INTRODUCTION TO LAKE ECOSYSTEM ECOLOGY: A GLOBAL PERSPECTIVE

The scientific discipline of limnology is focused on the study of inland waters, fresh and saline, large and small, and young and old. For example, the 5 Laurentian Great Lakes in North America contain some 20% of the Earth's surface fresh water, and Lake Baikal in Siberia contains another 18% (Likens, 2009). The recently constructed Three Gorges Dam Reservoir in China, to be completely filled by the end of 2009, will contain about 40 km^3, or about 8% of what Laurentian Lake Erie (484 km^3) contains. Lake Baikal is the deepest and one of the oldest freshwater basins (>20 Mya); Three Gorges Reservoir is one of the newest major basins.

Whether large or small, young or old, shallow or deep, these water bodies function as ecosystems with strong and complicated interactions among all of the living and nonliving components of the ecosystem. Ecosystems are the basic units of nature (Tansley, 1935). In terms of area of water (<1%) or volume of fresh water (<0.3%) on our planet, inland lakes and reservoirs of the world are tiny, but in terms of interest and use for drinking, sanitation services, food, recreation, transportation and aesthetics, they provide hugely important resources and ecosystem services to humans.

Limnology is a quintessential form of ecosystem science because comprehensive limnological understanding is based on information from biology, physics, chemistry, geology, hydrology, meteorology and so forth. The recent Encyclopedia of Inland Waters (Likens, 2009) incorporates all of these various disciplines and more in addressing and describing the inland-water ecosystems of the Earth.

Limnology is a relatively old scientific discipline with a professional international society (the International Society of Limnology (SIL)) founded in 1922. From the beginning, SIL has focused on both theoretical and applied issues in aquatic ecosystems as do the topics of this volume.

This volume focuses on 5 topics about the lentic, inland waters of our planet, that is, lake and reservoir ecosystems: 1. Introduction to Lake Ecosystem Ecology: A Global Perspective, 2. Lake Ecosystems: Structure, Function and Change, 3. Hydrodynamics and Mixing in Lakes, 4. Lakes and Reservoirs of the World, and 5. Lakes and Reservoirs: Pollution, Management and Services. The information and perspectives contained in this volume are highly relevant to the understanding and management of a variety of current environmental problems, such as eutrophication, acid rain and climate change.

The articles in this volume are reproduced from the Encyclopedia of Inland Waters (Likens, 2009). I would like to acknowledge and thank the authors of the articles in this volume for their excellent and up-to-date coverage of these important topics in limnology.

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