VEGETATION DISTURBANCE HISTORY IN THE GREAT SMOKY MOUNTAINS PRIOR TO ACQUISITION BY THE NATIONAL PARK SERVICE[1]

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INTRODUCTION

Prior to federal land acquisition procedures, the 208,000 hectares of Great Smoky Mountains National Park (GRSM) were distributed among some 6000 private landowners, including logging companies, but mostly consisting of farmers. By the time the park was established in 1934, most farmers had given up their land, and only one logging company was still cutting. Although the park has been under federal protection for over 50 years, the current forest dynamics still reflect the pre-park history of disturbances such as fire, farming, and logging. Thus, a parkwide study of historical vegetation disturbance was undertaken (Pyle 1985). The study objective was to collate archival disturbance history information in order to produce a broad scale overview map of pre-park vegetation disturbance patterns.

METHODS AND MATERIALS

The GRSM Archives and other sources of historical maps and written documents were searched for information pertaining to site specific land use history or to general logging and farming practices in GRSM. All information suited to mapping was collated into sets of United States Geologic Survey 7 1/2 minute topographic maps. The meaning of mapped boundaries and land use categories shown on historical maps was interpreted using written documents. Broad scale disturbance categories were developed from both the site specific and generalized boundaries shown on the 7 1/2 minute working maps. Pre-park disturbance history was summarized on a single small scale map. The percentage of total GRSM area affected by each disturbance was estimated using a dot grid.

RESULTS AND DISCUSSION

On a gradient of disturbance from minor to major changes in species composition and age class distribution, concentrated settlement was considered the most severe disturbance. Looking at the yearly averages of land use for farming versus logging, the area farmed was well over five times that of logging in a given year. However, because farming activities involved use of the same tracts year after year, the total area of concentrated settlement amounted to nine percent of GRSM, or less than one fourth of the area of corporate logging.

Although logging companies represented less than one percent of the pre-park land owners in GRSM, 40 percent of the park was logged by lumbering corporations. In general, corporate logging involved large scale, highly mechanized operations. Railroads, mechanized loaders and skidders, and bandmills were contrasted with the locally based small scale operations that generally involved portable sawmills and skidding via horse teams.

The relatively small patches of forest cut by local loggers were considered a diffuse disturbance. Other disturbances diffused throughout the landscape included isolated farms. On a finer scale, trees taken for a family's firewood supply, scattered seedlings eaten by free ranging cattle, or scattered trees killed by annual woods burning were also considered diffuse disturbances. Areas of diffuse disturbance totalled 21 percent of the park and were generally found on the periphery of areas of concentrated settlement.

Another eight percent of the Park was mapped as having big trees with diffuse disturbance. Overall, these tracts could not be considered undisturbed, but they did include patches of large hardwoods within a matrix of diffusely disturbed stands. Miscellaneous disturbances such as intense fires in otherwise undisturbed areas, or grazing on high elevation grassy balds, amounted to about two percent of the park.

The remaining 20 percent of GRSM was mapped as "high in virgin forest attributes based on little or no record of pre-park disturbance." It should be understood that these areas include both hardwood stands whose decimation by chestnut blight went unrecorded and stands of spruce-fir wherein the mature Fraser fir was killed by balsam woolly aphids (Adelges piceae Ratz.) beginning 25 years after park establishment.

The difference between my 20 percent high in virgin forest attributes and other estimates of up to 40 percent virgin forest in the Smokies lies in the difference between the viewpoint of a land acquisition officer and that of a forest ecologist. While areas of diffuse disturbance might contain enough big trees to be considered virgin forest for purposes of land valuation, the species composition, age class distribution, and changes over time in diffusely disturbed forest do not reflect what is to be expected in a forest in which the effects of human activity are absent. Thus, virgin forest attributes was a term developed from a stand dynamics viewpoint,

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to incorporate a more explicit description of what sort of of stand conditions could be expected.

LITERATURE CITED

Pyle, C.
1985. Vegetation disturbance history of Great Smoky Mountains National Park: An analysis of archival maps and records. U.S. Dept. of the Interior, National Park Service, Research/Resources Management Report SER-77. Southeast Regional Office, Atlanta, GA. 69 pp.