DMSM - Making the Defoliation Call

within-tree and among-tree factors

Percent Affected

For area features, polygons and grid cells, DMSM's percent affected call measures the **among-tree** impact (i.e. percent of canopy occupied by defoliated trees).

PERCENT AFFECTED*
Very Light (1 - 3%)
Light (4 - 10%)
Moderate (11 - 29%)
Severe (30 - 50 %)
Very Severe (> 50 %)

*Percent Affected used for damage polygons and grid cells

Number of Trees

For point damage, the **among-tree** measure is number of trees.

NUMBER OF TREES**
1
2 - 5
6 - 15
16 - 30
31 - 99

**Number of Tree ranges used for damage point features. Optionally, enter a specific 1-99 tree count for points

Defoliation Damage Types

The three defoliation Damage Types are differentiated by the average **within-tree** foliage loss for affected trees across the damage point, polygon or grid cell.

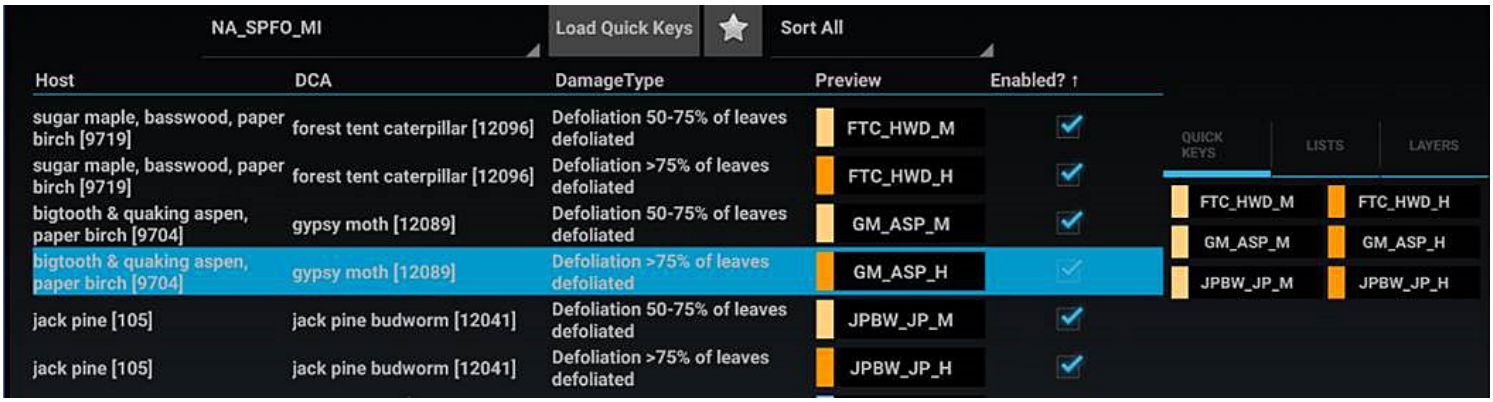
It is possible to have severe **within-tree** defoliation (> 75% average leaf loss amongst defoliated trees) and Very Light (1-3%), **among-tree**, percent of canopy occupied by defoliated trees within a damage area. Conversely a damage area could be fully occupied by lightly defoliated (<50% leaf loss) trees.

States/regions have different philosophies as to how they map defoliation damage. Some feel that aerial survey can only reliably distinguish the most severely defoliated trees and therefore only define one defoliation Quick Key per defoliator agent/host combination. Others define separate Quick Keys using all three defoliation Damage Types believing it's both possible and significant to distinguish the three shades of within-tree defoliation severity.

DMG_TYPE CODE	DMG_TYPE NAME
2	Mortality
3	Crown Discoloration
4	Crown Dieback
5	Topkill
6	Branch Breakage
7	Main stem Broken or Uprooted
8	Branch flagging
9	No damaage
11	Mortality-Previously Undocumented
12	Defoliation < 50% of leaves defoliated
13	Defoliation 50-75% of leaves defoliated
14	Defoliation > 75% of leaves defoliated
18	Other Damage (known)
19	Unknown Damage

Mapping Defoliation with DMSM

Mapping defoliation with DMSM begins in the pre-season task of building the Quick Key list surveyors will use in the upcoming survey season. Part of that process is defining the set of defoliation Quick Keys to cover the range of Agent/Host combinations found in your area. In this example the state or region has defined **within-tree** Moderate (50-75% foliage loss) and High (> 75% foliage loss) defoliation Quick Keys for three DCA/Host combos (Forest Tent Caterpillar on a Hardwood host group, Gypsy Moth on an Aspen host group, Jack Pine Budworm on Jack Pine).



INTENSITY	DAMAGE TYPE	QUICK KEY LABEL
Defoliation Moderate	Defoliation 50 - 75% of leaves defoliated	FTC_HWD_M
Defoliation High	Defoliation > 75% of leaves defoliated	FTC_HWD_H
Defoliation Moderate	Defoliation 50 - 75% of leaves defoliated	GM_ASP_M
Defoliation High	Defoliation > 75% of leaves defoliated	GM_ASP_H
Defoliation Moderate	Defoliation 50 - 75% of leaves defoliated	JPBW_JP_M
Defoliation High	Defoliation > 75% of leaves defoliated	JPBW_JP_H

When it comes to actually mapping defoliation, the surveyor's choice of Quick Key both labels the defoliating Agent/Host but also characterizes the average **within-tree** foliage loss. In the following example the surveyor must choose between the two forest tent caterpillar defoliation Quick Keys. The defoliated trees represented in the graphic have a range of **within-tree** foliage loss. The surveyor determines that, on average, the defoliated trees have lost 50-75% of their leaves and chooses the 'FTC_HWD_M' Quick Key. The **among-tree** percent affected call is based on the percent of canopy within the mapped polygon covered by the defoliated trees, and in this example the surveyor selects 11-29% as the best approximation amongst the five percent affected classes.

Mapping Defoliation with DMSM Example