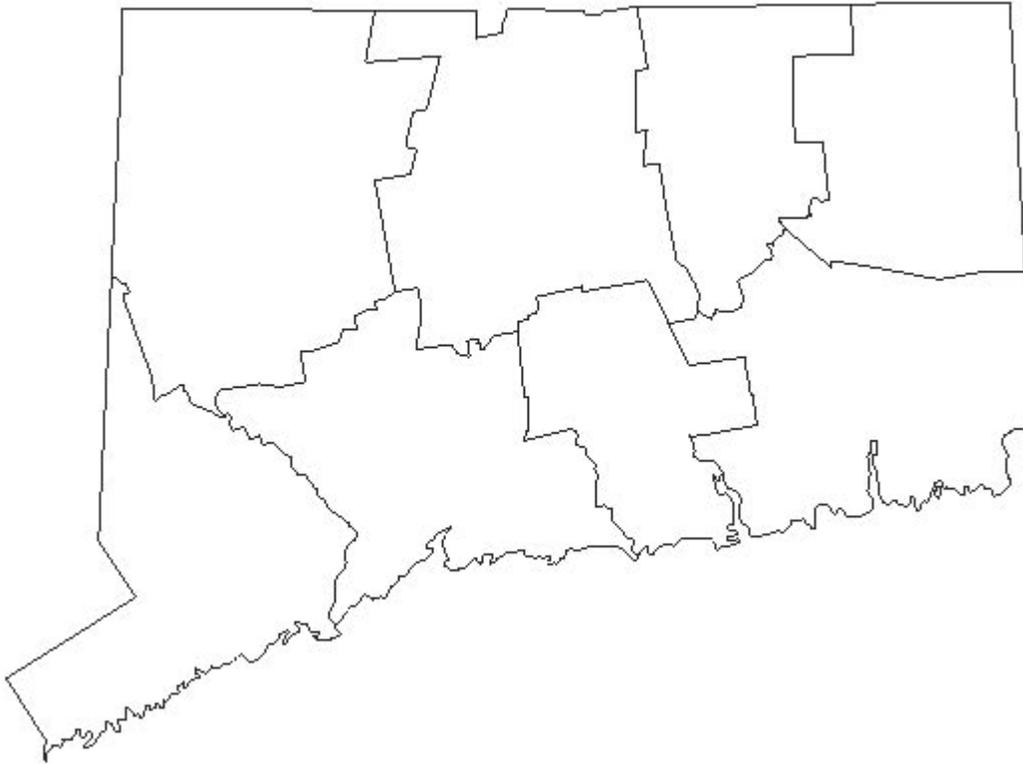USDA United States
Department of
Agriculture

Forest Service

Northeastern
Research Station

NE-INF-153-02

Forest Health Monitoring in Connecticut

1996 - 1999

CONNECTICUT

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 Connecticut, 18 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.

All plots were visited at least once between 1996 and 1999, and five to eight plots were sampled each year. This report summarizes the most recent conditions.
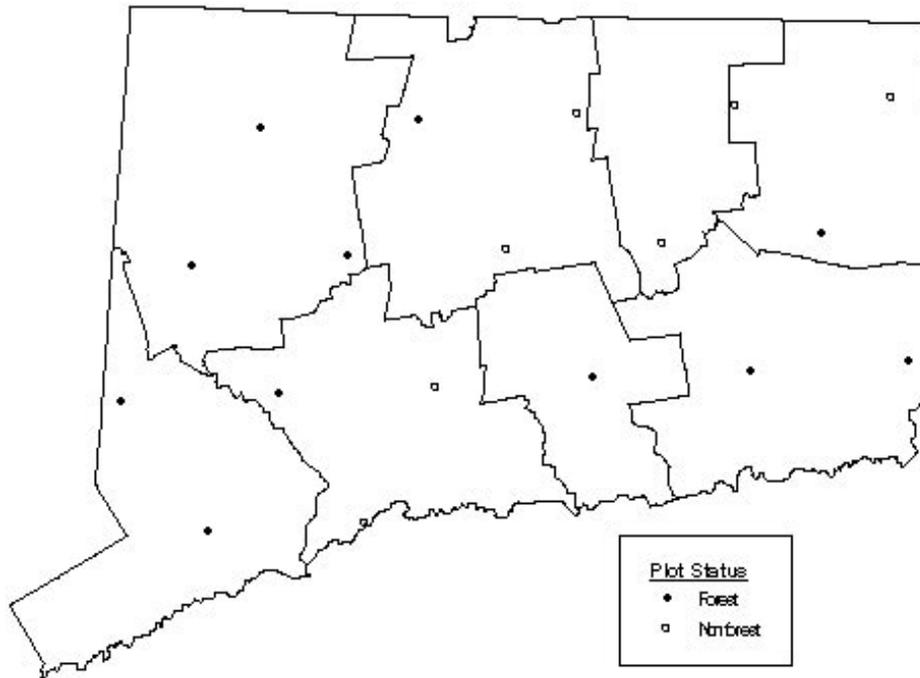

Figure 1. – Current status and approximate locations of Forest Health Monitoring (FHM) plots in Connecticut.

Plot Characteristics

❍ 11 of the 18 plots were at least partially forested.

❍ 57 percent of the 18-plot area was forested.

❍ 66 percent of the forested areas were in oak-hickory forest types; the second most common group was the maple-beech-birch forest type, accounting for about 20 percent of the forested areas. White-red-jack pine forest types accounted for 10 percent of the forested areas.

❍ 66 percent of the forested areas were in sawtimber-size stands with the remainder of the forested areas in poletimber-size stands.

❍ 69 percent of the forested areas were in stands more than 60 years old; and 21 percent were in stands 41 to 60 years old.

Plot Structure (Table 1)

Seedlings

❍ Red maple seedlings (12 inches tall, less than 1 inch diameter) were most abundant, accounting for about 26 percent of the 322 seedlings counted.

❍ The five most abundant species groups collectively accounted for 72 percent of the seedlings. They were red maple, other birch, hickory, white and green ash, and eastern hemlock. The "other birch" group was mainly sweet birch.

Saplings

❍ Eastern hemlock saplings (1 to 4.9 inches d.b.h.) were the most abundant, accounting for 25 percent of the 61 saplings counted.

❍ The four most abundant species groups collectively accounted for 64 percent of the saplings. They were eastern hemlock, other birch, red maple, and yellow birch.

Trees

❍ Red maple trees (5 inches d.b.h. or greater) were the most abundant, accounting for 17 percent of the 236 trees counted.

❍ The five most common species groups collectively accounted for 63 percent of the trees. They were red maple, other birch, other (non-select) red oak, hickory, and eastern hemlock. As in the seedling and sapling samples, the "other birch" group was primarily sweet birch.

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

Species	Size Class		
	Seedlings	Saplings	Trees
Eastern hemlock	28 [5]	15 [1]	22 [5]
White/green ash	32 [4]	2 [5]	11
Yellow birch	1	4 [4]	13
Other birch	54 [2]	11 [2]	35 [2]
Hickory	33 [3]	2 [5]	24 [4]
Sugar maple	9	2 [5]	15
Red maple	85 [1]	9 [3]	40 [1]
Other red oak	4	-	28 [3]
Select white oak	21	2 [5]	15
All Softwoods	30	15	25
All Hardwoods	292	46	211
All Species	322	61	236

Table 2. – Mean plot values and percentage of trees with ratings of specified values, by crown variable, Connecticut, 1996-99. (plot means based on 11 forested plots; percentage of trees based on 236 live trees 5 in. or more in d.b.h.)

	Value
Crown Dieback	
Plot Mean	4.2%
Trees with $\leq$5% dieback	86
Foliage Transparency	
Plot Mean	17.0%
Trees with $\leq$30% transparency	97
Crown Density	
Plot Mean	49.0%
Trees with >30% density	97

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.

- ❍ 86 percent of the trees had low dieback ratings; average dieback was 4 percent.

- ❍ Less than 1 percent of the trees had high dieback ratings (more than 20 percent affected crown).

- ❍ Dieback was highest on eastern hemlock, where 4.5 percent of the trees had high dieback ratings.
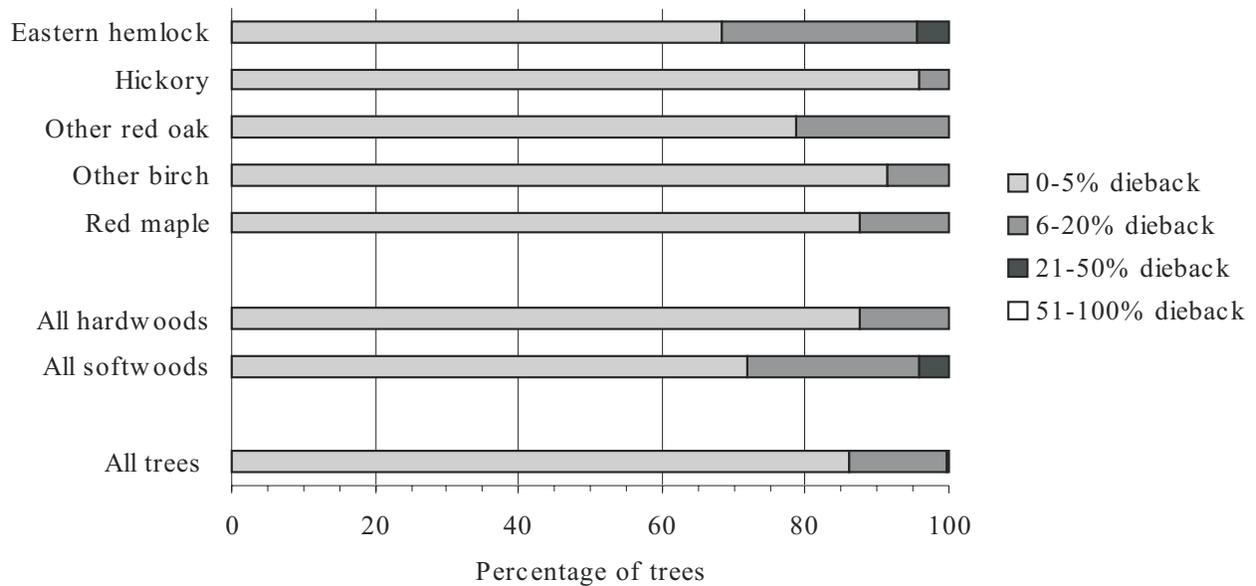
Figure 2. – Distribution of crown dieback ratings for trees in Connecticut, 1996-99.

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.

❍ 97 percent of all trees and 98 percent of common species had normal transparency ratings; average transparency was 17 percent.

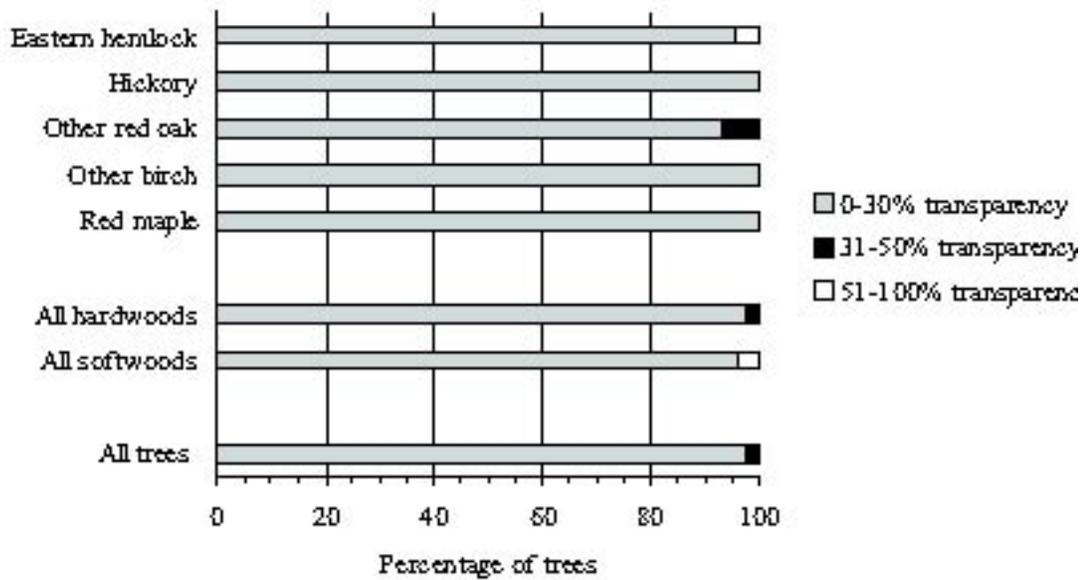❍ 4.5 percent of eastern hemlock had crowns in the highest transparency rating category (51 to 100 percent).

Figure 3. – Distribution of foliage transparency ratings for trees in Connecticut, 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.

❍ 93 percent of trees had high density ratings; average crown density was 49 percent.

❍ 45 percent of eastern hemlock had low crown density (30 percent or less) compared to 7 percent of all trees.
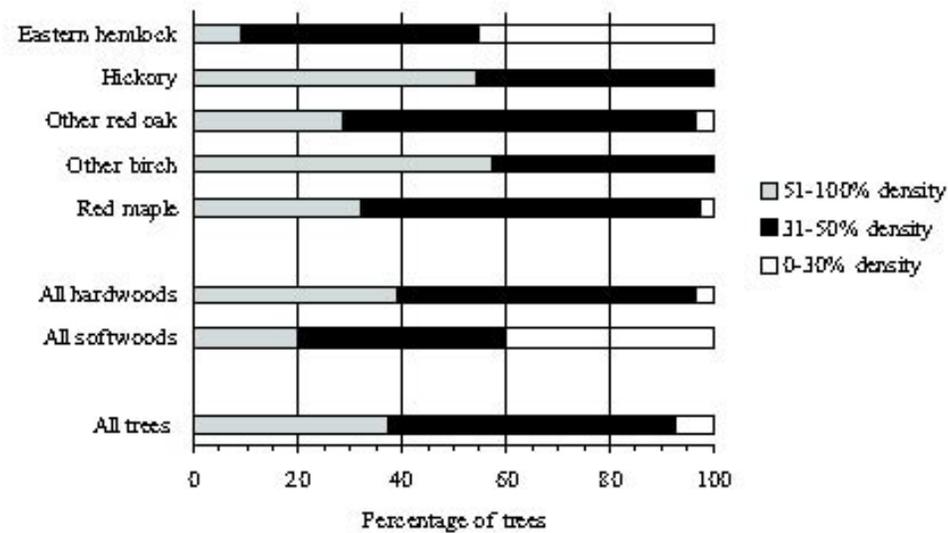

Figure 4. – Distribution of crown density ratings for trees in Connecticut, 1996-99.

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).

❍ 77 percent of trees had no significant damage, 17 percent had one damage, and 6 percent of the trees had two or more damages.

❍ 56 percent of 70 damages were decay; 19 percent were dead or broken tops; 9 percent were cankers and galls; and 7 percent were dead or broken branches.

❍ 46 percent of eastern hemlock had no significant damage; more than three-quarters of the damages were dead or broken tops.

❍ 42 percent of select red oak trees had one or more damages, with more than 85 percent of the damages related to decay.

Summary

Connecticut has mature forests dominated by hardwoods. Most trees are healthy with full crowns (low transparency and high density), little dieback and little damage. The exception is eastern hemlock, which was in poor condition, with thin crowns, more dieback and more damage, especially broken tops. These conditions are likely the result of attack by the hemlock woolly adelgid and other pests.

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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