Crown Health: Fine Twig Dieback

Fine twig dieback indicates the death of tissues responsible for producing and supporting most of a tree's leaf surface area and branch growth. The amount of fine twig dieback is a reflection of the severity of recent stresses on the tree.

Dieback Class	Description	Dieback Class	Description
1	0-1%	55	51-55%
5	2-5%	60	56-60%
10	6-10%	65	61-65%
15	11-15%	70	66-70%
20	16-20%	75	71-75%
25	21-25%	80	76-80%
30	26-30%	85	81-85%
35	31-35%	90	86-90%
40	36-40%	95	91-95%
45	41-45%	99	96-99%
50	46-50%	100	100%

Photo by Julia Pike

Please Note:
Fine twig dieback does not include natural branch dieback (self-pruning due to crown competition or shading in the lower portion of the crown) or large broken or dead branches.

Photo Example:
Fine twig dieback Class 40 (for 40%)

The mobile app is available for free at the Apple App Store and on Google Play.

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Crown Health: Leaf Discoloration

Leaf discoloration is a symptom of some diseases, can indicate a nutrient imbalance, and can be a symptom of drought stress. The metric should only include deviation from the normal healthy color of leaves for the target tree's species. Many cultivated trees have healthy leaves that are non-green or have striped or mottled (variegated) patterns.

Discoloration Class	Description
1	**0-1% (trace)** of tree affected by leaf discoloration
2	**2-25%** of tree affected by leaf discoloration
3	**26-50%** of tree affected by leaf discoloration
4	**51-75%** of tree affected by leaf discoloration
5	**76-100%** of tree affected by leaf discoloration

Consider the total surface area of leaves in the crown when estimating discoloration percent. For example, a tree that has 100% of its leaves with a small spot on them is not 100% discolored.

25% 50%

75% 95%
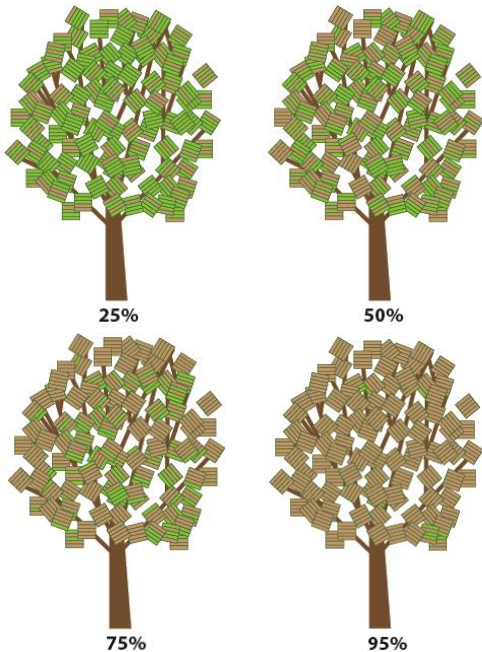
Photo Example:
Stress-induced leaf discoloration

Diagrams (left):
Examples of discoloration percentages

Photo Example:
Healthy leaf from a tree cultivated to have non-green leaves and is not considered discolored.

Photo by HTHC staff

Photo by HTHC staff

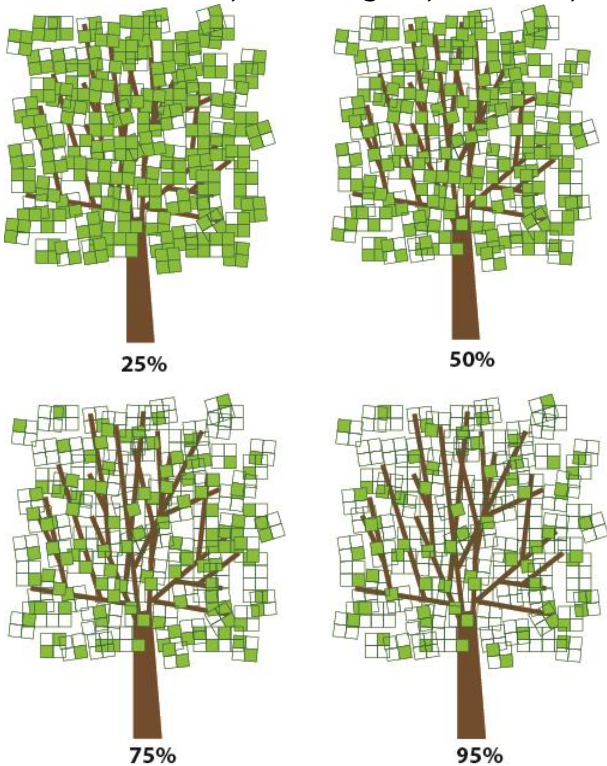The mobile app is available for free at the Apple App Store and on Google Play.

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Crown Health: Leaf Defoliation

Defoliation applies to the total surface area of leaves impacted by defoliation (holes in the leaves or missing portions of leaves).

Leaf Defoliation Class	Description
1	**0 - 1%** (trace) of tree affected by leaf defoliation
2	**2 - 25%** of tree affected by leaf defoliation
3	**26 - 50%** of tree affected by leaf defoliation
4	**51 - 75%** of tree affected by leaf defoliation
5	**76 - 100%** of tree affected by leaf defoliation

Note: If 100% of the leaves have a small amount of defoliation each, the rating is not 100%. Assess the percentage of total surface area of leaves impacted by leaf defoliation.

25%

50%

75%

95%

Photo:
Leaf defoliation due to insect herbivory

Diagrams (left):
Examples of leaf defoliation percentages

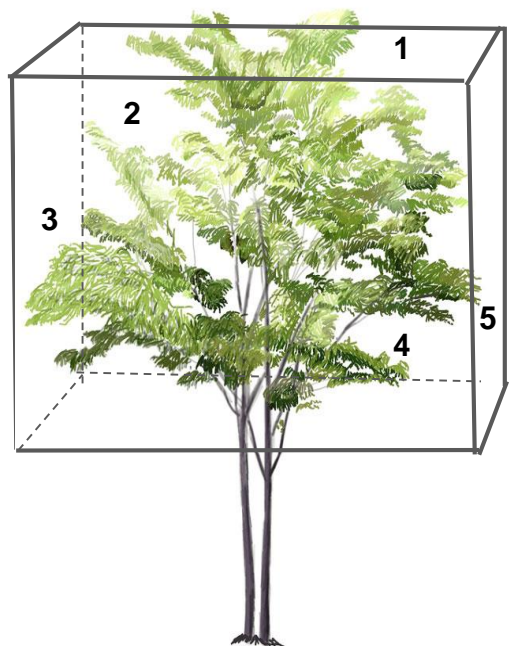The mobile app is available for free at the Apple App Store and on Google Play.

Crown Health: Crown Light Exposure

Crown light exposure (CLE) is the number of sides of the tree receiving sunlight from above. There are 5 sides considered: the top of the tree is counted as one side, plus 4 equal vertical sides of the tree. A third of the side must be receiving light to qualify as receiving full light.

Crown Light Exposure Class	Description
0	The tree receives no full light because it is shaded by trees, vines, or other vegetation
1	The tree receives full light from the top or 1 side.
2	The tree receives full light from the top and 1 side (or 2 sides without the top).
3	The tree receives full light from the top and 2 sides (or 3 sides without the top).
4	The tree receives full light from the top and 3 sides.
5	The tree receives full light from the top and 4 sides.

Trees can be shaded by buildings, other trees, vines or climbing plants – anything that is blocking full sunlight from reaching the tree

Photo Example:
Crown Light Exposure Class 4 - Building blocks a substantial amount of light from the 5th side

Photo by HTHC staff

The mobile app is available for free at the Apple App Store and on Google Play.

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Crown Health: Vigor

A comprehensive assessment of crown health based on several signs of stress. Crown Vigor considers Fine Twig Dieback, Leaf Discoloration, Leaf Defoliation, and large broken or dead branches.

Class	Description
1	• **Less than 10%** cumulative Fine Twig Dieback, Leaf Discoloration, and Leaf Defoliation • Tree is in reasonably good health • No major branch mortality
2	• **10-25%** cumulative Fine Twig Dieback, Leaf Discoloration, and Leaf Defoliation **And/Or** • **25% or less** crown area missing due to broken or dead large branches
3	• **26-50%** cumulative Fine Twig Dieback, Leaf Discoloration, and Leaf Defoliation **And/Or** • **50% or less** crown area missing due to broken or dead large branches
4	• **More than 50%** cumulative Fine Twig Dieback, Leaf Discoloration, and Leaf Defoliation **And/Or** • **Over 50%** of crown area missing due to large broken or dead branches
5	• Tree (over 4.5 feet tall) **is dead** • Can be standing or down

Crown Vigor is meant to measure the overall health of the crown. To measure it, consider the following metrics:
• *Leaf Discoloration*
• *Leaf Defoliation*
• *Fine Twig Dieback*
• *Large Broken or Dead Branches*

It **does not** *include Crown Transparency or Crown Light Exposure*

Broken or Dead Large Branches are indicative of longer-term stresses on a tree, and/or past poor health
Do not include pruned branches

Photo Example:
Vigor Class 2
Due to Fine Twig Dieback and *dead, major branches*

Photo by HTHC staff

The mobile app is available for free at the Apple App Store and on Google Play.

Crown Health: Crown Transparency

Increased Crown Transparency is an early symptom of decline. It is assessed by estimating the percentage of sky you can see through the crown. When estimating percentages, consider the area covered by the entire crown of the tree.
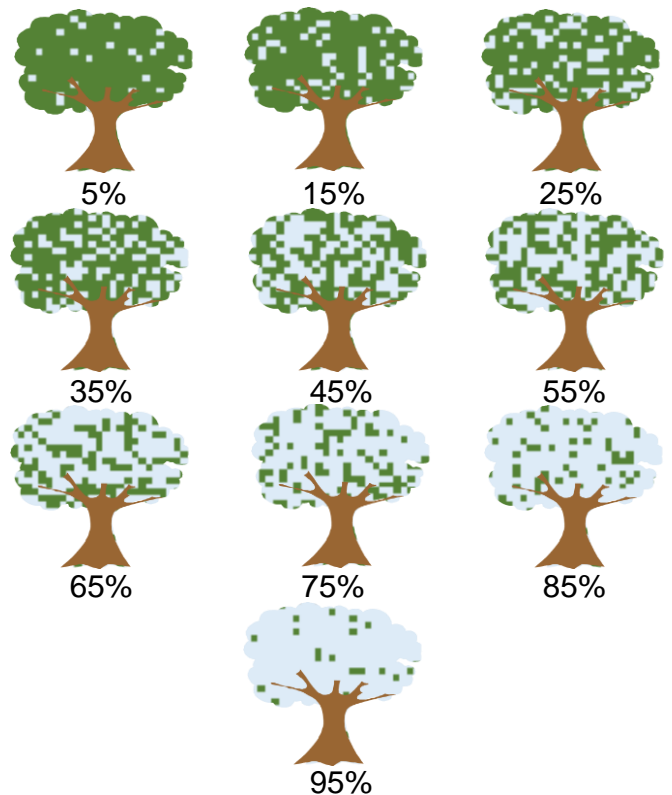
Measure by viewing gaps in the crown at multiple angles, including from underneath and beside the tree. Measure gaps where skylight is visible – *not* light that filters through leaves.

Photo by HTHC staff

Photo: Patches of skylight seen in gaps of a tree's crown

Crown Transparency Class	Description
1	**5%**
2	**15%**
3	**25%**
4	**35%**
5	**45%**
6	**55%**
7	**65%**
8	**75%**
9	**85%**
10	**95%**

5% 15% 25%
35% 45% 55%
65% 75% 85%
95%

Diagrams: Examples of Crown Transparency classes

The mobile app is available for free at the Apple App Store and on Google Play.

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Crown Health: Tree Portrait

A Tree Portrait is a vital tool resource for tree stewards, managers, and for research. Taking a tree portrait during each Health Check can help track the progression of visual signs of stress in a tree over several visits, and aide in future visits to a tree.

A Tree Portrait should be a view of the entire tree, or as much as possible given its surroundings. This gives tree managers and researchers a view of the tree's overall structure, location, and general condition. For large trees, you may need to step back to capture the entire tree in one image!

Be Careful:

When trying to find an angle for the Tree Portrait, be mindful of your surroundings! Sometimes the best angle is across a street or driveway – keep your eyes up and do not enter traffic or an unsafe area to take a photo!

Tree Photos are linked to the tree, and visible in the Mobile App when signed in. They are also saved to your device's photo library.

Photo by HTHC staff

Other Reasons for Tree Photos:

The HTHC Mobile App allows users to take multiple pictures of a tree. This can be used to take photos of anything else of interest for a particular tree – wounds, problems that may need attention, or anything else.

The mobile app is available for free at the Apple App Store and on Google Play.

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