

**GUIDELINES OF
LAKE MANAGEMENT**
Volume 5
**MANAGEMENT OF LAKE
ACIDIFICATION**

Editor:

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**International Lake Environment Committee
United Nation Environment Programme**

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FOREWORD

Acidification is a serious problem for many lakes in the Northern Europe and Eastern North America. There are, however, clear indications that the problem of lake acidification also may become a problem in many developing countries in the coming decades. Southern China, for instance seems to be the next region which will suffer from acidification of lakes caused by acid precipitation.

It is important that the developing countries learn from the mistakes of the industrialized countries. The experience shows that it is always more cost effective to solve pollution problems at an early stage of their development; the longer the pollutants have accumulated in the environment, the more difficult and expensive the pollution abatement will be. It is better to use early warnings and to try to prevent the pollution problem, than to try to solve it after the environmental degradation has occurred. It is therefore important for the developing countries to learn about acidification of lakes, and to understand the reactions of lake ecosystems to acid precipitation. This will enable the developing countries to react rapidly at the first signs of acidification, and avoid the catastrophes we have experienced in some lakes in the industrialized world.

This Guideline book number five on Acidification explains in detail the relations between sources, i.e., air pollution caused by sulfur and nitrogen oxides, and their effects on lakes. Management possibilities and strategies against acidification are discussed. Indeed, an early use of such environmental management initiatives should be considered to avoid changes in the structure of lake ecosystems, which would otherwise make lake restoration more difficult. It is my hope that the developing countries will use this information in order to be prepared to meet possible forthcoming lake acidification at an early stage, thereby avoiding the mistakes made in the industrialized world.

Reuben Olembo
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Nairobi
December 1992

FOREWORD

In view of the ever-increasing importance of lakes and reservoirs as sources of freshwater supply, the physical and chemical degradation of lake and reservoir environments is now an emergent issue that needs worldwide cooperation. The survey of the state of world lakes, which has been carried out jointly by ILEC and UNEP since 1987, revealed the prevalence of six major environmental problems over the continents: 1) water level subsidence due to overuse of lake water, 2) accelerated siltation, 3) acidification 4) toxic contamination and 5) eutrophication, all of which may eventually lead to 6) the collapse of lake ecosystems with resultant losses of biodiversity and many endemic species of plants and animals. It is regretted that these problems were not explicitly emphasized in Chapter 18, Protection of the Quality and Supply of Freshwater Resources, of Agenda 21 agreed upon by the UN Conference on Environment and Development held in Rio de Janeiro five months ago.

Among these, the acidification of lake water is somewhat different from the others in that a large number of lakes in a few limited regions, such as Scandinavia and northeastern parts of North America, have been collectively damaged. This was probably caused by the geographical location of the regions in relation to industrial centers emitting huge amounts of acidic air pollutants and by the poor buffer capacity of soils that depend on geological conditions. However, other parts of the world may not be free from the danger forever. Acid precipitation itself is now prevailing over most industrialized areas and even certain less developed areas of the world. If acid rain continues to fall, the lakes in those areas may be influenced suddenly as soil buffer capacity is exhausted. Environment managers should, therefore, always be careful about the possible future acidification of the lakes for which they are responsible.

Representing ILEC's Scientific Committee, I would like to extend our special thanks for the continued support to this serial publication by UNEP and the other organizations concerned. The Committee gratitude is also due to the editor, Professor S.E.Jørgensen and other contributors to this volume.

Tatuo Kira

Chairperson, Scientific Committee of ILEC Foundation.

November 1992, Otsu

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