

ANNUAL ASSESSMENT OF FOREST HEALTH

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Introduction

The purpose of conducting annual assessments of forest health is to provide information on condition and trends over time that will be useful in evaluating potential causes of declines.

For 1991, forest health was assessed only at one elevation and watershed, 1360 ft (415 m) in the Browns River watershed. Two types of plot designs were used to obtain forest health information. One plot was established in 1988 as part of the North American Maple Decline Project (NAMP) and a second plot was added in 1991 following the protocols used in the National Forest Health Monitoring Program.

NAMP Plot Methods

At the time of initial plot establishment, general site and stand characteristics are recorded according to standardized NAMP protocols (Millers et al, 1991). Annual evaluations of tree condition and foliage damage require three visits to the plot to determine extent of injury from early-, mid-, and late-season defoliators: one in mid-to-late June, July, and early September. Evaluators are trained and certified with other state and provincial field crews to maintain high Quality Control. Between crew and state remeasurements are done on 12 % of the clusters and each field crew. Data entry is completed by the NAMP data analyst, and statewide data is acquired following quality check by the analyst. Metric units are used for data collection and analysis.

NAMP Plot Results

Site and stand characteristics for the NAMP plot are presented in Table 1.

The plot-cluster is established at 415 m (1360 ft) on a west facing slope, with a slight slope (8%). Each of the 5 plots with the cluster vary in soil conditions from well drained to poorly drained.

At the time of plot establishment, this stand was categorized as moderately declining, based on comparisons with other statewide sugar maple stands. The average stand age was estimated at 110 years. Management consisted of past grazing, thinning, and

present use as an active sugarbush. As such, species composition was 98 % sugar maple.

The trend in tree condition has improved since 1988, with the 1991 assessment showing an average percent dieback at only 3.0 % and foliage transparency at 10.9 % (Table 1). No new tree mortality occurred.

Damage assessments from insect defoliators on this plot found light damage (1-30 % of crown with damaged leaves) from pear thrips feeding, and light to moderate damage (1-60 % of crown with damaged leaves) from maple leaf cutter feeding.

Forest Health Plot Methods

At the time of initial plot establishment, general site and stand characteristics are recorded according to standardized NFHM protocols (Conkling and Byers, 1992). Plot location was selected to compare stand level information on forest health from the pre-established NAMP plot with that of the NFHM program. In addition, it was desirable to determine the optimum within-season time for assessing tree condition. To accomplish this goal, crown vigor ratings were taken at 3 week intervals throughout the field season, for a total of 4 visits. Within season changes in pest damage were recorded at each visit. These revisits also served as a remeasurement for Quality Assurance. Data entry and analysis was completed by our staff. English units are used for data collection and analysis.

Forest Health Plot Results

Specific information on species composition, understory vegetation, and tree measurements are presented in Table 2. For 1991, crown ratings showed an average crown dieback of 1.9 %, transparency of 11.0 % and density of 58.3 %. These values will be most meaningful when compared over time to consider trends in tree condition, but based on dieback ratings, 100 % of trees on these plots were considered healthy (≤ 15 % dieback).

Within-season remeasurements did not find significant differences in dieback or transparency ratings between any of the dates (Figure 1). Dieback ratings ranged from 0 to 10 %, and transparency ratings ranged from 5 to 25 % throughout the season.

Discussion

Crown ratings on trees in both health plots (NAMP and FHM) showed that trees were generally healthy in 1991. Future plans to add forest health plots should improve the sample size and therefore the reliability of this information.

Moderate defoliation from maple leaf cutter was the only stress factor measured on plots that may affect the future condition of trees, especially sugar maples. Generally favorable growing

conditions, good water availability during the spring season, were observed at this site.

The consistent ratings obtained during the within-season remeasurements indicate that crown ratings could be conducted any time between mid-June and the end of August. Future repetition of this work will confirm or refute this, especially during years with major stress occurrences.

References

Conkling, B. B. and G. E. Byers (eds.). 1992. Forest Health Monitoring Field Methods Guide. Internal Report. U. S. Environmental Protection Agency, Las Vegas, NV.

Millers, I., D. Lachance, W. Burkman & D. Allen. 1991. North American Sugar Maple Decline Project: organization and field methods. Gen. Tech. Rep NE-154. Radnor, PA: U.S. Dept. of Agr., Forest Service, Northeastern Forest Experiment Sta. 26 p.

Table 2. Forest structure, species composition and tree measurements for 1991 on a Vermont Monitoring Cooperative forest health plot at the Proctor Maple Research Center, Mount Mansfield, Vermont, at 1360 ft. (415 m) elevation.

FOREST STRUCTURE

POINT NO.	NO. LIVE TREES	NO. LIVE SAPLINGS	NO. LIVE SEEDLINGS	PERCENT COVER				
				seedlg	fern	moss	herbs	shrubs
1	13	3	6	0	75	5	5	0
2	2	0	1	5	50	5	50	0
3	0	0	9	50	10	5	10	40
4	6	2	12	5	50	5	10	0

SPECIES COMPOSITION

SPECIES	% OF TOTAL LIVE TREES	% OF TOTAL LIVE SAPLG	% OF TOTAL LIVE SEEDLG
Sugar maple	90.4	100	64.3
Red maple	4.8	0	3.6
Yellow birch	4.8	0	10.7
Striped maple	0	0	14.3
White ash	0	0	7.1

TREE MEASUREMENTS (averages from July 9 data)

SPECIES	DBH(in)	CRWN CLASS	CRWN RATIO(%)	CRWN DIAM(ft2)	DK(%)	TR(%)	DEN(%)
Sugar maple	6.86	3.05	53.2	358.95	1.8	10.5	60.0
Red maple	6.50	3	45	252	0	15	40
Yellow birch	6.20	4	65	627	5	20	40
All species	6.81	3.1	53.1	366.6	1.9	11.0	58.3

Where DBH = diameter at breast height (inches)
 CRWN Class = crown class, or position in canopy: 1=open grown, 2=dominant, 3=codominant, 4=intermediate, 5=suppressed
 CRWN RATIO = crown ratio, or percent of total tree height living.
 CRWN DIAM = crown diameter, or width of crown at drip line taken at widest point and the 90 degrees from widest point.
 DK = dieback, or the percent of crown with recently dead branches.
 TR = transparency, or the percent of light coming through the foliage.
 DEN = density, or the percent of total possible area filled by the crown (including bole, foliage, reproductive parts, etc).

For more detail on definitions, values and procedures, refer to the NFHM Methods Manual).

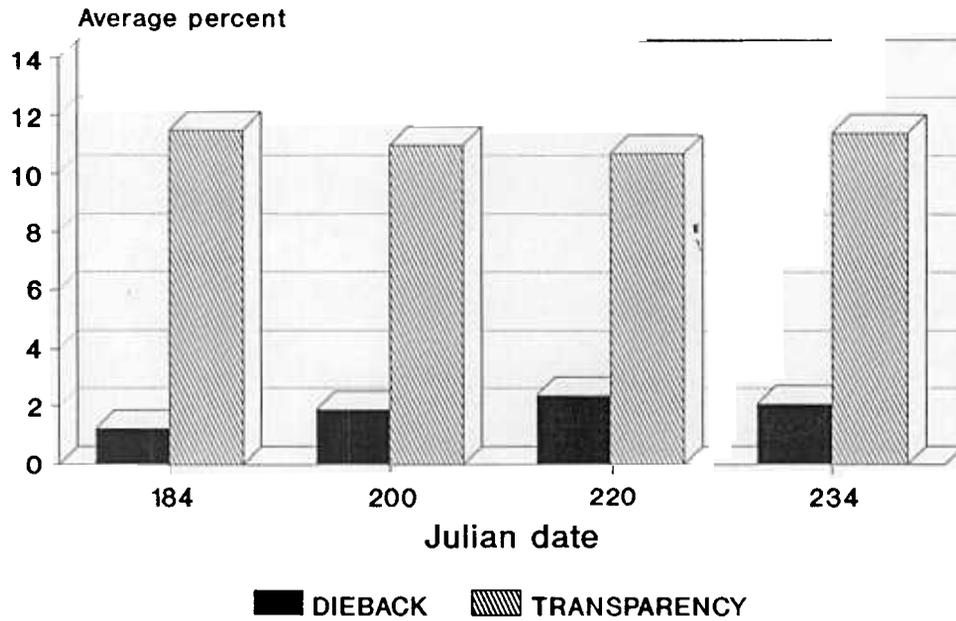


Figure 1. Seasonal variability of crown ratings for 1991 on a Vermont Monitoring Cooperative forest health plot, Proctor Maple Research Center, Mount Mansfield, Vermont, at 1360 ft (415 m) elevation.