



**LEFT PHOTO:** White woolly masses at the bases of the needles are a clear sign that this hemlock in CF is infected with HWA.

**RIGHT PHOTO:** Example of what hemlock trees look like. These trees in CF have been treated.

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### **Brief introduction to the HWA and the importance of hemlocks to our southern Appalachian forest ecology.**

Hemlock woolly adelgid (HWA) is an invasive pest found in eastern North America and is thought to have been brought in on nursery stock in about 1951. It was initially detected in Shenandoah National Park in Virginia in the 1980s. By 2002 it was discovered in the Great Smoky Mountains National Park, which is home to over 200,000 acres of old-growth forests, including significant populations of old-growth hemlocks. This infestation, which coincided with a severe drought, led to rapid and widespread mortality of hemlocks throughout the Great Smoky Mountains National Park and surrounding southern Appalachians.

HWA kills hemlocks by affixing itself to the base of the hemlock needle where it feeds on the tree's starch reserves. HWA feeding interferes with the tree's ability to take up water and nutrients, producing a drought-like response that some researchers have likened to an allergic reaction. As a result, the hemlock's needles take on a grey and dusty appearance and begin to drop. Increasingly unable to photosynthesize as it loses its needles, the tree slowly dies from the bottom up. Trees can succumb to the pest in as little as four years, but in some cases this takes much longer. Sadly, the largest trees, which require the movement of more water and nutrients to their crowns, appear to be the most vulnerable.

The southern Appalachian Mountains are home to the eastern (Canadian) hemlock (*Tsuga canadensis*) and the Carolina hemlock (*Tsuga caroliniana*). The predominant hemlock species within Connestee Falls'

forests is the eastern hemlock. The eastern hemlock is a forest giant. Affectionately nicknamed the 'Redwood of the East', it can live for over 800 years and reach heights of more than 170 feet. It is typically found in riparian areas, growing along headwater streams, in moist, shady groves, and on north facing slopes. Many of the multiple benefits hemlocks provide to the forests follow from their "shady" character. Shade from hemlocks helps regulate stream and forest floor temperatures, providing a favorable stream habitat for many native fish, amphibians, and aquatic invertebrates. Hemlock roots hold stream banks in place. Hemlock foliage is an important source of food and shelter in eastern forests, particularly in winter when hardwood trees are dormant. The dense branches are used by many species of birds as nesting sites, including some birds that are highly dependent on hemlocks, such as the black-throated green warbler.