

## New Jersey Fact Sheet: Forest Pest Management

### January, 2013

#### Introduction

Forest Pest Management is the process of enhancing forest health by minimizing outbreaks and impacts of forest pests, including insects, disease, and invasive plants. New Jersey has approximately 2.2 million acres of forest land that provide many economic, ecological, and aesthetic benefits. Forests play an important role in providing essential environmental services, such as protecting or improving air and water quality, building and preserving healthy soil, and providing habitat for both common and rare wildlife. In recent decades, there has been a dramatic increase in the number of forests pest that negatively affect the forest's ability to provide these services. Because of this increased threat, Forest Pest Management has become an important factor in preserving the health and integrity of forest habitats.

#### Threats

Some forest pests that currently threaten the health of forest ecosystems are native to the United States. Historically, the populations of these pests have been stable or limited by habitat constraints and natural predators; however, recent changes in weather patterns and the landscape have afforded some pests the opportunity to expand their range into forests that lack these protections, including forests in New Jersey. In other cases, forest pests have been inadvertently introduced from other countries. These exotic organisms typically have few natural predators in their new habitat and can therefore rapidly reach epidemic levels within a forest. The sudden influx of an unknown pest can result in severe forest degradation, causing a decrease in both economic and ecological health.

#### Prevention

Forest management techniques that reduce vegetative competition, promote high species diversity, and enhance individual tree vigor can help increase a forest stand's resistance to forest pests. A Forest Stewardship Plan, prepared by an approved forester or qualified natural resource professional, should include specific management practices to achieve these goals. Typically



This forest stand is being managed under a Forest Stewardship Plan in order to promote healthy tree growth and to decrease the risk of a potential pest outbreak (Jean Lynch, NJA)

methods can include selective thinning, herbicide application to control invasive vegetation, and prescribed burns. Certain restrictions may apply to specific sites and projects, so it is important to consult an approved forester or natural resource professional for proper guidance.

To further avoid the spread of forest pests, untreated wood products, such as firewood, should be kept local and not transported across state or county lines.

#### Control of Existing Pests

In addition to preventative measures, early detection and rapid response to existing outbreaks is an efficient and effective way to minimize damage. Forest pests include fungi, bacteria, pathogenic infections, insect and nematode infestations, and invasive plants. Although accurately identifying all forest pests may be difficult for many landowners, some of the current priority species that exhibit easily identifiable characteristics are described below. If a forest appears to be affected by these or any other pest, it is important to consult an approved forester or natural resource professional to assist with positive identification and management



(From left to right) Adult Asian Longhorn Beetle (Melody Kenna, USDA Forest Service, bugwood.org), adult Emerald Ash Borer (USDA Forest Service, fs.usda.gov), adult Southern Pine Beetle (Erich G. Vallery, USDA Forest Service, bugwood.org), adult Hemlock Woolly Adelgid (Kelly Oten, bugwood.org).

options. Certain pests should also be reported to the appropriate government agencies, including the United States Department of Agriculture (USDA).

**Emerald Ash Borer (*Agrilus planipennis*)**

The Emerald Ash Borer (EAB) is native to Asia and has become increasingly detrimental to North American forests. As of 2012, it had not yet been found in New Jersey; however, EAB has been detected in New York and Pennsylvania. This invasive insect targets all ash species (*Fraxinus spp.*) and poses a significant threat to New Jersey’s forest land. As the larvae feed on the living tissue beneath the bark, they impair the tree’s ability to transport water and nutrients between its leaves and roots. If the tree is experiencing additional stress from other factors, mortality is likely to occur in less than two years. The first sign of an infestation may be a decrease in crown foliage; however, the best way to detect an EAB infestation is by removing a section of bark to look for the S-shaped galleries created by feeding larvae. After undergoing metamorphosis deep in the sapwood, mature beetles emerge and leave a distinctive D-shaped exit hole in the outer bark of the tree. Because this pest has not yet been found in New Jersey, it is particularly important to report any suspected cases to the United States Department of Agriculture (USDA) and the New Jersey Department of Agriculture. Early detection and management are essential to preventing widespread mortality in New Jersey.

**Asian Longhorn Beetle (*Anoplophora glabripennis*)**

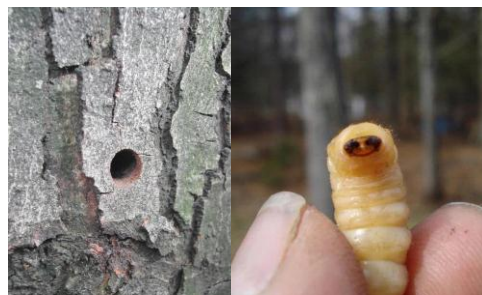
The Asian Longhorn Beetle (ALB) is also native to Asia. It is known to affect a variety of hardwoods, including different maple species. As of December 2012, it was not widespread in New Jersey, having been reported in Hudson, Union, and Middlesex counties. The ALB larvae feed on both the sapwood and the heartwood of infested trees. This can cause structural weakness, disruption of the movement of water and nutrients throughout the tree, and increased susceptibility to other natural threats. The signs of an infestation include the presence of adult beetles, large exit holes (3/8 inches in diameter), and “oozing” tree sap. Since ALB burrows deep into the heartwood, and pesticide applications are limited to the sapwood, they are marginally effective in controlling the insect. The systemic insecticide Imidacloprid can be used during the spring months and should be applied to the trunk or the soil surrounding both infested trees and uninfested trees. The most effective way to eliminate this pest is to cut and chip all infested trees. Report any suspected cases to the United States Department of Agriculture (USDA) and the New Jersey Department of Agriculture.

**Southern Pine Beetle (*Dendroctonus frontalis*)**

The Southern Pine Beetle (SPB) is a species native to the U.S. that has had recent population surges resulting in widespread damage throughout the pine forests of southern New Jersey. In 2010, this pest infested and killed over 14,000 acres of pine forests in New Jersey



**EAB** signs include S-shaped galleries (left) (Steven Katovich, USDA Forest Service, bugwood.org) and D-shaped exit holes (right) (Debbie Miller, USDA Forest Service, bugwood.org)



**ALB** signs include large exit holes (left) (PA Department of Conservation & Natural Resources, bugwood.org) and oozing sap. The larvae (right) (Kenneth R. Law, USDA APHIS, bugwood.org) are cream in color



**SPB** signs include S-shaped galleries (left) (Ronald F. Billings, Texas Forest Service, Bugwood.org) and pitch tubes (right) (James R. Meeker, USDA Forest Service, bugwood.org)





Infestation of Southern Pine Beetle moving from right to left in a pine stand (Robert L. Anderson, USDA Forest Service, bugwood.org)

alone, and in 2011, 7,000 acres of New Jersey forest were affected. The beetle spreads when adults emerge from an infested tree, fly en masse to a new target tree, and emit pheromones to attract additional adult beetles.

SPB is known to affect all pine species in its range, but favors yellow or hard pines. The beetles damage the tree while burrowing under the bark and are vectors of a “blue stain” fungus that clogs the tissues that are used to uptake water, subsequently killing the tree. One of the first signs of an SPB infestation is the presence of pitch tubes caused by adults boring into the bark. As the infestation progresses, the needles of the trees fade to a dull yellow or brown, and S-shaped galleries carved by the larvae can be seen under the bark. Exit holes from emerging adults will also be present, and sawdust from these holes will be seen at the base of the tree. In order to stop the spread of SPB, infested trees along with a 40 to 70 foot buffer of healthy trees should be removed or can be cut and left with their crowns pointing toward the infestation. This configuration helps to disrupt the pheromone trail that other beetles might otherwise follow to remaining uninfested trees. SPB outbreaks should be reported to New Jersey State Forest Service.

### Hemlock Woolly Adelgid (*Adelges tsugae*)

The Hemlock Woolly Adelgid (HWA) is native to East Asia and was first found in Virginia in 1951. In New Jersey, about 26,000 acres of Eastern hemlock have been infested by HWA and a significant number of Eastern hemlock stands have been destroyed. Both the nymphs and adults of this exotic insect attack the base of the needle of the Eastern hemlock, feeding on the tree’s sap. The first signs of HWA infestation include cotton-like masses at the base of the needles as well as dying limbs. As feeding continues, the needles begin to dry out, turn a grayish green, and eventually fall off, limiting the tree’s ability to produce food. Eventual mortality can be a slow process as other stressors begin to compound the problem. HWA is susceptible to a wide range of pesticides, but treating trees in a forest is usually not practical. Several biological controls continue to be tested with moderate results.

- *Laricobius osakensis* – a predatory beetle from Asia that preys on HWA
- *Pseudoscymnus tsugae* – a predatory beetle that preys on HWA; this insect is very mobile and feeds on all life cycle stages of HWA
- *Lecanicillium muscarium* – an insect-killing fungus that has proven to be successful

An additional insect-killing fungus is currently being investigated and is showing some promise as a future control.

### Gypsy Moth (*Lymantria dispar*)

The Gypsy Moth is native to Europe and Asia, but was introduced to New Jersey and can now be found statewide. The preferred hosts include a variety of oak species, but other deciduous trees and shrubs may be used. The female gypsy moth lays buff-colored egg masses in sheltered outdoor locations, including trees, outdoor chairs, picnic tables, tents, and other outdoor objects. After hatching, larvae feed on the foliage of trees, which can eventually lead to defoliation. While stands may recover from some defoliation events,



HWA infestations can be identified by the cotton-like masses at the base of the needles (Robert L. Anderson, USDA Forest Service, bugwood.org)



**Gypsy Moth** (from left to right) females are light in color while the males are a darker grayish brown (USDA APHIS, PPQ, bugwood.org). The females lay buff-colored egg masses (Milan Zubrik, Forest Research Institute-Slovakia, bugwood.org) while the caterpillars (Jon Yuschock, bugwood.org) feed on foliage which eventually leads to defoliation (USDA APHIS, PPQ, bugwood.org)

repeated defoliation, especially when combined with other stressors, can lead to weakening and death of individual trees. Signs of an infestation include the presence of egg masses, caterpillars, or defoliation.

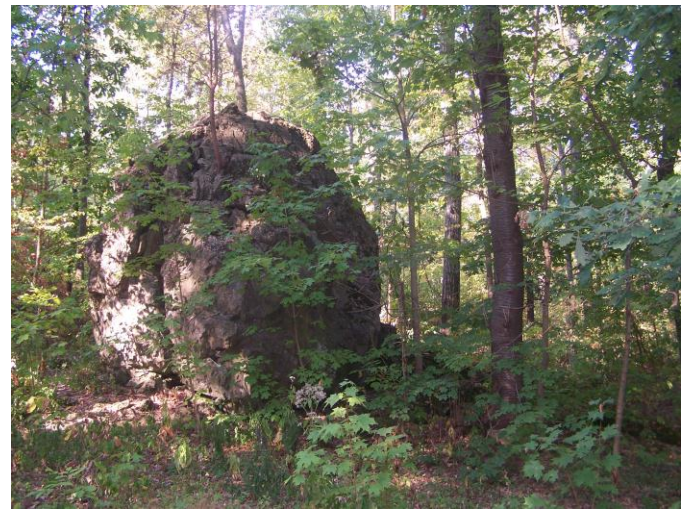
Gypsy moths are considered to be permanently established in many parts of their U.S. range, with the population fluctuating annually. The goal of gypsy moth management is usually to suppress or limit an outbreak in areas where they are established, and to slow or prevent their spread into unaffected areas.

Gypsy moths are most effectively managed through integrated pest management (IPM) techniques. Effective tools include natural fungi and viruses that target the caterpillar stage, synthetic hormones that disrupt maturation and growth, and synthetic pheromones that disrupt the mating cycle. A common form of control is the application of a naturally occurring bacterium, *Bacillus thuringiensis*, which suppresses the appetite of the moth. It is important to note that several of the methods used to control gypsy moths may affect other butterfly and moth species, so their use may be regulated or discouraged in areas with sensitive species. The control method used will vary depending on the population density, the growth stage targeted, and other factors. Because gypsy moth management may occur at a large scale or involve control agents that have limited availability, it is often conducted by state or federal agencies, and certain permits or restrictions may apply to specific sites or projects. It is important to consult an approved forester or qualified natural resource professional for guidance on gypsy moth management.

### **Financial and Technical Assistance**

With an approved Forest Stewardship Plan that addresses forest pests, a landowner can improve the health of a forest stand while protecting it against future outbreaks. The landowner is generally responsible for the cost of development and implementation of a Forest Stewardship Plan. However, qualifying landowners in New Jersey have several options for obtaining technical and financial assistance for forest management.

The Natural Resources Conservation Service (NRCS) offers technical and financial assistance to forest landowners through the Environmental Quality Incentives Program (EQIP). Eligible landowners with 10 acres or more of forest land may receive cost-share assistance for the development or implementation of a Forest Stewardship Plan. All management plans cost-shared through EQIP must be prepared by an NRCS approved Technical Service Provider (TSP). A list of TSPs can be found at a local NRCS service center or on the New Jersey NRCS website.



Preventative methods along with proper management can help preserve the health of New Jersey's forests while reducing the risk of forest pests (John Parke, NJA)

**NRCS office locations and more detailed information about NRCS assistance and the EQIP program can be found at: [www.nj.nrcs.usda.gov/](http://www.nj.nrcs.usda.gov/)**

### **For More Information:**

#### ***General Information on NRCS Forestry Programs***

[www.nj.nrcs.usda.gov/technical/forestry/index.html](http://www.nj.nrcs.usda.gov/technical/forestry/index.html)

#### ***Information on NRCS EQIP Program***

[www.nj.nrcs.usda.gov/programs/eqip/forestry.html](http://www.nj.nrcs.usda.gov/programs/eqip/forestry.html)

#### ***Locating an NRCS TSP***

<http://techreg.usda.gov/CustLocateTSP.aspx>

#### ***NRCS Conservation Practice Standard-Forest Stand Improvement***

<http://efotg.sc.egov.usda.gov/references/public/NJ/NJ666.pdf>

#### ***NRCS & NJ Audubon Southern Pine Beetle Fact Sheet***

<http://www.nj.nrcs.usda.gov/technical/forestry/index.html>

#### ***NRCS & NJ Audubon Emerald Ash Borer Fact Sheet***

<http://www.nj.nrcs.usda.gov/technical/forestry/index.html>

#### ***NJDEP Forest Stewardship Plan Requirements***

[www.state.nj.us/dep/parksandforests/forest/min\\_guide\\_nj\\_stew.pdf](http://www.state.nj.us/dep/parksandforests/forest/min_guide_nj_stew.pdf)

#### ***NJDEP Forest Service Forest Health Information***

[http://www.state.nj.us/dep/parksandforests/forest/njfs\\_forest\\_health.html](http://www.state.nj.us/dep/parksandforests/forest/njfs_forest_health.html)

#### ***NJDEP Forest Service Regional Offices and Contact Information***

[www.state.nj.us/dep/parksandforests/forest/njfs\\_regional\\_offices.html](http://www.state.nj.us/dep/parksandforests/forest/njfs_regional_offices.html)

#### ***List of NJ DEP-Approved Consulting Foresters***

[www.state.nj.us/dep/parksandforests/forest/ACF.pdf](http://www.state.nj.us/dep/parksandforests/forest/ACF.pdf)

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