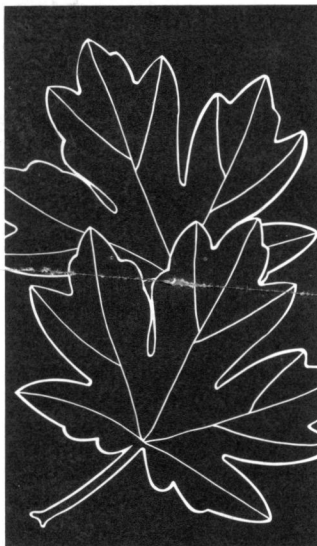
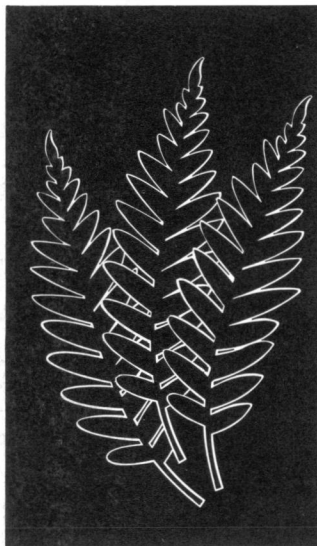


NATURAL VEGETATION OF OREGON AND WASHINGTON



Commentary and
Bibliographic Supplement
Jerry F. Franklin and Tawny Blinn



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PREFACE

Natural Vegetation of Oregon and Washington had its genesis in a hastily prepared introduction to the plant communities of the Pacific Northwest for participants in the XI International Botanical Congress in 1969. When supplies of this first document were exhausted within a year, it was decided not simply to reprint it, but to prepare a revised and expanded volume including a great deal of additional information and numerous additional photographs. The resulting volume, *Natural Vegetation of Oregon and Washington*, was published by the USDA Forest Service Pacific Northwest Forest and Range Experiment Station in 1973.

Major advances have occurred in our understanding of the vegetation of the region since that time, and another major revision of the book is needed. Significant new information is now available in such fields as autecology and population biology, vegetation description and classification, successional processes, and ecosystem functioning. In addition, a comprehensive description of the vegetational series now exists, allowing a much more consistent book organization. New chapters are needed on disturbance ecology and ecosystem processes.

Unfortunately, however, major revision is not possible at this time. In the face of ongoing demand for the book—which has been out of print for several years—the Oregon State University Press has decided to reprint *Natural Vegetation of Oregon and Washington* with the addition of a bibliographic supplement which brings the literature citations up to date and helps identify some of the major advances in our understanding of the vegetation of the Pacific Northwest.

We are grateful to the following people for providing many of the citations in the bibliographic supplement: Jim Agee, Roger del Moral, Angie Evenden, Richard Fonda, Bob Frenkel, Sarah Greene, David Hibbs, Art Kruckeberg, Richard Mack, Joe Means, Len Volland, and Don Zobel.

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COMMENTARY AND BIBLIOGRAPHIC SUPPLEMENT

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Major advances have occurred in our understanding of the vegetation of the Pacific Northwest since *Natural Vegetation of Oregon and Washington* was published in 1973. These advances are reflected in the large number of articles and reports published in the last 15 years; this supplemental bibliography contains more than 500 citations compared to only about 400 in the original book.

We have included all relevant literature citations of which we are aware including some currently in press. We have tried to be comprehensive regarding vegetative communities and their distribution, including successional dynamics. The coverage is exemplary only regarding ecosystem analysis, autecology, and plant population ecology. We will appreciate readers bringing omissions to our attention.

Plant Community Analysis and Classification

The most comprehensive advance during the last 15 years has been in our understanding of plant communities, including their composition, distribution, and relation to the environment. The greatest single contributor to this advance has been the Area Ecology program of the U.S. Department of Agriculture, Forest Service. Trained plant ecologists have now sampled and classified vegetation on every national forest in Oregon and Washington. The program was created by Frederick C. Hall, based on the work and philosophy of R. F. Daubenmire. Vegetation classifications are now available as processed reports for every national forest (see the literature citations under Atzet, Brockway, Hall, Halverson, Hemstrom, Henderson, Hopkins, C. Johnson, Topik, Volland, and Williams) as are large, compatible synecological data sets.

Vegetation analysis has also been conducted by other individuals and institutions. Major examples include classifications in Olympic, Mount Rainier, and North Cascades National Parks (e.g., Agee and Pickford 1985, Franklin and others 1987a, Smith and Henderson 1986), Bureau of Land Management areas in southwestern Oregon (e.g., Wheeler and others 1986a, 1986b), and studies at various universities (e.g., del Moral 1979b, del Moral and Long 1977, Frenkel and Heinitz 1987, Kratz 1975).

Wetland communities, especially salt marshes, have finally begun to receive the attention they deserve. Studies have examined not only composition of salt marsh communities and its relation to environmental gradients (e.g., Disraeli and Fonda 1979, Eilers and others 1983, Ewing 1983), but also the effects of diking and dike removal (e.g., Mitchell 1981). Mountain wetlands, riparian vegetation, and lowland bogs have been studied (e.g., Campbell and Franklin 1979, Frenkel and others 1986, Kovalchik 1987, Padgett 1982).

Subalpine and alpine meadow communities have always been favorite subjects of ecologists. Efforts to describe these communities have continued (e.g., Douglas and Bliss 1977, Henderson 1974, Mairs 1977), with increased attention to the impacts of human and other animal use (e.g., Schreiner 1982). Population studies of these communities have been conducted, especially by del Moral and his associates in the meadows of the Olympic Mountains.

Disturbance Ecology

Research in the Pacific Northwest reflects the increased interest in effects of disturbance on vegetation patterns, processes, and rates of recovery. Catastrophic as well as small-scale disturbances have been examined. Approaches have included modeling (e.g., Dale and others 1986), chronosequences (e.g., Oliver and others 1985), and stand-age reconstructions (e.g., Franklin and Hemstrom 1981).

The most notable disturbance in the region was the catastrophic eruption of Mount St. Helens on May 18, 1980, which precipitated major studies of successional patterns and processes in affected regions (Bilderback 1987; Keller 1982, 1987). Included were studies on the devastated region close to the mountain (e.g., Wood and del Moral 1987), as well as in the ashfall areas in the Cascade Range (e.g., Antos and Zobel 1985, Zobel and Antos 1986) and in eastern Washington (e.g., Mack 1981a). A major surprise was the importance of biological legacies—living organisms and organic materials including woody debris—in determining rates and pathways of recovery (e.g., Franklin and others 1985). Reviews of the Mount St. Helens research have been made covering one (Keller 1982) and five (Keller 1987) years of recovery.

Other disturbances that have received much attention are wildfire, exotic invasions, grazing, and clearcutting. Fire histories have been analyzed for several geographic regions (e.g., Hemstrom and Franklin 1982; Stewart 1986a, 1986b); they suggest that both large- and small-scale fires have been important. Mack, Rickard, and their associates have analyzed the invasion of *Bromus tectorum* L. (cheatgrass brome) in the steppic regions east of the Cascade Range. Succession after clearcutting continues to receive attention and has been the subject of long-term studies on permanent sample plots (Halpern 1987). Research on tree mortality and the role of forest gaps in northwestern forests is just getting underway.

Paleobotanical studies provide a long-term context on climatic and vegetational dynamics. Such research has continued to contribute to our regional knowledge through a variety of techniques including pollen analysis (e.g., Mack and others

1979), tree-ring analysis (e.g., Brubaker 1980), forest aging (e.g., Yamaguchi 1978), and macrofossils (e.g., Dunwiddie 1987).

Ecosystem Processes

In the last 15 years, we have made great strides in our understanding of structure and function in northwestern ecosystems, both forest and steppe. The International Biological Program's (IBP) Coniferous Forest Biome and Grassland Biome projects, which were in progress in 1973, have now been completed and have spawned numerous successor research projects. Forest work was focused in the Cedar River watershed in the Washington Cascade Range and in the H.J. Andrews Experimental Forest in the Oregon Cascade Range; shrub-steppe research was conducted primarily at the Hanford reserve in eastern Washington (e.g., Rickard 1985). These studies expanded understanding of productivity and its relation to the environment (e.g., Fujimori and others 1976, Gholz 1982, Grier and Logan 1977, Grier and Running 1977, Waring and Franklin 1979), belowground processes (e.g., Vogt and others 1981a, 1981b, 1981c), canopy processes (Massman 1982, Nadkarni 1984), the ecological roles of coarse woody debris (standing dead trees and downed boles) (e.g., Harmon and others 1986, Maser and Trappe 1984), and the influence of individual tree species on soil properties (e.g., Turner and Franz 1985a, 1986). Major progress reports have been published on the IBP-related research (Edmonds 1980, Waring 1980).

Ecosystem studies have also been conducted in the Olympic rain forest. Topics include succession (e.g., Luken and Fonda 1983), forest-river interactions (e.g., Starkey and others 1982), nurse-log phenomena (Harmon 1987), and interactions between elk and vegetation.

Composition, structure, and function of old-growth forest ecosystems have been studied intensively (e.g., Franklin and others 1981, Juday 1977), especially west of the Cascade Range where old-growth forests have become a major land-use issue. The role of such forests as habitat for specialized animal species is of concern. Preservation of such forests is increasingly viewed as a landscape issue (e.g., Franklin and Forman 1987, Harris 1984).

Scientific Reserves

Significant progress has been made during the last 15 years in the establishment of scientific reserves to represent the major vegetation types of Oregon and Washington. A multi-institutional regional plan (Dyrness and others 1975) was an important step, which has been followed by more detailed State plans (Oregon State Land Board 1981, Washington State Department of Natural Resources 1987). Research natural areas and scientific reserves have nearly doubled (Greene and others 1986), with areas established by six Federal agencies, the State of Washington, and The Nature Conservancy. This effort has been aided by the development of natural heritage data bases through the cooperative efforts of The Nature Conservancy and the State governments.

Future Research Needs

Information on the vegetation of the Pacific Northwest will probably continue to develop at a similar rate during the next decade as it has during the last. Although

some shifts in topical and regional emphasis are occurring, total research appears to be increasing modestly. Clearly, a shift toward more detailed studies of processes and more use of experimentation and modeling has occurred.

Some major research needs that should be addressed include synthesis and collation of plant-community data; analysis of successional patterns, including attention to multiple pathways and detailed stand reconstructions; regional analysis of disturbance patterns including additional paleobotanical studies; and expanded aut-ecological and population studies of important species, including other than the dominant life forms. An absolutely critical need in all of this research will be the development of long-term data sets on successional changes, populations, and ecosystem processes. Without such sustained efforts, information essential to developing and testing ecological theories will not be available.

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