

## **Eliminating Canopy Vines and Controlling Invasives at Coniston**

Eliminating strangling, smothering vines in woodland tree canopies is not rocket science! If you cut off a vine where it comes out of the ground, everything above will die. But if you do not cut these same vines once more, at 6 or 7 feet above the ground, sprouts from the ground will use those dead vines to find a new path into the canopy. So it is important to have a clear space, seven feet deep around the trunk of each tree with no vines, shrubs or branches in it. This means that all shrubs and vines in that space must be cut off at ground level, and again at 6 feet, and consolidated in piles on the ground. Any branches on the trunk of the tree being freed, that are within 6 feet of the ground, must also be removed and piled on the ground. Then, if the tree is at least 10 inches in diameter, no twining vines can make it into the canopy; they will attempt to twine around the trunk, but not having anything to hold on to, will of their own weight slide to the ground. Vines like Asian bittersweet and Japanese honeysuckle are twining vines. Porcelain vine and grape, climbing by tendrils, must have branchlets for those tendrils to grasp to get into the canopy. Vines like poison ivy and Virginia creeper can still climb such a tree because they have aerial roots that can cling to the bark, but they are lesser threats.

What happens to the cut-off vine stems at ground level? Large old vines of Asian bittersweet and grape, those above two inches in diameter, will seldom send up new shoots; they just die. Smaller cut-off vines will re-sprout, but in the absence of shrubs or other means of reaching into the canopy, will simply trail about on the ground. Deer will browse these, helping to keep them under control. Japanese honeysuckle vines have many adventitious buds at the base of the main stem, so when the vine is cut, these will sprout vigorously unless the entire basal part of the stem is uprooted, or cut off from its roots. The sprouts will trail along the ground, rooting as they go, and persist in the understory indefinitely. They will, of course, climb onto any small shrubs they chance upon so it is best to eliminate the basal portion of the vine completely as the vine is first cut. Likewise, smaller poison ivy vines and most exotic shrubs will regrow from the base after being cut. In such cases, the fol-

low-up monitoring of the woodland will indicate where control by cutting or carefully targeted spraying with herbicides is needed.

Depending on the condition and density of the trees remaining in a particular woodland, regrowth of exotic invasives in the ground layer will be more or less suppressed by the increasing shade as the canopy recovers. In more open or severely degraded woodlands, there is an increase in light reaching the ground level in the first few years following removal of the canopy vines. Consequently, there will be a notable increase in shade tolerant invasive herbaceous and woody seedlings. Those invasives, like Japanese barberry, Japanese honeysuckle, poison ivy and winged euonymus, will grow more slowly and fail to flower or produce seed. This gives those monitoring the site more time to control any remaining or returning invasives. That is the reason why the time and effort needed decreases dramatically after the canopy vines are gone. It is still important not to allow any exotic invasives to reach flowering size, or gain access to the tree canopy. The high-light requiring herbaceous plants will decline as the canopy closes.

At the same time that invasive seedlings are coming into the more open woodland, there is an increase in seedlings of desirable, shade-tolerant native shrubs like spicebush and arrow-wood viburnum; provided there is a seed-source. At Coniston these two species are lightly browsed by deer, but they are not, at present, a preferred food. It is hoped that they will eventually provide a shrub layer in the woodland. Those monitoring the woodland should do what is needed to keep these free of competition from vines like Japanese honeysuckle.

Finally, it may be necessary to enhance the density of trees within or at the edge of the woodland. At Coniston we have had success in planting native oaks, sugar maples, black birches, hornbeams, hop-hornbeams, flowering dogwoods and other edge and understory trees. All must be caged or planted in tubes to prevent deer predation and buck-rubbing. We hope to thicken the edges of the woodlands and allow branches to grow out over the meadow at a height sufficient to allow routine mowing close to those edges. Assiduous monitoring will always be needed.

Richard W. Lighty, January 2021

## Woodland Restoration Time Requirements at Coniston

The time and effort needed to eliminate invasives at Coniston is a function of the age of the woodland, the density and species diversity of the trees, the mix of invasive plants, the amount of light reaching the ground, and the amount of edge relative to the depth of the woods. The job is never finished, but the nature of the work changes with progress. Eventually it becomes routine monitoring of the status, with controls applied as needed. The presence of deer will always work against the return to an historically typical Eastern North American woodland.

**East woods & East Successional Woods:** 5.8 acres, bordered by open meadow on three sides and by invasive-infested woodlands on neighboring properties on one side. This young woodland had formerly been a pasture with a small brook shaded by a narrow band of mature red maples, walnuts and sycamores. In 2007, when control began, trees in the main body of the woods were about 37 years old. The canopy was heavily infested with vines while the understory had only a few invasive, non-native shrubs and vines; principally Russian olive, multiflora rose and Japanese honeysuckle. Tree trunks, large limbs and branches were strangled and broken by Asian bittersweet and weighed down by native grape vines. In the heart of the woods there were 75 or 80 dead or dying flowering dogwoods and ten or twenty dead or dying red cedars, remnants of the higher-light "old-field" interval after agriculture ceased. Some dogwoods persisted along the edges which were heavily infested with Russian olive, multiflora rose, Japanese honeysuckle and poison ivy. The activities, and time spent accomplishing them over 13 years, were:

2007 - 8	<b>40 man-hrs.</b>	began freeing all interior trees of invasive vines
2008 - 9	<b>22 man-hrs.</b>	continued freeing trees of invasive vines
2009 - 10	<b>2 man-hrs.</b>	mop-up of interior invasive vines, monitoring begins
2010 - 11	<b>2 man-hrs.</b>	monitoring and control of ground layer for invasives
2011 - 12	<b>2 man-hrs.</b>	monitoring and control of ground layer for invasives
2012 - 13	<b>1 man-hrs.</b>	monitoring and control of ground layer for invasives
2013 - 14	<b>1 man-hrs.</b>	monitoring and control of ground layer for invasives
2014 - 15	<b>1 man-hrs.</b>	monitoring and control of ground layer for invasives
2015 - 16	<b>10 man-hrs.</b>	control of invasives along meadow edges begins*
2017 - 18	<b>17.5 man-hrs.</b>	control of invasives along meadow edges
2018 - 19	<b>30.5 man-hrs.</b>	control of invasives along meadow edges
2019 - 20	<b>32 man-hrs.</b>	clean up edges, raise edge canopy to allow mowing

\* monitoring continues through 2020 - and thereafter!

161 Total man-hours over 12 years - An average of - 13.4 man-hours per year, or 2.3 man-hours/acre/year.

Note : The ongoing physical effort decreases dramatically after the canopy invasives are removed. The time spent in planting and caring-for trees for reforestation is not included for here.

**South Successional Woods: 4.5 acres:** bordered by meadow on two sides and by hedgerows and residential development on two sides. While this woodland was abandoned about the same time as the East and East-Successional Woodlands, there were, for several years, misguided attempts to control invasives using heavy equipment. This kept the woods more open and allowed higher light to reach the forest floor, encouraging the growth of multiflora rose, Russian olive and other invasive exotic, sun-loving shrubs and vines. This in turn, caused much greater difficulty in controlling canopy vines because of the massive, thorny shrubs around the trees,

where the mowers had not been able to operate without damaging trunks or branches. The result was fewer, more widely separated trees, each with a heavily-infested canopy, but with almost no canopy in the spaces between them. The time needed to control canopy vines and exotic shrubs with hand labor was greatly increased over that needed in other woodlands at Coniston. Fortunately, the grounds management department had a very heavy-duty brush cutter and a skilled operator. With this, the large, thorny shrubs could be cut almost to the ground so that residents with hand tools could finish the job and cut the canopy vines appropriately. The use of heavy equipment saved many hours of hand work.

2010 - 11	<b>24 man-hrs.</b>	cutting canopy vines and invasive shrubs
2011 - 12	<b>16 man-hrs.</b>	cutting canopy vines and invasive shrubs
2013 - 14	<b>12 man-hrs.</b>	cutting canopy vines and invasive shrubs
2014 - 15	<b>3 man-hrs.</b>	cutting canopy vines and invasive shrubs, "Ambusher" work 5 hrs.
2015 - 16	<b>8.5 man-hrs.</b>	cutting canopy vines and invasive shrubs, monitoring
2016 - 17	<b>8.5 man-hrs.</b>	cutting canopy vines and invasive shrubs
2017 - 18	<b>41.5 man-hrs.</b>	cut invasives, laid debris, "Ambusher" 8 hrs.
2018 - 19	<b>45 man-hrs.</b>	cut invasive, laid debris, monitoring, target spray glyphosate
2019 - 20	<b>6 man-hrs.</b>	monitoring, cut invasives, target spray glyphosate

164.5 total man-hours over 8 years. An average of- 20.6 man-hours per year or 4.6 man-hours/acre/year.

Note: The time spent machine-clearing some areas, and the time spent in planting and caring-for trees for reforestation is not included here.

**Haines Mill Road (Area A):** 1 acre: a narrow strip originally populated with mature, old-growth trees, and bordered on one side by the road and beyond that, old-growth forest. On the other side is the landscaped residential area with turf, and open to the sky. While the area was infested with canopy vines like Asian bittersweet, native grape, greenbriar, poison ivy and Japanese honeysuckle, as well as a diversity of exotic shrubs, it was easy to get these woody plants under control. After ten years, the nature of work changed to the control of herbaceous invasives like garlic mustard, and eradication of woody invasive seedlings. This was accomplished by careful, precisely-targeted application of non-aerosol glyphosate.

2009 - 2018	- <b>11 man-hrs.</b>	- cutting and pulling woody and herbaceous invasives
2018	- <b>6.25 man-hrs.</b>	- cutting, pulling and target-spraying invasives
2019	- <b>10.75 man hrs.</b>	- cutting, pulling and target-spraying invasives
2020	- <b>5 man-hrs.</b>	- cutting, pulling and target-spraying invasives

33 man-hrs. man-hours over 11 years - An average of 3 man-hours per year or 3 man-hours/acre/year.

Note: The time spent in planting and caring-for trees for reforestation is not accounted for here.

**Locust Grove Road Woodland (Area B):** 1 acre: a narrow strip of remnant woodland bordered by the road and power lines on one side and by open meadow on the other. Only about ten mature, native woodland trees remained on this site; among them, three species of oak, beech and maple. The edge along the open meadow was heavily infested with mature Russian olives which supported Asian bittersweet, native grape and Japanese honeysuckle. This accounted for much of the large man-hour requirements from 2016 to 2019, Periodic poor "pruning" of the

power line exacerbates the problem of narrowness, resulting in high light reaching the ground level. While oaks, maples, wild cherry, beech and dogwood seedlings are abundant, they are all susceptible to deer browsing and buck-rubbing, so they must be caged if they are to grow into mature trees. The high light also encourages garlic mustard and Japanese honeysuckle to seed and proliferate in the interior. The largest part of the hand labor here was spent on controlling these.

2009 - 10 - **8 man-hrs.** - cutting, pulling and target-spraying invasives with glyphosate  
2010 - 11 - **2 man-hrs.** - cutting, pulling and target-spraying invasives with glyphosate  
2012 - 13 - **1 man-hr.** - cutting, pulling and target-spraying invasives with glyphosate  
2013 - 14 - **1 man-hr.** - cutting, pulling and target-spraying invasives with glyphosate  
2014 - 15 - **1 man-hr.** - cutting, pulling and target-spraying invasives with glyphosate  
2015 - 16 - **13.5 man-hrs.** cutting, pulling and target-spraying invasives with glyphosate  
2016 - 17 - **55 man-hrs.**- cutting, pulling and target-spraying invasives with glyphosate  
2017 - 18 - **24.5 man-hrs.**-cutting, pulling and target-spraying invasives with glypho.  
2018 - 19 - **55 man-hrs.** - cutting, pulling and target-spraying invasives with glyphosate  
2019 - 20 - **30.25 man-hrs.**-- cutting, pulling and target-spraying invasives with glypho.

191.25 total man-hours over 10 years - An average of 19.1 man-hours per year  
or 19.1 man-hours/acre/year.

Note: The time spent in planting and caring-for trees for reforestation is not accounted for here.

**Western Boundary Line (Area C):** .5 acres: This, basically, is the fence line separating Coniston from an adjacent development. One-third of its length is in old-growth woodland, two-thirds has landscaped residential areas on one side and mature white pines on the other. This very narrow area has, thanks to the pines, moderately low-light over much of its length. Most of the labor has been used to cut canopy vines and control invasive seedling shrubs, vines, Japanese wineberry and garlic mustard.

2010 - 2018 - **15 man-hrs.** - controlling invasives, pruning white pines  
2018 - **2.75 man-hrs.**- cutting, pulling and target-spraying invasives with glypho.  
2019 - **3 man-hrs.** - cutting, pulling and target-spraying invasives with glypho.  
2020 - **3.5 man-hrs.** - cutting, pulling and target-spraying invasives with glypho.

Total man-hours over 11 years - 24.25 man-hrs. An average of 2.2 man-hours per year or 4.4 man-hours/acre/year.

Note: The time spent in planting and caring-for trees and shrubs planted for screening is not accounted for here, nor is the time spent "deadwooding" the white pines entered here.

**In summary**, the effort to free these wooded areas of invasive vines, shrubs and other exotic plants varied significantly:

2.3 man-hrs./acre/year for East Woods/East Successional Woods  
4.6 man-hrs./acre/year for the South Successional Woods  
3.0 man-hrs./acre/year for the Haines Mill Road (Area A)  
19.1 man-hrs./acre/year for the Locust Grove Woods (Area B)  
4.4 man-hrs./acre/year for the Western Boundary Line (Area C)

## WHAT WE HAVE LEARNED

It can be seen from this that the amount and intensity of maintenance required is a function of the initial “quality” of the woodland: its age, the extent of invasive infestation, the tree spacing, the amount of edge in respect to the size of area, the density of canopy and size of existing trees. The condition and quality of the canopy trees after they are freed of vines is also very important. In the cases above, these factors accounted for the large differences in man-hours per year per acre.

In general, the initial work in freeing a woodland of canopy vines and controlling invasive, high-light requiring invasive shrubs at the edges required more time and effort than the continuing monitoring and control in later years. This was reversed in areas with a high edge-to-area ratio: for example, in the narrow woodlands along the roads and boundary lines. The difference was largely due to the need for continued control of herbaceous and woody invasive seedlings which require high light.

The goal of any such restoration must be to reestablish a healthy, dense canopy of mixed, hard-wooded, native trees with long life-spans. Once this is begun, attention can be given to restoring the understory layers of small, shade-tolerant native trees and shrubs. Eventually a healthy, vigorous herbaceous plant layer must be established in an environment subject to constant deer predation and threatened by the return of invasive exotic plants.

For these reasons, all restored woodlands must be assiduously monitored in perpetuity for recurring problems. Trees and shrubs must be protected from deer browsing and buck-rubbing. Invasive plants will always be seedling-in, particularly at the edges. Eternal vigilance will make the job easier, as potential infestations are defeated in their early stages. To do this, stewards of the woodlands must be able to identify problem plants, as well as desirable plants, at all stages in their life cycles.

It has been heartening to note the resurgence of a limited number of native herbaceous and woody plants in each of these woods. Spicebush (*Lindera benzoin*), nanny berry (*Viburnum prunifolium*), maple-leaved viburnum (*V. acerifolium*), American holly (*Ilex opaca*), winterberry holly (*I. verticillata*), as well as sensitive fern (*Onoclea sensibilis*), hay-scented fern (*Dennstaedtia punctilobula*), spinulose wood fern (*Dryopteris carthusiana*), evergreen wood fern (*D. intermedia*), ebony spleenwort (*Asplenium platyneuron*), two species of grape fern (*Botrichium virginianum* & *B. dissectum*) and Christmas fern (*Polystichum acrostichoides*) have all made their appearance after the invasive vines and shrubs have been subdued. Wild flowers such as fall white aster (*Eurybia divaricata*), rich weed (*Collinsonia canadensis*), may-apple (*Podophyllum peltatum*), bloodroot (*Sanguinaria canadensis*), jack-in-the-pulpit (*Arisaema triphyllum*), Solomon’s seal (*Polygonatum biflorum*) false Solomon’s seal (*Mianthemum racemosum*), and ramps (*Allium tricoccum*) have appeared or reappeared in a number of recovering areas.

Richard W. Lighty, 4 January 2021

**CHARACTERISTICS OF MAJOR INVASIVE PLANT THREATS TO WOODLANDS  
IN THE MID-ATLANTIC REGION**

The enemy	type of plant	dis- sem- inated by	needs disturb- ed sites	prick- les, thorns etc.	ability to climb	ability to grow in deep shade	threat level: high - 5 low - 1
asian bittersweet <i>Celastrus orbiculatus</i>	exotic woody vine	birds	edges	no	50 to 100 ft.	no	5
grape <i>Vitus spp.</i>	native woody vine	birds	no	no	50 to 100 ft.	no	5
Japanese barberry <i>Berberis thunbergii</i>	exotic shrub	birds	no	yes	no	yes	3
Japanese hops <i>Humulus japonica</i>	exotic herbaceous an- nual vine	various	open areas	yes	15 to 20 ft.	no	3
Japanese honeysuckle <i>Lonicera japonica</i>	exotic woody vine	birds	no	no	15 to 30 ft.	yes	4
mile-a-minute vine <i>Persicaria perfoliata</i>	exotic annual vine	birds	open areas	yes	10 to 20 ft.	no	3
multiflora rose <i>Rosa multiflora</i>	exotic climbing shrub	birds	open areas	yes	15 to 30 ft.	no	4
poison ivy <i>Toxicodendron radicans</i>	native woody vine	birds	edges	no	50 to 100 ft.	yes	2
porcelain berry <i>Ampelopsis bre- vipedunculata</i>	exotic woody vine	birds	open areas	no	50 to 100 ft.	yes	5
Russian olive <i>Elaeagnus angustifolia</i>	exotic shrub	birds	open areas	yes	no	no	5
stilt grass <i>Microstegium vimineum</i>	exotic annual	various	open areas	no	2 to 3 ft.	no	2
wineberry <i>Rubus phoenicolasius</i>	exotic bramble	birds	open areas	yes	no	no	1
winged euonymus <i>Euonymus alatus</i>	exotic shub	birds	no	no	no	yes	4

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