Comparative Reservoir Limnology and Water Quality Management


Reservoirs have become a major source of water, food, and recreation world-wide. Good reservoir water quality is critical to meet human needs, yet water quality is often adversely impacted by the same human populations that strongly depend upon it. Effective reservoir management has therefore become a critical area of research and application. This book provides valuable information on that topic. The collected papers that form the 13 chapters of the book are indirect products of the International Conference on Reservoir Limnology and Water Quality Management, held during 1987 in Czechoslovakia. The underlying theme is “furthering our understanding of the inter-relationships between theoretical limnology and management of water quality.”

The book is divided into four parts: a comparison of reservoirs in different geographical regions; modeling, statistical analyses, and remote sensing; regional management approaches; and the present state of knowledge of reservoir limnology.

Part 1, Comparative Reservoir Limnology, contains four chapters. Chapter 1 considers semi-arid reservoirs, and provides evidence that they constitute a distinct class of lakes. The chapter includes interesting comparisons of user-perceived vs. measured lake trophic state, and an extensive table of summary data, which will be of value to those interested in exploring further the relations between the physical, chemical, and biological parameters. Chapter 2 provides general limnological information about reservoirs in Brazil, and includes discussions of regional eutrophication-management issues. The goal is to provide regional management recommendations based on a theoretical framework of how the Brazilian reservoirs operate. Chapter 3 considers problems inherent to trophic classification of reservoirs, including light limitation, short residence times, and spatio-temporal variability. This is a nice overview of some important, although not new ideas. Chapter 4 deals with the unique limnology of sub-alpine pump-storage reservoirs. The chapter is intended to give basic information about nutrient dynamics and algal production, and describes the use of a simulation model to describe temperature profiles and nutrient circulation.

Part 2, Mathematical Models and New Techniques, contains six chapters. The introductory Chapter 5 describes the general value of mathematical models to reservoir management. The following chapters consider the specific topics of: multi-compartment phosphorus-cycling models for Polish reservoirs (Chapter 6); seston sedimentation-nutrient remineralization-primary production relationships in Spanish reservoirs (Chapter 7); cyanobacterial competitive ability in relation to nitrogen and phosphorus loadings (Chapter 8); parameter sensitivity analysis (Chapter 9); and the use of mathematical models to couple regional hydrology and in-lake processes (Chapter 10). The underlying theme is “furthering our understanding of the inter-relationships between theoretical limnology and management of water quality.”

Part 3, Reservoir Water Quality Management, contains two chapters. Chapter 11 deals with fish community succession, and provides valuable information, including: an annotated and referenced list of models used in reservoir limnology, and the goals of those models; processes occurring during dry and wet periods; and a list of cases where theoretical models have been successful in the management of a reservoir in their watersheds. The concept of “ecotechnology,” in this chapter, in relation to both basic ecological and resource management goals.

The overall quality of this book is very good, in terms of content, binding, typesetting, figure, and editor. The chapters are well referenced and there is an index. The book may be prohibitively costly for some purchases, but it will serve as a valuable library acquisition. It contains information that will be most useful to basic scientists and managers, but it will also be a source for limnologists in general. The last two chapters are required reading for students of limnology and water resource management. —K.E. HAVENS, Department of Research, South Florida Water Management District, Beach, FL 33416-4680.