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## Preface to the Revised Edition

Since the publication of *Biology and Conservation of Sea Turtles* in 1982, significant advances have been made in our understanding of sea turtle biology and in the conservation of sea turtles. Of course, critical aspects of sea turtle biology still elude us and serious threats continue to jeopardize sea turtle populations. As is natural, those involved in sea turtle biology and conservation tend to dwell on the deficiencies rather than on our accomplishments. I hope that the publication of this revised edition can serve as a celebration of the progress we have made.

The original contributions to the 1982 edition have not been changed. To document the progress made since then, as well as the deficiencies that remain, eighteen authors have written reviews for fourteen topics. The topics were selected to represent those areas in which major advances have been made, not to provide an overview of all major aspects of sea turtle biology and conservation. The authors were given the difficult task of summarizing their fields in very few words and listing the significant new literature, so that readers could quickly grasp new developments and gain access to the primary literature that has appeared in each area since this volume was first published.

The progress has been fueled by improved communication among individuals involved in all phases of sea turtle work. Foremost in this area has been the *Marine Turtle Newsletter*. Initiated in 1976 by Nicholas Mrosovsky, who served as its first editor, the MTN has continued to flourish under the successive editorships of Nat Frazer and, currently, Karen and Scott Eckert.

The Annual Symposia on Sea Turtle Biology and Conservation have played a crucial role in keeping everyone abreast of research and conservation devel-

opments. These symposia have grown from a few people gathered in Jacksonville, Florida, in 1981 to gatherings in recent years of nearly 600 people from all over the world. This growth would not have been possible without the careful nurturing provided by Jim and Thelma Richardson, Barbara Schroeder, Sally Murphy, and the scores of other selfless volunteers who undertake the huge task of hosting this event each year. The Proceedings of these symposia—published since 1988 as Technical Memoranda of the National Marine Fisheries Service Southeast Fisheries Science Center—provide rapid communication of the results of the symposia.

The Marine Turtle Specialist Group of the International Union for the Conservation of Nature—a group of over 200 individuals from more than 50 countries—has increased its effectiveness as a network for communication within the international community of sea turtle conservationists. The two West Atlantic Turtle Symposia (WATS I, Costa Rica, 1983, and WATS II, Puerto Rico, 1987), convened under the auspices of IOCARIBE and, guided by Fred Berry, provided important impetus for communication and planning on a regional basis, which have been continued in other areas.

The many publications that have resulted from the decades of research on sea turtles are retrievable, thanks to the Sea Turtle On-line Bibliography developed by Alan Bolten and maintained by the Archie Carr Center for Sea Turtle Research at the University

of Florida. This system is available worldwide at no charge on the Internet. Also on Internet, CTURTLE is a listserv discussion group that provides rapid communication among individuals involved in sea turtle biology and conservation.

I want to express my gratitude to Karen Eckert and George Zug, who stimulated interest and organized the funding effort for this revised edition, and to the Atherton Seidell Endowment Fund for providing financial support. I thank the authors of the new sections for writing three-page reviews when they wanted to write thirty pages, and Peter Cannell, science acquisitions editor for Smithsonian Institution Press, for his help and encouragement.

Finally, in the celebration of our progress, we should remember those early workers who made our advances possible: the pioneers who first brought the plight of sea turtles to the attention of the world, who solved many of the early problems, and who served as our mentors. Since we gathered at the World Conference on Sea Turtle Conservation in Washington, D.C., in November 1979, we have lost valued colleagues. Archie Carr passed away in May 1987; Doug Robinson, in June 1991; Leo Brongersma, in July 1994. We see far because we stand on the shoulders of giants. To those giants, I respectfully dedicate this revised edition.

Karen A. Bjorndal  
January 1995

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## Introduction

When the World Conference on Sea Turtle Conservation convened in Washington, D.C. on 26–30 November 1979, more than three hundred participants had come together from forty different nations. Our purpose was threefold: to increase communication between areas of the world where lack of information flow has impeded conservation efforts, to take stock of our knowledge of the biology of sea turtles, and to develop a Conservation Strategy for the world's sea turtles to serve as a philosophical basis and general model for future conservation efforts.

All these endeavors were successful. The information exchange, begun at the conference, has continued unabated and already has had positive results. This volume presents the summary of sea turtle biology made at the meetings. The Conservation Strategy (including a list of specific Action Projects), which appears at the end of this volume, speaks for itself. It is not an integrated methodology for conserving sea turtles. There are too many variables among geographic areas—and too many gaps in our knowledge. Although some specific points in the strategy may become dated, the underlying principles are enduring. In his paper in this book, David Ehrenfeld stated the case succinctly: “. . . a combination of our incomplete knowledge about sea turtles and the numerous constraints imposed by their biology dictates a very conservative conservation strategy. I conclude that the best we can do is to concentrate on the protection of existing wild populations, using the simplest and least risky techniques of conservation.”

The papers that make up this book are grouped into three sections, roughly in the order in which they were presented at the conference. Those in the first section deal with different aspects of the basic biology of sea turtles as these apply to conservation problems and

possible solutions. The large number of papers on the topic of reproduction shows where the major research efforts have been in the past. Recent research in areas away from the nesting beaches is beginning to round out our understanding of sea turtle ecology. It is in this section that our ignorance seems greatest and most frustrating because our science really has few sure answers to the problems of sea turtle conservation. Many of the papers (for example, the population models) represent only first attempts at deciphering some facet of sea turtle biology and are not intended to be final, accurate representations.

The second section includes papers that report the status of sea turtle populations or that discuss subsistence hunting in different regions. The authors have accomplished an impressive task in placing before us summaries of what is known of the distribution and density of all the sea turtle populations of the world. The coverage is, by necessity, uneven. In some areas, every meter of beach has been walked and all nesting turtles tagged. In others, and unfortunately these are in the vast majority, we have only historical references, or a report from a single plane flight over the region, on which to base our information. Still other areas represent total blanks. In the years ahead, these poorly known areas will certainly grow smaller. It is hoped that the summaries presented here will help focus survey efforts and funds on the places where they are needed most.

The third section comprises papers that deal with conservation theory, techniques and law as well as with general conservation problems that are not restricted to one geographic region. Few papers in the areas of conservation theory and law, as they apply to sea turtles, have been published. Those that appear here are a major contribution to this important field and will be a valuable reference source for years to come. This section also includes the most controversial articles—those treating the long-debated questions of turtle farming and head-starting.

Five of the papers presented at the conference are not included here. Two were committed elsewhere: Carr's West Atlantic Survey is to be published in full by the National Marine Fisheries Service under contract NA 80-GA-C-00071, and Bjorndal's paper on marine turtle life tables appeared in *Copeia* 1980, number 3. The other three papers were not submitted for publication in this volume.

For the participants in the conference, and all sea turtle conservationists, I would like to thank the fol-

lowing organizations whose donations were a major factor in the success of the conference: World Wildlife Fund/U.S.; National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce; U.S. Fish and Wildlife Service, U.S. Department of the Interior; U.S. Agency for International Development through the Man and the Biosphere Program; Center for Environmental Education; Chicago Zoological Society; New York Zoological Society; U.S. National Park Service, U.S. Department of the Interior; Arabian American Oil Company; Defenders of Wildlife; Truland Foundation; Fauna Preservation Society; Chelonia Institute; U.S. National Shrimp Congress; and the U.S. Navy and U.S. Marine Corps. The U.S. Department of State kindly allowed us to hold the conference in the State Department Building. Other contributors were too many to be listed, but this in no way lessens our gratitude for the generosity of them all. Vivian Silverstein and Patty Shaver worked hard, long hours to organize the conference with great success, and special thanks are due them.

Karen A. Bjorndal  
15 January 1981

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**with contributions on  
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**Biology and Conservation of**

# **Sea Turtles**

**Revised Edition**



**Edited by Karen A. Bjorndal**