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CONIFEROUS FOREST BIOME

ECOSYSTEM ANALYSIS STUDIES

I DON'T KNOW WHAT PAPER TO KEYWORD & THERE IS NOT ENOUGH INFO TO KEYWORD ANYWAY

INTERNAL REPORT 164

PROGRESS REPORT
July 1975 - August 1976

Edited by
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CONIFEROUS FOREST BIOME

Summary of Research and Synthesis

Activities July 1975 - August 1976

Edited by

Robert L. Edmonds

Internal Report No. 164

March 1977

Coniferous Forest Biome
College of Forest Resources
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1. INTRODUCTION

Research activities in the post-IBP phase of the Biome program prior to July 1975 were reported in Internal Report 162. Summaries of research and synthesis activities from July 1975 to August 1976 are presented here.

The reports are arranged in the following order: Analysis of Individual Terrestrial Ecosystems, which has three components (Behavior and Strategies of Individual Ecosystems, Environment and Plant Succession and the Land-Use Model); Analysis of Watersheds, which has two components (Watershed 10 and Findley Lake); and Analysis of aquatic ecosystems, which is divided into two components (Lakes and Streams). A total list of Biome publications is included in the Appendix. A more specific list of open literature publications is available from the Biome Office. Progress of the synthesis activities is discussed in Section 5.

2. ANALYSIS OF INDIVIDUAL TERRESTRIAL ECOSYSTEMS

2.1. Behavior and Strategies of Individual Ecosystems

2.1.1. Leaf conductance in different forest stands - R. H. Waring and S. W. Running, Oregon State University.

A manuscript was completed describing how stomata of subordinate hardwood species respond to light, evaporative stress, and soil water availability. We found that except when light directly impinged upon the leaves of understory shrubs, their stomata remained closed. As shallow-rooted species depleted their water supply stomata also closed. Species adapted to clearcuts, whether deciduous or evergreen, had higher leaf conductance rates than more shade tolerant plants (1).

We have continued to develop more accurate means of estimating stand leaf area (2). We find that the highest leaf areas (40-55 m^2/m^2 for all surfaces) occur in environments where soil water is always in good supply and the temperatures are cool (3). Where the evaporative demand is high internal resistance to water flow appears to reduce leaf area proportionally. Only in a few cases does nutritional stress appear to constrain foliage development (3).

In research comparing individual species, we have extended earlier hypotheses concerning a linear relation between cross-sectional area of conducting tissue and leaf area from conifers to *Rhododendron*, *Castanopsis*, and *Acer macrophyllum*. The shrub *Acer circinatum* was found to have non-linear relationships which means it is particularly adapted to responding to changes in the overstory (4).

Preliminary work on the sapwood of large conifers indicates that the entire reservoir may be utilized in less than 10 days during periods of high transpiration. Refilling of the reservoir appears to be a function of both supply and demand. Rapid recharge follows summer storms that wet the soil to a depth where roots are active. Fall storms are associated with reduced evaporative demand so that deficits are refilled by diffusion, requiring up to 4 months. Sapwood water flux may serve as an index to evaporative demand and root uptake under specified conditions (5,6).