UPLAND OAK SIZE-DENSITY RELATIONSHIPS: A MODERN EXAMINATION OF GINGRICH (1967) STOCKING

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In oak-dominated forests of the Eastern United States, foundational understanding of size-density relationships was formed by the seminal work of Gingrich in 1967. However, relationships defined by Gingrich have received limited quantitative evaluation in the context of broader historical data contemporary to Gingrich's original work or under present-day oak stand conditions where extensive research has documented fundamental regionwide shifts in forest structure and composition over the past 50 years. Our first research objective compiled available historical data documenting oak size-density relationships and assessed how appropriately the Gingrich stocking chart represented those historical patterns. To support this objective, we conducted an extensive survey of published literature and research archives from the U.S. Department of Agriculture, Forest Service, Central States Forest Experimental Station (currently Northern Research Station). Twenty-three historical sources were assembled including data from the majority of studies originally utilized by Gingrich in 1967. Our second objective compared historical data and Gingrich stocking charts with current oak size-density trends from the Forest Service, Forest Inventory and Analysis database. With this second objective, analysis evaluated whether our historical understanding of oak size-density relationships and established density management tools (i.e., Gingrich stocking chart) are appropriate to represent today's changing forest conditions.

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