

**A Dendrochronological Analysis of Vegetation Change and
Climate History in Two Southern Appalachian Balds,
Craggy Gardens and Big Bald, NC**

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(Abstract)

In the southern Appalachians, unforested openings known as balds persist on or near mountain peaks. These high elevation openings support a variety of unusual biota and are considered globally rare as a result of their biodiversity. Balds have historically been subject to both natural and human disturbances. Such historical and more recent disturbances have had a profound impact on vegetation dynamics in these systems. With the use of dendrochronology and GIS, this research project was aimed at 1) reconstructing the temporal and spatial patterns of tree encroachment into Craggy Gardens, a grass/heath bald, and determining the causal factors, and 2) investigating tree-growth responses of *Quercus rubra* L. to climatic factors at Craggy Gardens and Big Bald, North Carolina (high elevation forest-grass ecotones).

Results indicate that historical grazing and land management have been responsible for vegetation changes at Craggy Gardens, in particular the advancement of *Quercus rubra* L. into the grass bald. Dendrochronological analyses showed that incremental growth of *Quercus rubra* L. growing in and adjacent to the balds was controlled by spring temperatures and drought conditions over most of the past century, until around 1970, when tree began responding primarily to growing year summer temperatures over the last four decades. This study concluded that land-uses overprinted on climatic conditions have governed local-scale vegetation structure over the past 150 years and without continuing management, trees may continue to advance into Craggy Gardens. Changing human disturbances along with observed climate changes in recent decades provides will most assuredly set the stage for future vegetation changes in southern Appalachians balds.