**Oligarchy and Rareness in Large-scale Forest Inventories; Identifying and Managing for Vulnerable Species

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**Topic:** Rare species management
**Proposal Type:** Individual Presentation
 **Abstract:**Oligarchy is a common trait of forest stands in the eastern USA. It is evident in forest inventory stand tables of large-scale forest inventories, areas the size of individual states or larger. The degree of forest stand oligarchy is variable and is the result of a complex set of factors arising from competition, disturbance, and species characteristics. In contrast to oligarchy, these types of large-scale forest inventories are also useful in identifying rare tree species. Rare may be defined either spatially or in regard to a proportion of the total population of tree species. A general premise of rareness is that these particular species populations are vulnerable to environmental and/or anthropogenic fluctuations because of their small numbers, thus lessening the probability of survival and prompting the need for possible protective measures. I used data from the USDA Forest Service, Forest Inventory and Analysis (FIA) program to study oligarchy and rareness patterns of tree species in Arkansas. In the 2015 forest inventory 114,872 trees were tallied on 5600 plots representing 109 species. One species, Pinus taeda L., (an oligarch) accounted for 25 percent of all trees tallied. In contrast, 22 species (rare) only occurred 5 times or less in the tally. Because of the low frequency of rare species in a probabilistic sample, statistical parameters are weaker. However, baseline information can be established allowing for stronger follow-up stratified sampling. Establishing and defining specific levels of rareness may be difficult but conservationists might find large-scale forest inventories useful in monitoring changes in rareness. Changes in degrees of rareness in repeated samples over time could be used as alerts in modifying forest management practices in respective states to protect vulnerable tree species.