



## YOU AND YOUR FOREST: LETTER 7

### Invasive Species and Forests

Not all non-native species are considered invasive species. So what is an invasive species? The definition of invasive species by most groups is defined as a species that is: 1) non-native (or alien) to the ecosystem under consideration and 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Invasive species can be plants, animals, and other organisms (e.g., microbes). Human actions are the primary means of invasive species introductions.

As a threat to our biodiversity, invasive species have been judged second only to habitat loss. Invasive species come from all around the world and the rate of invasion is increasing with the increase in international trade that accompanies globalization.

Invasive species have caused many problems in the past, are causing problems now, and pose threats to

our future natural resources. A wide variety of species are problematic for many sectors of our world: our ecosystems, including both natural systems and also managed forests. Invasive plants out-compete other species for water, nutrients, sunlight, and space. As a result, invasive species can: Displace native species, Reduce plant diversity, Alter ecosystem processes, Hybridize with native plants, changing their genetic makeup, Destroy the habitats that support native animals, insects, and micro-organisms, Create ecosystems that support aggressive, non-native plants, animals, and pathogens.

This issue will focus specifically on invasive species that are currently, or may in the future, impact the forested landscape. The ability to respond proactively, including prevention, early detection and rapid response, is crucial to effective invasive species management, in order to ensure a future with healthy and resilient forested lands.

### What Can You Do?

With regards to invasive species, **timing is everything.**

**Prevention.** Don't allow for the introduction of invasives into your landscape.

**Early detection** is essential. Monitoring your forest and keeping up to date on the status of existing and potential invasive species in your region will help minimize the impact of invasive species.

**Rapid response,** What can you do once you are faced with an establishing invasive species. In this issue there are common woodland invasive species with corresponding treatments.

**Management:** Eradication or limiting an invasive species' impact is the primary objective.



## Common Woodland Invasive Plants

When combating invasive plants it is essential to learn what plants are already known to be a problem in your area, and avoid planting them. Some plants are still available as landscape plants and are sold or promoted in nurseries. It is best to err on the side of caution - if you have any doubts about a certain type of vegetation, don't plant it!

Consider planting native trees and shrubs. Native plants occur naturally in the region in which they evolved. In the United States, native plants are usually defined as those plants that have been present since the time of European contact. Below you will find a list of the more problematic invasive trees, shrubs, forbs and vines with corresponding management recommendations.



*Keep forests invasive species free*

### Trees

#### Norway Maple

*Acer platanoides*  
Forest Edge, Fencerows  
Full Sun to Full Shade  
By Seed (wind)  
Avoid planting near woodlands

#### Tree of Heaven

*Ailanthus altissima*  
Forest Edge and Gaps, Disturbed areas  
Zone 5 and warmer  
By Seed and Root suckers  
Avoid planting near woodlands  
Hand-pull or Dig up

#### White Poplar

*Populus alba*  
Full sun, Forest Edges, Wetland Edges  
Root Suckers  
Avoid planting near woodlands

#### Black Locust

*Robinia pseudoacacia*  
Forest Edge and Interior, Full Sun to Full Shade  
Disturbed Sites  
Root Suckers (primarily) and Seed  
Avoid planting  
Dig up seedlings or apply herbicide

### Shrubs

#### Barberry

*Berberis thunbergii, vulgaris*  
Forest Interior and Edge, Full Sun to Full Shade

By Seed (birds)  
Cut down/Dig up or apply herbicide

#### Autumn Olive

*Elaeagnus umbellata*  
Open areas, Forest Edge  
By Seed (birds)  
Avoid planting in woodlands  
Cut down/Dig up

#### Burning Bush

*Euonymus alatus*  
Full Sun to Full Shade  
By Seed (birds) and Root Suckers (form thickets)  
Avoid planting in woodlands  
Cut down/Dig up; Herbicide

#### Privet

*Ligustrum obtusifolium*  
Full Sun to Full Shade, Forest Edge and Interior  
By Seed (birds)  
Avoid planting; Cut down/Dig up; Herbicide

#### Honeysuckle

*Lonicera tatarica, maackii, morrowii*  
Full Sun to Full Shade, Forest Edge and Interior  
By Seed (birds) Stump Sprouts  
Cut down/ Dig up; Herbicide

#### Buckthorn

*Rhamnus cathartica, frangula*  
Full Sun to Full Shade, Upland and Wetland  
By Seed (birds)  
Cut down/Dig up; Herbicide

*Continued on next page*

## Common woodland IS Plants continued

**Vines****Porcelain Berry***Ampelopsis Brevipedunculata*

Full to Partial Sun, Forest Edge and Gaps  
 By Seed (birds, mammals), Stems and Roots  
 Hand-pull; Herbicide

**Purple Loosestrife***Lythrum salicaria*

Full Sun to Partial Shade  
 Wetland and Upland Sites,  
 Perennial By Seed, Underground Stems  
 Hand-pull; *Galerucella pusilla* and *calmariensis*  
 leafeating Beetles

**Oriental Bittersweet***Celastrus orbiculatus*

Full Sun to Partial Shade  
 Forest Edge and Gaps  
 By Seed (birds, humans)  
 Hand-pull; Herbicide

**Japanese Knotweed***Polygonum cuspidatum*

Full Sun to Full Shade, almost any site,  
 Perennial By Seed & Roots  
 Hand-pull, Dig up Roots,  
 Smother, Herbicide

**Japanese Honeysuckle***Lonicera japonica*

Full Sun to Full Shade  
 Forest Edge By Seed (birds)  
 Hand-pull; Herbicide

**Giant Hogweed***Heracleum mantegazzianum*

Full Sun to Partial Shade,  
 Perennial by Seed and Roots  
 Dig up Roots, Herbicide  
 Use Caution: Sap is Toxic  
 Sap is Toxic. Proceed carefully.

**Forbs****Garlic Mustard***Alliaria petiolata*

Full Sun to Full Shade  
 Disturbed Soils,  
 Biennial By Seed  
 Hand-pull



---

**Invasive Insect Pests**

The following are some the most prominent invasive forest insect pests threatening New York. The insect pests, hemlock woolly adelgid, emerald ash borer, Asian longhorned beetle and beech bark blister disease, all currently exist or have been found in the recent past in New York. Trees may die, if no action is taken, when infested by any of them. If occurring at a large scale, the mortality could have profound ecologic, economic, and social consequences

***Emerald Ash Borer***

The Emerald ash borer (*Agrilus planipennis*) has been increasing in locations throughout the Hudson Valley and points west and it appears this trend will continue. Why should we care? And what can we do about it? The emerald ash borer has been found in numerous counties in New York State, including Ulster, Greene, Orange and Albany counties. It attacks white and green ash. These grow mostly in mixture with other species. The vast second-growth forests that regenerated on former farmlands may have appreciable amounts of both species. Loss of these trees would still leave many viable hardwood woodlands, but it could have important ecologic and economic impacts.



“Pests” continued on next page



### ***Emerald Ash Borer (continued)***

Ash trees grow mostly in mixture with other species. The vast second-growth forests that regenerated on former farmlands may have appreciable amounts of both species. Except where these species occur in pure stands, landowners could favor other trees during thinning and other forest operations. Ash wood is white, dense, strong and straight grained. It is used for the production of baseball bats. The wood is also favored for furniture and tool handles.

The Emerald ash borer is small and does not fly long distances. It has a metallic green color, a small body size, and blunt head. Long distance dispersal is commonly associated with movement of firewood. Many communities are preparing for the Emerald ash borer by doing inventories of their trees, especially in towns and cities. Street trees are particularly problematic because dead or dying ash becomes brittle and lose limbs quickly, making them a higher risk in more populated areas.

*These pictures represent EAB larvae, larval galleries that EAB produce and the Purple Trap used to determine the presence of EAB..*



### ***Asian Long-horned Beetle***

Asian Longhorned Beetle (*Anoplophora glabripennis*) is an insect pest of hardwood trees. It is a native of China and was first detected in New York in 1996.

This beetle poses a serious threat to forests of the north-east and maple syrup production. Infestations in Massachusetts, New York and New Jersey are under eradication by USDA APHIS.

The Asian long-horned beetle has only been found within the state in the New York City area. Unfortunately, it has recently killed thousands of trees in Massachusetts, and could potentially affect maple-dominated woodlands of rural New York as well. Sugar maple dominates those northern hardwood forests, growing on 31 million acres in Northeastern United States (US For. Serv. 1990). Red maple also occurs widely throughout the region, and may dominate bottomland and poorly drained sites. To have these species killed off would prove catastrophic. It would drastically change the character of northern hardwood woodlands and have profound economic, ecologic and social impacts.



Substituting other tree species for the maples seems impractical.

This is just one of many forest pests that are moved to un-infested forests by humans moving firewood.

<http://pest.ceris.purdue.edu/index.php>

*"Pests" continued on next page*

## *Beech Bark Blister Disease*



Beech bark blister disease results from the combined action of the beech scale insect and a pathogenic fungus, *Nectria coccinea*. Most affected beech end up succumbing to the disease, either directly or as a result of being attacked by other pathogens. The beech scale insect is part of the scale family. In mid-summer, the female deposits her eggs (asexual reproduction) in the bark fissures. The larva hatches and stays in the same place or migrates to other cracks. In fall, the nymph becomes stationary again and secretes a woolly envelope. This woolly envelope makes the tree look like it is covered with snow. The scale insect over winters in the bark of the

tree. The fungal spores are disseminated by rain splash or by the wind and penetrate into the tree through wounds created by the scale insect. The fungus first causes a depression in the bark of the affected region and cankerous blisters of various sizes also form. On severely affected trees, there are so many cankers that they end up merging. Tree mortality is often caused by other pathogens, such as *Hypoxylon* fungi, for example, or other insects. Andrej Kunca, National Forest Centre - Slovakia, Bugwood.org

## *Hemlock Woolly Adelgid*



The hemlock woolly adelgid (HWA) is a destructive introduced pest of forest and ornamental hemlock trees (*Tsuga* spp.) in the eastern United States. The adelgid feeds at the bases of needles, causing them to desiccate and the tree to take on a gray cast. The result is needle loss, which prevents trees from producing new apical buds. Heavy infestations have killed trees in as little as 4 years, yet some trees have survived infestations for more than 10 years. Other stress factors may affect the tolerance of *Tsuga* spp. to insect attack.

Close-up of white ovisacs. (Chris Evans, River to River CWMA, [www.Bugwood.org](http://www.Bugwood.org))

## *Earthworms*

All of the terrestrial earthworms in the Catskill Mountain Hudson River region are non-native, invasive species from Europe and Asia with a number of them invading our hardwood forests and causing the loss of tree seedlings, wildflowers, and ferns. Hardwood forests developed in the absence of earthworms. Without worms, fallen leaves decompose slowly, creating a spongy layer of organic "duff." This duff layer is the natural growing environment for native woodland wildflowers. It also provides habitat for ground-dwelling animals and helps prevent soil erosion.

Invading earthworms eat the leaves that create the duff layer and are capable of eliminating it completely. Big trees survive, but many young seedlings perish, along with ferns and wildflowers. Some species return after the initial invasion, but others disappear. In areas heavily infested by earthworms, soil erosion and leaching of nutrients may reduce the productivity of forests and ultimately degrade fish habitat and other niches.





## Forest Management and Invasive Species

### *The role for silviculture when managing threats of exotic insects*

Usually, appropriate Forest Management planning and strategies rely on silviculture to reduce potential impacts of natural injurious agents, but may also include direct control of pests and other problems.

Current research continues to evaluate biocontrol insects and fungi for use against these three exotic pests, but no candidates have shown immediate promise. For the present, use of insecticides or biologic controls for hemlock woolly adelgid, emerald ash borer, and Asian long-horned beetle seems impractical and unlikely at the stand and forest levels. For most harmful insects, silviculture attempts to::

1. Keep trees vigorous and remove age classes before they become weakened by maturity. That usually helps to slow or reduce losses to some degree.

2. Change the species composition to reduce the abundance of susceptible ones. That can happen by proper species selection during thinning and related cutting, and through an appropriate reproduction method and seed source.

These measures usually make woodlands more resistant to infestation and more resilient in their response afterward. Thinning can shift the species composition by removing susceptible trees. It also favors vigorous trees and those not yet weakened by old age. These better withstand stress. Vigorous trees may also take longer to die after an infestation by many insects, allowing more time to implement a reaction and recovery plan. Yet tree vigor does not reduce the certainty of mortality or lessen the effects of many of the forest insect pests described in this letter. However what is important to remember is that once these insects infest a tree, it will most likely die, unless some action is taken.

---

## Feral Swine

Addressing is a timely issue for New York State and the future of its countryside. Feral Swine (*Sus scrofa*), also known as feral pigs or wild boars, are appearing in multiple locations throughout New York. The introduction of feral swine into North America's most likely originated with early Europeans in the 1500s but another more current avenue is via hunting clubs, sport game preserves, and individual hunters who import Eurasian and Russian wild boar.

The impact of feral swine is far reaching. By sheer numbers they have the ability to triple their numbers in a few years, breed as young as 6 months and have multiple litters of 2-12 piglets in a year. In the past, New York's traditionally cold winters have been thought to keep the numbers down, but breeding success in places such as North Dakota and Saskatchewan have shown their heartiness. They can also breed with domesticated swine and have few known predators.

Most feral swine average 120 lbs. but can reach a staggering 400 lbs. They exhibit a wide range of color variations from white to dark brown, due to cross breeding with domestic pigs. Their tusks are 4-5 inches, sharp and dangerous. Feral swine has been estimated to cost over \$1 billion in damages and control each year in the United States, impacting agriculture in particular. In 2011 over \$35,000 in damage was documented in New York State.

Feral swine eat almost any available plant or animal, typically at night and out of sight. But the disturbances they create are evident; ruined crops, and rooted, wallowed fields and forests, including sensitive wet areas. Their persistent rooting disturbs soils, impacts water quality, and destroys various forest plants including trees, seedlings and forest floor plants, as well as numerous ground nesting birds, reptiles and amphibians. They will also kill and eat vulnerable wild and domestic mammal species, such as deer fawns. Another concern is feral swine are carriers of multiple diseases and parasites, including Brucellosis, Pseudorabies, Swine influenza, Toxoplasmosis, Tularemia, and Trichinellosis.



*Feral Swine continued*

Feral swine have been confirmed in 6 counties in New York State. They first showed up about a decade ago in Onondaga and Cortland Counties, and have been limited, up to now, in central NY counties where they were thought to have escaped from game preserves. With the recent discovery in Peru, NY, in the Champlain Valley, the fear is an expansion into the Adirondack Park.

Feral Swine are very smart and difficult to hunt. In New York, anyone with a small game license may hunt and kill feral swine year round with no limit. But timing is everything in order to achieve long term control. Current legislation is being proposed in New York to prohibit feral swine, and Pennsylvania is considering legislation to completely eradicate feral swine and wild boar. Furthermore, the New York State Department of Environmental Conservation has a goal to eradicate feral swine from New York.

Photo: Billy Higginbotham, Texas AgriLife Extension Service, Bugwood.org

## Resources & References

[Ash Management Guidelines for Private Landowners](#) - Expert recommendations for private landowners on how to manage their ash.

[Guidelines for Disposal of Invasive Terrestrial Plants](#) - A resource from University of Connecticut

[Check, Clean, Dry!](#) a warning flyer about aquatic hitchhikers for boaters from Trout Unlimited

[Firewood Warning](#) a small flyer from the NYSDEC about the risk of moving firewood

[stopthebeetle.info](#) - fun games and an EAB educational resource from USDA- APHIS

[beetledetectives.com](#) - Organizations can report their findings in a friendly competition

[beetlebusters.info](#) -USDA APHIS resource for ALB

[emeraldashborer.info](#) - A multinational effort to bring the latest information on emerald ash borer

[The New York State Invasive Species Information Clearing-house](#) - a newly launched partnership between Cornell University and NYS Sea Grant. This website provides useful identification tips and fact sheets for many of the high priority invasive species in New York. NYIS.info

[Invasive.org](#) - a partnership between the University of Georgia's Bugwood Network, USDA Forest Service and USDA APHIS PPQ.

[The National Invasive Species Information Center](#) - a project of the USDA National Agricultural Library providing invasive species information at the National, State, and Local level.

[Catskill Regional Invasive Species Partnership \(CRISP\)](#)  
<http://catskillinvasives.com/>

CRISP partners represent diverse stakeholders from throughout the Catskill Mountain Region who promote education, prevention, early detection and control of invasive species to limit their impact on the ecosystems and economies of the Catskills.

[Ecology and Management of Invasive Plants](#)  
<http://www.invasiveplants.net/>

[USDA Forest Service Invasive Species](#)  
<http://www.fs.fed.us/invasivespecies/>

[Invasive Plant Council of New York](#)  
<http://www.ipcnys.ene.com/>

[Invasive Plants of New England](#)  
<http://invasives.eeb.uconn.edu/ipane/>

[Invasive and Exotic Species](#)  
<http://www.invasive.org/>

[Forest Invasive Alien Species](#) [www.exoticpests.gc.ca](http://www.exoticpests.gc.ca)

# Don't Move Firewood

There are many invasive insect species in New York that could kill trees in forested communities. These include Emerald ash borer, Asian long-horned beetle, and others you have read about in this letter. Why is there an emphasis on firewood? Firewood itself isn't the problem—what is potentially the problem is moving it from one place to another. The bark on firewood can harbor insects and diseases that may be unseen but can kill trees. Many of these pests have been transported via the movement of firewood. Commercial lumber, unlike most firewood, is typically kiln-dried, which kills most pests.

By transporting firewood, you could be spreading diseases and invasive insects that can quickly kill large numbers of trees. Help STOP THE SPREAD and obey the Firewood Regulation:

- It is best to leave all firewood at home - please do not bring it to campgrounds or parks.
- Get your firewood at the campground or from a local vendor - ask for a receipt or label that has the firewood's local source.
- If you choose to transport firewood within New York State:
- It must have a receipt or label that has the fire-

wood's source and it must remain within 50 miles of that source.

- For firewood not purchased (i.e. cut from your own property) you must have a [Self-Issued Certificate of Source \(PDF, 100 kB\)](#), and it must be sourced within 50 miles of your destination.
- Only firewood labeled as meeting New York's heat treatment standards to kill pests (kiln-dried) may be transported into the state and further than 50 miles from the firewood's source. Acceptable firewood heat treatment must raise the core temperature of the firewood to 71 degrees C, or 160 degrees F, and hold it there for at least 75 minutes. Most "kiln-drying" processes that reduce the moisture content to less than 18% achieve this sterilization standard. For additional questions regarding this regulation call this toll-free number: 866-640-0652 or e-mail: [firewood@gw.dec.state.ny.us](mailto:firewood@gw.dec.state.ny.us)




---

This publication, dedicated to furthering an understanding of invasive species impacting forested lands, was supported through funds provided by the Catskill Regional Invasive Species Partnership (CRISP).

---

CORNELL COOPERATIVE EXTENSION'S  
AGROFORESTRY RESOURCE CENTER &  
THE WATERSHED FORESTRY PROGRAM OF THE WATERSHED  
AGRICULTURAL COUNCIL

Cornell Cooperative Extension  
of Columbia and Greene Counties  
Agroforestry Resource Center  
6055 Route 23, Acra, NY 12405  
Phone: 518-622-9820  
Email: [greenec@cornell.edu](mailto:greenec@cornell.edu)

The Forest Stewardship Self-Study Course is a collaboration among Cornell Cooperative Extension, New York City Department of Environmental Protection, U.S. Department of Agriculture's Forest Service and the Watershed Agricultural Council's Forestry Program.

Many thanks to Greater Adirondack R C & D Council and especially Laurel Gailor of Cornell Cooperative Extension of Warren County for their outline and assistance with the Forestry Letter Series.

Cornell Cooperative Extension provides equal program and employment opportunities.