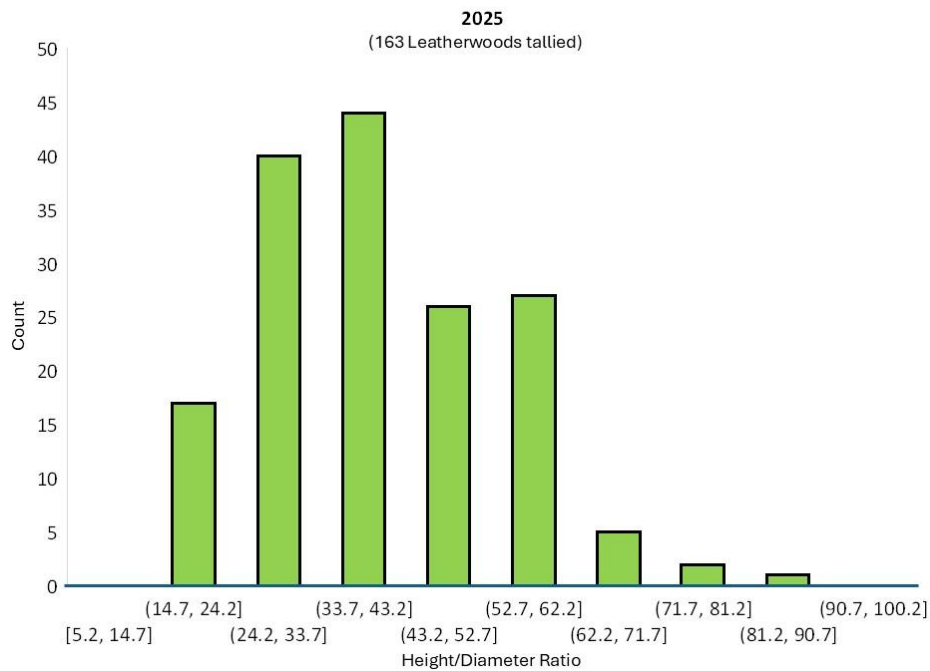


Figure 9. The distribution of the height over diameter ratio for Leatherwoods measured at the site in April of 2025, after a winter of Deer repellent spraying. The horizontal axis indicates ranges in the unitless height:diameter ratio, while the vertical axis shows the number of Leatherwood stems whose dimensions fell within the respective ranges. Lower values indicate short, stocky, often browsed stems.

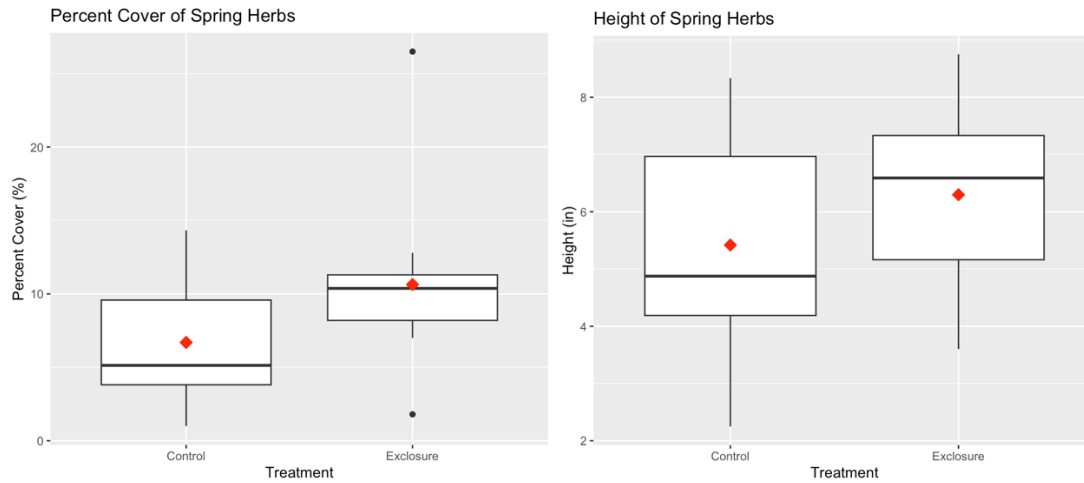


Figure 10. Two Box-and-Whisker plots showing the distribution data in the control and the exclosure. The red diamond is the average, the black bar is the median, and the black dots are outliers. (Left) Estimated percent cover of vegetation. (Right) Average height of vegetation.

Considerations & Outlook

We plan to repeat our surveys in 2026. Our 2025 work suggests that the reduction of Deer browsing (initially through repellent spraying) may well alter the growth rate and form of Leatherwoods in this clump. The comparison of Figs. 8 and 9 suggests that upward growth has been encouraged by the decrease in winter browsing, and we would predict that this trend would continue within the exclosure (although, at a certain height, stem-diameter growth may outstrip relative height growth and thereby cause a reduction of the ratio). We would also predict that the number of flowering Leatherwood plants will increase. The inclusion of Leatherwood stems inside and outside of the exclosure may help document the effects of the fencing. Incidental observations in December 2025 did indicate that Deer were browsing the unsprayed and unfenced Leatherwoods outside of the exclosure, while, to date, no evidence of Deer activity inside the exclosure has been noted.

While we hope that our fencing efforts will help these Leatherwood plants to prosper, we will need to see how other plant species respond to the elimination of Deer browse. By repeating our surveys of herbaceous plants, we hope to be able to detect the effects of restricted browsing on other plants beside Leatherwood, and it would be nice to see an increase in the abundance and diversity of ephemeral spring flowers within the exclosure. However, increased competition between other plant species and Leatherwood is possible. Recall that Deer repellent was generally only applied to Leatherwoods, potentially favoring them over other plants growing in the area. The fencing, on the other hand, protects all plant species within the exclosure, perhaps not only encouraging greater herbaceous plant diversity and height, but also greater competition with at least the younger Leatherwoods.