VMC Tree Phenology Monitoring - Bud Development Methods Modifications: 1991-2004

Year	Species	Elevation (feet)	Species modifier (sex)	Canopy level (upper, lower, regen)	Methods & modifications
1991	Sugar Maple	1400		Upper, Lower & Regen	As per Parker & Skinner methods for sugar maple bud development monitoring, data collected through vegetative stage 7 (not 8). Five mature trees and 5 saplings (regeneration) are monitored twice weekly from April-mid June. Bud development stages are recorded at each visit on upper canopy, lower canopy and regeneration. Both vegetative and flower buds are monitored.
1992-1995	Sugar Maple, Yellow Birch & American Beech	1400-2200		Upper, Lower & Regen	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Five mature trees and 5 saplings of each hardwood tree species are monitored at two elevations (1400 and 2200') for a total of 10 trees and 10 saplings. Bud stages are recorded from the upper canopy, lower canopy and regeneration from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified for yellow birch and beech to allow between year comparisons of bud and leaf development. Flowers are also monitored when present.
1995	Red Maple & White Ash	1400		Upper, Lower & Regen	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Five mature trees and 5 saplings of each hardwood tree species are monitored at one elevation (1400') for a total of 5 trees and 5 saplings per species. Bud stages are recorded from the upper canopy, lower canopy and regeneration from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified for red maple and white ash to allow between year comparisons of bud and leaf development. Flowers are also monitored when present.
1996-1999	Sugar Maple & White Ash	1400		Upper and Regeneration	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Five mature trees and 5 saplings of each hardwood tree species are monitored at one elevation (1400') for a total of 5 trees and 5 saplings per species. Bud stages are recorded from the upper canopy and regeneration, from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified for white ash to allow between year comparisons of bud and leaf development. Flowers are also monitored when present.
1996-1997	Red Maple	1400	Male & Female	Upper and Regeneration	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Five mature trees of each sex (male and female) and 5 saplings are monitored at one elevation (1400') for a total of 10 trees and 5 saplings. Bud stages are recorded from the upper canopy and regeneration, from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified to allow between year comparisons of bud and leaf development. Flowers are also monitored when present.

1998	Red Maple	1400	Female	Upper	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Tree 2 died. No new tree selected until flowers could reveal female tree to choose for next year. Four mature trees are monitored at one elevation (1400'). Bud stages are recorded from the upper canopy, from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified to allow between year comparisons of bud and leaf development. Flowers are also monitored when present. .
1998	Red Maple	1400	Male	Upper and Regeneration	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Five mature trees and 5 saplings are monitored at one elevation (1400') for a total of 5 trees and 5 saplings. Bud stages are recorded from the upper canopy and regeneration, from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified to allow between year comparisons of bud and leaf development. Flowers are also monitored when present.
1998	Sugar Maple & Red Maple	1400		Regeneration	Five randomly selected seedlings and saplings were monitored to compare against tagged saplings. Sugar maple saplings have grown out of reach so a new system for regeneration monitoring was needed.
1999	Red Maple	1400	Male & Female	Upper and Regeneration	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Five mature trees of each sex (male and female) and 5 saplings are monitored at one elevation (1400') for a total of 10 trees and 5 saplings. Female Tree 6 now replaces dead Tree 2. Bud stages are recorded from the upper canopy and regeneration, from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified to allow between year comparisons of bud and leaf development. Flowers are also monitored when present.
2000-2002	White Ash	1400		Upper and Regeneration	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Six mature trees and 5 saplings are monitored at one elevation (1400'); an additional tree was added since one of the trees is declining. Regeneration is non-random, since only 5 saplings have been located in the monitoring area. Bud stages are recorded from the upper canopy and regeneration, from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified for white ash to allow between year comparisons of bud and leaf development. Flowers are also monitored when present.

2000-2002	Sugar Maple & Red Maple	1400	Male & Female	Upper and Regeneration	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Five mature trees of each sex (red maple has both male and female) and 5 randomly selected saplings are monitored at one elevation (1400') per species. Bud stages are recorded from the upper canopy and regeneration, from dormancy through full leaf expansion. Descriptions of sugar maple bud stages have been modified for red maple to allow between year comparisons of bud and leaf development. Flowers are also monitored when present.
2003-2004	Sugar Maple	1400		Upper and Regeneration	Bud development is recorded twice weekly from early April through mid-June using visual ratings as seen through a high powered spotting scope. Five mature trees and 5 randomly selected saplings are monitored at one elevation (1400'). Bud stages are recorded from the upper canopy and regeneration, from dormancy through full leaf expansion. Flowers are also monitored when present. Other species discontinued for short-term since baseline data completed.