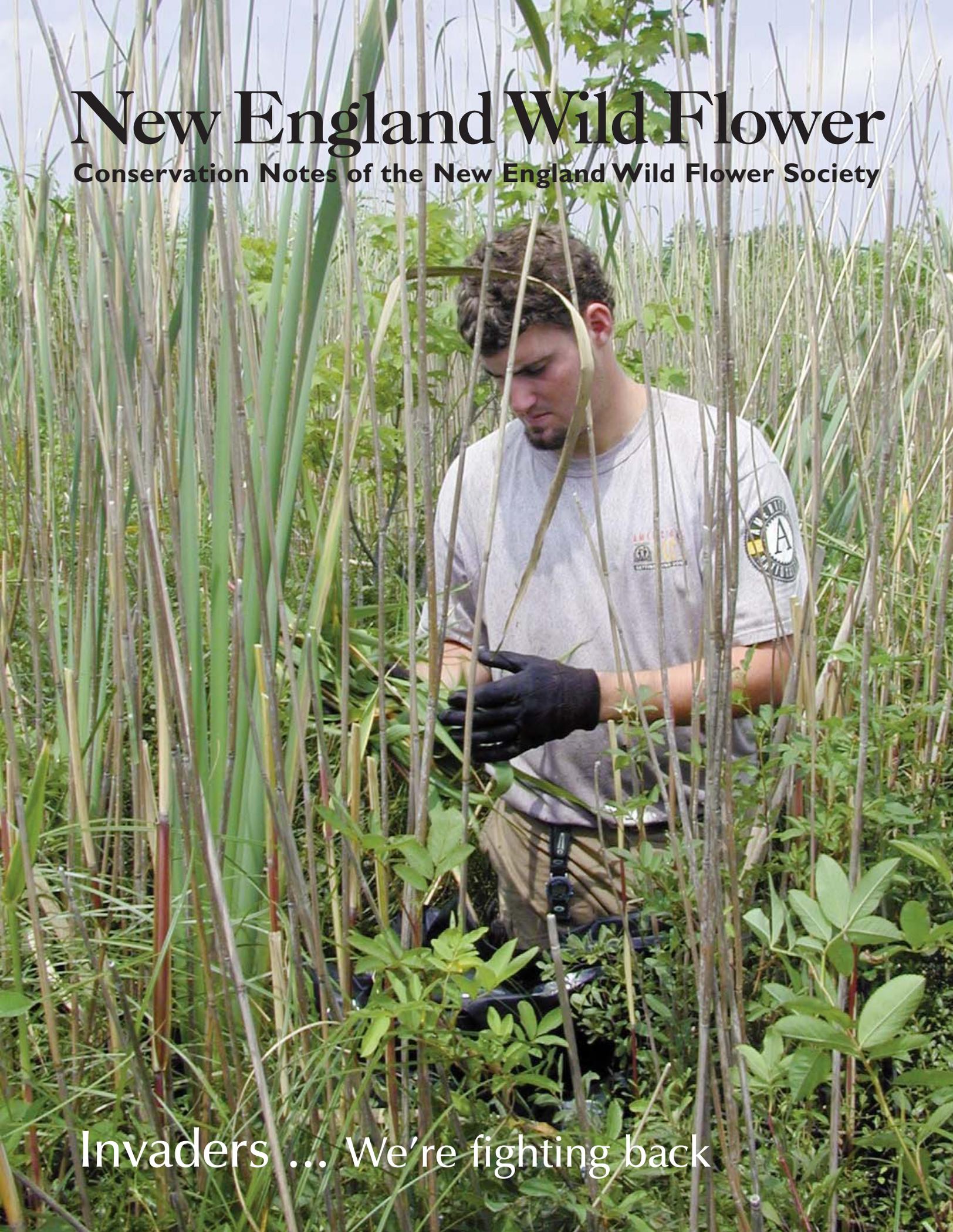


# New England Wild Flower

Conservation Notes of the New England Wild Flower Society



Invaders ... We're fighting back

# Help Us Save New England's Landscape

New England Wild Flower Society is dedicated to native plants and their habitats. Share our commitment to protecting biodiversity in natural areas throughout our region.



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# New England Wild Flower

Conservation Notes of the  
New England Wild Flower Society

Volume 10, No. 3, 2006

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*This publication was made possible through the generosity of the Litowitz Foundation, the Millipore Foundation, Polly Pierce, Tom and Jackie Stone, and the members and friends of New England Wild Flower Society.*



## Dear friends,

Imagine New England’s habitats filled with plants from somewhere else. It is not difficult to do. Forests that once sheltered native viburnum and witch-hazel are choked by winged euonymus and Japanese barberry. Purple loosestrife overwhelms acres of wetlands where bulrush used to grow. Oriental bittersweet cloaks countless oaks and maples on woodland edges. How can we keep our New England landscape biologically diverse and looking like *here*, when constant pressure by invasive species leads to homogenization, making our natural areas look more like *there*?

New England Wild Flower Society is one voice in a global chorus of organizations, agencies, and researchers, all urging public awareness of the overwhelming reality of biological invasions and the potentially destructive impact of alien species on the natural communities they invade. But for many people, the difference between a landscape full of invasive plants and a native landscape is indiscernible. Botanical invaders are mistaken for part of the native landscape, because “they’ve always been here.”

Beyond appearances, ecological research proves that some non-native plants win over native plants in competition for space, nourishment, and reproductive capacity, to become dominant, and in some cases keystone, species. For example, common reed (*Phragmites australis*), now abundant throughout New England, has subjugated numerous native wetland plant species. Their disappearance is causing the decline of the native amphibians and insects dependent on them.

While research ecologists work to understand and explain the impact of biological invaders, the Society joins with many partners and volunteers to control rampantly invasive, non-native plants that threaten our ecosystems. Over the years, we have devised a number of effective techniques.

In these pages, you will find out what the Society and our collaborators are doing about invasive plants, and where we are in the effort to protect New England’s natural places. You will discover what some people have done at their own homes and in their communities to control botanical invaders and encourage native species.

Most of all, you will learn how to identify the botanical bullies in your region and how to apply proven methods for controlling them in your own neighborhood. We invite you to join us in saving New England’s lovely and unique natural landscapes.

Gwen Stauffer, Executive Director  
New England Wild Flower Society



# Invasive Plants of New England

The plants in this “rogues’ gallery” illustrate common invasive characteristics, possess qualities that make them particularly threatening to native plants and habitats, or have shown the capacity to expand their range dramatically in the coming years. They may not be found in every part of New England, and they may not yet be considered invasive everywhere they are found, but we should be aware of their disruptive potential. At the end of this publication, you will find additional sources of information on invasive plants, including links to comprehensive invasive plant lists and details of control methods.

*Note: Where suggestions on invasive plant removal, including herbicide use, are given in this text, readers should follow all state regulations and all precautions listed on product labels. For more information on invasive plant removal, see “Managing Invasive Plants: Methods of Control,” by Christopher Mattrick, on page 20.*

Sources: *New England Wild Flower: Invaders*, Vol. 2, No. 3, 1998, edited by Christopher Mattrick, Frances Clark, and Sarah Shonbrun. *New England Wild Flower Society’s Field Manual of Invasive Plants for the Northeast*, Second Edition, by Bayard Ewing and Christopher Mattrick, revised 2006.

## TREES

### Norway maple (*Acer platanoides*)

As a popular street tree, this large native of Europe and western Asia grows rapidly in a wide variety of conditions while resisting drought, pollution, and pests. Where Norway maple flourishes, it often out-competes its valuable, indigenous relative, the sugar maple (*Acer saccharum*). The trees are similar in size, shape, flower, and fruit, but Norway maple has dark, furrowed bark and, generally, larger leaves. When cut, the leaf stems and leaf veins of Norway maple exude a milky sap, and its fall color is yellow, while sugar maple leaves turn red.



### Tree of heaven (*Ailanthus altissima*)

Native to central China, tree of heaven's hardiness, aggressive nature, and versatile ability to spread by seeds and root suckers made it attractive in urban settings after its introduction in the late 1700s. From city landscapes, it moved into rural, agricultural, and natural areas, where it became a serious problem. Dense colonies form quickly, crowding out other vegetation. When cut, the stump sends up fast-growing shoots, and a mature tree can produce up to 300,000 winged seeds in a single season, which can remain dormant for years until conditions are suitable for germination. Trees also produce a chemical compound that can kill some other vegetation. Distinguished from similar walnut, sumac, and elderberry trees by its winged fruits and long compound leaves with smooth-edged leaflets, tree of heaven is most readily controlled by proper herbicide application.



## SHRUBS

### Autumn olive (*Elaeagnus umbellata*)

Originally imported from China, Korea, and Japan, this shrub or small tree, with tubular, fragrant, light yellow flowers that appear after the leaves, and numerous small, round reddish fruits, has been popular in New England since colonial times. It is found along roadways and in pastures, open woodlands, and on woodland edges, where it has escaped from cultivation. Autumn olive, like certain legumes, has the ability to fix nitrogen, allowing it to thrive in poor soils. Growing rapidly and producing many seeds, these plants sprout energetically when cut back or burned, making control especially difficult. Controls include pulling small plants, being careful to remove the entire root system, and painting herbicide on the cut stumps of larger specimens.



### Black locust (*Robinia pseudoacacia*)

A native of the southern Appalachian Mountains, where its large fragrant flowers attract bees and its hard wood is prized, black locust has become widely established elsewhere, often planted to control erosion. The plant produces many seeds, but research shows that they rarely germinate; instead, this member of the pea family reproduces primarily by vegetative means. Suckers and stumps sprout vigorously, producing large colonies from a single root system, crowding out other species. Readily identified by the presence of long, paired thorns, black locust poses a significant threat to native sandplain grasslands and pine barrens. On Cape Cod it occupies thousands of acres formerly covered with scrub oak-pitch pine forest.





### Burning bush (*Euonymus alatus*)

Blazing fall color has made burning bush a popular landscape standard, still widely available at garden centers. This compact, branching shrub with distinctive, corky winglike structures on the stems and small branches is happy in sun or shade and often planted along highway corridors. The plant's abundant fruits attract birds that disperse the seeds widely. Once established, burning bush spreads readily into forests and open spaces where its almost impenetrable, mat-like root system and dense tangle of branches give it a competitive advantage. Highbush blueberry, similar in size, requirements, and bright foliage, and with fruit that attracts humans as well as other wildlife, is an excellent garden and landscape replacement for burning bush.



### Common buckthorn (*Rhamnus cathartica*) Glossy buckthorn (*Frangula alnus*), pictured at left

Common and glossy buckthorn form thickets along roadsides or infiltrate woodlands, where they are persistent and difficult to remove. Common buckthorn, a European native, has rounded, glossy leaves edged with fine teeth, and black, glossy, berry-like fruit and prefers neutral to alkaline soils. The leaves of glossy buckthorn, naturally ranging from Europe through Asia and Africa, are oval and toothless. The fruits turn from reddish to purple-black as their long growing season progresses, and flowers and fruits may be present at once from May through September. First introduced in the 1700s and often planted as hedges, both buckthorn species are now found from southern Canada through the northeastern U.S. in old fields, hedgerows, power line cuttings, and woodland edges. Glossy buckthorn is also common in wetlands, including such important habitats as bogs, beaver meadows, and calcareous fens.



### Japanese barberry (*Berberis thunbergii*)

This small, thorny shrub is one of the most widespread invasive plants in New England, first seen in the Boston area around 1875. With its brilliant fall foliage and scarlet fruit, it has naturalized in many habitats, including field edges, roadsides, and open forests. Easily identified by the presence of a single spine beneath each cluster of small, untoothed leaves, Japanese barberry is one of the first plants to leaf out in spring. The related common barberry (*B. vulgaris*) has toothed leaves and a two- or three-branched spine beneath each cluster of leaves. Many forested natural sites, especially in southern New England, have large areas dominated by dense Japanese barberry stands beneath which nothing but barberry seedlings can grow.



### Multiflora rose (*Rosa multiflora*)

Native to eastern Asia, this rose now ranges throughout most of the northeastern and midwestern United States. Though multiflora rose has large clusters of fragrant white flowers and showy rosehips, this sturdy, thicket-forming shrub gained a foothold as understock for grafting other kinds of ornamental roses and as living fences for livestock, erosion control plantings, and wildlife cover. The seeds, readily dispersed by birds and other animals, can remain viable in the soil for ten years or more, making eradication especially "thorny." Native roses lack the feathery, deeply fringed stipule at the bottom of each compound leaf and usually have smaller clusters of flowers. There are no white flowering roses that are native to the Northeast.

### Wineberry (*Rubus phoenicolasius*)

Like birds and bears, humans can be lured to help a plant spread by the taste of an appealing fruit. The berries of this member of the raspberry family have a tangy sweetness suggested by the common name, but the plant is less welcome for its ability to form an impenetrable tangle, now seen over much of southern New England. Wineberry, originally from Japan and western China, entered the United States from England in the late 1800s and quickly escaped from cultivation. Dense, reddish hairs give the stems a furry appearance, unlike other raspberries. The dark green leaves are white and hairy underneath. The bright red fruits attract birds, especially robins, which disperse the seed widely. When cut back, wineberry resprouts vigorously, like most raspberries.



### Honeysuckles, shrublike (*Lonicera morrowii*, *L. x bella*, *L. maackii*, *L. tatarica*)

Originating in Russia, Asia, and Japan, these shrubs and the related vine honeysuckle (*L. japonica*) were long prized for their sweet flowers and bright berries and widely distributed as horticultural plants and for wildlife food and color. Promoted by the U.S. Soil Conservation Service for erosion control, and well established along roadsides, they spread to abandoned fields, woodland edges, and wetlands, where they are capable of shading out smaller native ferns, grasses, and wildflowers and suppressing succession. Though they degrade the microhabitats that small creatures such as insects, rodents, and reptiles prefer, the honeysuckles are attractive to birds, which readily disperse their seeds. The honeysuckles, taken together, are among the most abundant invasive plants in New England.



## VINES

### Japanese honeysuckle (*Lonicera japonica*)

This woody trailing or climbing vine resembles its bushier relatives, with egg-shaped, entire, opposite leaves. The very fragrant, tubular white flowers, aging to yellow, appear from late spring to autumn, followed by black, juicy berries. Japanese honeysuckle is a true generalist and its longtime popularity as a garden plant has made it ubiquitous; having escaped from neglected cottage yards, it is now found often along roadsides, in thickets, twining up trees in woodlands, and at the edges of fields.



### Mile-a-minute (*Polygonum perfoliatum*)

An annual vine with triangular, blue-green leaves, mile-a-minute lives up to its name. Introduced to Pennsylvania from Asia in the 1930s, by the time we wrote about this plant in 1998, it had spread throughout the mid-Atlantic states, but New England was still free of it. Since then, mile-a-minute is known to have entered Connecticut and Rhode Island and, as of 2006, has now been reported in Massachusetts. The midrib of the leaves, as well as the four-sided stems, have recurved spines that help it climb over vegetation and even buildings. Forming mats over other plants, blocking the sun, this is a serious pest for agricultural and nursery crops, as well as native plants. The blue, pea-sized fruits are primarily dispersed by birds, although they also float. Commonly found in the open or along forest edges, mile-a-minute grows more slowly in the shade.





### Oriental bittersweet (*Celastrus orbiculatus*)

This twining woody vine, native to Japan, Korea, and China, entered North America in the mid-1800s and soon spread from Louisiana to Maine. Oriental (or Asiatic) bittersweet can grow to 60 feet, reaching the tops of mature trees, and strangling trees, shrubs, and other vines as it goes. In autumn, the yellow fruits split to reveal bright red seed coverings (arils). Animals disperse the seeds, and humans use the vines to make ornamental wreaths and swags, which quickly sprout on the trash heap. A native bittersweet, *Celastrus scandens*, may hybridize with the invasive species. Flowers and fruits of American bittersweet occur only at the end of each branch, while Oriental bittersweet's are located in between the leaf and stem. Cut stems resprout vigorously, making control difficult.



### Porcelain berry (*Ampelopsis brevipedunculata*)

Shiny bunches of berries shading from white or yellow through lilac, green or turquoise blue, enhanced the ornamental popularity of this delicate-looking vine. First introduced in the 1870s, porcelain berry is locally dominant along the Massachusetts coast, where birds readily spread the seeds. Ironically, the plant was well established in the Brookline, Massachusetts, backyard of Minna Hall, one of the founders of the Massachusetts Audubon Society. Her property is now an urban sanctuary, and work is ongoing to control this and other exotic species and replant the site with native plants. As recently as ten years ago, garden centers still carried porcelain berry, which may have been as appealing to the unknowing gardener as it was to Mrs. Hall a hundred years ago.



### Swallowworts, black and pale or red (*Cynanchum louiseae* [*C. nigrum*], *C. rossicum*)

These herbaceous, twining vines in the Dogbane family (Apocynaceae) form dense colonies that are almost impossible to eradicate, breaking apart when dug up. Black swallowwort has dark purple flowers with triangular petals, while pale or red swallowwort has pale-purple to yellowish flowers and petals almost twice as long as they are wide. Cutting off the flowers only delays the maturing of fruits, which cast seeds to the wind from seed-pods that are similar to the pods of milkweeds, which are their close relatives. Swallowworts easily overwhelm open sites in wildlife sanctuaries, and along roadsides and railroads with comprehensive cover through which nothing else can grow.

## HERBACEOUS PERENNIALS

### Bishop's weed (*Aegopodium podagraria*)

This perennial, with delicate clusters of flowers similar to Queen Anne's lace, is often sold in garden centers as a durable ground cover. Indeed the plant will not die, but rather will spread and persist for years in the garden and out through the fence into the edges of natural areas. It is highly resistant to attempts to eradicate it. Small pieces of root left after weeding easily resprout. Outside of the garden, bishop's weed persists in more natural areas and can become locally abundant, remaining for years after the frustrated gardener has moved away. It is particularly invasive in floodplains along the Connecticut River.



### Cypress spurge (*Euphorbia cyparissias*)

The milky juices of the cut plant are said to be a skin irritant. That milky juice and the pinkish buds on widespread perennial roots help to distinguish cypress spurge from similar plants. Dense bunches of greenish-yellow flowers on multi-branching umbels appear in spring and continue well into fall. This perennial reproduces by the seeds contained in three-lobed seedpods and by sprouting from the root buds. Cypress spurge has spread from cultivation into pastures and abandoned farmland, woodlands, and along roadsides. Because it is believed to be toxic to livestock, this plant is particularly troublesome in pastures.



### Garlic mustard (*Alliaria petiolata*)

Native to Europe, garlic mustard was first reported on Long Island in 1868, probably introduced via kitchen gardens. Today it is known in 30 states, from New England west to Nebraska and Kansas, and south to Virginia, growing luxuriantly in sun and shade. A biennial with seeds sprouting in the spring, it forms dark green rosettes of heart-shaped, toothed leaves the first year, and stalks topped with clusters of white, cruciform flowers the second spring. When crushed, the plants smell strongly of garlic. They also taste like garlic, and one palatable way to reduce this pest is to add the washed leaves (picked from safe, pesticide- and pollution-free sites) to soups, stews, and frittatas. [Read late-breaking news on garlic mustard on pages 16 and 17.]



### Dame's rocket (*Hesperis matronalis*)

A member of the mustard family (Brassicaceae), dame's rocket is a showy, biennial or short-lived perennial, two- to three-feet tall. The leaves are alternate, hairy, sharply toothed, and downy beneath. Large, loose clusters of fragrant white, pink, or purple flowers bloom May to August in moist woodlands, on woodland edges, floodplains, open areas, and along roads. Dame's rocket resembles garden phlox, but can be distinguished by its toothed, rather than smooth, leaves and flowers with four, rather than five, petals.



### Japanese knotweed (*Fallopia japonica* [*Polygonum cuspidatum*])

This fall-blooming, herbaceous perennial can reach ten feet on hollow stems that resemble bamboo. Introduced in the late 1800s, it soon escaped, furthered by its use for erosion control along waterways. Tolerant of difficult conditions, it forms large, dense colonies that are extremely difficult to control. Japanese knotweed spreads primarily by rhizomes (underground stems), which can travel up to 65 feet from a single plant. In late autumn, as the canes die off and fall to the ground, they create a thick layer of mulch through which nothing but more Japanese knotweed can sprout. This, in combination with its early emergence, quick growth, and the dense shade cast by the large leaves, makes this species a major threat to native plant communities. River shores are especially at risk.





### Japanese stilt grass (*Microstegium vimineum*)

A shade-tolerant annual, first seen in Tennessee in 1919, Japanese stilt grass is now found from Florida to Massachusetts, west to Ohio. In New York and Connecticut, it can be seen along the Hudson and Connecticut Rivers, preferring moist, shady habitats such as river banks, floodplains, swamps, and woodland thickets, as well as roadsides. Individual plants can produce more than 100 seeds, quickly replacing other vegetation. Specialized species such as native buttercups cannot compete with this thick-growing, lime-green grass. Sometimes called “Chinese packing grass,” the plant may have been introduced as protective packaging for imported porcelain.



### Purple loosestrife (*Lythrum salicaria*)

Imported from Europe more than a century ago, purple loosestrife now paints North American wetlands with its tall spikes of bright lavender or magenta flower heads, choking out nearly all native vegetation where it occurs and severely degrading wildlife habitat. No bird, mammal, or fish in North America is known to feed extensively on loosestrife. Each plant can produce up to two million seeds, which remain viable in the soil for many years. Once established, usually in disturbed sites in shallow fresh water, such as roadside ditches, the shores of streams, rivers, and lakes, and across wetlands, populations are very difficult to eradicate. Researchers are testing biological controls, involving predatory insects from the plant’s native range, in many states, including most of New England.



### Spotted knapweed (*Centaurea stoebe ssp. micranthos* [*C. maculosa*, *C. biebersteinii*])

In the western United States, this pervasive rangeland weed covers thousands of acres, reducing livestock and elk forage by up to 90 percent. Overwintering as a rosette, spotted knapweed is a biennial (or short-lived perennial) that shoots up by late spring to produce pink, white or purple flowers from July to September. The seeds do best in full sun, so the plant is less successful in the shade of our eastern forests than along roadsides and in grasslands. Spotted knapweed closely resembles three other potentially invasive knapweeds: short-fringed knapweed (*C. nigrescens*), brown knapweed (*C. jacea*), and black knapweed (*C. nigra*). Care is recommended in handling this plant, which some sources say may be carcinogenic.



### Yellow flag iris (*Iris pseudacorus*)

This showy European native gives new meaning to the phrase “attractive nuisance.” First planted in the 1800s as a splash of color along pond edges, stream banks, and other moist areas, the deep blue-green sword-like leaves and lemony yellow flowers of yellow flag iris are now found far from cultivated gardens and domestic ponds, energetically colonizing wild wetlands where they can displace native irises. Yellow flag iris is easily distinguished from native irises because it is the only yellow-flowered iris species growing in the wild. Because it readily spreads both from seed and by division, digging or pulling the whole plant is advised.

### Common reed (*Phragmites australis*)

Though the eight- to ten-foot stems of common reed are highly visible in wetlands, roadside ditches, and salt marshes along coasts, their status is subject to debate. Soil records indicate the presence of phragmites in Connecticut 3,000 years ago, a naturally occurring part of many tidal and non-tidal wetland habitats. In the modern era, development and agriculture in and around wetlands have created disturbed situations that phragmites is well suited to exploit. Some scientists believe that around 1900 a new aggressive strain of *Phragmites australis* was introduced from Europe, and it is this strain that is invasive. Whether native or exotic, the ecological drawbacks are obvious as diverse wetland communities become monotonous stands of *Phragmites australis*.



## AQUATIC PLANTS

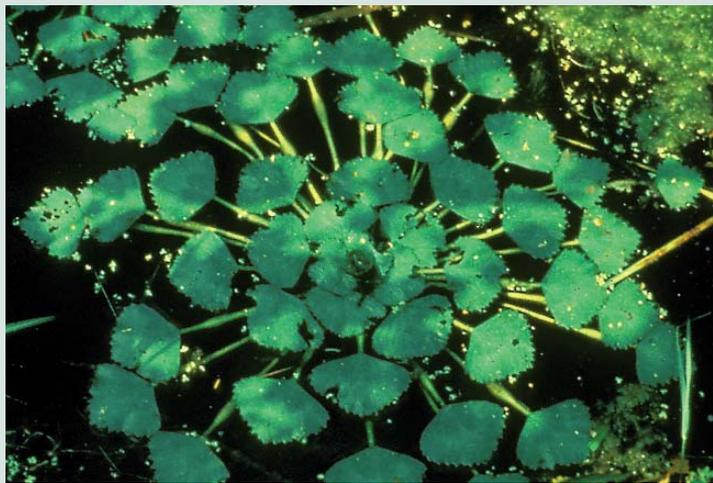
### Hydrilla (*Hydrilla verticillata*)

A classic example of an invasive water plant, hydrilla is considered one of the top problem weeds in some U.S. states. Hailing from Australia, Asia, and Central Africa, this plant was first identified in Florida in the 1960s, probably discarded when an aquarium was cleaned. In less than 40 years, hydrilla has spread throughout the southern states and as far west as Washington and California, and north to New England, where it has gained a foothold in Connecticut. The branching, upright stems of this underwater plant can extend 25 feet or more to reach the surface, where it produces stalks of small white flowers. It tolerates difficult conditions, including dim light, nutrient-poor water, and a broad temperature range. Heavy concentrations of hydrilla degrade water quality and foul waterways, curtailing recreational activities.



### Water chestnut (*Trapa natans*)

This aquatic plant is locally dominant in some lakes and slow-moving rivers in Connecticut, Massachusetts, and Vermont. Rowers along the Charles River in Cambridge, paddlers on the Sudbury River west of Boston, and anglers in Lake Champlain have tangled with this weed, which sprouts from a sharp-spined fruit capable of puncturing tractor tires. The plants grow quickly, with stems up to 16 feet long forming rosettes that can float downstream. The fearsome fruit can hook a ride on the breast of a goose or duck. Large mats of the vegetation cause fish kills by depleting oxygen, and block out light for native vegetation.



### Eurasian watermilfoil (*Myriophyllum spicatum*)

The submerged, feathery leaves of Eurasian watermilfoil grow in whorls of four. Inconspicuous reddish flowers, pollinated by the wind, are borne in the axils of tiny, scale-like leaves on stems that stick out of the water. The plants occasionally set seed, but spread mainly from stem fragments, allowing them to hitch rides from waterway to waterway on boat propellers and trailers. Once Eurasian watermilfoil grows to the flowering stage, the stems break into pieces, which sink to the bottom of lakes and ponds, where they root. In spring, they grow quickly, shading out native plants beneficial to wildlife, degrading the ecology of lakes and streams, and interfering with recreational and industrial water use.





Glossy buckthorn (*Frangula alnus*)

# Where are they now?

Two invasive plants and what has changed  
in eight years by Christopher Mattrick and Frances Clark

*When we published our first Invaders magazine back in 1998, we selected a few plants for in-depth profiles because their methods of dispersal and the problems of control they presented were characteristic of many invasive, non-native plants. Among the species we chose were garlic mustard (*Alliaria petiolata*), a widespread herbaceous plant, and common and glossy buckthorn (*Rhamnus cathartica* and *Frangula alnus*), closely related woody shrubs already lining highways throughout New England. For this all-new Invaders publication, we asked Chris Mattrick, who wrote some of the original profiles, to tell us what has changed in our knowledge of these invasive plants and their effect on our landscapes over the past eight years.*



Garlic mustard (*Alliaria petiolata*)

## Garlic Mustard: Yes, it still stinks

As I reread my 1998 article on garlic mustard, I realized one thing immediately—we had seriously underestimated the tenacity of this species.

Back then, all the data suggested that garlic mustard's seeds could live five to six years in the soil. To eradicate an infestation, then, all you needed to do was hand-pull the plants for five or six years, preventing the production of new seed. Now we know it's not that easy.

First, it is almost impossible to remove every plant in an infestation. One or two will always survive to provide seed for the next year and years to come. If your infestation is on a roadside, snowplows and other vehicles will do an excellent job of replenishing and spreading the seeds. Our new best estimate for the survival of garlic mustard seed in the soil has doubled to 10–12 years.

Hand-pulling still appears to be the best way to control small infestations of garlic mustard, and even many large infestations if you can rally a group of volunteers. One control technique that has fallen out of favor since 1998 is the practice of cutting or mowing large areas of garlic mustard. Anecdotal data and some studies conducted in the Green Mountain National Forest show this to be ineffective, due to the tendency of the cut plants to resprout and ultimately set seed. When we first wrote about garlic mustard, biological controls looked promising, but ten years later there are still no effective biocontrol recommenda-

tions for this plant. That leaves herbicides or an army of determined volunteers as the only practical treatments for large infestations of garlic mustard.

I no longer think of garlic mustard as a shade-loving species that favors moist soils. It certainly will grow in these conditions, but it does equally well in dry-to-moist mesic soils in full sun. Garlic mustard does appear to have a strong affinity for sweeter soils, and we find most of the larger infestations in areas with high soil pH.

Although garlic mustard continues to expand its range, we have yet to see an explosion of this plant's populations in northern New England. In 2004, the Invasive Plant Atlas of New England (IPANE) listed this species as an early detection species in Maine. [Read more about early detection and IPANE on page 6.] In 2005, New England Wild Flower Society, IPANE, and the Maine Natural Areas Program began active control efforts on populations in York County and multiple locations in the greater Augusta area. In 2005 alone, we received credible reports of garlic mustard at previously unknown locations in Bangor, Orono, Boothbay, Westport, and Wiscasset, and I am sure there are more as yet undiscovered locations in Maine. In the White Mountains of New Hampshire, we discovered and eradicated a handful of plants in 2005. When we checked the same site this past season, we found no garlic mustard, but that doesn't mean we should let down our guard.

Garlic mustard remains widespread and increasing. Infestations are easier to control in their infancy, so we urge everyone to learn to recognize this species in all its forms.

Visit our Web site at [www.newfs.org](http://www.newfs.org) to download a copy of *New England Wild Flower: Invaders*, Vol. 2, No. 3 (1998) and read the full garlic mustard and common and glossy buckthorn case studies.

## Glossy & Common Buckthorn: They're making headway, but so are we

Everything Frances Clark mentioned in her 1998 essay on common and glossy buckthorn remains true today, in northern New England as well as farther south. The buckthorns, in particular glossy buckthorn, are the number one threat to ecosystems in the White Mountain region. Eight years ago, glossy buckthorn was a plague from around Boston up into the Monadnock region of New Hampshire, and as far as Brattleboro, Vermont. Yet in 2001, when New England Wild Flower Society began its invasive plant survey of the White Mountain National Forest, it took two years and hundreds of volunteer hours to locate glossy buckthorn in the White Mountain region.

Today, just five years later, we find this invasive plant in nearly every habitat except the alpine zone. Roadsides, field edges, wildlife openings, mixed hardwood stands, floodplain forests, beaver meadows, cedar swamps, pine forests, and hemlock forests are all at risk. In St. Johnsbury, Vermont, glossy buckthorn has displaced nearly all the understory and herbaceous species in a 40-acre town forest. Even farther north, this species, accompanied by Japanese knotweed, lines the roadsides of Route 3 between Lancaster and Northumberland, New Hampshire. The towns of Jackson and Bartlett, New Hampshire, are seeing an explosion of glossy buckthorn to rival the worst infestations I ever saw in Massachusetts or Connecticut. And though I am speaking mostly of glossy buckthorn, many of my colleagues are facing the same battles with common buckthorn.

Control of the buckthorns is straightforward: dig them, pull them, chop them, or spray them with herbicide. Unfortunately, their sheer abundance sometimes makes our individual efforts seem hopeless. We should not abandon the techniques we currently use, because they do work, but we should look into alternatives, including biological methods. I am not a great advocate of biological control, but having spent so much of the past 12 or so years killing buckthorns by traditional methods, I feel we need to draw a new tool from the box.

The news is not all bad. Most states in New England now have some sort of regulation covering distribution and sale of invasive plants. Back in 1998, several cultivars of glossy buckthorn were readily available through local nurseries, but no one sells them today. Every year, more people hear about the threat these species pose and learn how to identify them. More and more take the next step by volunteering to help survey and control invasive plants, and spreading the word. The problem of these invasive plants remains enormous, and it's easy to feel overwhelmed, but time has shown us that our methods can work to reduce and even reverse their impact. Garlic mustard, the buckthorns and other invasive plants succeed through persistence and by exploiting every opportunity. To fight them, we need to borrow from them that same persistence and adaptability.

**So keep watching. Keep thinking. Keep acting.**



Glossy buckthorn (*Frangula alnus*) infestation in St. Johnsbury, Vermont.

### BREAKING NEWS

## Garlic mustard attacks the forest and the trees

by Frances Clark, Consulting Botanist  
and Principal of Carex Associates, Lincoln, Massachusetts

We know that garlic mustard invades forests, overwhelming wildflowers and shedding seeds by the thousands. Now we have new evidence that this low-growing herb is even killing trees.

Research led by Kristina Stinson<sup>1</sup> at the Harvard Forest in Petersham, Massachusetts, indicates that garlic mustard destroys the microbial network native plants depend on. A recent paper concludes that conditions created by garlic mustard break up the longstanding, beneficial relationship of mycorrhizal fungi and native trees of our northeastern temperate forests.

Certain fungi support healthy growth for thousands of native plants by transporting usable phosphorus to their roots. They may also protect the host plants from pathogens. Fossils show that this mutualistic relationship of plants and fungi has been going on for over 400 million years.

Tree species characteristic of mature New England forests, such as white ash, sugar maple, and red maple, count on fungi for healthy, competitive growth. Garlic mustard secretes phytochemicals that kill the fungal spores, preventing the beneficial fungi from colonizing roots of young plants, and creating an opening for weedy species that are not dependent on the fungi. As a result, the whole forest community changes. How long garlic mustard's disruptive phytochemicals last in the soil is unknown.

Our forests are the result of thousands, even millions, of years of evolutionary processes. Research reveals once again the fascinating interdependency of plants and soil microbes. This information should renew our resolve to target incursions of garlic mustard into mature forests. Our work will help save woodland wildflowers now, and defend the tree canopy that will shade them in the future.

<sup>1</sup>Stinson, KA, Campbell SA, Powell JR, Wolfe BE, Callaway RM et al. (2006). Invasive plant suppresses the growth of native tree seedlings by disrupting belowground mutualisms. *PLoS Biol* 4(5): e140. DOI:10.1371/journal.bio.0040140.

# Test your invasive plant identification skills

How many invasive plants can you find in this photo? Answers on page 36.



kills.



# Managing Invasive Plants

## Methods of Control

by Christopher Mattrick

### They're out there. The problem of invasive plants is as close as your own backyard.

Maybe a favorite dogwood tree is struggling in the clutches of an Oriental bittersweet vine. Clawlike canes of multiflora rose are scratching at the side of your house. That handsome burning bush you planted few years ago has become a whole clump in practically no time ... but what happened to the azalea that used to grow right next to it?

If you think controlling or managing invasive plants on your property is a daunting task, you're not alone. Though this topic is getting lots of attention from federal, state, and local government agencies, as well as the media, the basic question for most homeowners is simply, "How do I get rid of the invasive plants in my own landscape?" Fortunately, the best place to begin to tackle this complex issue is in our own backyards and on local conservation lands. We hope the information provided here will help you take back your yard. We won't kid you—there's some work involved, but the payoff in beauty, wildlife habitat, and peace of mind makes it all worthwhile.

### PLAN OF ATTACK

Three broad categories cover most invasive plant control: mechanical, chemical, and biological. Mechanical control means physically removing plants from the environment



Spraying chemicals to control invasive plants.

through cutting or pulling. Chemical control uses herbicides to kill plants and inhibit regrowth. Techniques and chemicals used will vary depending on the species. Biological controls use plant diseases or insect predators, typically from the targeted species' home range. Several techniques may be effective in controlling a single species, but there is usually one preferred method—the one that is most resource efficient with minimal impact on non-target species and the environment.

### MECHANICAL CONTROL METHODS

Mechanical treatments are usually the first ones to look at when evaluating an invasive plant removal project. These procedures do not require special licensing or introduce chemicals into the environment. They do require permits in some situations, such as wetland zones. [See sidebar on page 23.] Mechanical removal is highly labor intensive and creates a significant amount of site disturbance, which can lead to rapid reinvasion if not handled properly.

#### Pulling and digging

Many herbaceous plants and some woody species (up to about one inch in diameter), if present in limited quantities, can be pulled out or dug up. It's important to remove as much of the root system as possible; even a small portion can restart the infestation. Pull plants by hand or use a digging fork, as shovels can shear off portions of the root system, allowing for regrowth. To remove larger woody stems (up to about three inches in diameter), use a Weed Wrench™, Root Jack, or Root Talon. These tools, available from several manufacturers, are designed to remove the aboveground portion of the plant as well as the entire root system. It's easiest to undertake this type of control in the spring or early summer when soils are moist and plants come out more easily.



Using tools to remove woody stems.



Volunteers hand pulling invasive plants.

### Suffocation

Try suffocating small seedlings and herbaceous plants. Place double or triple layers of thick UV-stabilized plastic sheeting, either clear or black (personally I like clear), over the infestation and secure the plastic with stakes or weights. Make sure the plastic extends at least five feet past the edge of infestation on all sides. Leave the plastic in place for at least two years. This technique will kill everything beneath the plastic—invasive and non-invasive plants alike. Once the plastic is removed, sow a cover crop such as annual rye to prevent new invasions.

### Cutting or mowing

This technique is best suited for locations you can visit and treat often. To be effective, you will need to mow or cut infested areas three or four times a year for up to five years. The goal is to interrupt the plant's ability to photosynthesize by removing as much leafy material as possible. Cut the plants at ground level and remove all resulting debris from the site. With this treatment, the infestation may actually appear to get worse at first, so you will need to be as persistent as the invasive plants themselves. Each time you cut the plants back, the root system gets slightly larger, but must also rely on its energy reserves to push up new growth. Eventually, you will exhaust these reserves and the plants will die. This may take many years, so you have to remain committed to this process once you start; otherwise the treatment can backfire, making the problem worse.

## CHEMICAL CONTROL METHODS

Herbicides are among the most effective and resource-efficient tools to treat invasive species. Most of the commonly known invasive plants can be treated using only two herbicides—glyphosate (the active ingredient in Roundup™ and Rodeo™) and triclopyr (the active ingredient in Brush-B-Gone™ and Garlon™). Glyphosate is non-selective, meaning it kills everything it contacts. Triclopyr is selective and does not injure monocots (grasses, orchids, lilies, etc.). Please read labels and follow directions precisely for both environmental and personal safety. These are relatively benign herbicides, but improperly used they can still cause both short- and long-term health and environmental problems. Special aquatic formulations are required when working in wetland zones. You are required to have a state-issued pesticide applicator license when applying these chemicals on land you do not own. To learn more about the pesticide regulations in your state, visit or call your state's pesticide control division, usually part of the state's Department of Agriculture. In wetland areas, additional permits are usually required by the Wetlands Protection Act. [See sidebar on page 23.]

### Foliar applications

When problems are on a small scale, this type of treatment is usually applied with a backpack sprayer or even a small handheld spray bottle. It is an excellent way to treat large monocultures of herbaceous plants, or to spot-treat individual plants that are difficult to remove mechanically, such as goutweed, swallowwort, or purple loosestrife. It is also an effective treatment for some woody species, such as Japanese barberry, multiflora rose, Japanese honeysuckle, and Oriental bittersweet that grow in dense masses or large numbers over many acres. The herbicide mixture should contain no more than five percent of the active ingredient, but it is important to follow the instructions on the product label. This treatment is most effective when the plants are actively growing, ideally when they are flowering or beginning to form fruit. It has been shown that plants are often more susceptible to this type of treatment if the existing stems are cut off and the regrowth is treated. This is especially true for Japanese knotweed. The target plants should be thoroughly wetted with the herbicide on a day when there is no rain in the forecast for the next 24 to 48 hours.

## Cut stem treatments

There are several different types of cut stem treatments, but here we will review only the one most commonly used. All treatments of this type require a higher concentration of the active ingredient than is used in foliar applications. A 25 to 35 percent solution of the active ingredient should be used for cut stem treatments, but read and follow all label instructions. In most cases, the appropriate herbicide is glyphosate, except for Oriental bittersweet, on which triclopyr should be used. This treatment can be used on all woody stems, as well as phragmites and Japanese knotweed.

For woody stems, treatments are most effective when applied in the late summer and autumn—between late August and November. Stems should be cut close to the ground, but not so close that you will lose track of them. Apply herbicide directly to the cut surface as soon as possible after cutting. Delaying the application will reduce the effectiveness of the treatment. The herbicide can be applied with a sponge, paintbrush, or spray bottle.



Cut stem treatment tools.

For phragmites and Japanese knotweed, treatment is the same, but the timing and equipment are different. Plants should be treated anytime from mid-July through September, but the hottest, most humid days of the summer are best

for this method. Cut the stems halfway between two leaf nodes at a comfortable height. Inject (or squirt) herbicide into the exposed hollow stem. All stems in an infestation should be treated. A wash bottle is the most effective application tool, but you can also use an eyedropper, spray bottle, or one of the recently developed high-tech injection systems.

It is helpful to mix a dye in with the herbicide solution. The dye will stain the treated surface and mark the areas that have been treated, preventing unnecessary reapplication. You can buy a specially formulated herbicide dye, or use food coloring or laundry dye.

There is not enough space in this article to describe all the possible ways to control invasive plants. You can find other treatments, along with more details on the above-described methods, and species-specific recommendations on The Nature Conservancy Web site ([tncweeds.ucdavis.edu](http://tncweeds.ucdavis.edu)). An upcoming posting on the Invasive Plant Atlas of New England ([www.ipane.org](http://www.ipane.org)) and the New England Wild Flower Society ([www.newfs.org](http://www.newfs.org)) Web sites will also provide further details.



Hollow stem injection tools.

## Biological controls—still on the horizon

Biological controls are moving into the forefront of control methodology, but currently the only widely available and applied biocontrol relates to purple loosestrife. More information on purple loosestrife and other biological control projects can be found at [www.invasiveplants.net](http://www.invasiveplants.net).

## DISPOSAL OF INVASIVE PLANTS

Proper disposal of removed invasive plant material is critical to the control process. Leftover plant material can cause new infestations or reinfest the existing project area. There are many appropriate ways to dispose of invasive plant debris. I've listed them here in order of preference.

- 1. Burn it**—Make a brush pile and burn the material following local safety regulations and restrictions, or haul it to your town's landfill and place it in their burn pile.
- 2. Pile it**—Make a pile of the woody debris. This technique will provide shelter for wildlife as well.
- 3. Compost it**—Place all your herbaceous invasive plant debris in a pile and process as compost. Watch the pile closely for resprouts and remove as necessary. Do not use the resulting compost in your garden. The pile is for invasive plants only.



Injecting herbicide into the hollow stem of phragmites.

**4. Dry it/cook it**—Place woody debris out on your driveway or any asphalt surface and let it dry out for a month. Place herbaceous material in a doubled-up black trash bag and let it cook in the sun for one month. At the end of the month, the material should be non-viable and you can dump it or dispose of it with the trash. The method assumes there is no viable seed mixed in with the removed material.

*Care should be taken in the disposal of all invasive plants, but several species need extra attention. These are the ones that have the ability to sprout vigorously from plant fragments and should ideally be burned or dried prior to disposal: Oriental bittersweet, multiflora rose, Japanese honeysuckle, phragmites, and Japanese knotweed.*

Christopher Mattrick is the former Senior Conservation Programs Manager for New England Wild Flower Society, where he managed conservation volunteer and invasive and rare plant management programs. Today, Chris and his family work and play in the White Mountains of New Hampshire, where he is the Forest Botanist and Invasive Species Coordinator for the White Mountain National Forest.



## Controlling Invasive Plants in Wetlands

### Special concerns; special precautions

Control of invasive plants in or around wetlands or bodies of water requires a unique set of considerations. Removal projects in wetland zones can be legal and effective if handled appropriately. In many cases, herbicides may be the least disruptive tools with which to remove invasive plants. You will need a state-issued pesticide license to apply herbicide on someone else's property, but all projects in wetland or aquatic systems fall under the jurisdiction of the Wetlands Protection Act and therefore require a permit. *Yes, even hand-pulling that colony of glossy buckthorn plants from your own swampland requires a permit.* Getting a permit for legal removal is fairly painless if you plan your project carefully.

**1.** Investigate and understand the required permits and learn how to obtain them. The entity charged with the enforcement of the Wetlands Protection Act varies from state to state. For more information in your state, contact:

**ME:** Department of Environmental Protection  
[www.state.me.us/dep/blwq/docstand/nrapage.htm](http://www.state.me.us/dep/blwq/docstand/nrapage.htm)

**NH:** Department of Environmental Services  
[www.des.state.nh.us/wetlands/](http://www.des.state.nh.us/wetlands/)

**VT:** Department of Environmental Conservation  
[www.anr.state.vt.us/dec/waterq/permits/htm/pm\\_cud.htm](http://www.anr.state.vt.us/dec/waterq/permits/htm/pm_cud.htm)

**MA:** Consult your local town conservation commission

**RI:** Department of Environmental Management  
[www.dem.ri.gov/programs/benviron/water/permits/fresh/index.htm](http://www.dem.ri.gov/programs/benviron/water/permits/fresh/index.htm)

**CT:** Consult your local town Inland Wetland and Conservation Commission

**2.** Consult an individual or organization with experience in this area. Firsthand experience in conducting projects in wetland zones and navigating the permitting process is priceless. Most states have wetland scientist societies whose members are experienced in working in wetlands and navigating the regulations affecting them. A simple Web search will reveal the contact point for these societies. Additionally, most environmental consulting firms and some nonprofit organizations have skills in this area.

**3.** Develop a well-written and thorough project plan. You are more likely to be successful in obtaining a permit for your project if you submit a project plan along with your permit application. The plan should include the reasons for the project, your objectives in completing the project, how you plan to reach those objectives, and how you will monitor the outcome.

**4.** Ensure that the herbicides you plan to use are approved for aquatic use. Experts consider most herbicides harmful to water quality or aquatic organisms, but rate some formulations as safe for aquatic use. Do the research and select an approved herbicide, and then closely follow the instructions on the label.

**5.** If you are unsure—research, study, and most of all, ask for help. Follow the rules. The damage caused to aquatic systems by the use of an inappropriate herbicide or the misapplication of an appropriate herbicide not only damages the environment, but also may reduce public support for safe, well-planned projects.

# Happy Alternatives: Replac



Tupelo (*Nyssa sylvatica*)

## *Designing* outdoor spaces in a natural way

by Tom Smarr, Horticulture and Botanical Garden Director, and Rolf Schilling, Horticulturist

Our gardens, like our homes, reveal our creativity. Plants make up the walls, ceilings, and floors of our outdoor living spaces, and selecting the right ones to express our personalities and preferences is a matter of both art and science. When choosing the best plant palette for your garden, consider the plants' cultural requirements and behavior under cultivation, as well as the aesthetic attributes.

Some plants can take advantage of the nurturing environment of our gardens to become aggressive or invasive. They may even “escape” to harm natural areas nearby. To avoid the need to monitor and control these potential troublemakers, choose instead from the thousands of great native plants available to the environmentally aware gardener.

Native plants spring forth with enhanced color and elegance when we cultivate them in our gardens. They offer distinct regional identity and better response than non-native plants to our extreme climatic variations. Many of these plants will tolerate a wide range of soil, moisture, light, and temperature conditions, but achieve their best growth when placed with an understanding of their cultural needs. Insects and other wildlife have developed mutually beneficial relationships with the plants of their native regions, and planting natives can strengthen the ecosystem that is your garden.

The key to gardening success is to develop a personal “vocabulary” of reliable plants for various conditions and landscape requirements. Does the elegant shape of a small tree seem more appealing than a forty-footer? Would a grouping of small shrubs add interest without blocking the view, or does privacy demand a taller arrangement? If you're planting for the future, long-lived varieties will reward your patience, but if you're looking for fast results, you can select from a palette of quick-growing choices. Native plants allow almost unlimited combinations for unique and fascinating gardens.

# ing Invasive Plants in the Landscape

We can design our outdoor spaces in the easiest and most natural way through responsible selection of beautiful, resilient plants that are harmless to their surroundings. Early spring jewels, summer lushness, fall color, and winter interest—you'll find them all in New England's native plants. Here are some of our personal favorites.

**TALL SPECIMEN TREES** offer attractive fall color, graceful structure, and high canopy. Where Norway maples may have stood, these will work beautifully under similar conditions.

**Kentucky coffee tree** (*Gymnocladus dioica*) [Zones 4–8, 60'–75'] matches a stately and commanding presence with versatility. In form and foliage, it rivals black walnut's elegance. Ideal in rich soil, this locust relative performs in average soil, endures mild drought and air pollution, and has few pests. Sweetly scented flowers yield curious, tropical-looking pods. To avoid pod litter, all-male clones such as 'Espresso' and 'Stately Manor' are available.

**Tupelo** (*Nyssa sylvatica*) [Zones 5–9, 30'–60' or more] thrives best in tight, damp soil. In well-drained areas, rich soil helps maintain its growth rate. Graceful in every season, tupelo's dark, lustrous fall foliage displays the vivid hues of a vintner's tasting table. Through winter, the pale bark displays well on sculptural limbs. 'Hayman's Red' (Red Rage) is especially resistant to autumn leafspot.

**Pin oak** (*Quercus palustris*) and **white oak** (*Q. alba*) [Zones 4–8, 50'–80'] display some of the best forms among deciduous trees. Pin oak has the sweeping outline of a fir tree, and white oak bears undulating limbs of an unequal grandeur. In warm seasons, white oak offers a cooling blue island, while in autumn pin oak stands out in scarlet and burgundy. Pin oak also a good street tree.

**Sassafras** (*Sassafras albidum*) [Zones 4–9, 30'–60'] grows quickly in varied soils along forest edges, becoming a grand specimen in the open. New branches are green with unusual "hand, mitten, glove"-shaped leaves (kids love them) that compete in fall display with the best of maples.

## *Honorable Mention:*

**Yellow buckeye** (*Aesculus flava*), **American yellowwood** (*Cladrastis kentukea*), and **yellow poplar/tulip tree** (*Liriodendron tulipifera*) are excellent as specimen trees with great form and foliage, and charming flowers. Yellow poplar can reach over 100 feet. **Native sugar maple** (*Acer saccharum*) has vibrant, glowing fall color that tops the dull straw shades of its invasive cousin, Norway maple.



*Sassafras* (*Sassafras albidum*)

# native trees and shrubs



American witch-hazel (*Hamamelis virginiana*)

**SMALL TREES** with great color and shape can stand alone or with a group. These offer landscape value, but, unlike invasive buckthorns, they don't spread through the whole neighborhood.

Shade tolerant **striped maple** (*Acer pensylvanicum*) [Zones 3–7, 15'–20'] has striated bark in green, blue, or coral in the cultivar 'Erythrocladum,' enchanting in the winter, and glowing with golden fall color. The limbs are graceful and the flowers surprisingly lovely. It needs cool, moist soil.

**American witch-hazel** (*Hamamelis virginiana*) [Zones 3–5, 15'–20'] forms an elegant arching mound of stems. Delicate flowers appear after leaf drop, and light the understory in autumn. Witch-hazel is versatile in sun or shade and any soil conditions, and practically pest-free.

**Staghorn sumac** (*Rhus typhina*) [Zones 3–8, 15'–35'] delivers fiery late-season foliage, with interesting fruit clusters, and is not choosy about soil. Cultivars such as 'Laciniata,' with finely dissected foliage, and 'Tiger Eyes,' with sunburst leaves, are preferred for their self-limiting growth; they top out at 10'–12' and won't spread too far.

### *Honorable Mention:*

**Native hawthorns** (*Crataegus crus-galli*, *C. phaenopyrum*, *C. nitida*, *C. viridis*, etc.) are excellent small trees, as are **American hornbeam** (*Carpinus caroliniana*), the **silverbells** (*Halesia diptera* and *H. tetraptera*), **redbud** (*Cercis canadensis*), and—not quite as easy as the others, but well worth the effort—the showy and graceful **Franklin tree** (*Franklinia alatamaha*).

**TALL SHRUBS** create a screen with color, flowers, and fruit, outclassing invasive plants like burning bush, Russian olive, and the shrub honeysuckles.

For unsurpassed fall color, **chokeberries** (*Aronia pyrifolia* [*A. arbutifolia*, and *A. melanocarpa*]) [Zones 4–9, 6'–10' and Zones 3–8, 3'–5', respectively] are versatile hedge-forming shrubs, laden with red or black berries. 'Brilliantissima' is particularly incandescent.

**Ozark hazel** (*Hamamelis vernalis*) [Zones 4–8, 6'–10'], especially 'Autumn Embers,' and **highbush blueberry** (*Vaccinium corymbosum*) [Zones 3–8, 4'–8'] offer the best fall foliage, plus spring flowers, gorgeous branching, and a tenacity that makes them almost foolproof. For a golden glow in autumn, try **summersweet** (*Clethra alnifolia*) [Zones 4–9, 3'–8'] and its many cultivars, which combine exquisitely scented August blooms and durability.

**Spicebush** (*Lindera benzoin*) [Zones 4–7, 8'–15'] shows its tiny flowers before the leaves and tolerates shade.

For sheer toughness few shrubs match **ninebark** (*Physocarpus opulifolius*) [Zones 3–8, 6'–12'], laden with domes of white blooms in spring. 'Dart's Golden' and 'Diablo' give a choice of chartreuse or burgundy leaves.

**Bayberry** (*Morella carolinensis* [*Myrica pensylvanica*]) [Zones 4–7, 2'–6'] and **inkberry** (*Ilex glabra*) [Zones 4–9, 6'–8'] are almost as tough as ninebark, and are semi-evergreen and evergreen, respectively. Bayberry's waxy, fragrant berries were once used to make candles.



Chokeberry (*Aronia pyrifolia* [*A. arbutifolia*])

**Smooth sumac** (*Rhus glabra*) [Zones 2–9, 10'–15'] endures most soils, while yielding spectacular autumn berries and leaves.

Don't forget the **osiers** (*Cornus sericea* and *C. racemosa*) [Zones 2–7 and Zones 3–8, respectively, 3'–8' or 10'], also called **red osier** and **grey dogwood**, with graceful stems in winter and interesting fruits.

#### *Honorable Mention:*

Other choice but versatile shrubs for flowers, berries, and/or foliage include **Carolina allspice** (*Calycanthus floridus*) [Zones 5–9, 6'–10'] with curious and savory-scented blooms in cinnamon or pale green ('Athens'); **fothergilla** (*Fothergilla major*) [Zones 5–9, 6'–10'], with sweet-scented "bottlebrush" flowers in spring and brilliant leaf color in fall; and **winterberry** (*Ilex verticillata*) [Zones 3–9, 6'–10'] with its compact cultivars 'Red Sprite' and 'Winter Red,' which offer an overabundance of berries.

**SMALL SHRUBS** give a burst of color, long season interest, and fill in that low mid-layer between tall shrubs and perennials. You'll never need to dig out a ragged barberry or root out a shrub honeysuckle again.

The smaller species of **fothergilla** (*Fothergilla gardenii*) [Zones 5–9, 2'–3'] is a gem that has perfumed flowers in spring, tolerates shade, and with sun displays a wide range of fall color. 'Blue Mist' offers cool summer color; other cultivars are available.



Fothergilla (*Fothergilla gardenii*)



Hydrangea (*Hydrangea arborescens* 'Annabelle')

With its showy domes of white sterile flowers, shade tolerance, unfussy nature, and cold hardiness, our native **hydrangea** (*Hydrangea arborescens*) [Zones 3–8, 3'–5'] is choice, and cultivar selections abound.

For shade with moisture, **dog hobble** (*Leucothoe fontanesiana*) [Zones 4–7, 2'–4'] and its cousin **coastal leucothoe** (*L. axillaris*) [Zones 5–8, 3'–4'] are superb, growing even in the gloom under hemlocks. Neatly evergreen up to the coldest parts of its range, any winter kill regenerates readily. Spring racemes of small white bells and selections with variegated leaves and bright red winter twigs add seasonal versatility.

**Snowberry** (*Symphoricarpos orbiculatus*) [Zones 2–7, 2'–5'] is versatile and showy enough to have been selected and hybridized with sister species. The native variety has coral berries; 'Alba' has white berries, and colored varieties include 'Amethyst.'

An all-time American favorite, **lowbush blueberry** (*Vaccinium angustifolium*) [Zones 2–5, 0.5'–2'] forms a durable short hedge or mixed border grouping, with plenty of fruit for man and bird.

'Friendship,' a mid-size hybrid of lowbush and highbush blueberries, and many other blueberry varieties offer a choice of heights, fruiting times, and foliage.

# native perennials and vines

A dwarf inkberry (*Ilex glabra* 'Compacta') is dense and short, serving well in the garden or hedge, as an excellent substitute for boxwood.

## *Honorable Mention:*

Sweet fern (*Comptonia peregrina*) [Zones 2–6, 2'–4'] has clean foliage all season, as does yellowroot (*Xanthorhiza simplicissima*) [Zones 3–9]. St. John's wort (*Hypericum kalmianum* and *H. frondosum*) [Zones 4–7, 2'–3' and Zones 5–9, 3'–6', respectively] offers a bounty of cheerful yellow flowers. Native viburnums (*Viburnum nudum*, *V. acerifolium*, *V. lantanoides*, etc.) are exquisite in bloom, fruit, and fall color, but check to see if viburnum beetle is a problem in your area.

**PERENNIALS** are colorful and bring a spark of interest during the mid-garden season. Use for moist to wet soils instead of yellow flag, purple loosestrife, and Japanese knotweed.

Queen-of-the-prairie (*Filipendula rubra*) [Zones 3–7, 3'–7'] lives up to its name. Bold leaves and quick growth bring towering stems of feathery pink fans through summer that turn earthy but hold fast into November.

Blazing stars (*Liatris scariosa* and *L. pycnostachya*) [Zones 3–8, 1'–4' and Zones 3–9, 3'–4', respectively] have more generous wands of pink flowers than loosestrife, and northern blazing star withstands drier conditions.

Native lobelias (*Lobelia cardinalis* and *L. siphilitica*) [Zones 3–9, 2'–4'] have a similar style, covering the red and blue ends of the spectrum.



Queen-of-the-prairie (*Filipendula rubra*)



Blue lobelia (*Lobelia siphilitica*)

Pokeberry (*Phytolacca americana*) [Zones 5–9, 4'–6'], with its cultivars 'Silberstein' and 'Melody,' has wonderful height and foliar interest, plus deep purple berries from summer through fall. Thoreau waxed poetic over this plant.

## *Honorable Mention:*

New York ironweed (*Vernonia noveboracensis*) [Zones 3–9, 4'–8'], Culver's root (*Veronicastrum virginicum*) [Zones 3–9, 3'–6'], and marsh mallow (*Hibiscus moscheutos*) [Zones 4–9, 4'–7'] are all vigorous, easy to please, and have showy flowers.

**VINES** and other climbers are ideal for those blank vertical spaces. These natives won't take over your home and neighborhood the way Asian bittersweet and Japanese honeysuckle do.

**Virginia creeper** (*Parthenocissus quinquefolia*) [Zones 3–10, to 40+ feet] has few pests and needs little attention. It's at its best planted on the sunny side of a fence or pergola, where it will rapidly climb until it reaches light. Virginia creeper will reward you with lush, draping foliage, burgundy in autumn and laced with dark blue berries. This large vine needs room and can stand shade.

Smaller, but showy, **Texas clematis** (*Clematis texensis*) bears scarlet, cupped blossoms, topping out at about 6–7 feet. Place this on the south or west side of buildings, or similar sheltered spaces, and this southern belle can thrive into Zone 6, even Zone 5 in a favorable site. **Virgin's bower** (*C. virginiana*) [Zones 4–9, 10'–20'] has brilliant white, starry flowers, and rambles happily among shrubs or along a large lattice.

**Wooly Dutchman's pipe** (*Aristolochia tomentosa*) [Zones 4–9, 10'–40'] bears bold, heart-shaped leaves with a tropical flair and most curious flowers that give the plant its name. This is another large vine that will grow in shade with rich soil.



Texas clematis (*Clematis texensis*)



American wisteria (*Wisteria frutescens* 'Clara Mack')

**American wisteria** (*Wisteria frutescens*) [Zones 5–9, 20'–30'] is a choice replacement for the rampant Asian species. The variety 'macrostachya' surpasses the standard type in bloom size and there are other cultivars available. They take pruning well and can be shaped over time in much the same way as exotic wisterias.

**Honorable mention:**

**American climbing fern** (*Lygodium palmatum*) [Zones 6–10, 3'–8'] requires moist, fertile soil and part shade. This is not easy to buy or grow, but rewards the adventurous gardener with singular lobed foliage that changes sizes from large to minuscule as it spirals up any available support. **Maypop** (*Passiflora incarnata*) [Zones (5) 6–10, 3'–8'] surprises with its very tropical look and reaches about ten feet in northern climates with flowers as showy as any and interesting fruits.