

ANNUAL ASSESSMENT OF FOREST HEALTH IN THE LYE BROOK WILDERNESS AREA 1994

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Abstract

Forest health monitoring plots were established in the Lye Brook Wilderness Area, in the towns of Manchester, Sunderland and Winhall, Vermont. The design and measurements used are the same as in the National Forest Health Monitoring Program (NFHM), and one of the plots was previously established (1990) as part of that network. General measurements include: site characterization, mensuration, crown condition and damage. Tree condition measurements include crown dieback, density, live crown ration, crown width, and foliage transparency.

Most tree species at both elevations were in a healthy condition (\leq 15% dieback). The exception was dominant and codominant yellow birch trees, where 26.7% of trees had more than 15% dieback. Black cherry at 1400' and red maple at 2200' had thin crowns. Black cherry is known to shed it's leaves when injured, so this may be one reason for the high transparency ratings on this species.

Paper birch, yellow birch and black cherry had high numbers of standing dead trees, 25, 11.1 and 9.1% respectively. Live paper birch trees seem to have recovered from past stresses, as is reflected in low dieback, high density and normal transparency ratings. Yellow birch and black cherry may still be in decline.

Introduction

Annual assessments of crown condition, mortality, and damage are conducted on permanent plots located at two elevations. The purpose of these plots is to document changes in tree health over time and will aid in the identification of causes for declines, if they occur.

Materials and Methods

Four long-term monitoring plots using the design and measurement variables of the National Forest Health Monitoring Program (NFHM) are used to represent forest health in the Lye Brook Wilderness Area (Tallent-Halsell, N.G. 1994). In 1990, one plot was established at 2300' as part of the NFHM Program grid. One additional plot at the same elevation and 2 plots at 1400' were established in 1994. These paired plots at these elevations were chosen to make them comparable to plots on Mt. Mansfield, the other VMC study site.

Results and Discussion

Most overstory tree species in the Lye Brook Wilderness area plots were in a healthy condition in 1994 (\leq 15% dieback). Only 83.3% of yellow birch trees had less than or equal to 15% dieback. Average dieback for all tree species was low compared to other Vermont locations. High transparency ratings were observed for black cherry and red maple growing in plots at 2200'. Since black cherry is known to drop injured leaves, a high transparency rating may indicate the presence of an earlier season insect, disease, weather or air pollution foliage damage.

When all crown classes of trees are used, again most trees are generally healthy, with yellow birch and beech being the exception, 75 and 80% of trees healthy, respectively. Poor transparency ratings are consistent on black cherry and red maple at 2200'. High numbers of dead trees are recorded for paper birch, yellow birch and black cherry. Paper birch seems to have experienced a previous stress responsible for tree mortality, but current condition of trees is good as indicated by low dieback, high density and normal transparency ratings. Yellow birch and black cherry seem to remain in decline on these plots. Indicators of decay were present on many of the yellow birch boles, an added sign of poor health. The black cherry trees had very small crowns, with average crown ratios of 33%.

No clear differences occurred in tree condition between the two elevations. A higher diversity of tree species was present in the 1400' plots as compared with the 2200' plots, 11 and 5 species, respectively.

Figure 1. Crown condition measurements for overstory trees growing on monitoring plots at different elevations in the Lye Brook Wilderness Area for 1994.

Species	Elevation	Dieback (%)	Transparency (%)	Density (%)	Healthy (%)
Balsam Fir	2200	1.0	18.3	48.3	100
Black Cherry	1400	6.7	25.6	45	100
Paper Birch	1400	3.3	15.6	58.3	100
Red Maple	1400	3.8	14.2	55.2	98.4
	2200	6.0	20.8	47.2	100
Red Spruce	2200	1.1	16.6	51.1	100
Yellow Birch	1400	6.7	19.2	49.2	83.3
All Species	1400	5.2	17.0	53.0	94.6
	2200	3.4	18.9	48.4	100

Healthy = trees with \leq 15% dieback

Figure 2. Tree condition measurements for all crown classes of trees growing on monitoring plots at different elevations in the Lye Brook Wilderness Area for 1994.

Species	Elevation	Dieback (%)	Transparency (%)	Density (%)	Healthy (%)	Dead (%)
Balsam Fir	2200	1.2	18.8	46.6	100	2.9
Beech	1400	8.5	15.5	50	80	0
Black Cherry	1400	6.5	24.5	45	100	9.1
Paper Birch	1400	3.3	15.6	58.3	100	25.0
Red Maple	1400	3.6	14.2	55.2	98.5	1.5
	2200	6.6	20.7	44.9	100	2.6
Red Spruce	2200	1.4	17.9	47.1	100	5.4
Sweet Birch	1400	1.2	15	55	100	0
Yellow Birch	1400	9.4	18.2	45	75	11.1
All Species	1400	5.0	16.6	52.5	94.6	8.7
	2200	3.4	19.1	46.3	100	7.8

References

Tallent-Halsell, N.G. (ed.). 1994. Forest Health Monitoring 1994 Field Methods Guide. EPA/620/R-94/027. U.S. Environmental Protection Agency, Washington, D.C.