

EVALUATION OF OZONE DAMAGE TO VEGETATION
ON THE LYE BROOK WILDERNESS
IN 1991

SURVEY REPORT
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INTRODUCTION

Under provisions of the Clean Air Act of 1977, the Forest Service is responsible for the protection of "Class I" wilderness areas from the adverse effects of air pollution. In 1987, personnel of the National Forest System requested assistance from Forest Health Protection in evaluating the effect of ozone on the vegetation of the

Eye Brook Wilderness in Vermont. Since then the Wilderness has been surveyed annually for symptoms of

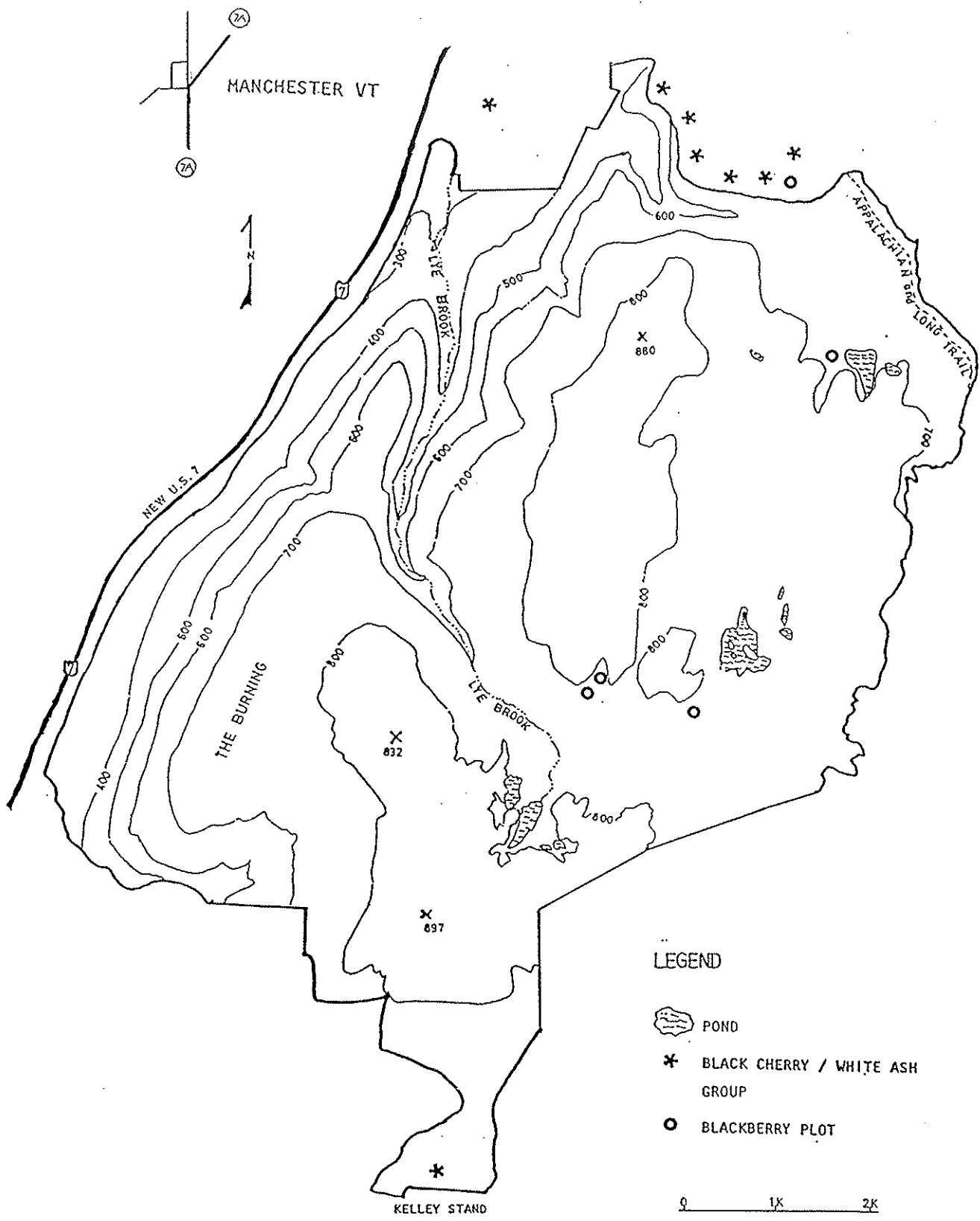


Figure 1 Map of Iye Brook Wilderness Green Mountain National Forest

Injury ratings

To compare the extent of damage to sensitive vegetation from year to year, or among species, the injury must

sample trees (black cherry or white ash) were examined and rated. From 1988 to 1991, nearly all the injury found on these species consisted of a single stippling or discoloration of the leaves. Most (90%) of the

RESULTS AND DISCUSSION

Symptoms on black cherry and white ash

Table 1 compares symptom expression on black cherry and white ash for 1988, 1989, 1990, and 1991. Most investigations, in which both species were involved, indicate that black cherry is somewhat more sensitive than white ash. The average death rate was 20% for black cherry and 10% for white ash.

The average frequency/intensity indices for both species are grouped in Table 2.

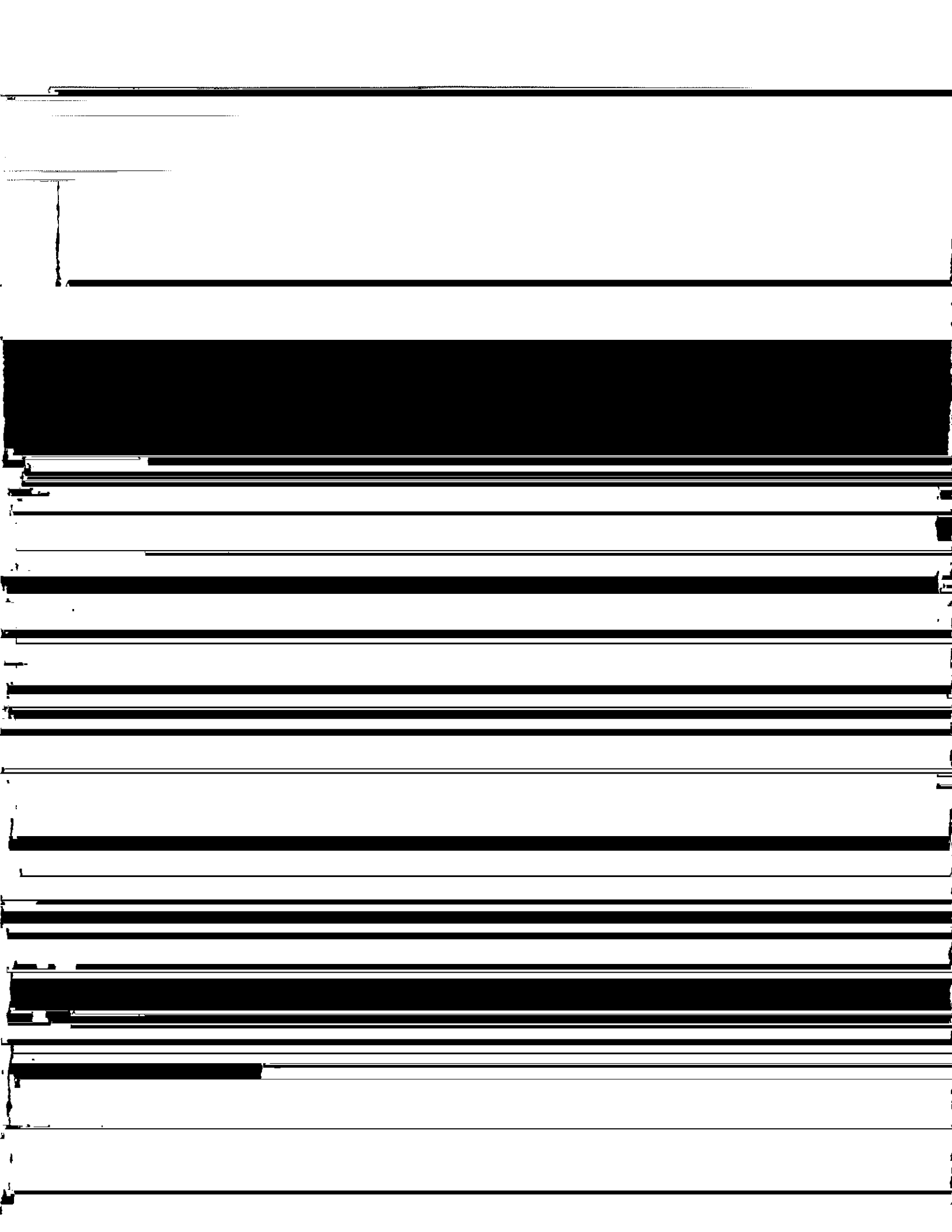
Table 2. Frequency x intensity indices of ozone symptoms on black cherry and white ash foliage on the Lye Brook Wilderness 1988 through 1991.

| Group Number | Total trees ¹ | | Average injury index | | | |
|--------------|--------------------------|------|----------------------|------|------|------|
| | Cherry | Ash | 1988 | 1989 | 1990 | 1991 |
| 1 | 5 | 0 | 1.0 | 2.0 | 0.0 | 0.0 |
| 2 | 0 | 5(4) | 2.6 | 8.0 | 0.0 | 2.4 |
| 3 | 3(1) | 2(1) | 7.0 | 3.0 | 2.3 | 7.8 |
| 4 | 1(1) | 4(0) | 1.2 | 5.1 | 3.6 | 5.6 |
| 5 | 2(1) | 3(0) | 1.0 | 6.6 | 2.4 | 5.2 |

¹Number in parenthesis refers to number of trees examined in 1988.

Of the 15 black cherry trees added in 1991 (not included in Tables 1 and 2), 4 (27 percent) of the trees and 25 (17 percent) of the branches had symptoms. The injury indices averaged 4.0.

The method by which these trees are rated must be considered a crude one. Only a few branches, rather than the entire tree, could be examined. Even these branches were usually parts of a single large branch. The intention was to obtain branches exposed to sunlight, otherwise the choice of branches was arbitrary.



on, Ve

SEP

39
37
42
35

27
27
28
25

47
47
49
45

61
69
84
66

9
10
12
10

2
1
1
0

0.3
0.2
0.2
0.0

ont

ST

2
7
3
2

6
8
5
6

8
5
9
0

3
6
2
9

6
8
6
7

0
0
0
0

0
0
0
0

MP

M

7 MONTH
MEAN/TOTAL

48
45
44
43

37
35
34
33

57
53
51
53

942
908
763
775

21
19
16
16

196
40
72
105

4.4
0.9
1.5
2.2

UG

/TOTAL

36
18
17
15

12
17
16
14

16
16
15
17

3
3
18
10

2
3
0
8

2
9
9
5

7
4
2
8

lacking in our previous surveys. Now, the differences in the extent of symptoms on the plants (Table 1) do

(3) Precisely what the injuries described here mean to the plants is not yet known. As injuries to individual