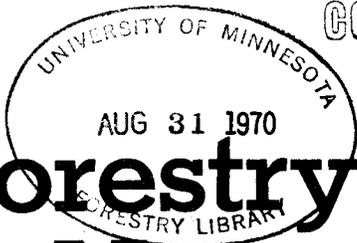


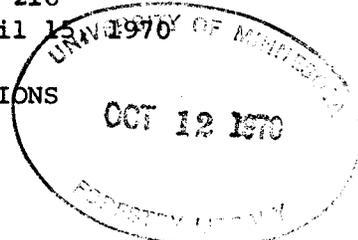


# Minnesota Forestry Research Notes



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CHARACTERISTICS OF FOREST STANDS IN RELATION TO EDAPHIC CONDITIONS  
IN ST. CROIX STATE PARK, MINNESOTA

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A reconnaissance of forest vegetation in St. Croix State Park, located in east central Minnesota, was made in 1967 as a preliminary phase of a more comprehensive research effort. The survey was undertaken to determine the range and general nature of the prevailing ecological conditions, thereby contributing to an information base to be considered in decisions on park management objectives. Observations were recorded for 127 selected stands considered representative of the ecological variability in the park forest. Figure 1 depicts the geographic location and local cover types for sampled forest communities. Reconnaissance procedures included preparation of a species list, estimation of plant cover percentages, determination of stand age structure, evaluation of regeneration, and measurement of tree heights and diameters for each community. Soil characteristics were evaluated in accord with standard field procedures.

Survey Analysis. This report is a partial summary of survey data and focuses on the relationships of distribution, synecological roles, and physical attributes of major tree species with variation in soil moisture and nutrient conditions. The system of synecological coordinates<sup>2/</sup> was used in the analysis. Accordingly, sampled communities were ordinated in moisture-nutrient coordinates as demonstrated in Figure 2. A designated coordinate position represents relative levels of soil moisture and nutrients for a given community. In aggregate, these positions characterize plant-soil interrelationships of the park forest. Within this framework, site units 1 to 9 in Figure 2 represent relatively discrete bioenvironmental interrelationships. To some extent, the distinctiveness of site units is apparent in the spatial patterns formed by ordinated plant communities. Species distribution patterns, variable stand structure, and diagnostic soil properties were used as supplementary differentiating criteria. The correspondence of forest cover types, another criterion, and site units is illustrated in the figure.

Measurements of stand attributes are summarized within a framework of site units and cover types in Table 1. The terms "dry to wet" and "poor to rich", referring to moisture and nutrient conditions respectively, are used in a comparative sense to differentiate site units within the range of conditions observed (Figure 2).

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<sup>2/</sup>Bakuzis, E. V. and H. L. Hansen. 1962. Distribution of balsam fir reproduction and basal area on the edaphic field of forest communities in the Central Pine Section of Minnesota. Minn. For. Notes No. 120, 2 pp.

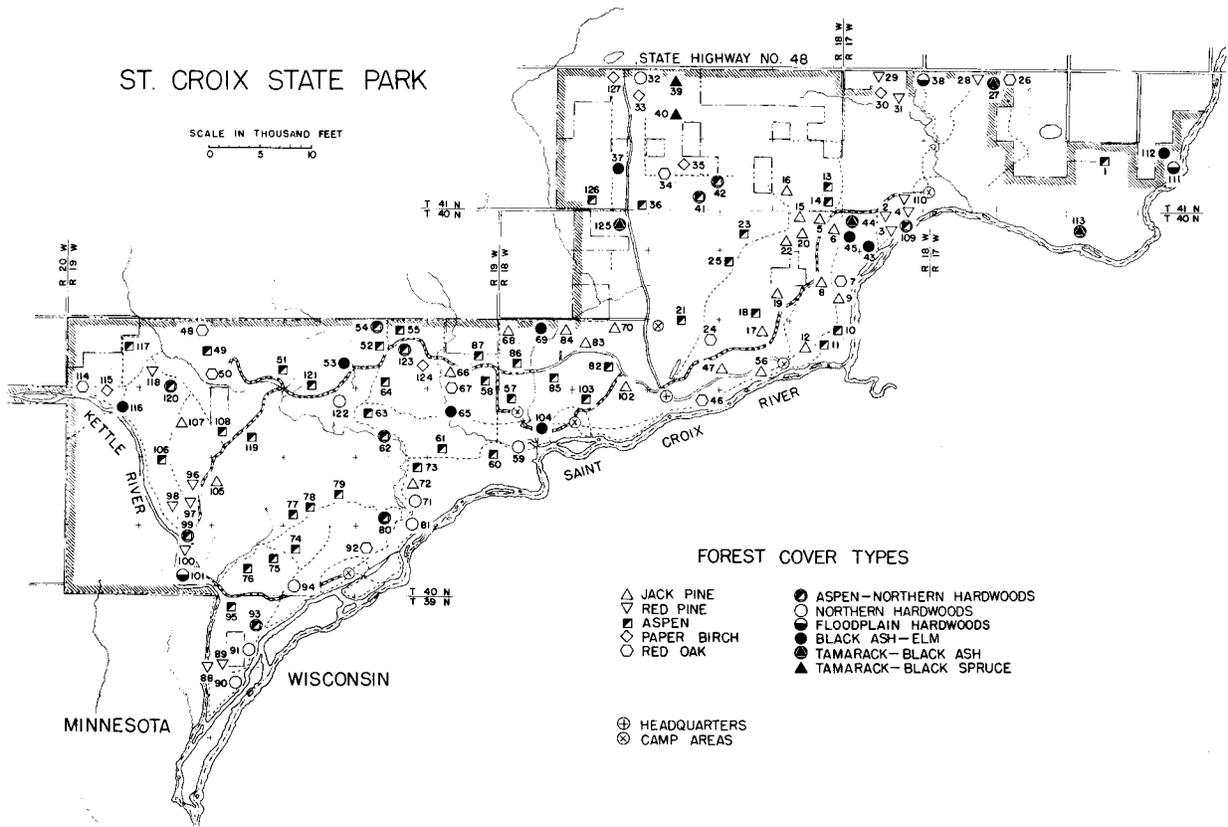


Figure 1. Location of forest communities studied by cover types in St. Croix State Park, Minnesota

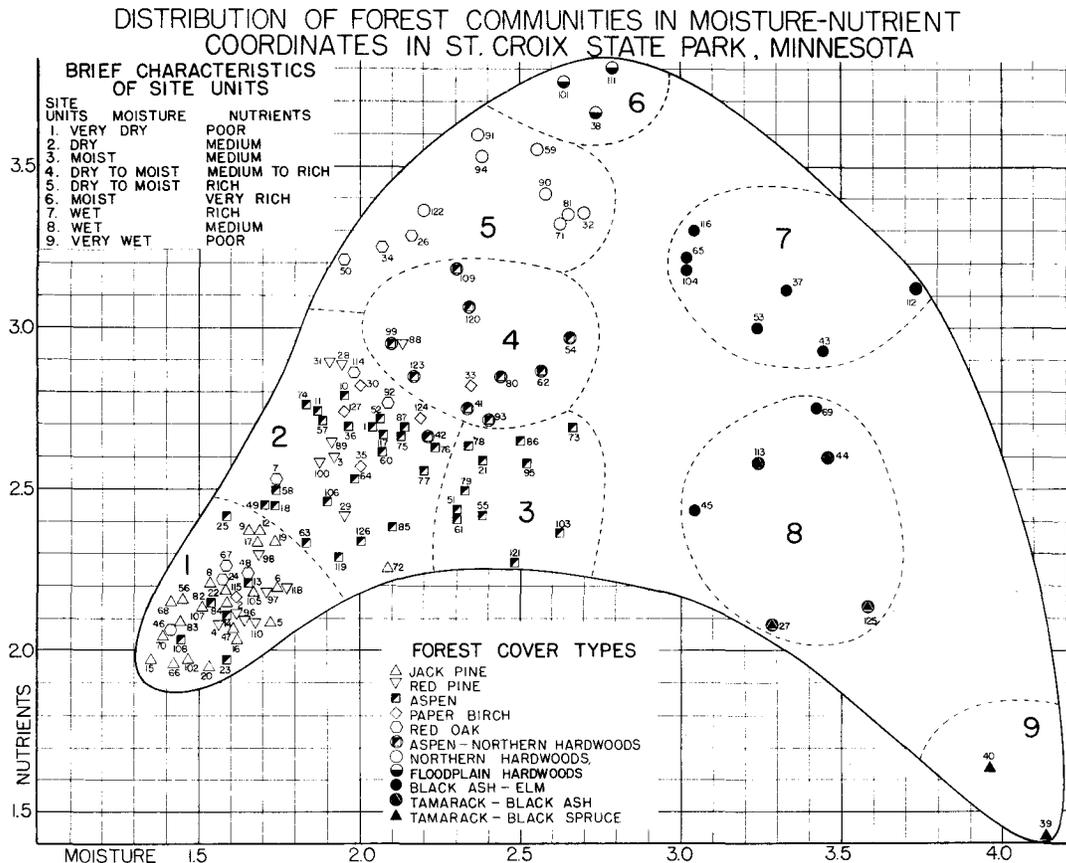


Figure 2. Distribution of forest communities by cover types and site units in moisture-nutrient coordinates in St. Croix State Park, Minnesota

Examination of the definition subscale shows that Scenic campers define a natural area more naturalistically than St. Croix and Whitewater campers. St. Croix-Whitewater campers define a natural area similarly, but more naturalistically than Minnehaha-Phalen picnickers. Average percentage scores for the definition subscale are Scenic, 78; St. Croix and Whitewater, 74; and Minnehaha and Phalen, 72.

For the value subscale, there was no significant difference in the value placed upon natural areas by the three state park samples. State park campers value natural areas more highly than city park picnickers value such areas, however. Median percentage scores for the value subscale are Scenic, 82; St. Croix and Whitewater, 80; and Minnehaha and Phalen, 78. Thus, each park sample scores more highly on the value which it places on natural areas than on how naturalistically it defines a natural area.

As to recreational games such as softball, volleyball, badminton, jarts, and frisbee, one or more were used in state park campgrounds by 55 percent of the Scenic sample, 53 percent of the St. Croix sample, and 69 percent of the Whitewater sample. In making comparative interpretations of these figures, it should be noted that the average length of stay at Scenic is over twice as long as that at St. Croix.

While recreational games were common in state parks, materials and equipment for nature appreciation were rather uncommon. Thirty-eight percent of Scenic visitors used binoculars at the park, compared to 26 percent at St. Croix and 23 percent at Whitewater. Only 10 percent of Scenic campers brought any type of nature identification literature to the park, compared with 15 percent at St. Croix and 13 percent at Whitewater.

### Interpretation

Comparisons of user characteristics and naturalistic orientation scale scores show that place of residence within the Twin Cities, size of area in which most of one's life is spent, and length of time lived in the Twin Cities are not predictors of naturalistic orientation, nor is the type of area chosen for vacations. Several indicator characteristics were found, however. The 46 to 55 age group is more naturalistically oriented than any other age group. One who has less education than a high school diploma is likely to be less naturalistically oriented than one having more education, although those with a high school diploma or more education are just as likely to be of low naturalistic orientation as of high naturalistic orientation.

Campers falling into the professional-technical-managerial occupational classification are more likely to be in the upper end of the scale, while clerical-sales people are more likely to fall into the lower range of scale scores. Those who bring no games, or three or more games to the park are more likely to fall in the upper range of scale scores, while those who bring one or two games are more likely to fall in the lower range of scores. Campers who use nature identification books or whose main reason for visiting the park is "enjoyment of nature" are more likely to fall into the upper range of scale scores.

Although the Kruskal-Wallis test indicates significant statistical differences in the naturalistic orientation of Scenic versus St. Croix-Whitewater campers, this is not necessarily true from an observable, behavioral standpoint. While it is true

that the median scale score at Scenic is slightly higher than for the other state parks, the range of scores for the three park samples is almost identical. In general, the three park samples might be described as having a mild to medium naturalistic orientation.

The naturalistic orientation scale is more a reflection of previous exposure to the natural environment than to current interest in it. Given a sufficiently high interest in nature, the naturalistic orientation scale can perform the valuable function of indicating the range of programs which best complement the orientation of park visitors. For example, results show that enjoyment of nature as a specific reason for visiting a state park is more important to Whitewater campers than Scenic campers from the Twin Cities, despite the higher naturalistic orientation of the Scenic sample. Thus, interest in nature is quite high at Whitewater, but interpretive programs at Whitewater should be somewhat less naturalistic from an overall standpoint than those which could be offered at Scenic.

There is obviously a segment of state park campers who are not naturalistically oriented, and who do not visit parks primarily to enjoy nature. Parks such as St. Croix, in which the natural habitat has been greatly modified, could provide the types of recreational services which would attract these campers. Then, with better publicity of the management goals of individual parks, campers would tend to visit areas which cater to their interest, and park management goals should be more easily realized.

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