

Preface

From 22 to 24 October 1979 a conference on 'The Role of Fire in Northern Circumpolar Ecosystems' was held by the Fire Science Centre, University of New Brunswick, Fredericton, Canada. The present volume is based on that conference and attempts to examine the role of fire in the functioning of northern ecosystems by identifying which temperate region fire concepts or theories apply to the circumpolar North and which concepts are unique to northern ecosystems. This is quite important, because much fire ecology research has been conducted in ecosystems such as grasslands, dry shrublands or dry forests which are subject to frequent or regular drought periods and numerous fires. Essentially, fires occur whenever sufficient fuel accumulates in these ecosystems. In contrast, many northern ecosystems are subject to different environmental conditions and much longer fire rotation periods. In these regions there may be an abundance of fuel at all times but weather conditions and ignition source dictate when that fuel will burn.

This volume consists of fifteen chapters, and is divided into an introduction which provides an overview and then five sections. The first section considers 'Past and present fire frequencies', from post-glacial times to the present industrial period. Four chapters in the section 'Physical effects of fire' next examine fire behaviour in northern forests, shrublands, and organic soils, and effects of fire on the ground thermal regime and nutrient cycling in northern ecosystems. Chapters on 'Concepts of fire effects on individuals and species' specifically consider plant individuals and species, and small-mammal and bird communities. 'Fire effects in selected vegetation zones' includes reviews of the role of fire in jack pine (*Pinus banksiana* Lamb.), black spruce (*Picea mariana* (Mill.) B.S.P.) and *Abies*-dominated forest ecosystems as well as the lichen-dominated tundra and forest-tundra. The final section on 'Fire control and management' includes two chapters on the special problems of fire control and prevention in peatlands and on the important topic of fire management in wilderness areas and parks.

In organizing both the conference and this volume we attempted to attract input from the northern hemisphere circumpolar countries where fire is an important environmental factor. We recognize that the Eurasian boreal forests are underemphasized, especially when it is realized that this area is twice the size of the North American boreal forest. Political boundaries and several

languages have presented barriers to information flow in the past, and, in addition, fire suppression is often a local responsibility.

As with many multi-authored volumes, some readers may be distracted by differing author styles, author perspectives, depth of the presentation, and balance of subjects in the present volume. However, we believe the drawing together of the very scattered circumpolar information will prove useful to students of fire ecology who have a background in temperate ecosystems and who wish to identify some of the unique features of fire in northern ecosystems. This volume also provides access to a large volume of literature that until now was not available through the usual international science search methods. We believe the volume is timely in light of the increasing pressure now being applied to northern ecosystems by both non-consumptive use of resources such as tourism and consumptive use of both renewable and non-renewable resources.