Introduction

This volume marks not only the beginning of the second decade of ASTM symposia on aquatic toxicology, but also the beginning of the second decade of aquatic toxicology as a mature science. The science of aquatic toxicology matured in 1977 in the sense that it adopted a paradigm for its practice: hazard assessment by tiered testing and iterative comparison of expected ambient and toxic concentrations. That paradigm was first described in the first ASTM aquatic toxicology symposium *(ASTM STP 634, Aquatic Toxicology and Hazard Evaluation: First Symposium).* The past decade was largely devoted to implementing this paradigm.

As the second decade begins, an alternate paradigm, risk assessment, is gaining popularity with regulatory agencies. Risk assessment is concerned with estimating the probability of specific undesirable effects. It is more demanding than hazard assessment in that it must deal explicitly with the nature and magnitude of effects and with uncertainty about those effects. It will require development of new methods and refinement of old methods of testing and analysis.

In addition, a number of problems are apparent that have not been adequately addressed. These include (1) large-scale cumulative effects of multiple pollution sources on regional communities and populations, such as the Chesapeake Bay and striped bass; (2) effects of spills, storm runoff, and other nonroutine exposures with complex temporal dynamics; (3) effects of variation in organism condition on susceptibility; (4) predicting effects of new chemicals whose mode of action is unknown; (5) cumulative effects of pollution, harvesting, modification of the physical environment, and natural stochastic processes; and (6) balancing risks and benefits of different levels of testing, monitoring, and waste treatment.

These and other problems constitute a significant challenge for the coming decade. The editors believe that the papers presented in this volume demonstrate a capability and a willingness to tackle these difficult problems.

Glenn W. Suter II

Oak Ridge National Laboratory, Oak Ridge, TN 37831; symposium chairman and editor.

Michael A. Lewis

Procter and Gamble Co., Cincinnati, OH 45217; symposium chairman and editor.