

Annual Assessment of Forest Health in the Lye Brook Wilderness Area 1996

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Cooperators

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Abstract

Most indicators of forest health measured in 1996 showed an improvement in tree condition from the previous year. At the 1400 foot elevation plots, overstory tree dieback remains low (6.1%), crown density has varied little (50.3%) and foliage was more abundant than in 1995, with average foliage transparency improving from 23% to 18%. At the 2200 foot elevation plots, overstory tree dieback remains very low (5.1%), crown density and foliage transparency both improved substantially from 1995.

Black cherry at the 1400 foot elevation plots continues to show high average dieback (12.5%), high foliage transparency (26.5%), and reduced crown density (38%). Other overstory tree species rebounded from dry conditions of 1995 and show improvements in most tree health indicators.

Damages to trees from insects, diseases, weather and other factors are a natural part of forests. Detecting and recording those damages that are significant to tree health and survival provides a information that can explain unexpected declines in tree health. Injury and damages present on tree boles, exposed roots, crownstem, branches and foliage are recorded when above a threshold established as "significant to tree health".

In 1996, nearly 40% of overstory red maple and black cherry trees on plots had visible damage symptoms. Fewer damages were detected on paper birch (20%), balsam fir (8%) and red spruce (5%). The most common type of damage was indicators of internal decay on tree boles.

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

Most indicators of forest health measured in 1996 showed an improvement in tree condition from the previous year. At the 1400 foot elevation plots, overstory tree dieback remains low (6.1%) [Table 1], crown density has varied little (50.3%) [Table 2], foliage was more abundant than in 1995, with average foliage transparency improving from 23% to 18% (Table 3), and the percentage of trees in a healthy condition increased to 94%.. At the 2200 foot elevation plots, overstory tree dieback remains very low (5.1%) [Table 1], crown density and foliage transparency both improved substantially from 1995 (Table 2 & 3), but there was a slight decrease in the percentage of trees in a healthy condition, from 97.6 to 92.7%, 1995 and 1996, respectively.

Black cherry at the 1400 foot elevation plots continues to show high average dieback (12.5%), high foliage transparency (26.5%), and reduced crown density (38%). Only 80% of the trees are in a healthy condition. Other overstory tree species rebounded from dry conditions of 1995 and show improvements in most tree health indicators.

Damages to trees from insects, diseases, weather and other factors are a natural part of forests. Detecting and recording those damages that are significant to tree health and survival provides a information that can explain unexpected declines in tree health. Injury and damages present on tree boles, exposed roots, crownstem, branches and foliage are recorded when above a threshold established as "significant to tree health".

In 1996, nearly 40% of overstory red maple and black cherry trees on plots had visible damage symptoms (Table 5). Fewer damages were detected on paper birch (20%), balsam fir (8%) and red spruce (5%). The most common type of damage was indicators of internal decay on tree boles.

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 - 1996.

Species	Elevation	1994	1995	1996
Balsam Fir	2200	1.0	1.8	2.9
Black Cherry	1400	6.5	12.5	12.5
Paper Birch	1400	*	*	4.5
Red Maple	1400	3.8	5.4	5.4
	2200	6.0	6.4	6.9
Red Spruce	2200	1.0	2.6	4.3
All Species	1400	5.2	7.1	6.7
	2200	3.4	4.2	5.1

* 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 - 1996.

Species	Elevation	1994	1995	1996
Balsam Fir	2200	48.3	44.2	50.6
Black Cherry	1400	45.5	42.5	38
Paper Birch	1400	*	*	54
Red Maple	1400	55.2	52.3	51.5
	2200	46.7	50.2	56.4
Red Spruce	2200	51.0	51.4	58.6
All Species	1400	53.0	52.4	50.3
	2200	48.3	48.7	55.2

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 - 1996. *indicates < 10 trees

Species	Elevation	1994	1995	1996
Balsam Fir	2200	18.3	24.4	16.7
Black Cherry	1400	25	*	26.5
Paper Birch	1400	*	*	20.5
Red Maple	1400	14.2	19.6	15
	2200	20.9	24.8	16.0
Red Spruce	2200	16.6	22.1	12.9
All Species	1400	17.0	23.1	18.2
	2200	18.9	24.1	15.3

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 - 1996. *indicates < 10 trees

Species	Elevation	1994	1995	1996
Balsam Fir	2200	100	100	91.7
Black Cherry	1400	100	*	80
Paper Birch	1400	*	*	100
Red Maple	1400	100	100	100
	2200	93.1	96.8	90
Red Spruce	2200	100	100	100
All Species	1400	98.1	92.2	94.0
	2200	98.6	97.6	92.7

Table 5. Percent of overstory trees affected by different types of tree damages in 1996.

Species	Elevation	Percent of trees and type of damage
Balsam Fir	2200	4 % with resinosis from bark beetles 4 % with broken or dead crownstem
Black Cherry	1400	10% with cankers 30% with indicators of decay
Paper Birch	1400	10% with indicators of decay 10% with open wounds (size > 20% of circumference)
Red Maple	1400	30% with indicators of decay 4% with open wounds 4% with xxx foliage
	2200	6% with cankers 2% with indicators of decay 6% with open wounds 9% with xxx foliage
Red Spruce	2200	5% with open wounds

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.