

The status and trends of the health of forest trees is of primary interest when assessing forest conditions. Tree health is affected by a wide variety of acute and chronic disturbances described in this report. Other types of disturbances include competition from invasive plants and storm events. In this section, overall tree health in the Northeast is described in terms of growth rate, mortality rate, crown condition, and incidence of damage. These same parameters are used to describe the health of individual tree species and species groups.

## **Health of All Combined Tree Species**

Net growth and mortality are key indicators of tree health that help determine if rates in certain geographic areas differ from regional averages (USDA Forest Service 2003f). An examination of FIA data (USDA Forest Service 2003d) for all tree species in the Northeast during 1985-1995 indicates problems with tree growth and mortality rates at only some localities (Figure 15). Net tree growth rates are good—commonly more than 2% a year across the region. Growth rates are lower, however, in such places as northern Maine, the southern tier of Pennsylvania, and central Minnesota. High mortality rates are indicative of locations with problems. Numerous counties in Maine, Pennsylvania, Illinois, Indiana, Minnesota, and Wisconsin have mortality rates greater than 1% a year, suggesting some kind of influence from disturbances that probably affect more than one tree species.

The condition of tree crowns and incidence of different types of tree damage help explain reduced growth rates and tree mortality. For this report, unhealthy crowns are defined as trees having at least 25% dieback, at least 30% foliage transparency, or less than 35% crown density. The most frequent types of damage selected for display were tree decay; breakage of tree roots, stems, and branches; and mechanical wounds.

As shown in Figure 15, tree crowns within New York and New England appear less healthy than in other parts of the Northeast. Decay is the most frequent type of observed tree damage, with more than 15% of the living trees having decay in many States. Breakage of tree stems, roots, and branches is more localized, with States in the northern tier of the region having a greater-than-average incidence of this type of damage. Mechanical wounding is generally low in comparison. These detrimental conditions feasibly can be associated with one or more disturbances described in previous sections.

# Health of All Combined Tree Species

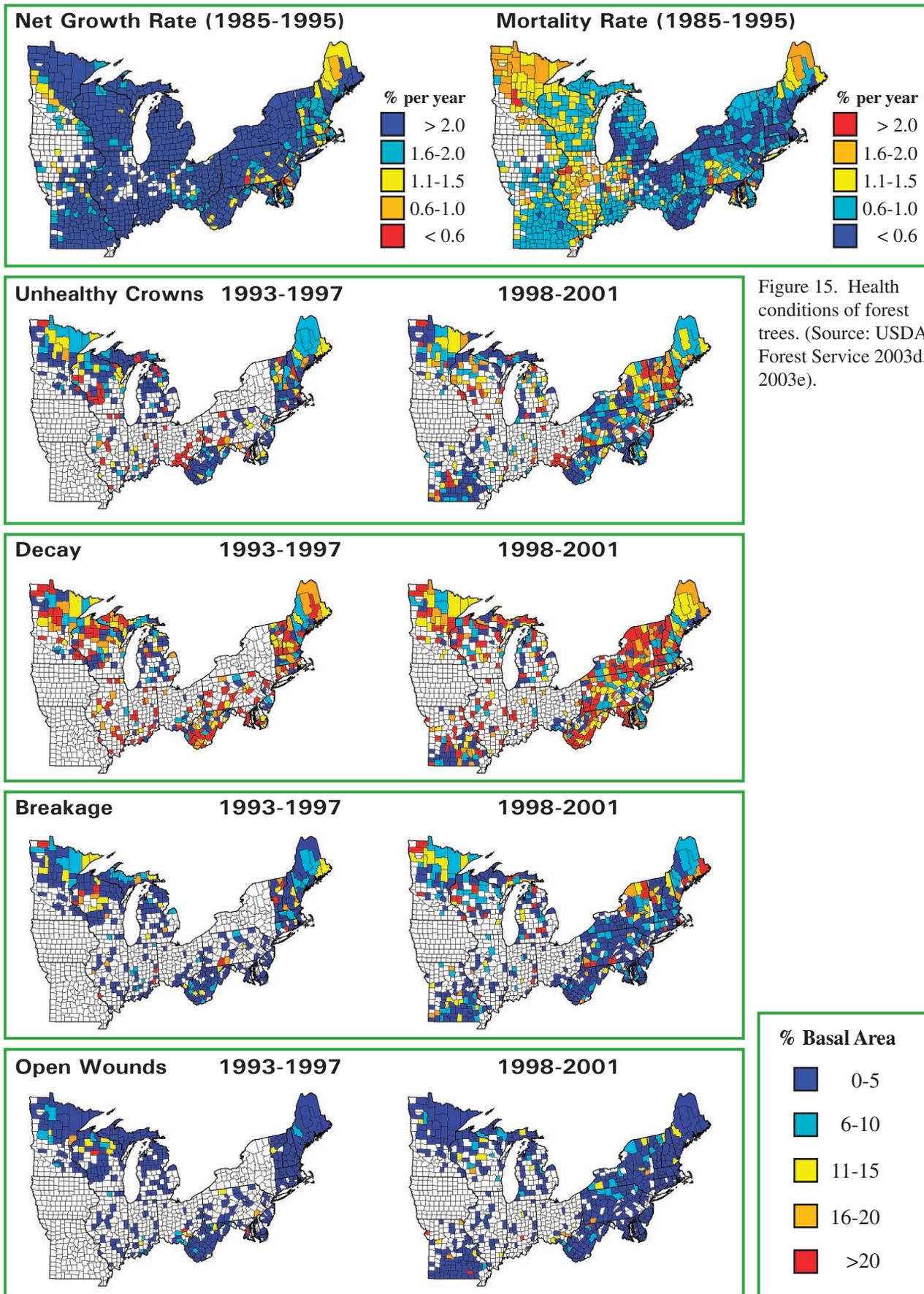


Figure 15. Health conditions of forest trees. (Source: USDA Forest Service 2003d, 2003e).

## **Health of Individual Tree Species**

Comparisons among tree species in the Northeast can show whether some are prone to more problems than others. Net growth and mortality rates, and crown condition and tree damage for different tree species and species groups are shown in Figures 16-36, to help determine which ones contribute to the forest-wide health status.

The maps of growth and mortality rates generally show that each species is healthy in most of the region, with the exception of fir species (Figure 30). Past epidemics of defoliation by eastern spruce budworm is associated with low growth rates and high mortality rates of fir in New England and the Lake States.

Condition of tree crowns and damage of different tree species help determine which ones contribute to the forest-wide conditions. These maps of crown condition and tree damage generally show that each species is healthy in most of the region. The relatively high incidence of decay among most hardwood species corresponds to forest-wide estimates, and is most likely associated with the mature age of forest stands throughout much of the region.