

Treatment Methods for HWA Infestation

At present there are several options for treating infested trees. The most common methods are summarized in the table.

Appropriate Use	Method	Treatment	Cautions
Private landowners treating individual trees no taller than 15 feet	Spraying tree foliage with insecticide	Imidacloprid products, insecticidal soaps, and dormant oils	<ul style="list-style-type: none"> Application in April to mid-May or July-October Tree must be thoroughly coated
Private landowners treating individual large trees with good soil conditions	Drenching or injecting the soil around the tree with insecticide	Insecticide with imidacloprid as the active agent	<ul style="list-style-type: none"> Application November-December; late February-May 2. Insecticide must not run off into streams
Private landowners treating individual large trees along streams or where soil is rocky or very poor	Injecting insecticide directly into the trunk of the tree	Insecticide with imidacloprid as the active agent	<ul style="list-style-type: none"> Application by professional arborist required
Government agencies treating large areas of infested trees on public property	Placing biological control agents (e.g. beetles) on infested tree branches so that the beetles will prey on HWA	Several species of predator beetles native to Japan, including <i>Sasajiscymnus tsugae</i> , <i>Laricobius nigrinus</i> , and <i>Scymnus sinuanodulus</i>	<ul style="list-style-type: none"> Application by researchers and professionals required Beetles are costly to raise before release Appropriate only for large tracts of forest land



Treating a Tree by Soil Injection
by Scott Griffin, Georgia Forestry Commission

How Can You Make a Difference?

If you own property with hemlock trees:
Treat your trees if they are infested.

If you hike, camp or fish in hemlock stands:
Avoid contact with infested branches so that you don't spread the adelgid to unaffected trees and areas.

If you want to support hemlock research:

1. Participate in citizen science projects through Atlanta Audubon Society or other groups.
2. Attend the Lumpkin Coalition's Hemlockfest in the fall.
3. Donate to local, regional and national organizations that are fighting to save hemlocks.

Additional Information Resources

HWA and Tree Treatment

- **United States Forest Service**
www.na.fs.fed.us/fhp/hwa/
www.fs.fed.us/conf/sopa/forest-health-nepa.htm
- **Georgia Forestry Commission**
www.gfc.state.ga.us/ForestManagement/HemlockWoollyAdelgid.cfm
- **Clemson University Department of Entomology, Soils and Plant Science**
<http://entweb.clemson.edu/eiis/newimp/newimp.htm>

Regional Predatory Beetle Labs

- **North Georgia College and State University at Dahlonega**
www.ngcsu.edu/resource/EnvirLeadCenter/pindex.htm
- **Young Harris College Hemlock Project**
www.yhc.edu/academics/math--science/yhc-hemlock-project.aspx

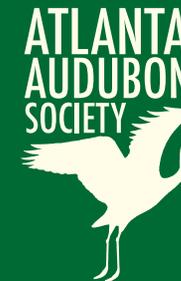
Citizen Science and Other Support Efforts

- **Atlanta Audubon Society**
www.atlantaaudubon.org
- **Georgia ForestWatch**
www.gafw.org
- **Lumpkin Coalition:**
www.lumpkincoalition.org

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Help Save the Eastern Hemlock

The eastern hemlock is under attack from an exotic insect species. **What will be the impact on forests and wildlife? How can you help?**



Creating, Promoting and Preserving
Bird-Friendly Habitat

www.atlantaaudubon.org

A Lovely Evergreen of the Appalachians

The eastern hemlock (*Tsuga canadensis*) is the notable evergreen of cove hardwood forests in the Appalachian Mountains, typically growing to a height of 60 to 80 feet with a diameter of three feet. It is also found in stands along streams and cool slopes up to 4,500 feet in elevation. Its pyramidal shape is easily identified by graceful, delicate-looking dark green foliage, with small cones placed decoratively at the ends of its twigs.

Eastern Hemlock Infested by Non-native Adelgid

In the 1950s an aphid-like bug (*Adelges tsugae*) called the hemlock woolly adelgid (HWA) appeared in Virginia on eastern hemlocks, infesting them, consuming the starches in the trees' branches and twigs that are essential to new growth and, ultimately, causing death after three to six years, if left untreated. The tell-tale sign of HWA infestation is cottony splotches at the base of needles on the underside of hemlock branches; these "woolly" sacs are the adelgid eggs inside their protective covering.

HWA infestation has now spread throughout the Appalachians, threatening the hemlock's survival. Although the HWA is common in Asia and in western North America, where spread and damage are checked by beetles that prey on adelgids, in the eastern United States the HWA has no naturally occurring predators. Consequently, it has ravaged hemlock stands from Maine to Georgia.



HWA Eggs on an Infested Tree, by Larry Winslett

How Does Hemlock Die-off Affect Forests and Wildlife?

Hemlock loss dramatically affects the diversity and health of eastern forests. In healthy stands fallen needles contribute to the acidity of the soil of cove hardwood forests that are rich in plant life: trees, shrubs, and wildflowers.

Eastern hemlocks shade streams and keep the water cool enough to support native trout species as well as many other fish and aquatic species. A number of birds are dependent on the hemlock habitat for nesting and foraging. These include migrants such as Blackburnian Warblers, Black-throated Blue Warblers, Black-throated Green Warblers, Wood Thrushes and Veeries, along with resident Blue-headed Vireos, Brown Creepers, Winter Wrens and Red-breasted Nuthatches.



Blackburnian Warbler, by Dan Vickers



Brook Trout, by Steve Banakas

What Is Being Done?

Organizations are working on ways to reduce the impact of the HWA on native hemlocks. The Georgia Forestry Commission, the U.S. Forest Service, and the National Park Service are using a combination of chemical and biological control methods to combat the HWA. These methods include the selective treatment of individual trees with insecticides and the release of several species of predator beetles.

Higher education institutions, among them North Georgia College and State University, Young Harris College, Clemson University, and The University of Georgia, are raising predator beetles in labs, which they supply to government agencies for release in infested stands of hemlocks. These institutions are also evaluating the beetle releases to determine their effectiveness in the control of HWA.

Nonprofit groups like Atlanta Audubon Society are participating in citizen science initiatives to monitor research sites, extending the reach of treatment and control efforts. Atlanta Audubon Society volunteers are monitoring six sites in the Chattahoochee National Forest to assist in predator beetle research. The work is an important part of the organization's efforts to *create, promote, and preserve bird-friendly habitat*.

The Lumpkin Coalition (Lumpkin County, GA) holds special events such as the annual Hemlockfest to raise awareness and funds to support research. Many other groups are also educating the public about the threat to hemlocks and about treatment options for trees on private property.