Impact of ACID RAIN and Deposition on Aquatic Biological Systems

Isom/Dennis/Bates *editors*

ASTM STP 928

IMPACT OF ACID RAIN AND DEPOSITION ON AQUATIC BIOLOGICAL SYSTEMS

A symposium
sponsored by
ASTM Committee D-19
on Water
Bal Harbour, FL, 29 Oct. 1984

ASTM SPECIAL TECHNICAL PUBLICATION 928
Billy G. Isom, Tennessee Valley Authority,
and Sally D. Dennis and John M. Bates,
Ecological Consultants, Inc., editors

ASTM Publication Code Number (PCN)
04-928000-16

1916 Race Street, Philadelphia, PA 19103

Library of Congress Cataloging-in-Publication Data

Impact of acid rain and deposition on aquatic biological systems.

(ASTM special technical publication; 928)
Includes bibliographies and index.
"ASTM publication code number (PCN) 04-928000-16."
1. Acid rain—Environmental aspects—Congresses. I. Isom, B. G. (Billy G.) II. Dennis, Sally D. III. Bates, John M. (John Morton), 1932– . IV. American Society for Testing and Materials. Committee D-19 on Water. V. Series.
QH545.A17I47 1986 574.5'263 86-14076
ISBN 0-8031-0492-8

Copyright © by AMERICAN SOCIETY FOR TESTING AND MATERIALS 1986
Library of Congress Catalog Card Number: 86-14076

NOTE

The Society is not responsible, as a body,
for the statements and opinions
advanced in this publication.

Printed in Baltimore, MD
August 1986

Foreword

The symposium on the Impact of Acid Rain and Deposition on Aquatic Biological Systems was held in Bal Harbour, Florida on 29 Oct. 1984. The American Society for Testing and Materials' Committee D-19 sponsored the symposium. Billy G. Isom, Tennessee Valley Authority, and Sally D. Dennis and John M. Bates, Ecological Consultants, Inc., presided as symposium chairpersons; Sally D. Dennis and Eric L. Morgan, Tennessee Technological University, served as session chairpersons.

Related ASTM Publications

Validation and Predictability of Laboratory Methods for Assessing the Fate and Effects of Contaminants in Aquatic Ecosystems, STP 865 (1985), 04-865000-16

Aquatic Toxicology and Hazard Assessment (Seventh Symposium), STP 854 (1985), 04-854000-16

Ecological Assessment of Macrophyton: Collection, Use and Meaning of Data, STP 843 (1984), 04-843000-16

Ecological Assessments of Effluent Impacts on Communities of Indigenous Aquatic Organisms, STP 730 (1981), 04-730000-16

Aquatic Invertebrate Bioassays, STP 715 (1980), 04-715000-16

A Note of Appreciation to Reviewers

The quality of the papers that appear in this publication reflects not only the obvious efforts of the authors but also the unheralded, though essential, work of the reviewers. On behalf of ASTM we acknowledge with appreciation their dedication to high professional standards and their sacrifice of time and effort.

ASTM Committee on Publications

ASTM Editorial Staff

David D. Jones
Janet R. Schroeder
Kathleen A. Greene
Bill Benzing

Contents

Overview 1

Assessment of Aquatic Effects Due to Acid Deposition— J. L. MALANCHUK, P. A. MUNDY, R. J. NESSE, AND D. A. BENNETT 4

A Preliminary Assessment of the Importance of Littoral and Benthic Autotrophic Communities in Acidic Lakes—T. L. CRISMAN, C. L. CLARKSON, A. E. KELLER, R. A. GARREN, AND R. W. BIENERT, JR. 17

The Effects of Short-Term and Continuous Experimental Acidification on Biomass and Productivity of Running Water Periphytic Algae—L. PARENT, M. ALLARD, D. PLANAS, AND G. MOREAU 28

Relationships of Spatial Gradients of Primary Production, Buffering Capacity, and Hydrology in Turkey Lakes Watershed— D. C. L. LAM, A. G. BOBBA, D. S. JEFFRIES, AND J. M. R. KELSO 42

Size-Dependent Sensitivity of Three Species of Stream Invertebrates to pH Depression—J. W. ALLAN AND T. M. BURTON 54

Buffering Capacity of Soft-Water Lake Sediments in Florida— T. E. PERRY, C. D. POLLMAN, AND P. L. BREZONIK 67

Linking Automated Biomonitoring to Remote Computer Platforms with Satellite Data Retrieval in Acidified Streams— E. L. MORGAN, K. W. EAGLESON, T. P. WEAVER, AND B. G. ISOM 84

Consideration of Total Ion Composition in Designing Toxicity Tests Using Aluminum Salts and Mineral Acids—R. C. YOUNG 92

A Simple Method to Measure pH Accurately in Acid Rain Samples—P. F. BOYLE, J. W. ROSS, J. C. SYNNOTT, AND C. L. JAMES 98

Author Index 107

Subject Index 109

ISBN 0-8031-0492-8