



Tennessee's Forest Land Area Was Stable 1999–2005 but Early Successional Forest Area Declined

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Abstract

A new analysis of the most recent (2005) annualized moving average data for Tennessee indicates that the area of forest land in the State remained stable between 1999 and 2005. Although trends in forest land area vary from region to region within the State, Tennessee neither lost nor gained forest land between 1999 and 2005. However, Tennessee had more than 2.5 times as much early successional forest area in the early 1970s as in 2005. The decline in early successional forest area in Tennessee is a matter of concern.

Keywords: Annual inventory, early successional, FIA, forest inventory, mature forest, Tennessee.

Service, U.S. Department of Agriculture, Forest Inventory and Analysis (FIA) Program, in conjunction with the Tennessee Division of Forestry. The focus of this note is on trends in estimated forest land area and area of early successional stands in the State. The information reported is based on an examination of 2,262 forested plot locations (4,443 total plots) systematically located and sampled from 2000 to 2005.

Forest Land

From 1961 to the most current inventory (2005), Tennessee has remained at least 50 percent forested. Over the last half-century, total estimated forest land peaked in 1999 (table 1).² Although it appears that there was a gain of an estimated 24,000 acres of forest land between 1999 and 2005, the 2005 estimate statistically ($\alpha = 0.05$) represents no change and is better viewed as a leveling off of the

Introduction

This note reports findings from the most recent annual moving-average inventory in Tennessee with an inventory year of 2005. The inventory was conducted by the Forest

Table 1—Land class attributes for Tennessee from 1961 to 2005

Land class	1961	1971	1980	1989	1999	2004	2005
	<i>million acres</i>						
Timberland	13,432.4	12,819.8	12,879.0	13,265.2	13,459.2	13,254.0	13,301.4
Other/reserved	263.5	316.5	429.5	337.3	390.3	530.1	579.7
Total forest	13,695.9	13,136.3	13,308.5	13,602.5	13,849.5	13,784.0	13,881.2
Nonforest land	12,826.2	13,338.6	13,141.6	12,844.5	12,511.4	12,504.2	12,409.6
Total land area	26,522.1	26,474.9	26,450.1	26,447.0	26,360.9	26,378.8	26,378.8
Percent forested	0.52	0.50	0.50	0.51	0.53	0.52	0.53

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² Note: Data from the 1999 inventory were reprocessed in 2007 due to systematic bias discovered in past phase 1 area stratification (Coulston, in press). Estimates presented here reflect updated figures.

historical trend of increasing forest land. The change that occurred between the 1989 and 1999 inventories was the only statistically significant inventory-to-inventory change in forest land area in Tennessee during the period 1989–2005 (fig. 1). This change in trend deserves attention in future inventories. In 2005, Tennessee forests covered an estimated 13.9 million acres distributed across the State, and accounted for 53 percent of the total State land base. Ninety-six percent or 13.3 million acres of the forest land in the State was considered available for timber production (timberland—table 1).

Regional (fig. 2) trends have not always mirrored the statewide trend. For example, the West Central unit has neither significantly lost nor gained forest land since before the 1989 inventory (fig. 3). The West and Central units were the only units to gain statistically significant amounts of forest land between 1989 and 1999. Estimated forest land area declined in the East and Plateau units over this 16-year period, but the change was not statistically significant.

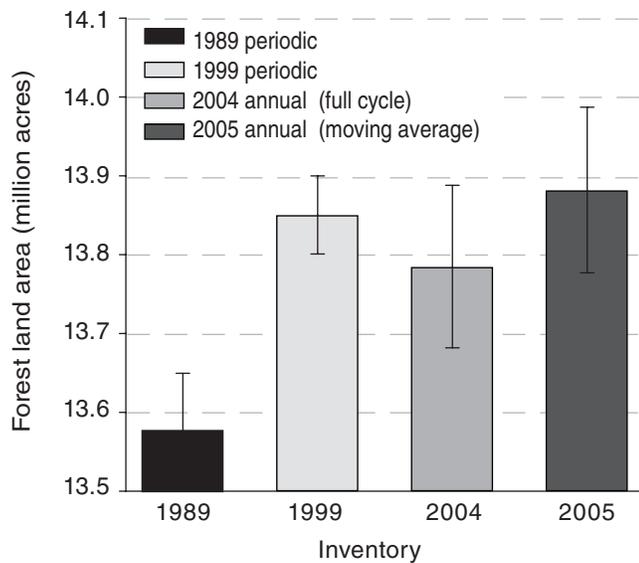


Figure 1—Forest land area for the last four inventories of Tennessee, 1989–2005. Note: the y-axis does not begin at zero. Error bars represent one standard error.



Figure 2—Regional FIA units in Tennessee.

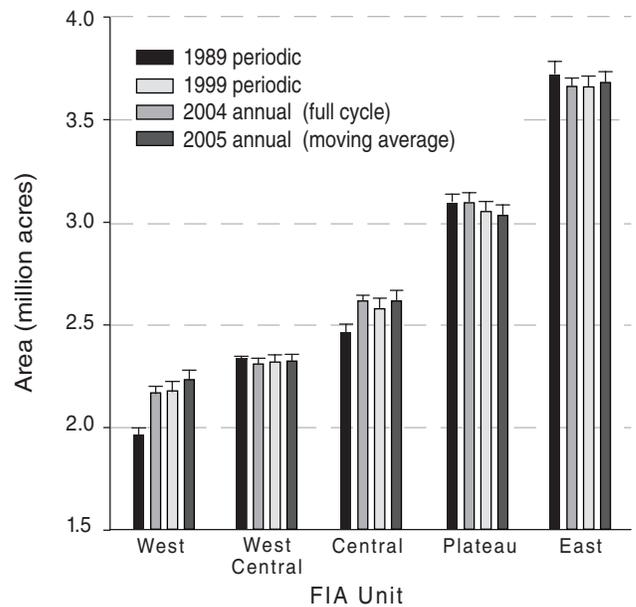


Figure 3—Forest land area by FIA unit in Tennessee for the last four inventories. Note: the y-axis does not begin at zero. Error bars represent one standard error.

A Maturing Forest

At the time of the 2005 inventory, Tennessee forest land was dominated by mid- to late-successional forests. The State had seen a declining trend in area of early successional or small diameter forests over the previous 40+ years (fig. 4). In fact, the decline was precipitous and significant. In 1971,

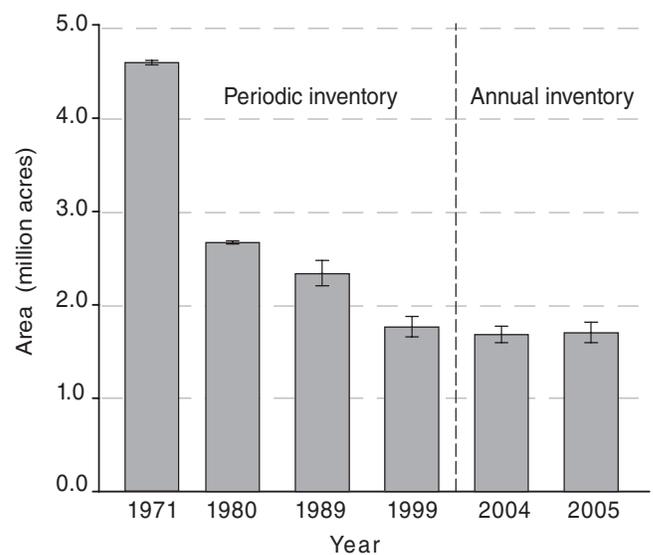


Figure 4—Forest land area in early successional (small diameter stand-size class) stands in Tennessee, 1971–2005. Error bars represent one standard error.

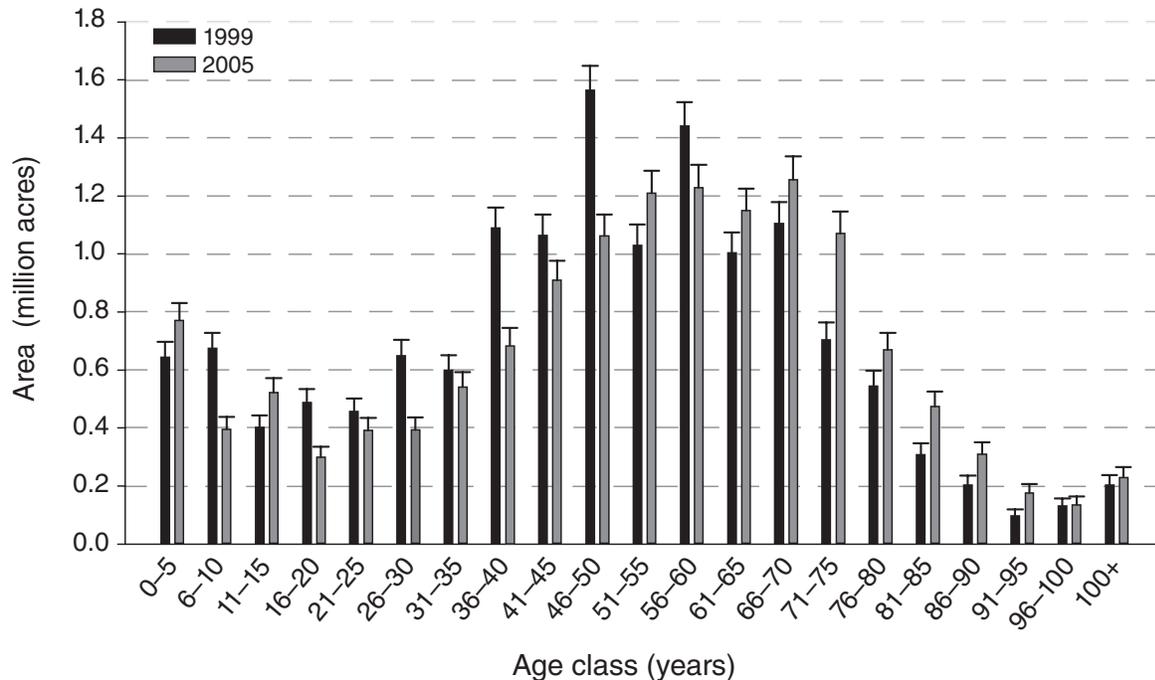


Figure 5—Forest land area by 5-year age classes for Tennessee, 1999 and 2005. Error bars represent one standard error.

early successional stands occupied an estimated 4.6 million acres in Tennessee. At the time of the 2005 inventory, such stands occupied an estimated 1.7 million acres. Such a decline, even if it is accompanied by an increase in forested stands in later successional stages, implies that there is less available habitat for early successional-dependent wildlife.

As forested acreage in early successional stands declined, there was a corresponding aging of Tennessee’s forest resource. In 1999, the 5-year age class that had the greatest acreage was the 46–50 year age class (fig. 5). By 2005 the peak in the age class distribution had shifted, extending from the 56–60 to the 66–70 year age class. Most age classes <50 years of age declined between 1999 and 2005, while many of the age classes >50 years increased. More and more stands were recruiting into older age classes, just as many stands were recruiting into later successional stages.

Conclusions

Since the early 1990s there has been a great deal of speculation about the impact of increasing parcelization, development, and growth in human populations on forests in Tennessee. The results from the most recent FIA inventory are encouraging and suggest that any decline in forest land that was forecast has yet to be realized. However, the observation that the historical trend of increasing forest land has flattened may suggest a potential reversal in the near

future. Thus, the annual inventory provided by FIA becomes increasingly important, as it provides a snapshot of forest resources across the United States. The annual inventory design allows for monitoring on a continual basis rather than on a periodic one.

The loss of early successional (small stand-size class) forests across Tennessee is a matter of concern. The aging of a forest resource dominated by oaks (Schweitzer 2000) gives rise to additional concerns. As Tennessee forests mature, vulnerability to drought, insect outbreaks, and pathogens increases. Such vulnerabilities may mediate rapid changes in the structure and composition of the State’s forests. However, an aging forest resource does not guarantee such large-scale disturbances. The bottom line is that as Tennessee forests mature, changes will occur. Whether the changes are positive or negative depends on the needs and wants of individual groups of humans or populations of wildlife.

Literature Cited

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