In summary, we believe this is a very useful book, better suited for the researcher than for the undergraduate and should be part of any well-rounded stream ecologist's library. Our comments are intended to describe the scope of this book and use it as a barometer of the state and direction of the discipline. Stream ecology is a healthy, broad discipline and this book can help an individual researcher increase the scope of his or her research interests by facilitating application of new techniques.

Stuart Findlay
Robert O. Hall, Jr.

Institute of Ecosystem Studies
Millbrook, New York 12545

William V. Sobczak

Section of Ecology and Systematics
Cornell University
Ithaca, New York 14853

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MILNER, A. M., AND M. W. OSWOOD [EDS.]. 1997. **Freshwaters** [sic] **of Alaska: Ecological syntheses.** Springer. ISBN 0-387-94379-X. 369 p.

Exploitation of the environment results in profound alterations of natural ecosystems. Evaluation of these changes, as well as their potential suppression or reversal, presumes some understanding of conditions at an earlier stage. In spite of the intensive modifications of the temperate and tropical regions of the world by rampant, exponentially increasing human exploitation, vast areas of the arctic and subarctic regions are relatively unmodified by direct human interventions. Alaska is a small but important portion of these regions. Our understanding of existing limnological characteristics of the inland waters of Alaska is largely in its infancy.

The small book on the fresh waters of Alaska makes no attempt to be encyclopaedic in summarizing limnological data available from this large, relatively remote state. Rather, examples of different freshwater ecosystems are synthesized, in as much as is possible at these early stages of evaluation and understanding. Some ecosystems are studied most intensively—coupled descriptive and experimental analyses of these few systems provide disproportionately greater insights into the resiliency and potential recovery capacities of these systems.

Because of the uneven and usually limited depth of understanding of the structure and functioning of waters of Alaska, coverage in this book is similarly uneven. The severe climate along an extensive latitudinal gradient results in a vast habitat and climatic diversity of the state. The small human population and restricted access to surface waters has resulted in limited degradation. Recognition of the need for understanding of these resources, however, and excellent support logistics associated with the military have attracted a bevy of good limnologists to the region. By far the most thoroughly studied lake ecosystem in Alaska is Toolik Lake, where the seemingly simple food-web structures are in reality large and complex. Importantly, the largely phosphorus-limited planktonic food-web is dominated by microbial components, and clearly most organic matter and energy emanates from benthic and allochthonous sources. Frequent seemingly dogmatic statements given as fact regarding controlling mechanisms for carbon and energy fluxes in the Toolik ecosystem are perhaps founded in the many studies cited, but often many alternative explanations exist. The limnological summary of the shallow, highly humic stained, and eutrophic cryogenic Smith Lake provides a marked contrast to the Toolik system and touches on the enormous lake diversity of this region.

The detailed studies of the Kuparuk River indicate the marked temporal variability that occurs in tundra riverine ecosystems. Although little is known of the microbial utilization of organic matter, the fluctuating regulatory capacities of phosphorus, nitrogen, and invertebrate grazing on attached communities demonstrate the temporal volatility that exists in these tundra systems. The concluding chapter by M. W. Oswood presents a particularly instructive analysis of both the diversity and commonalities among streams and rivers of Alaska, in which the comparative climatic and edaphic traits of the region are integrated with biological components.

Much of the book is devoted to the effects of organisms on surface waters. Discussion of waterfowl and wetlands is most general, and where the general characteristics of waterfowl distributions and migrations emerge, practically no ecology of the vast wetlands is presented. Much attention is directed to effects of land management, mining, and forestry on salmon habitat, behaviors, and migrations. Clearly the loading of nitrogen from marine sources by the migration, spawning, and death of salmon can be significant in some lakes, although quantification is very difficult. The management practice of fertilization of oligotrophic lakes to increase growth rates of salmon has been variably successful because of the individualistic balances among nutrients and fry stocking. Eutrophication of lakes for salmon, most of which are never harvested, is quite antithetical to contemporary management strategies and cannot be justified.

Climate is obviously a dominant driver of the bioenergetics, biodiversity, rates of biogeochemical cycling, and productivity in the aquatic ecosystems of this arctic region. Climatic variability results in frequent disturbances of habitats, community structure, and productivity. The idea that these freshwater ecosystems are simple is obviously misplaced. The primary messages of this eclectic collection of limnological essays are how little we understand of these tundra and arctic fresh waters and the difficulty of extrapolating our general concepts of ecosystem operation to these systems so severely constrained and modified by climate.

Robert G. Wetzel

Department of Biological Sciences
University of Alabama
Tuscaloosa, Alabama 35487-0206

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RICHARD Y. MORITA. 1997. **Bacteria in oligotrophic environments: Starvation-survival lifestyle.** Chapman & Hall. 529 p.

Bacteria have extraordinary capability for survival in the absence of energy and nutrient sources. Viable (i.e. capable of growing and producing progeny following resuscitation) bacterial cells have been recovered from rocks, coal, frozen soils, ice cores, solar salt deposits, subsurface deposits, and waters with apparent ages of thousands of years. Owing to the ease with which such samples can become contaminated during handling, it is often difficult to verify claims