

outlining landform unit, soils and vegetation, and special-purpose maps (i.e. active layer thickness, plant growth form, etc.).

The final section includes the References and two Appendices. Appendix A consists of four master maps, coded numerically and by colour, outlining landforms, soils, vegetation, etc. Appendix B presents profiles of the major soils in the area.

The atlas, though an interesting document, would be much more useful if the authors had provided at least one bar scale and north arrow per page of maps. The authors create some confusion about the size of the area they are mapping. Their detailed colour maps for area three are not 3.6 km<sup>2</sup>, but rather 3.6 km square.

Should the atlas be revised and a new edition be brought forth, we feel that the special-purpose maps would merit considerable elaboration so as to demonstrate the great potential of the data in assisting in the orderly industrial development of the region. For example, in developing the oil spill sensitivity map the authors use essentially a single factor, vegetation recoverability potential, to delineate their units. They note that willow and sedge species are quite resilient to moderate spills and that these species are associated with wet areas. On the other hand, *Dryas integrifolia*, which is found on the dry tundra, is a species very sensitive to oil. Thus their sensitivity map delineates the dry tundra with *Dryas* as the most sensitive area and the wet tundra as having a good recovery potential. They fail to consider that in the event of an oil spill the oil, if above its pour point, would migrate to the wet tundra and terrain depressions thus complicating the development of sensitivity maps. This confusion could be eliminated if the authors had labeled their map "vegetation recovery potential under oil spills of moderate intensity".

For anyone interested in undertaking similar geobotanical studies, the atlas provides a format and a methodology that can be adopted or modified to fit special circumstances. For those interested in the environment of the North Slope or in teaching about it, it provides an easily comprehended style and many interesting observations. The extensive references provide access to additional data.

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**AN ARCTIC ECOSYSTEM: The Coastal Tundra At Barrow, Alaska.** Edited by JERRY BROWN, PHILIP C. MILLER, LARRY L. TIESZEN, and FRED L. BUNNELL. US/IBP Synthesis Series No. 12. Stroudsburg, PA: Dowden, Hutchinson and Ross, 1981. i-xxv + 571 p. \$29.50 U.S. (Distributed by Academic Press, Inc., 111 Fifth Avenue, New York, NY 10003.)

Establishing during the last war, the Naval Arctic Research Laboratory at Barrow, Alaska, has been the base for many fundamental arctic studies. It is regrettable that lack of funding has recently resulted in the closing of its doors to the support of scientific research.

The present book synthesises much of the extensive U.S. IBP tundra biome research that was carried out at the lab from 1970-1974. Thirty-two authors and 24 contributors are listed and many others assisted in various ways. The broad objectives of this research were to: determine how the coastal tundra operates; obtain data to compare this with cold-dominated ecosystems elsewhere; and gather information on degradation, maintenance, and restoration of temperature-sensitive and cold-dominated tundra and taiga ecosystems. Companion volumes have appeared elsewhere on the limnology of tundra ponds by John Hobbie, and the vegetation and production ecology of tundra by Larry Tieszen. Actually, the title of the present book is misleading as it encompasses the content of all three volumes.

There are 12 chapters: the coastal tundra at Barrow; climate, snow cover, microclimate and hydrology; biophysical processes and primary production; photosynthesis; control of tundra plant allocation patterns

and growth; pattern and succession in the vegetation; the soils and their nutrients; composition, biomass and ecology of the microflora; microfloral activities and decomposition; the herbivore-based trophic system; the detritus-based trophic system; and carbon and nutrient budgets. The editors point out that "within each of these subdivisions, the reader will find the common theme of the limitation of rates of biological processes by low temperature and related conditions of short growing season and the presence of permafrost". The book ends with a list of references cited; appendices listing the IBP tundra biome projects, personnel, site locations, and location of the major biome plots; and a subject index.

The extensive use of ecological models has aided understanding by allowing ecosystem simulations; however, oversimplification has at times led to an inadequate coverage of the individual species that occur in the area. Lichens, bryophytes, insects and spiders, all of which are abundant and important in the area, have, with few exceptions, received very scant treatment. It would have helped if there had at least been an Appendix in which all life forms known from the area were listed. It is a sad documentary that recent arctic ecological work has often been carried out by individuals who knew, and gathered data on, only the larger and more striking species, and that funding for major research programs did not allow the hiring of scientists with better taxonomic knowledge.

An impressive amount of information has been discovered about the coastal tundra at Barrow, and it is generally well presented, but one should not get the impression that the job has been thoroughly done; much work remains. Little attempt has been made to show how typical or atypical the tundra on the Barrow area is to that found elsewhere. While many general principles hold true throughout the arctic, the tundra is far more variable than most people realize.

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**EFFECTS OF FIRE IN ALASKA AND ADJACENT CANADA — A LITERATURE REVIEW.** By LESLIE A. VIREECK and LINDA A. SCHANDELMEIER. Anchorage, Alaska: U.S. Department of the Interior, Bureau of Land Management. Alaska Technical Report 6. 1980. 124 p. Soft cover. Gratis.

This comprehensive, highly readable and useful review brings together more than 300 papers on the ecological effects of fire in taiga and tundra ecosystems of Alaska and adjacent Canada. Based on a computerized and abstracted bibliography containing about 750 references, the review discusses the most recent and important of these. Since some of this literature is contained in unpublished reports, the review provides access to otherwise unavailable information. The authors interpret and derive conclusions from these diverse studies to describe the available information and unanswered questions about fire effects in Alaska resulting in a reference, state-of-the-art handbook. This review is one of a series of recent high-quality technical reports produced by the Bureau of Land Management in Alaska.

The review is organized into six sections. Literature references for each of the topics covered are listed at the end of each section as well as all together at the end of the report. An introductory section summarizes the information sources including a list of several symposia and workshops which have been held to discuss and review fire effects in the North. Viereck and Schandelmeier's review clearly fills a need not addressed by these symposia proceedings, which tend to lack continuity owing to the diversity of authors and geographic areas covered.

The second section on fire regimes and fire history is particularly useful in that it brings together a number of reports on fire frequencies in different parts of Alaska and Canada. Exceptional fire years appear to be characteristic of the Alaskan taiga and tundra with 1940, 1957 and 1969 outstanding in the taiga and 1977 a year of widespread tundra fires in northwestern Alaska. The authors point out that better fire records and more accurate mapping of fire boundaries are needed, particularly for tundra regions. This second section of the review also clarifies a number of important but confusing terms in the literature such as fire severity and fire intensity. In the following section on the effects of fire on soils and watersheds, fire severity is discussed in relation to the amount of organic material removed from the soil surface — a key effect which subsequently controls permafrost changes and post-fire revegetation.