Annual Assessment of Forest Health in the Lye Brook Wilderness Area 1995

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Abstract

Annual assessments of forest health in the Lye Brook Wilderness Area are conducted to monitor trends in tree condition over time and to aid in the identification of causes, if declines occur. Monitoring efforts began in 1990 in spruce and fir forests at 2300', and have since been expanded to include monitoring at 1400' in northern hardwood forests. Data collection includes mensuration, crown health and tree damages. Plot design and measurement variables follow the procedures of the National Forest Health Monitoring program.

Over 92% of overstory trees at both elevations were considered healthy ($\leq$15% dieback) in 1995. Average dieback for all trees remains below 10% at both elevations, an indication of overall good tree health. However, all species, except red maple, showed increasing dieback from 1994 values. Foliage transparency and crown density likewise increased. Spring and early summer drought conditions most likely contributed to these signs of tree stress.

Black cherry at 1400' showed a significant increase in average dieback, nearly doubling that of 1994. High transparency ratings (29%) were also recorded, as were observations of curled leaves and foliage discoloration. The combination of these crown symptoms indicates both past and current stress responses are affected these trees. A longer time period is needed to determine a baseline condition for "normal" health.

No new mortality occurred for any of the overstory trees on previously established plots. Standing dead trees on newly established plots appears high for some species due to the relatively small sample size, and does not reflect annual mortality rates.

Introduction

Annual assessments of crown condition, mortality, and damage are conducted on permanent plots located at two elevations, 1400 and 2300 feet. The purpose of these plots is to document changes in tree health over time and to 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) (Tallent-Halsell, N.G. 1994)are used to represent forest health in the Lye Brook Wilderness Area. Data collected to assess forest health includes mensuration, crown condition and tree damages. 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. An additional high elevation plot was added in 1995 to improve the hardwood sample size. These elevations were chosen for comparison with plots on Mt. Mansfield, the northern Vermont VForEM study site.

Results and Discussion

Over 92% of overstory trees at both elevations were considered healthy ($\leq$15% dieback) in 1995 (Table 1). Average dieback for all trees remains below 10% at both elevations, an indication of overall good tree health. However, all species, except red maple, showed increasing dieback from 1994 values. Foliage transparency and crown density likewise increased. Spring and early summer drought conditions most likely contributed to these signs of tree stress.

Black cherry at 1400' showed a significant increase in average dieback, nearly doubling that of 1994 (Table 2). High transparency ratings (29%) were also recorded, as were observations of curled leaves and foliage discoloration. The combination of these crown symptoms indicates both past and current stress responses are affected these trees. A longer time period is needed to determine a baseline condition for "normal" health.

No new mortality occurred for any of the overstory trees on previously established plots (Table 1). Standing dead trees on newly established plots appears high for some species due to the relatively small sample size, and does not reflect annual mortality rates (Table 2).

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.

Table 1. Crown condition measurements for overstory trees growing on monitoring plots at different elevations in the Lye Brook Wilderness Area for 1995.

Species	Elevation	Dieback (%)	Transparency (%)	Density (%)	Healthy (%)
Balsam Fir	2200	2.0	24.3	44.6	100
Black Cherry	1400	12.5	29.0	42.5	90
Paper Birch	1400	4.5	28.0	52.5	100
Red Maple	1400	5.7	19.8	52.5	95.4
	2200	5.9	24.9	48.8	100
Red Spruce	2200	2.9	21.7	53.8	100
All Species	1400	7.3	23.3	52.5	92.4
	2200	4.5	24.0	49.0	99

Healthy = trees with $\leq$ 15% dieback

Table 2. Tree condition measurements for all crown classes of trees growing on monitoring plots at different elevations in the Lye Brook Wilderness Area for 1995.

Species	Elevation	Dieback (%)	Transparency (%)	Density (%)	Healthy (%)	New Dead (%)
Balsam Fir	2200	2.1	25.5	42.8	100	0
Beech	1400	9.5	22.0	59.0	80	0
	2200	10.0	29.6	38.8	83.3	7.7*
Black Cherry	1400	12.3	28.6	41.8	90.9	0
Paper Birch	1400	4.5	28.0	52.5	100	0
Red Maple	1400	5.7	19.8	52.5	95.4	0
	2200	5.9	24.9	48.8	100	3.7*
Red Spruce	2200	2.6	22.4	49.9	100	0
Striped Maple	2200	8.0	21.5	50.0	80	9.1*
All Species	1400	6.8	23.0	54.0	94.2	3.8
	2200	3.4	19.1	46.3	100	0

* = Standing dead trees on newly established plot.