Habitats

University of New Hampshire Cooperative Extension • Forestry, Wildlife and Water Resources Programs Newsletter

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What is an Invasive Plant and Why Should We Care?

by Malin Ely Clyde, Coverts Project Coordinator, UNH Cooperative Extension

Many of the most familiar plants in our gardens, fields, and even our forests are not native to New Hampshire. Over the last 400 years or so, immigrants have brought plants from their countries of origin, importing such specimens as Japanese barberry for hedges, purple loosestrife for color in the garden, and Norway maple trees for shade. Conservation organizations have encouraged the planting of autumn olive for erosion control and wildlife food. The nursery trade continues to import exotic species, promoting new varieties and colors for gardening and landscaping. The vast majority of plant imports that are common in our landscape do not cause problems, but a small percentage of them (such as the examples above) have proven to be such good competitors in their new environments that they have become recognized as *invasive plants.*

According to the definition accepted by the New England Wild Flower Society,[1] in order to qualify as an invasive plant, a species must be non-native. So staghorn sumac, an aggressive colonizer of disturbed sites, would not qualify since it is native to our state. An invasive plant must also be able to spread into an intact ecosystem and cause economic or environmental harm by developing self-sustaining populations and becoming dominant or disruptive to those systems. So the lawn grass in your backyard, though non-native and dominant, would not qualify either since it is a desired plant and is not self-sustaining (rather, it requires a lot of maintenance!). In addition, in the agricultural world, many so-called "weeds" qualify as invasive plants, since most are non-native and all cause economic harm to the farmer whose fields or gardens they have infested. For example, spotted knapweed, a problem invasive plant in western rangelands, has reduced livestock and elk forage up to 90% in some areas.[2]

Invasive plants share several characteristics that help them thrive and dominate in new environments. Most invasive plants produce a lot of seed—a single purple loosestrife plant can produce 2 million viable seeds per year, have aggressive root systems, colonize in disturbed areas, and are habitat generalists. Imagine the vines of oriental bittersweet in the autumn, with their thick clusters of bright orange berries,

Autumn olive, ***Elaeagnus umbellata***

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What is an Invasive Plant?

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overrunning disturbed areas such as hedgerows or old fields, and sending out roots that sucker and sprout shoots when the top of the plant is cut.

So why should we care if plants are invasive or not? One might argue that this pattern of one plant out-competing another plant is the natural course of things. How can one plant be "better" than another? The answer to this question lies in the high value we place on native plants, endangered species, and the biodiversity of New Hampshire.

When an invasive plant comes to a natural area (dispersed by a bird or the wind, or planted by a gardener), native plants suffer. The diversity of the site usually plummets as the invader eventually dominates the area. Cattail marshes invaded by purple loosestrife do not support the same diversity of wildlife and fish species. The vines of oriental bittersweet encircle trees and kill them like a boa constrictor. Invasive plants also disrupt natural succession, as they form self-sustaining populations that alter the landscape indefinitely. For example, dense stands of common buckthorn shrubs can dominate the understory of forests, preventing the establishment of the next generation of tree seedlings, while new, buckthorn seedlings replace those older plants that die off. Forty-two percent of all species on the Federal Endangered Species List are listed in part due to invasive species (and for 18%, invasive species are the sole reason for their listing), and invasive species are destroying public natural areas at an estimated rate of 4,600 acres per day.[3] Invasive species also impact forestry and farming to the tune of $37 billion per year, jeopardizing seedling regeneration and damaging crops.[4] Finally, invasive species may be partly responsible for the present decline in migratory songbird populations (see "Wildlife and Invasive Plants" article in this issue).

The good news may be that invasive plants have not posed quite as great a threat in New Hampshire as they have in our neighboring states to the south. The slightly harsher environment and less dense settlement may have kept invasive plants from having as strong a hold on our natural communities. Many of our woods and backyards are still populated by native trees, shrubs, and wildflowers. However, there is still plenty of evidence in our natural areas that shows that invasive plants are a threat to New Hampshire's biodiversity. Learning how to identify the most common invasive plants is a great first step you can take towards protecting and enhancing the state's environment.

Some portions of this piece first appeared in an article by Malin called "Alien Invaders," published in the July-August issue of New Hampshire Audubon Magazine *in 1999.*

Examples of Common Invasive Plants in New Hampshire

Japanese barberry	*Berberis thunbergii*
Oriental bittersweet	*Celastrus orbiculatus*
Common buckthorn	*Rhamnus cathartica*
Glossy buckthorn	*Rhamnus frangula*
Burning bush	*Euonymous alatus*
Tartarian honeysuckle	*Lonicera tatarica*
Japanese honeysuckle	*Lonicera japonica*
Japanese stilt grass	*Microstegium vimineum*
Spotted knapweed	*Centaurea maculosa*
Japanese knotweed	*Polygonum cuspidatum*
Purple loosestrife	*Lythrum salicaria*
Norway maple	*Acer platanoides*
Mile-a-minute	*Polygonum perfoliatum*
Eurasian milfoil	*Myriophyllum spicatum*
Garlic mustard	*Alliaria petiolata*
Autumn olive	*Elaeagnus umbellata*
Russian olive	*Elaeagnus angustifolia*
Common reed	*Phragmites australis*
Multiflora rose	*Rosa multiflora*
Black swallow-wort	*Vincetoxicum nigrum*
Tree-of-Heaven	*Ailanthus altissima*

Footnotes

[1] Definition of invasive plants accepted by the New England Wild Flower Society.
[2] *New England Wild Flower Journal*, vol. 2, no. 3, p. 25.
[3] *New England Wild Flower Journal*, vol. 2, no. 3, p. 4.
[4] Chris Mattick, New England Wild Flower Society, handouts from conference, "Non-native Invasive Plants: Identification and Control," October 16, 2001, Portsmouth, NH. Sponsored by UNH Cooperative Extension.

The Effects of Invasive Species on Natural Plant Communities

by Ellen Snyder, Extension Specialist, Biodiversity, and Coordinator, NH Ecological Reserve System Project

Impenetrable, thorny thickets of multiflora rose, a major offender on any invasive species list, are common in the old fields and pastures, along field edges, and in adjacent second growth forests on my family's land in Amherst, Massachusetts. In southeastern New Hampshire thick stands of Autumn olive, another invasive villain, occupy old fields and road edges. These observations point to one of the key features of invasives—they thrive in disturbed areas.

Disturbance is also essential for some natural communities. It is these communities—river shores and islands, floodplain forests, beaches, and dunes—that depend on natural disturbance regimes that are particularly vulnerable to invasive species. Exposed soils offer prime sites for invasive species to colonize and spread. Japanese knotweed, oriental bittersweet, black swallow-wort, and garlic mustard are a few of the culprits affecting these natural communities.

Purple loosestrife, common reed, and water chestnut are well-documented invasive aquatic plants. Upland habitats suffer as well, perhaps as a result of past land clearing, trails and edges, or dispersal by animals and wind. Japanese and European barberry, common and glossy buckthorn, and Tartarian and Morrow's honeysuckle have crept into northern hardwood forests. Non-native herbaceous plants, including Canada bluegrass, coltsfoot, butter-and-eggs, white sweet clover, goutweed, and moneywort are affecting natural communities in Vermont and elsewhere in New England.

Plant ecologists are studying the effects of invasive species on community composition and structure. Effects include displacing one or more native species, eliminating an entire vegetation strata (e.g., ground flora, seedlings), or altering ecological processes (e.g., changes in hydrology or intensity of fire).

Invasive species are one of the major threats to the integrity of natural communities, second only to direct habitat loss. Brian Frappier, graduate student at UNH, found that glossy buckthorn caused a decline in first-year tree seedling density in southeastern New Hampshire pine forests, impacting advanced regeneration practices. Buckthorn was also associated with lower herbaceous cover and species richness. In *Wetland, Woodland, Wildland** the authors offer the following forest management recommendation—in areas with invasive species, keep openings small and leave uncut or undisturbed buffers between invasive infestations and areas to be cut.

* *Wetland, Woodland, Wildland: A Guide to Natural Communities of Vermont*. 2000. Thompson, E.H., and E.R. Sorenson. University Press of New England.

UNIVERSITY of NEW HAMPSHIRE COOPERATIVE EXTENSION

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The UNH Cooperative Extension Forestry and Wildlife Program has cared for New Hampshire's forests since 1925. Our mission is to educate New Hampshire's citizens about rural and urban environments enhancing their ability to make informed natural resources decisions.

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2002

Control of Non-native Invasive Plants on Your Woodlot

by Roger Monthey, Forest Stewardship Program Representative, USDA Forest Service, State and Private Forestry, Durham, NH

Like many landowners in the Northeast, you may be faced with non-native invasive plants such as bush honeysuckles (*Lonicera* spp.), Japanese barberry (*Berberis thunbergii*), glossy buckthorn (*Rhamnus frangula*), and Oriental bittersweet (*Celastrus orbiculatus*) encroaching upon your woodlot. These and other invasive plants can reduce native biodiversity as well as restrict the regeneration of desirable species, primarily due to the dense shade they cast as well as their aggressive growth. Many workshops are being held throughout New England by various educational and environmental groups (e.g, UNH Cooperative Extension recently hosted a workshop in Portsmouth, NH in October 2001). These workshops often focus on teaching how to recognize and control these species, providing valuable hands-on experience.

One method of invasive plant control is to cut and apply herbicide to the stems. Photo by Ben White.

Chris Mattrick, Senior Conservation Programs Manager with the New England Wild Flower Society (NEWFS), has a lot of experience and expertise in dealing with non-native invasive plants in New England. I attended one of Chris' workshops in Groveland, MA in August 2000. Chris emphasizes several critically important points in the control of invasive plants:

1. You must "pick your battles" in fighting the spread of these species. A "good" battle, for example, would be a landowner with relatively small acreage (as is the case for many non-industrial landowners in the Northeast) who wants to retain his or her woodlot in as natural a condition as possible. Another "good" battle would be a small nature sanctuary attempting to hold off the threat of invasives. A "bad" battle would be trying to control invasive plants along roadsides or similar areas. Roadsides are vectors for transmission of invasive plants, which are often extremely plentiful in these areas.

2. Control of invasive plants is very labor intensive. You are likely to have a big job ahead of you, even on small acreage, so you will probably need help. You can often hire local students (possibly those with an interest in plant ecology) through nearby high schools or colleges. You may also be fortunate enough to get volunteers to assist you. Contact local offices of state and Federal agencies (e.g., USDA Natural Resources Conservation Service, US Fish & Wildlife Service), or botanical groups for ideas on obtaining the help you need.

3. Know what you are controlling. Your woodlot is teeming with native plants, some resembling the invasive species you are trying to control. Proper identification is key. There are a number of educational books, articles and web sites to help you correctly identify and control invasive species.

   Some of these include:

   1) Gleason, Henry A., and Arthur Cronquist. 1991. *Manual of vascular plants of northeastern United States and adjacent Canada.* 2d ed. Bronx, NY: The New York Botanical Garden. 910 p.

   2) New England Wild Flower Society. 1998. *New England Wild Flower: Conservation Notes of the New England Wild Flower Society*. Invaders. Vol. 2, No. 3. Framingham, MA. 30 p.

   3) Maine Natural Areas Program. Invasive Plant Fact Sheets. Augusta, ME: Maine Department of Conservation. <http://www.state.me.us/doc/nrimc/mnap/factsheets/invasivesfact.html>

   4) Native Plant Conservation Initiative, Exotic Plant Working Group web site: <http://www.nps.gov/plants/alien>

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Wildlife and Invasive Plants

by Darrel Covell, Extension Specialist, Wildlife

Wildlife species have done perfectly well in their native habitat - adapting to the food and shelter provided by natural vegetation. But can non-native, invasive plant species benefit them? Yes, some wildlife benefit, but some exotic plants have negative consequences for other wildlife. We cannot generalize that invasive plants either help or hurt wildlife. For example, biologists can easily argue the escape cover benefits of a tangle of multiflora rose to New England cottontails, but some birds (like eastern towhees) prefer native dogwoods to multiflora rose (Suthers et al. 2000). Considering each invasive plant and its affects on animals (both positive and negative) is the only valid approach to weighing the costs and benefits (see Table).

Migratory birds use early successional habitat (e.g., old field or regenerating forest) during fall, taking advantage of the abundant fruit resources available. These birds select shrub habitats with ripened fruits as they become available. Frugivorous (fruit-eating) birds tend to choose high lipid (fat) fruits first. But some studies have shown that birds will take low-lipid fruits like autumn olive and Japanese honeysuckle concurrently with high-lipid fruits like panicled dogwood and poison ivy, perhaps striking a nutritional balance.

A study in New Jersey compared bird use of fruits from native and introduced plants. Fall use of native, high-quality fruits was 17-30 times greater than that of introduced, low-quality fruits (White and Stiles 1992). Of 30 native, fruiting plants studied, 9 (30%) contained lipid-rich pulp (high-quality fruit), compared to 1 of 15 (7%) introduced species. Generally speaking, native, high-quality fruits have a higher relative importance to birds and are eaten earlier in the season than the fruits of introduced plants. This study included the following invasive plants commonly found in New Hampshire: Japanese barberry, Multiflora rose, Oriental bittersweet, Burning bush, Common buckthorn, and three honeysuckles. Of these introduced plants, only one, Burning bush, has fruits that are considered high quality.

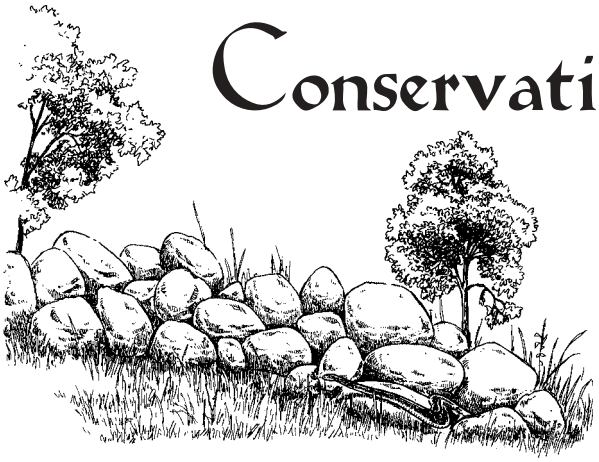
One study documented increased predation of robin nests placed in non-native shrubs (Amur honeysuckle and Common buckthorn) when compared to nests monitored in native shrubs (hawthorn and dogwood species). These two non-native, invasive species may cause robin nests to be more susceptible to nest predation due to their absence of thorns (compared to hawthorn) and branch form that may facilitate predator movement. The authors of this study propose that the abundance of invasive plant species in fragmented landscapes may be a reason for increased nest predation associated with the loss of larger forest blocks (Schmidt & Whelan 1999).

Invasive Plants and Their Affects on Wildlife

Invasive Plant	Wildlife	Positive (+) or Negative (-) Effect
Common buckthorn	American robin	(-) increased nest predation compared to native shrubs
	migrant birds	(-) low-quality fruits (low fat content)
Honeysuckle species	migrant birds	(-) low-quality fruits (low fat content)
Japanese barberry	New England cottontail	(+) escape cover
	wild turkeys	(+) fruits eaten in winter
	migrant birds	(-) low-quality fruits (low fat content)
Multiflora rose	New England cottontail	(+) escape cover
	northern mockingbird	(+) fruits provide enough nutrients for birds to overwinter further north
	eastern towhee and other migrants	(-) fruits offer lower nutritional value than native dogwood fruits
Oriental bittersweet	migrant birds	(-) low-quality fruits (low fat content)

Researchers are still studying both the positive and negative effects of non-native plants on wildlife. It is clear, however, that non-native plants which are invasive, do have long-lasting, negative consequences for native plants and the integrity of ecological systems. New Hampshire's native wildlife have co-evolved with their native food and cover plants. While some invasive plants can benefit some wildlife, the use of such plants is not essential and may degrade the quality of our natural environment.

Conservation Notes



Invasive Plant Project – Cheshire County Farm

by Marshall Patmos, Extension Educator, Forest Resources

As part of UNH Cooperative Extension's ongoing natural resource education and management activity program on Cheshire County property in Westmoreland, NH, an invasive plant species project has been underway for the last two years. The 650-acre ownership includes over a mile of frontage on the Connecticut river, a working dairy

Ben White removes purple loosestrife stems before seed dispersal. Photo by Marshall Patmos.

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Invasive Plants and Lost Forest Revenue

by Bill Guenther, Windham County Forester, University of Vermont Cooperative Extension

Windham County and much of Vermont had a bumper crop of white pine cones in 1987. This presented an opportunity to regenerate new stands of white pine that had reached maturity. In forest management, we often use a cutting method called a shelterwood to start a new crop of white pine. This is essentially a very heavy thinning where we leave large trees evenly spaced to provide seed at a wide spacing and cut all of the other trees so that enough light reaches the ground for the pine seeds to germinate.

On a woodlot in Westminster, a consulting forester prepared a shelterwood cutting in a stand of mature white pine. The timber harvest set up the right conditions for a new generation of pine and when the following spring came, there was a carpet of new seedlings that were so thick that by the end of the summer it looked like a bed of clubmoss.

For the next several years I would stop by this woodlot and observe how well things were coming along. It was textbook forestry and it appeared that a new (healthy) stand of white pine was started. One important point to consider in the development of white pine is that this species grows very slowly in the first five years or so after establishment. If anything comes up to compete directly with the young pines, this can cause some real problems.

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Developing Strategies for Living with Invasives

by Karen P. Bennett, Extension Specialist, Forest Resources

Introduction

Evidence suggests that non-native invasive plants are here to stay. If zero tolerance won't work as a broad landscape goal, we need to develop strategies to limit their spread and negative effects.

As with most natural resources issues, strategies need to be integrated at a number of geographic levels and involve a number of different players—landowners and their foresters working on individual parcels and with neighboring properties; volunteers working within their communities and with conservation groups and agencies; researchers seeking out new knowledge; and policy makers crafting sound policy.

Other sections of this newsletter describe what invasives are and the reasons we should be concerned about them. This article suggests strategies for dealing with them.

Landowner and Forester Strategies on a Property

Because invasives are already here and are so aggressive, and because we are still learning about them, most of the following suggestions for the landowner and forester admittedly fall into the "easier said than done" category.

Know what invasives are. Most basic of all strategies, this includes landowners and natural resource professionals learning to identify and distinguish them from native species as well as becoming knowledgeable about their potential threats, control, and management. Unfortunately, we don't have a full understanding of invasives. The savvy woodland observer willing to feed back observations and experiences to researchers will help build our collective knowledge base in this relatively new area of concern.

Learn about their behavior. Transporting a species to a given environment doesn't mean it will thrive. We know that not all introduced species will invade and they won't invade equally on all sites. They may be free of the insects and disease that control them on their home turf, but they are still limited by climate, nutrient, moisture, and light needs. That is why certain parts of the state and certain sites are more vulnerable and some less so. We need to develop local knowledge about the behavior of non-natives so that management and control recommendations can be developed.

Include invasives in management plans. We don't typically identify, inventory, and prescribe for the treatment of invasives. They should be an important consideration in plans.

Pick your battles. Invasive plants produce an abundance of fruits and seeds; are effectively dispersed by wind, animals and humans; readily take root in disturbed areas; grow rapidly; and compete aggressively. These characteristics frustrate many attempts at complete eradication, especially once a population is established. Since eradicating invasives on every site isn't possible, the most aggressive control should probably focus where they pose a threat to natural regeneration or natural communities.

Start early identifying and controlling before you have a problem. This strategy is a corollary to the "pick your battle" strategy. It is easier to remove one plant than it is to remove one acre of them.

Pay particular attention to monitoring and controlling them in natural communities. Prevent them from arriving. In the larger scheme of things, this may be the most important strategy. Following habitat destruction, invasive

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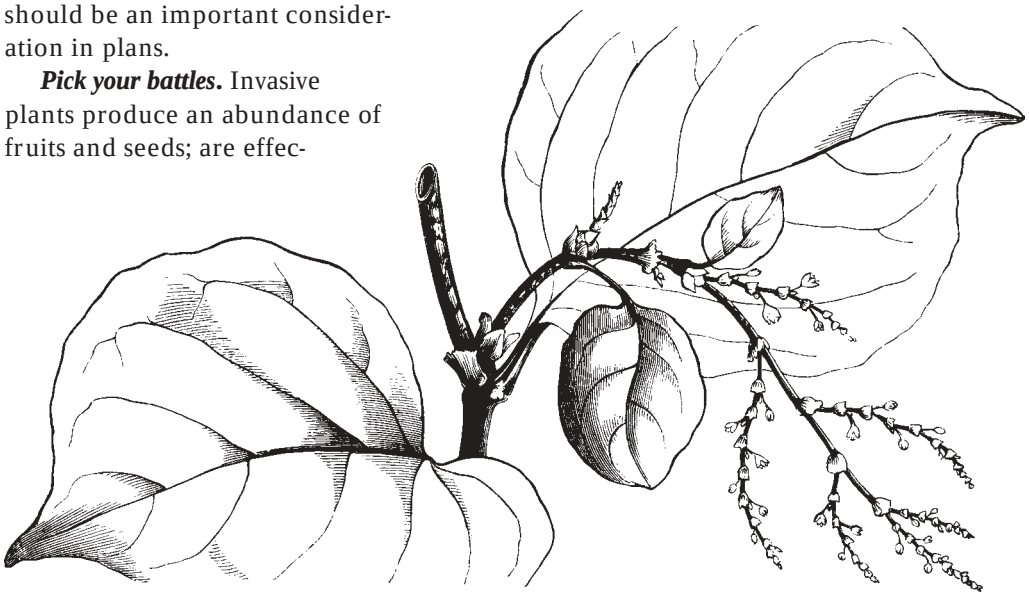

Japanese knotweed, *Polygonum cuspidatum*

Going Native with Landscape Design

by John Hart, American Society of Landscape Architects (ASLA);
Associate Professor of Horticultural Technology, Thompson School of Applied Science;
and Faculty Scholar, Office of Sustainability Programs, University of New Hampshire

Design shortcourse. Landscape design addresses four areas: fitness, form, function, feasibility. *Fitness* refers to ecological appropriateness, or fitting into the natural systems of the site. *Form* has to do with enhancing the site's beauty. *Function* focuses on the usability of a site—surface and subsurface drainage, pedestrian and vehicular movement, screens and buffers, service areas, etc. And *feasibility* gets down to the numbers: Are the installation costs and the long-term maintenance expenses affordable?

Three rules of landscape design derive from these areas of concern.

1. Landscape and ecosystem are one. Landscape design must promote biological diversity and follow ecological principles, or the design ultimately will fail.

2. Form must follow function. The design must first provide for the intended uses of the site. Plant species from other parts of the world may be very attractive, but they will not serve their intended functions if they are not adapted to our climate -- or if they are too well adapted and without natural controls.

3. Project costs need to account for long-term maintenance. Skimping on topsoil will save a lot of money at construction, but the resulting plantings will perform poorly and will require extra care year after year.

Why native plants? The rules above suggest emphasizing native species in our planting designs. Native plants are guaranteed to be a good ecological fit in terms of climatic variables such as temperature, precipitation, and growing season length. If properly selected, they serve their intended functions with little maintenance and with aesthetically pleasing flower, fruit, foliage, bark, shape, etc. And if selected with local site conditions in mind (soils, hydrology, sunlight, etc.), they will thrive over the long term with a minimum of expense. Native plants are also inherently good choices for providing native animal species with habitat for shelter, food, and reproduction.

Arranging native plants in your design. Using native plants in landscape design makes sense, but not merely as an end in itself. Successful landscape design is not about arranging individual plants, but about building diversity and strengthening relationships. Plants in nature arrange themselves into identifiable groups based on such factors as common environmental requirements and mutualistic relationships. The dominant arrangement in New England, and in the northeastern quarter of the US, is temperate deciduous forest. This forest is vertically layered, with an overstory canopy of large trees, a subcanopy of small trees, a shrub layer, a layer of herbaceous grasses and broadleaved perennials, a groundcover layer, a layer of decaying organic matter, and the layers of soil beneath. This forest is also arranged horizontally in clumps, typically based on differences in underlying soil and hydrologic conditions, and on differences in site history.

Landscape designs which take their cues from these natural patterns will very likely be successful, both aesthetically and ecologically. They will fit into the native forest pattern, and they will function as self-sufficient, sustainable, and economic ecological systems. Experienced gardeners and designers follow these structural patterns instinctively, with vertical layers and clumped groupings of species. This is not the only way to arrange plants successfully in the landscape, but designs in this model will be in tune with natural systems, will provide animal habitat, will be relatively low maintenance and self-sustaining, and will help sustain the people who experience them.

A short note on lawns. There is a place for lawns, but not everyplace. Lawns are diversity deserts, highly unstable, and wholly unsustainable. A lawn is only possible with continual inputs of labor, energy, fertilizers, water, lime, chemicals, etc. Indirect results include substantial air, soil, and water pollution. For example, one hour of mowing produces the same amount of air pollution as driving a car 180 miles.

A short list of my favorite natives.

Merely a starter kit for further exploration.

Trees:
American Elm (*Ulmus americana*)
Red Maple (*Acer rubrum*)
River Birch (*Betula nigra*)
White Pine (*Pinus strobus*)
White Spruce (*Picea glauca*)

Shrubs:
Witchhazel (*Hamamelis virginiana*)
Serviceberry (*Amelanchier* species)
Winterberry or Black Alder (*Ilex verticillata*)
Blueberry (*Vaccinium* species)
Viburnums. Including:
Nannyberry (*V. lentago*)
Witherod (*V. cassinoides*)
American Cranberrybush (*V. trilobum*)
Arrowwood (*V. dentatum*)

Vines and groundcovers:
Virginia Creeper (*Parthenocissus quinquefolia*)
Bearberry (*Arctostaphylos uvi-ursa*)
Bunchberry (*Cornus canadensis*)

And don't forget! *Proper plant, proper place*: Although a plant is native to the area, it will not necessarily thrive under your particular site conditions -- a marsh marigold will not do well next to a salted walk, and a mountain laurel will be thoroughly scorched in a windsept area of the lawn. Analyze the site, and know the needs of the species. *Scale:* Use mature sizes of plants when you work up your design. That cute three-foot arborvitae looks nice in front of the bay window for the first two years, but it will grow to sixty feet. *Site preparation:* There is no substitute for good site preparation -- topsoil, organic matter, drainage. Poor site prep is the number one cause of poor plant performance. *Black, white, gray:* Simply using native plants will not guarantee a successful and sustainable design; and yes, good designs can be done with exotic plants. The recommendation here is for moderation and a bit of precaution. Great landscapes can be fostered by a heavy weighting of native species, supported by a diversity of non-invasive exotics, structured in the native plant community model as interpreted on the site level. This will result in biodiverse and sustainable plant communities, great wildlife habitat, and attractive, people-friendly landscapes for living.

For further information on native species and sustainable landscaping:

<www.tsas.unh.edu> The website of the Thompson School. The program in Horticultural Technology offers numerous courses in plant materials and landscape design.

<www.sustainable.unh.edu> The website of the Office of Sustainability Programs at UNH includes information and links regarding the Biodiversity Education Initiative, including sustainable landscaping principles and practices.

<www.newfs.org> The website of the New England Wild Flower Society, promoting the utilization and conservation of native plants.

<www.nhdfl.org> NH Division of Forest and Lands and NH State Forest Nursery. Excellent publications on plants for urban environments, and on proper planting and cultural techniques.

Invasive Plant Project – Cheshire County Farm

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farm, open land and woodland. Garlic mustard and purple loosestrife are particular problems along the river, while buckthorn has taken hold in some of the woodland area openings.

Physical removal of the plants, stem removal before seed dispersal, severing, flame burner and herbicide treatments have been tried on different plots with varying degrees of success. Almost 100 garbage bags of loosestrife stems were collected and destroyed, hundreds of buckthorn stems and thousands of garlic mustard plants have been removed in one way or another. About 3 acres have been treated so far in this ongoing project. While the weather seemed to give less than desirable results, the project also participated in the NH Department of Agriculture, *Galerucella* beetle rearing project for release and control of loosestrife. Participation is planned again for 2002.

Working in part with a grant from the NH Department of Agriculture and participation in the Wildlife Habitat Improvement Program through the USDA Natural Resources Conservation Service, the effort has been made possible by the hard work of volunteer Jim Blake (Coverts 2001) of Westmoreland and Ben White (Coverts 2000), Extension Americorps associate. They used inmate labor to help whenever possible and worked in cooperation with Marshall Patmos, UNH Cooperative Extension, and Wendy Ward, Natural Resources Conservation Service.

Invasive Plants and Lost Forest Revenue

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At year two, three and four things looked very good with the developing seedlings that were now nearly a foot tall. This is the type of stand that could easily grow white pine at 25,000 board feet per acre. If we assume that each 1,000 board feet is worth $100, then each acre would have a gross timber value of $2,500. This stand that was regenerated is about 25 acres in size, so the timber value across that acreage would represent a gross value of $62,500.

I usually visited this stand each year but missed a couple visits, so was not out there for just over two years. When I walked into the woods I got a real shock. In just over two years the regenerating stand had been severely invaded by glossy buckthorn (*Rhamnus frangula*). This highly invasive exotic had established itself so well that it was now a 3-4 foot tall thicket that was shading out the light-loving pines. The competition was so extreme that we will likely lose the crop of white pine. Therefore we can make the assumption that this invasive exotic will cost the landowner $62,500 in lost revenue.

Cases like this are causing foresters to be increasingly concerned about the economic impact of invasive exotic plants.

Developing Strategies

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species are the number one threat to the integrity of natural areas.

Don't be the one to introduce new invasives. Most originate from long distances from the point of origin. Introduction, cultivation, escape, naturalization, and invasion may take 10, 20 ,50 or even 100 years to complete. Horticulture is responsible for the introduction of approximately 60% of invasive species. Conservation organizations are responsible for 25% of the introductions. Accidental introductions amount to 15%.

Strategies for the Public Arena

Volunteer. Volunteer efforts bridge individual action on specific sites with the landscape-level reach of government and conservation organizations. The New England Wildflower Society and others have active programs to map, control, and in some cases, eradicate invasives.

Research. For most of us the invasives issue burst on the scene a few years ago. There is still much that isn't known in the area of management and control: integrated pest management, what areas are vulnerable to infestation and by what invader, effects on natural communities, and effects on natural regeneration and other silvicultural considerations.

Develop public policy sensitive to the economy and ecology. This is no easy task considering that individual rights and livelihoods are involved. The NH invasive species committee was established last year to explore the environmental and economic effects of invasive plant, insect, and fungal species; promote research and education; and prevent and control the spread of invasives (see the winter 2001 issue of "Habitats" for a more thorough discussion of their mandate).

You Can Learn More

If you are interested in learning more, set aside April 26 or 27, 2002. We will be offering 2 workshops on the topic- one at Fox Forest in Hillsborough and the other at the Harris Center for Conservation Education in Hancock.

We are expanding our library on the topic and have included some of the more useful references in *The Invasives Package*. It includes identification sheets, lists of native species to plant, control on woodlots, and sources of information. Call 1-800-444-8978 for your copy.

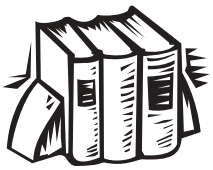
Upcoming Events

Check the event calendar on the UNH Cooperative Extension Forestry and Wildlife Program web site at <http://ceinfo.unh.edu/forest.htm>

Friday, February 15, 2002, 8 a.m. - 3:30 p.m.
Granite State Division of the Society of American Foresters 2002 Annual Meeting, Waterville Valley
FEE: TBA, Credits: 2 CEU's NH Licensed Foresters, 3 SAF CFE's,
Contact Inge Seaboyer at 271-3629 or email at iseaboyer@dred.state.nh.us

Tuesday-Thursday, March 26-28, 2002
New England Society of American Foresters Winter Meeting: Forestry in the Fragmentation Puzzle,
Center of NH / Holiday Inn, Manchester.
Please contact Jeffrey Ward at 203-974-8495 or jeffrey.ward@po.state.ct.us. Reservations can be made at the Holiday Inn at 1-800-465-4329. Be sure to tell them you're with NH SAF. Check out the website www.nesaf.org for additional information. FEE: Full package - $90 includes box lunch, 2 continental breakfasts, ice breaker and awards luncheon. Single day registration - $60 Student - full package $50, $25 / day, $35 two days. Additional awards luncheon tickets - $20 Additional Box lunches - $14. Late fee charged after March 4th - $15. Credits offered - call or see web site for details. Contact Karen Bennett at 603-862-4861 or email at karen.bennett@unh.edu.

Friday, April 26, or Saturday, April 27, 2002
Invasive Plants Workshops,
Fox Forest, Hillsborough, and Harris Center for Conservation Education, Hancock.
Contact Karen Bennett at 603-862-4861 or email at karen.bennett@unh.edu.



From the Resources Library

by Karen Bennett, Extension Specialist, Forest Resources

UNH Cooperative Extension Forestry Information Center

The following publications are available from the Forestry Information Center. Unless noted, all publications are free. For charge publications, make check payable to UNH Cooperative Extension and remit to UNHCE Forestry Information Center, Room 211 Nesmith Hall, 131 Main St, Durham, NH 03824. To request copies, call 1-800-444-8978 or email kathy.barrett@unh.edu.

Federal Income Tax on Timber: A Key to Your Most Frequently Asked Questions by Harry Haney, Bill Siegel, and Larry Bishop, all nationally recognized experts in the field of timber taxes, does exactly what the title says – it answers frequently asked questions. It gives a quick reference to the tax forms needed and briefly describes how to qualify for the best tax treatment for specific forestry activities.

Helping Trees Recover from Stress: A Guide for Homeowners reviews causes and symptoms of tree stress and proper care techniques such as pruning, planting, watering, fertilizing, mulching, and insect and disease control. Another useful publication from the USDA-Forest Service and Northeast Center for Urban and Community Forestry.

To Build A Bridge is a fully illustrated, pamphlet chronicling the building of a full-sized wooden bridge. It pictures the loggers, truckers and sawmill workers who fashioned the trees into lumber. Written by Sarah Smith, Extension Industry Specialist, it is non-technical and full of facts about covered bridges.

The much anticipated revision of the ***New Hampshire Directory of Sawmills and Lumber Wholesalers*** is available. Nearly 100 businesses are listed with location, services, products, annual production, and contact information. Also available at <ftp://ceftp.unh.edu/sawmil01.pdf>.

The ***2000-2001 New Hampshire Forest Market Report*** includes stumpage and delivered price ranges by species and quality by county. Volume tables, operating costs, Christmas tree and related products, maple sap and syrup prices, and price ranges for other forest products are among some of the other useful items included. Also available at <ftp://ceftp.unh.edu/FORMR01.pdf>.

We are expanding our own library on the topic of invasives. For some of the more useful items we have found, ask for ***The Invasives Package***. It includes identification sheets, lists of native species to plant, control on woodlots, and sources of information.

New Hampshire's Native Trees, Shrubs, and Vines with Wildlife Value is a 4-page listing of plant species, their fruiting period, use by wildlife, and what wildlife use the plants for food.

A reprint of the article ***More Harm Than Good*** by Kip Adams, NH Fish and Game Department, and Darrel Covell, Extension Wildlife Specialist, from the *New Hampshire Wildlife Journal* describes some of the reasons why feeding deer in winter can cause more harm to the deer population than good. Also, a new brochure of the same title, based on the article, is available from both Cooperative Extension and Fish and Game.

We continue to add to our UNH Cooperative Extension Forestry and Wildlife web site. Some of our best ideas come from visitors to the site. Go to <http://ceinfo.unh.edu/forestry/documents/FWRhome.htm> and let us know what you think.

Other Library Resources

The latest addition to your library for helping communities protect open space should be ***Planning for the Future of Local Forests: A Guide for New Hampshire Towns Using the Forestland Evaluation and Site Assessment Process (FLESA)***. Prepared and published by the North Country and Southern NH Resource Conservation and Development Councils, it provides communities with the tools to assess their forest resources, identify local values and goals, and better integrate natural resources into economic development strategies and planning in relation to the larger landscape. For more information, contact Elizabeth Cooper at (603)223-0083, or visit the FLESA website <http://www.nh.nrcs.usda.gov/Other/FLESA/FLESA.htm>.

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525081

Control of Non-native Invasive Plants

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5) The Nature Conservancy, Wildland Invasive Species Program web site: <http://tncweeds.ucdavis.edu>

Three major methods to control invasive plants include: biological control, mechanical control, and chemical control. Biological control is the use of non-native organisms to control non-native plants. One example is the use of foliage-eating beetles to help control Purple loosestrife (*Lythrum salicaria*). Mechanical control includes the use of weed whackers, clippers, loppers, brush saws, and chain saws to remove or retard undesirable species. Chemical control, or the use of herbicides, is often the most effective method of removing invasive plants, but there are risks due to "collateral" damage to nearby desirable resources (e.g., plants, aquatic life, water quality). In addition, it is very important to understand the laws that regulate herbicide applications in your state. An article summarizing these various methods is available on the following website <http://www.fs.fed.us/na/durham/who/stew_library.htm>. The title of the article is "The Biodiversity of a New England Woodlot Series: Control of Non-native Invasive Plants on Your Woodlot" written by myself and Chris Mattrick of NEWFS.

Safety precautions are a necessity when using mechanical or chemical methods to control invasive species. Proper safety equipment includes such items as safety goggles, a hard hat, gloves, boots, and chaps. Additional items for herbicide application include a dust mask, long sleeve shirt, hat, pesticide gloves, and eye wash. Have a first aid kit with you at all times.

In closing, it is very important that we increase public awareness on this issue, and encourage citizens to tackle this issue head on through local projects and activities. New Hampshire's Envirothon Program will be educating high school youth on this issue in the Spring of 2002. As a landowner myself faced with the problem of bush honeysuckles invading my woodlot, I know that landowners would appreciate any help they can get in dealing with these invasive plants.