

Level of hemlock woolly adelgid (HWA) infestation

Light:



Moderate:



Heavy:



Live crown ratio (LCR)

The **crown** of a tree consists of the mass of foliage and branches growing outward from the trunk of the **tree**. The **live crown** refers to the part of the crown that has live foliage.

The **Live Crown Ratio** is the % of total tree height that supports live foliage. *For example:* if foliated branches reached from the top of the tree all the way to the ground, that tree would have an LCR of 100%, if a tree had no living branches anywhere on the tree it would have an LCR of 0% (dead).

A healthy hemlock should have a **LCR** of close to 100%. A hemlock must have an **LCR** of $\geq 30\%$ to be an acceptable candidate for chemical treatment. Trees with LCRs of $< 30\%$ are not able to uptake chemical insecticide and therefore will not benefit from treatment.



Tree 1:

LCR 100%

CD 100%

healthy



Tree 2:

LCR 70%

CD 50%

moderate decline



Tree 3:

LCR 0%

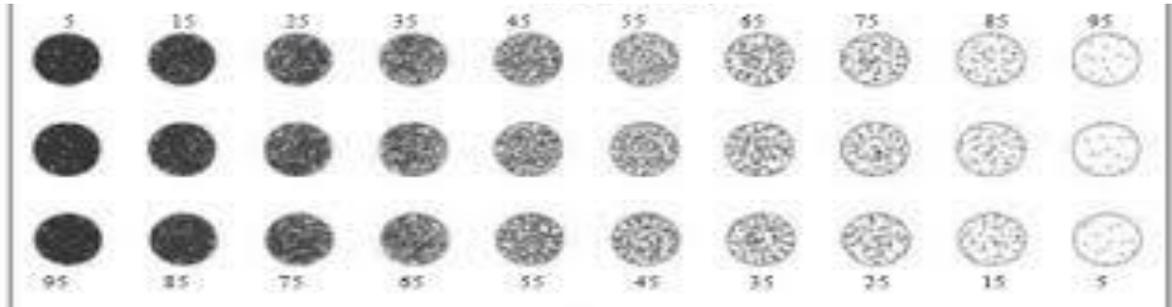
CD 0%

dead

Crown density (CD)

Crown Density is the % of branches, foliage, and/or fruit that blocks light coming through the live crown.

For example: A hemlock crown is 100% dense if no light passes through the foliated branches, it is 0% dense if light is clearly visible with no live foliage blocking it.

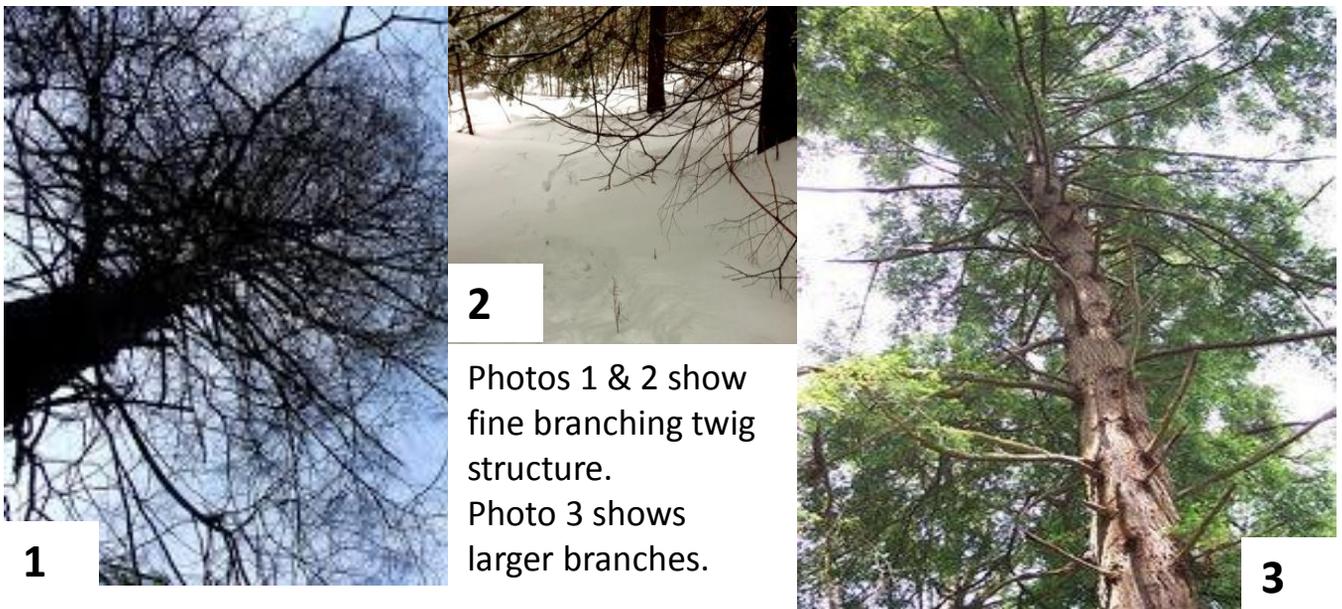


This diagram shows crown density levels
90-100% dense at the far left and 10-0% dense at the far R

Branch dieback

Does this tree have **dead branches**? Do the dead branches show **fine twig structure**?

It is normal for healthy hemlocks in a forested setting, to lose some or even many of their lower branches. A tell tale sign of hemlock woolly adelgid (HWA) damage is the presence of **fine branching twig structure** on dead branches. Fine twig structure indicates that the branch died relatively quickly as a result of stress instead of slowly, over time as part of its natural process.



1

2

Photos 1 & 2 show
fine branching twig
structure.
Photo 3 shows
larger branches.

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