INTRODUCTION

Reports by the USDA Forest Service (Powell et al., 1993), published research articles, (McGee 1984, McCune et al. 1988, Loucks 1997) and widespread local experience indicate that mortality rates for many tree species, a key measure of forest health, has doubled or tripled in parts of the greater Appalachian region since the 1960's and '70's. Such a change in tree mortality, if true over a large area, has great significance for local landowners, conservationists, sawmill owners and the U.S. as a nation. To know the extent of the problem, long-term but frequent on-the-ground measurements of living and dead trees are needed on a large number of landownerships.

To meet this need for data on current conditions, the Lucy Braun Association and Trees for the Planet created the Appalachia Forest Action Project (AFAP). Beginning in 1994, AFAP recruited volunteers, who were then trained as "citizen scientists" and supported by a few professional staff to undertake surveys of forest stocking, living and dead. Plots were established over the Cumberland and Allegheny Plateau of Alabama, Tennessee, Kentucky, West Virginia, Ohio and SW Pennsylvania. Biologically, this region is known as the Mixed Mesophytic Forest, a large, biologically ancient and unique region within the Appalachian mountain system (Braun 1950). It contains probably the most diverse and, at the same time, one of the most intact temperate forests in the world.

While state and federal agencies also carry out forest inventories to monitor the timber supply of commercial tree species, those remeasurements take place only at intervals of 8 to 18 years (DiGiovanni 1990), thereby limiting the timeliness of the results. In addition, sampling may not be sufficiently dense in local areas to relate the pattern of tree death rates to age class, altitude or other local site conditions. Also, the presently available surveys have not answered questions about trends in noncommercial

species such as the flowering dogwood, yellow locust (a variety of black locust), white basswood and the magnolias, as this project has sought to do. Thus, AFAP citizen monitoring has concentrated its efforts within the Mixed Mesophytic Forest, (plus 5 counties in North Carolina), with a goal of documenting current mortality patterns for the full range of species (Table 1) in as many locations as possible.

The results in this report are offered in the hope that the citizens and landowners in the region will be better informed, that everyone can become more engaged with forest health issues locally, and that regional and national policy makers will consider supporting the research needed to determine causes of the mortality being observed within the relatively natural communities of the Mixed Mesophytic Forest. In particular, it is hoped that this report will generate further interest in the association between air pollution -- in the form of acid precipitation and ground-level ozone and tree mortality.

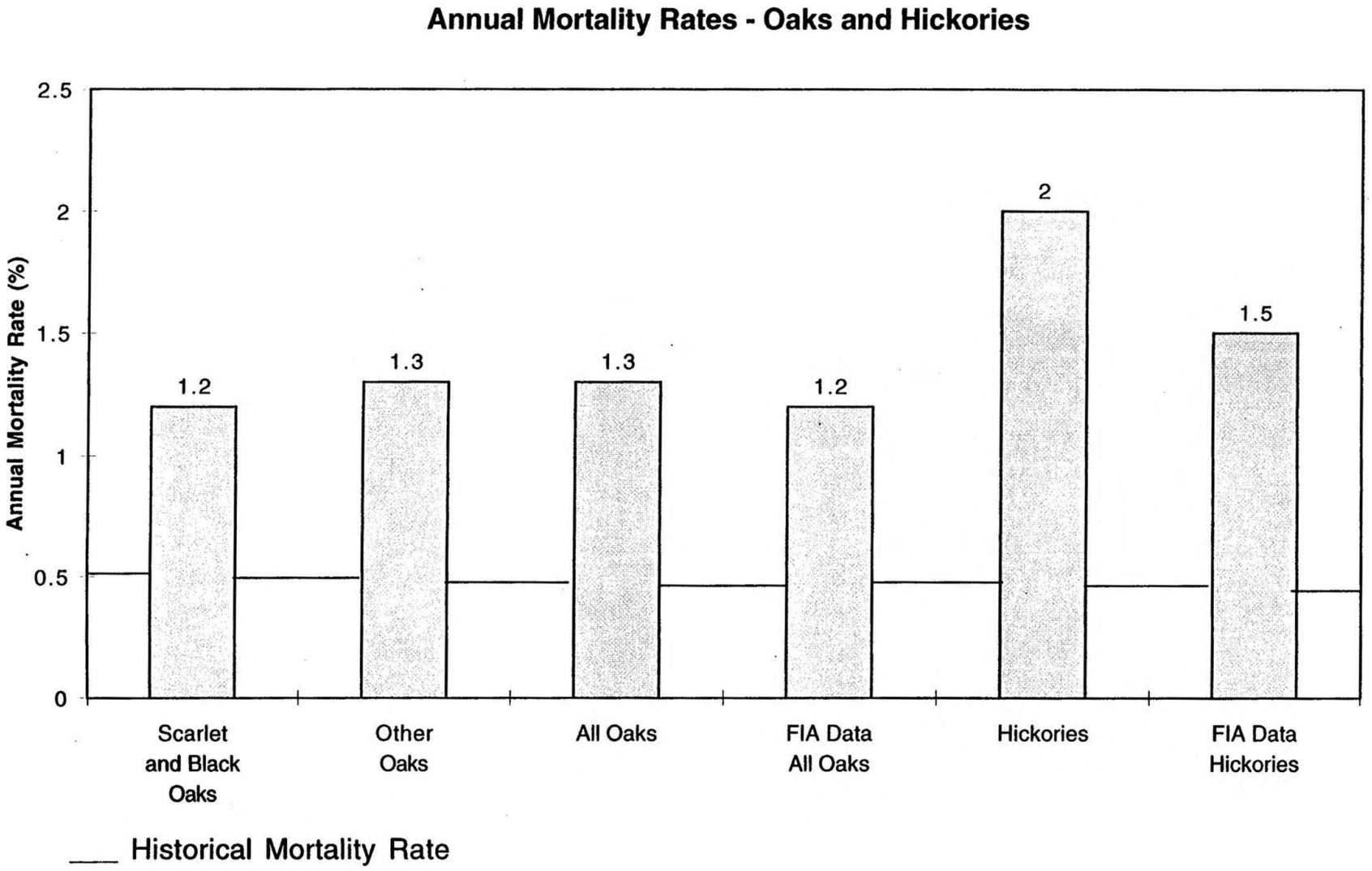

Figure 6. Observed annual mortality rates for four different species groups from the AFAP plots reported here, and two groups from recent US Forest Service FIA data (from Grant and Loucks 1997). No differences are evident between the short-lived and long-lived oak groups, and the two data sources show comparable mortality for oaks, with higher mortality for hickory than for oak.