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Forest Health Monitoring in New Hampshire

1996 - 1999



NEW HAMPSHIRE

The National Forest Health Monitoring (FHM) program monitors the long-term status, changes and trends in the health of forest ecosystems and is conducted in cooperation with individual states.

In New Hampshire, 37 FHM plots were established in 1990 (Fig. 1). Each point in Figure 1 represents the status and approximate location of one FHM plot. Each plot is a set of four fixed-area circular plots. Most tree measurements are made on four 1/24-acre subplots. Seedling and sapling measurements are made on four 1/300-acre microplots, located within the subplots.

In 1996 and 1997, about one-third of the plots were sampled. In response to a widespread ice storm that occurred in January of 1998, all of the established FHM plots in the state were sampled in 1998 and 1999. This report summarizes the most recent conditions.

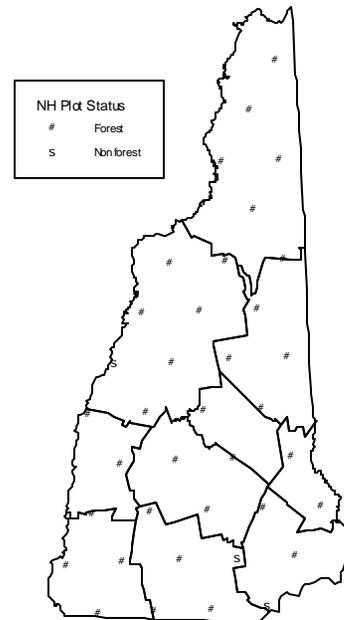


Figure 1. – Current status and approximate location of Forest Health Monitoring (FHM) plots in New Hampshire.

Plot Characteristics

- 34 of the 37 plots were at least partially forested
- 87 percent of the 37-plot area was forested.
- 58 percent of the forested areas were in the maple-beech-birch forest type group; the second most common group was the white-red-jack pine forest type, accounting for about 19 percent of the forested areas.
- 56 percent of the forested areas were in sawtimber-size stands with 33 percent of the forested areas in poletimber-size stands.
- 48 percent of the forested areas were stands that were more than 60 years old; 35 percent of the forested areas were in stands that were 41 to 60 years; 6 percent were in stands that were 21 to 40 years old; and 11 percent were in stands that were 20 years old or less.

Plot Structure (Table 1)

Seedlings

- Sugar maple seedlings (12 inches tall, less than 1 inch diameter) were most abundant, accounting for about 15 percent of the 1,229 seedlings counted.
- The five most abundant species groups collectively accounted for 72 percent of the seedlings. They were sugar maple, American beech, red maple, other maple, and select red oak.

Saplings

- Red maple saplings (1 to 4.9 inches d.b.h.) were the most abundant, accounting for 17 percent of the 205 saplings counted.
- The five most abundant species groups collectively accounted for 56 percent of the saplings. They were red maple, American beech, yellow birch, sugar maple, and select red oak.

Trees

- Red maple trees (5 inches d.b.h. or greater) were the most abundant, accounting for 22 percent of the 986 trees counted.
- The five most common species groups collectively accounted for 67 percent of the trees. They were red maple, sugar maple, eastern white pine, eastern hemlock, and paper birch.

Table 1. -- Number of trees by size class, and species groups, New Hampshire, 1996-99. Rankings of species quantity appear as superscripts beside numbers.

Species	Size Class		
	Seedlings	Saplings	Trees
Eastern hemlock	39	15	91 ⁴
Eastern white pine	30	5	122 ³
American beech	183 ²	24 ²	44
Paper birch	15	9	74 ⁵
Yellow birch	61	19 ³	40
Sugar maple	190 ¹	18 ⁴	154 ²
Red maple	118 ³	36 ¹	221 ¹
Other maple	112 ⁴	15	1
Select red oak	69 ⁵	18 ⁴	58
All softwoods	127	38	269
All hardwoods	1,102	167	717
All trees	1,229	205	986

Table 2. -- Mean plot values and percentage of trees with ratings of specified values, by crown variable, New Hampshire, 1996-99. (plot means based on 34 forested plots; percentage of trees based on 986 live trees 5 in. or more in d.b.h.)

	Value
<u>Crown Dieback</u>	
Plot Mean	3.8%
Trees with $\leq 5\%$ dieback	89
<u>Foliage Transparency</u>	
Plot Mean	19.4%
Trees with $\leq 30\%$ transparency	98
<u>Crown Density</u>	
Plot Mean	45.6%
Trees with $> 30\%$ density	83

Tree Condition

Crown Dieback (Table 2; Fig. 2)

Crown dieback refers to recent mortality of branches with fine twigs and is measured as a percentage of the tree crown. Low dieback ratings (5 percent or less) are considered to be an indicator of good health. High dieback ratings indicate poor health.

- 89 percent of the trees had low dieback ratings; average dieback was about 4 percent.
- 2 percent of the trees had high dieback ratings (more than 20 percent affected crown).
- 82 percent of red maple had low dieback ratings; 4 percent had high dieback ratings.

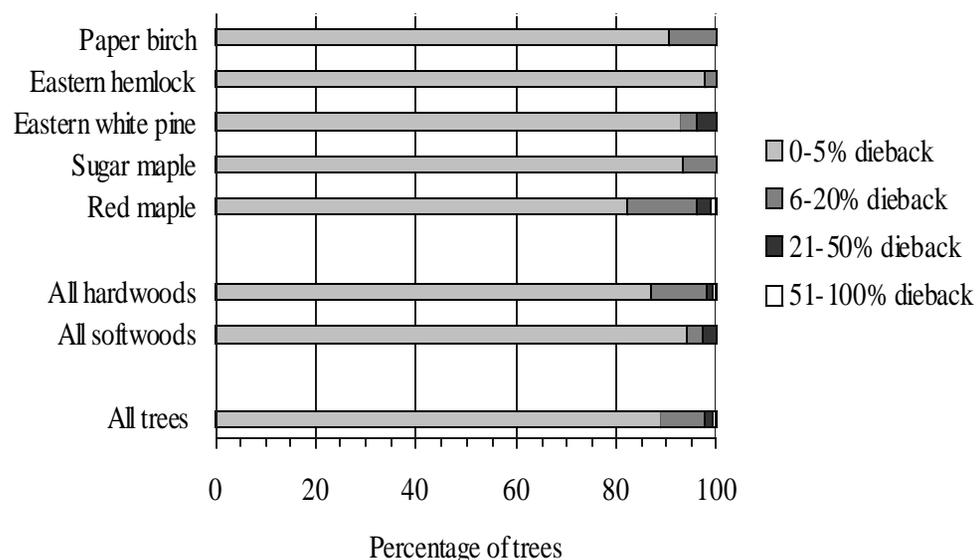


Figure 2. – Distribution of crown dieback ratings for trees in New Hampshire, 1996-99.

Foliage Transparency (Table 2; Fig. 3)

Foliage transparency is the amount of skylight visible through the live, normally foliated portion of the crown. Foliage transparency estimates the crown condition in relation to a typical tree for the site where it is found. Low transparency ratings (little visible skylight) indicate a full and generally healthy, crown; high transparency ratings indicate a sparse crown. Transparency ratings of 30 percent or less are considered normal for most trees.

- 98 percent of all trees had normal transparency ratings; average transparency was 19 percent.
- 92 percent of eastern white pine had normal transparency ratings.

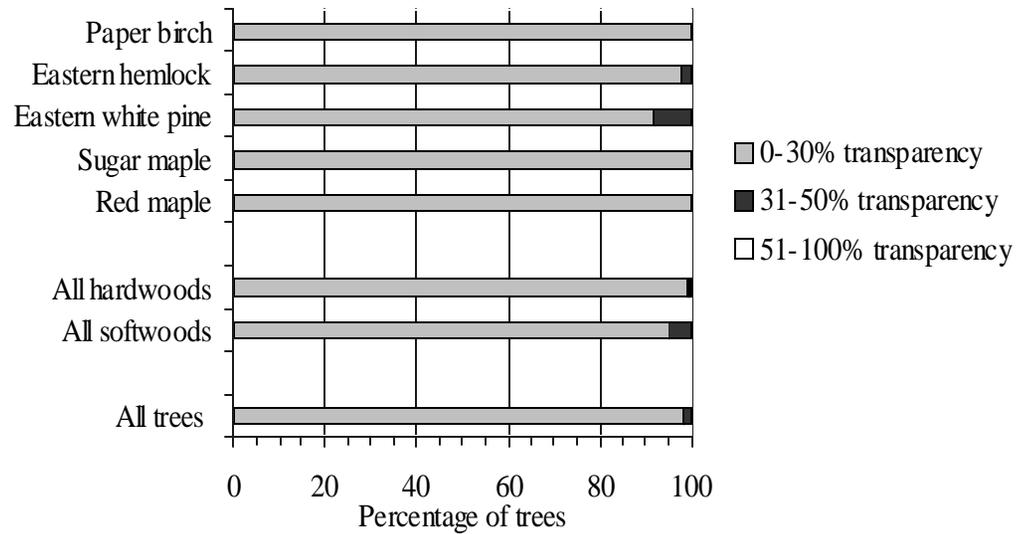


Figure 3. – Distribution of foliage transparency ratings for trees in New Hampshire, 1996-99.

Crown Density (Table 2; Fig. 4)

Crown density is the percentage of crown area where sunlight is blocked by crown branches, foliage, and reproductive structures. Crown density estimates crown condition relative to a typical tree for the site. Density also serves as an indicator of future growth. High density ratings (greater than 30 percent) indicate a full, healthy crown.

- 83 percent of trees had high crown density ratings; average crown density was 46 percent.
- 78 percent of red maple and 80 percent of eastern white pine had high crown density ratings.

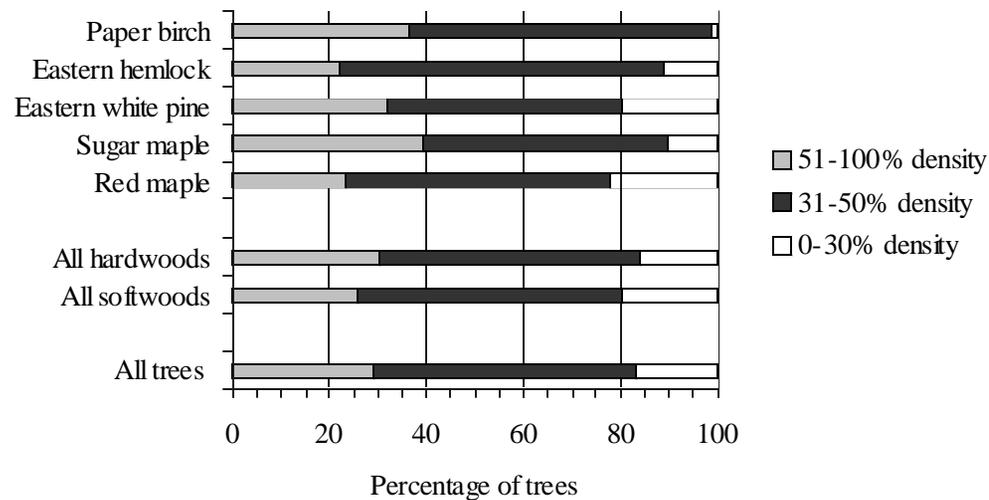


Figure 4.--Distribution of crown density ratings for trees in New Hampshire, 1996-99.

Tree Damage

Signs and symptoms of damage were recorded if the damage could kill the tree or affect its long-term survival. The 11 categories of damage used in this report were: cankers and galls, decay, open wounds, resinosis and gummosis, cracks and seams, vines, dead or broken tops, broken branches, other bole and root damage, other crown damage, and other damage (not otherwise defined).

- 74 percent of trees had no significant damage, 21 percent had one damage, and 5 percent of the trees had two or more damages.
- 65 percent of 314 damages were decay; 9 percent were open wounds; 8 percent were dead or broken tops; and 8 percent were cankers and galls.
- 95 percent of eastern hemlock and eastern white pine, and 88 percent of select red oaks had no damage.
- 58 percent of red maple had no damage; 30 percent had 1 damage. More than 75 percent of the damage on red maple was decay and 10 percent was dead or broken tops.

Summary

New Hampshire has mature forests dominated by hardwood species but with significant softwood resources. The majority of the trees are healthy with full crowns (low transparency, high density), little dieback and little damage. Red maple had higher dieback and more damage than other species. Eastern white pine had lower crown densities and little damage.

For more information regarding the FHM program, contact: Chuck Barnett, Northeastern Research Station USDA Forest Service, 11 Campus Blvd, Suite 200, Newtown Square, PA 19073, 610-557-4031; cjbarnett@fs.fed.us or visit the National FHM website: www.na.fs.fed.us/spfo/fhm

Acknowledgments

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