

A VEGETATION STUDY IN THE SUBALPINE ZONE
OF THE WESTERN NORTH CASCADES, WASHINGTON

by

GEORGE WAYNE DOUGLAS

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Approved by David L. M. Scott
(Chairman of Supervisory Committee)
Department College of Forest Resources
(Departmental Faculty sponsoring candidate)
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INTRODUCTION

In many mountainous areas, the environmental differences correlated to changes in the composition, structure, pattern and dynamics of the vegetation are well known. The subalpine zone of the Pacific Northwest, however, has received relatively little attention from ecologists until recent years. Previously most of the botanical work consisted of floristic accounts of the vegetation. This lack of synecological study is probably due to the inaccessibility, short snow-free season and frequently unfavorable climate of the region.

The Coast Range of British Columbia has been the subject of several studies. In the southern part of the range a comprehensive ecological and phytogeocoenological classification of the subalpine zone has been developed by Krajina (1959, 1965) and his students: Peterson (1964, 1965) and Brooke (1965a, 1965b). Brink (1959), also working in the same area, described successional changes in Garibaldi Park. McAvoy (1931), Cooper (1942) and Heusser (1960) gave brief accounts of subalpine vegetation further north in the Coast Range.

A general description of the vegetation of the Olympic Mountains of Washington appears in a flora by Jones (1936). Recently, a more intensive subalpine study of this area has been completed by Kuramoto (1968, 1969). Fonda and Bliss (1969) also gave a limited account of the subalpine zone.

Mt. Rainier has probably received more botanical attention than any other mountainous area in the Pacific Northwest. Jones (1938), Brockman (1931, 1947, 1949), Higinbotham and Higinbotham

(1954), Franklin (1966a) and Franklin and Mitchell (1967) have all contributed to the ecological knowledge of that area.

In Oregon, Van Vechten (1960), although working mainly in the alpine zone, gave a brief description of the subalpine zone in the Three Sister area. Swedberg (1961) and Hickman (1968) also gave accounts of subalpine vegetation in the northern and western Oregon Cascades, respectively. More general descriptions covering the subalpine zones of the entire Washington and Oregon region have been presented by Scott (1962a, 1962b) and Franklin and Dyrness (1969).

In the western North Cascades botanical research has been very limited. Localized floristic descriptions, now outdated, were written by Gorman (1907), St. John and Hardin (1929) and Muenscher (1941). Franklin and Trappe (1963), who made a reconnaissance of the area, gave a brief description of the plant communities. The only other work is the author's synecological and taxonomical studies (Douglas, 1969a, 1969b, 1969c; Douglas and Ballard, in press).

The purpose of this study is fourfold: 1) to obtain qualitative and quantitative data for the various natural vegetative units within the subalpine zone; 2) to describe and interpret these units in relation to the vegetative patterns and successional dynamics of the zone; 3) to establish a comprehensive classification system within which the units may be organized, and 4) to collect and record the occurrence of all the vascular plants and many of the mosses and lichens, as well as describe the phytogeographical and ecological characteristics of the

subalpine and alpine zone vascular plants of the western North Cascades and immediately adjacent areas.

A detailed study of all the vegetative units of the western North Cascades would require many years of investigation. In this thesis the major plant associations are described in some detail but there is only preliminary examination of the more complex plant communities of the streamsides and lake edges, rock outcrops, rockslides, talus slopes and avalanche tracks.