

**Annual Assessment of Forest Health  
in the Lye Brook Wilderness Area  
1998**

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Cooperators

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Introduction

Annual assessments of crown condition, mortality, and damages are conducted on permanent plots located at two elevations, 1400 and 2200 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. The same methods is used to assess forest health on plots throughout Vermont.

Materials and Methods

Five 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 VMC study site.

Results and Discussion

Crown condition. In 1998, trees surveyed showed a trend towards poorer condition (Tables 1-4). Percent of trees healthy was 81.3% on 1400 foot plots, and 93.5% on 2200 foot plots (Table 4). When compared to 5 year averages, tree foliage was significantly thinner (foliage transparency increased) and crown density was lower at both elevations (Figures 1-2). Survey plots were not affected by the January 1998 ice storm, but a prevalence of leaf diseases due to wet summer conditions may have played a factor in reduced foliage and crown density. Species particularly affected were black cherry at 1400 feet, and balsam fir at 2200 feet.

**Table 1.** Trend in average crown dieback measurements for overstory trees growing on monitoring plots at different elevations in the Lye Brook Wilderness Area, 1994 - 1998.

Species	Elevation	1994	1995	1996	1997	1998
Balsam Fir	2200	1.0	1.8	2.9	<u>2.2</u>	<u>6.6</u>
Black Cherry	1400	6.5	12.5	12.5	<u>6.0</u>	<u>9.5</u>
Paper Birch	1400	*	*	4.5	<u>1.5</u>	<u>5.0</u>
Red Maple	1400	3.8	5.4	5.4	2.9	4.3
	2200	6.0	6.4	6.9	<u>4.</u>	<u>5.7</u>
Red Spruce	2200	1.0	2.6	4.3	.9	2.8
All Species	1400	5.2	7.1	6.7	<u>3.5</u>	<u>6.2</u>
	2200	3.4	4.2	5	3.2	5.3

\* Sample size <10 trees.

**Table 2.** Trend in average crown density measurements for overstory trees growing on monitoring plots at different elevations in the Lye Brook Wilderness Area, 1994 - 1998.

Species	Elevation	1994	1995	1996	1997	1998
Balsam Fir	2200	48.3	44.2	50.6	<u>51.8</u>	<u>38.2</u>
Black Cherry	1400	45.5	42.5	38	<u>48.5</u>	<u>33.5</u>
Paper Birch	1400	*	*	54	<u>51.5</u>	<u>45.0</u>
Red Maple	1400	55.2	52.3	51.5	51.0	44.
	2200	46.7	50.2	56.4	<u>54.5</u>	<u>44.3</u>
Red Spruce	2200	51.0	51.4	58.6	56.2	46.0
All Species	1400	53.0	52.4	50.3	<u>51.8</u>	<u>42.2</u>
	2200	48.3	48.7	55.2	53.7	43.

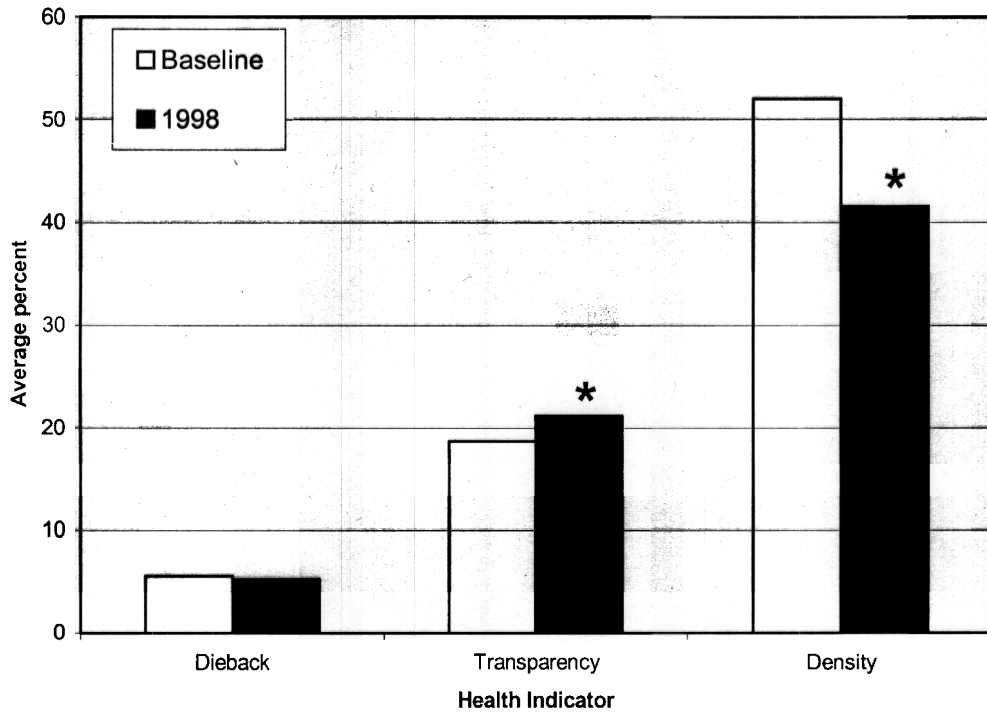
**Table 3.** Trend in average foliage transparency measurements for overstory trees growing on monitoring plots at different elevations in the Lye Brook Wilderness Area, 1994 - 1998. \*indicates < 10 trees

Species	Elevation	1994	1995	1996	1997	1998
Balsam Fir	2200	18.3	24.4	16.7	19.3	28.
Black Cherry	1400	25	*	26.5	25.5	29.5
Paper Birch	1400	*	*	20.5	17.5	23.8
Red Maple	1400	14.2	19.6	15	16.5	18.0
	2200	20.9	24.8	16.0	16.0	20.8
Red Spruce	2200	16.6	22.1	12.9	15.6	19.7
All Species	1400	17.0	23.1	18.2	17.9	21.5
	2200	18.9	24.1	15.3	17.0	23.0

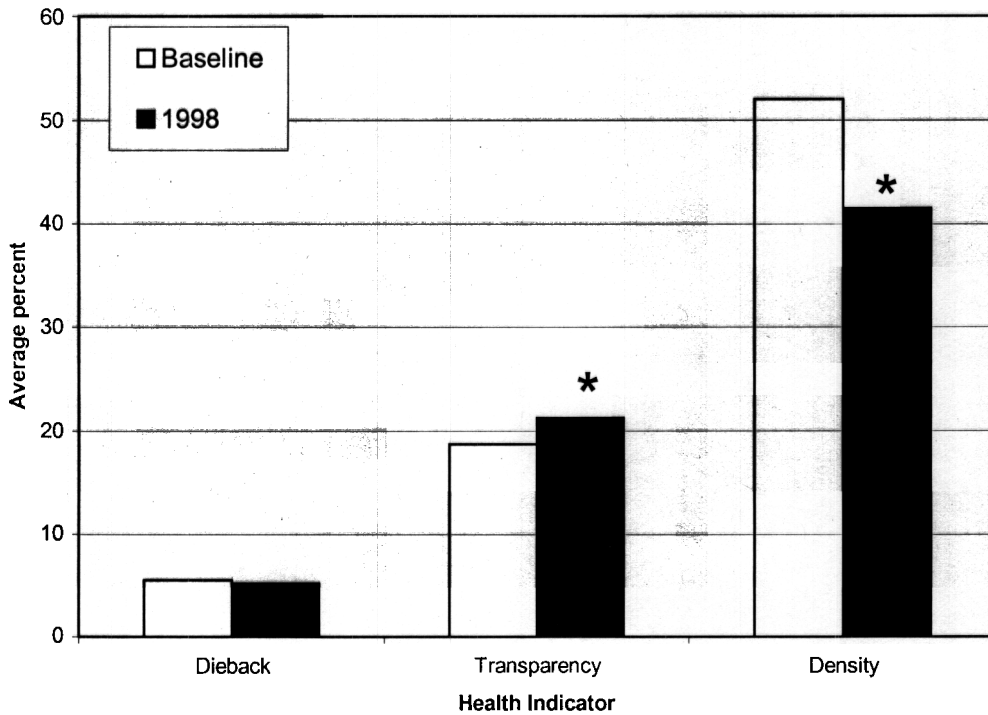
**Table 4.** Trend in percent of trees healthy for overstory trees growing on monitoring plots at different elevations in the Lye Brook Wilderness Area, 1994 - 1998. \*indicates < 10 trees

Species	Elevation	1994	1995	1996	1997	1998
Balsam Fir	2200	100	100	91.7	100	89.2
Black Cherry	1400	100	*	80	100	70.0
Paper Birch	1400	*	*	100	100	100
Red Maple	1400	100	100	100	95.8	87.0
	2200	93.1	96.8	90	100	95.2
Red Spruce	2200	100	100	100	100	94.7
All Species	1400	98.1	92.2	94.0	94.6	81.3
	2200	98.6	97.6	92.7	100	93.5

**Figure 1.** Overstory tree health in 1998 compared to 5 year averages (baseline) for survey plots at 1400 feet in the Lye Brook Wilderness Area. \* = significantly different



**Figure 2.** Overstory tree health in 1998 compared to 5 year averages (baseline) for survey plots at 2200 feet in the Lye Brook Wilderness Area. \* = significantly different



**Table 5.** Percent of overstory trees affected by different types of tree damages in 1998.

Elevation	Percent of trees damaged	Percent of damaged trees affected by types of damage
400	20 %	23.6 % with indicators of decay 3.6 % with open wounds (size > 20% of circumference) 3.6 % with dead or broken top 1.8 % with broken or dead branches
2200	25.5 %	13.1 % with indicators of decay 8.0 % with dead or broken top 2.9 % with open wounds 1.5 % with broken/dead branches 1.4 % with cankers 0.7 % with brooming

Tree damages. Results on the incidence of damages that have the potential to significantly affect tree growth and vigor show that 20% of trees on the 1400 foot elevation plots and 25.5% of trees on the 2200 foot elevation plots have some sort of damage (**Table 5**). The most common type of damage is “indicator of decay”. At the 2200 foot elevation, dead or broken tops are also common.

### 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. 1998 version.