

HISTORICAL RECONSTRUCTIONS OF HIGH-ELEVATION SPRUCE FORESTS IN THE APPALACHIAN MOUNTAINS

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Abstract.—The objective of this study was to determine whether the historical distribution of a small, high-elevation red spruce stand could be reconstructed based upon historical records. The study site was Giles County, VA, where a small stand of red spruce exists today, indicating that it has been in this location for as long as the written record exists for this region. Working through three approaches, I attempted to locate this stand within public land survey records and their associated witness trees, historical photographs, and government documents. Each dataset originates from a different time period: the survey records from the early 1800s, the photographs from the late 1800s, and the government documents from the early 1900s. The witness-tree record from the land surveys contained no evidence that red spruce was present in Giles County. In the historical photographs, only three photographs out of 237 showed red spruce, and in the government documents there was no evidence of red spruce. These results indicate that in historical reconstructions of vegetation, it is highly likely that small populations will be missed. These reconstructions should be viewed as generalized representations of the forest communities of the past rather than thorough reconstructions.

INTRODUCTION

Historical reconstructions of vegetation allow land-use historians to set current vegetation conditions within a context of past vegetation, allow ecologists to witness the successional changes on the landscape, and provide land managers with a better understanding of the cause-and-effect of human activities on vegetation dynamics (Russell 1997). Reconstructing vegetation typically provides the most accurate representation of past vegetation when multiple data sources are combined. However, most reconstructions tend to focus on large, landscape-level trends with an accurate reconstruction at the stand level or examination of rare species. Therefore the objective of this project was to take a known entity and see whether it was identifiable in the historical record. Specifically, I worked with a small red spruce stand on the top of Salt Pond Mountain in Giles County, VA, and attempted to find

references to it in the witness trees recorded in the public land surveys collected in the early 1800s, historical photographs taken in the late 1800s, and government documents describing the forest conditions in Giles County from the early 1900s. Results from this project will have important implications for management and conservation of high-elevation spruce-fir communities in the Appalachian Mountains (Foster et al. 1996).

STUDY AREA

Giles County is located in southwestern Virginia along the West Virginia border. The county was established as a political entity in 1806 and much of the early settlement was centered around agriculture. Almost 100 years later, natural resource extraction followed once the railroads entered the region. The major resources exported from Giles County were timber and limestone because the area lacked the coal resources common to other regions in the southern Appalachian Mountains (Copenheaver et al. 2007). The highest mountain in the county is Salt Pond Mountain, home to a small population of red spruce (*Picea rubens* Sarg.).

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METHODS

Three hundred fifty-four deed descriptions were transcribed from publicly available deed books located at the Giles County Courthouse in Pearisburg, VA. These deeds dated back to 1806-1830 and all deeds included metes-and-bounds descriptions of the parcel(s) of property exchanged. From these descriptions, witness trees (trees that “witness” the property corner) were tallied to identify species composition in Giles County from this early settlement period. Particular emphasis was placed on collecting deeds from the Mountain Lake area to increase the likelihood of including red spruce in the witness tree sample. In addition, 237 historical photographs taken by J.C. Porter in the 1880s and archived in Virginia Tech’s Special Collections were examined for the presence of red spruce. A magnifying lens was used to assist with the identification, and two researchers verified identification of the red spruce. Last, two historical government assessments of the forest resources of Giles County were examined for references to red spruce (Snidow and McComas 1927, Humbert 1929).

RESULTS

According to the witness trees recorded in the Giles County deed records, the dominant tree species found in the county in the early 1800s were: white oak (*Quercus alba* L.), northern red oak (*Quercus rubra* L.), black oak (*Quercus velutina* Lam.), hickory (*Carya* spp.), chestnut oak (*Quercus prinus* L.), yellow-poplar (*Liriodendron tulipifera* L.), sugar maple (*Acer saccharum* Marsh.), red maple (*Acer rubrum* L.), and scarlet oak (*Quercus coccinea* Muenchh.). Less dominant, but still relatively common, tree species included: ash (*Fraxinus* spp.), basswood (*Tilia americana* L.), beech (*Fagus grandifolia* Ehrh.), birch (*Betula* spp.), blackgum (*Nyssa sylvatica* Marsh.), black walnut (*Juglans nigra* L.), buckeye (*Aesculus flava* Aiton), chestnut (*Castanea dentata* (Marsh.) Borkh.), cucumber (*Magnolia acuminata* (L.) L.), dogwood (*Cornus florida* L.), ironwood (*Carpinus caroliniana* Walter), black locust (*Robinia pseudoacacia* L.), pine (*Pinus* spp.), post oak (*Quercus stellata* Wangenh.), sassafras (*Sassafras albidum* (Nutt.) Nees.), serviceberry (*Amelanchier* spp.), sycamore (*Platanus occidentalis* L.), and white walnut (*Juglans cinerea* L.). “Spruce pine” was mentioned three times, but an examination of common

names from this period demonstrates that this was likely a reference to Virginia pine (*Pinus virginiana* Mill.) and not red spruce.

Among the 237 historical photos, only three showed red spruce. Two of these photographs were identified as being along Kimberling Creek (far from the current population of red spruce) and one, on Salt Pond Mountain (near the current population of red spruce).

The Humbert (1929) document identified spruce as a component of the chestnut ridge type, but this forest type was also characterized as being on exposed ridges, drier soils, and burned-over sections. These latter characteristics do not match the known silvical characteristics of red spruce. The Snidow and McComas (1927) document was the source of the Giles County forest description included in the Humbert (1929) document. Snidow and McComas (1927) described the chestnut ridge type as having “scrub or spruce pine,” rather than the “spruce” recorded in Humbert (1929). Therefore, Humbert’s (1929) reference to spruce was a typographical error rather than a true inclusion of red spruce in that forest type.

DISCUSSION

The presence of a small population of red spruce on the top of Salt Pond Mountain was undetectable in both the witness-tree record and the government documents, but the historical photographs revealed red spruce in Giles County, VA. The absence of this species from some information sources implies that when attempting to reconstruct historical species distributions or forest types known to be rare, we must employ multiple historical documents because each historical source comes with its associated biases (Black and Abrams 2001). By combining different sources, we can offset the biases inherent in a given dataset.

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