

# Preface

Freshwater ecosystems worldwide, from high latitudes to the tropics, host highly diverse communities of aquatic invertebrates that are often dominated by large-bodied decapod crustaceans such as freshwater crabs, aeglids, crayfish, and shrimps. These conspicuous macroinvertebrates excite interest because of their large size, a characteristic that also makes them an attractive food source. As a consequence, the populations of these crustaceans are under increasingly heavy pressure. Moreover, the alteration of global ecosystems by humans has happened more in the past one hundred years than in any comparative period of time in history. Freshwater habitats, and the animals that depend on them, are now under imminent threat from a number of different sources, a fact that is reflected in the high rates of biodiversity loss in freshwater ecosystems in all parts of the world.

We became aware of the continuing demand for the latest information on the threats to freshwater ecosystems following the publication in 2014 of “Advances in Freshwater Decapod Systematics and Biology”, edited by Darren C.J. Yeo (National University of Singapore, Singapore), Sebastian Klaus (University of Heidelberg, Germany), and Neil Cumberlidge (Northern Michigan University, USA). This was the first multi-author English language book to be produced on the freshwater decapods, and it has become a much sought-after source of reference material for researchers, students, conservationists, citizen scientists, and regional managers. This realization is what motivated us to produce a book written by specialists in freshwater decapod conservation that highlights the scale of the problems facing all of us. We are especially aware of the importance of this message reaching the next generation of scientists and managers because they will be the ones facing the consequences of severe environmental disruption in their lifetimes.

Recent International Union for Conservation of Nature (IUCN) Red List assessments of the freshwater decapods from all parts of the world have revealed unexpectedly high numbers of species threatened with extinction and have specified the source of threats to each species. The majority of threatened species of decapods are restricted-range endemics living in habitats subjected to deforestation, alteration of drainage patterns, and pollution, and many species are over-harvested for human

consumption. The stability of freshwater ecosystems is being seriously altered by the introduction of non-native species, urbanization, logging, and overexploitation of native species, and these negative impacts are increasing with globalization and human encroachment. In addition, the rate of global climate change in the coming century is projected to increase, and this will further impact all ecosystems more rapidly than any changes that have occurred in the last 10,000 years. It is clear that we are rapidly losing a good part of the biodiversity of the freshwater realm worldwide, and trends indicate that this situation is becoming increasingly serious. The locations of threatened species of decapods and the nature of their extinction threats are now better understood, and our global conservation efforts can now be focused on those species and habitats that are in most need.

Here, we review the current strategies aimed at monitoring and quantifying the decline of the world's threatened freshwater decapod species and highlight the efforts being taken to develop conservation measures to prevent further losses. Strategies for the sustainable management of inland aquatic resources depend heavily on baseline data on diversity, conservation status, and distribution patterns of the freshwater decapod faunas, all of which are now available on a global scale. The growing pressures on freshwater habitats and their species make it a priority to understand the effectiveness of current conservation strategies at the global and national levels in protecting freshwater systems and their inhabitants.

Future challenges include the increasing human population that is placing additional pressures on freshwater resources as demands for food, energy, transport, and water supply grow. In addition, there are significant emerging threats to freshwater ecosystems from future global climate change. However, the scale of the impact of these threats on freshwater ecosystems is still not well understood by the public, policymakers, and politicians, and there is a need to raise awareness of the urgent need for conservation action before it is too late. The limited resources available for conservation mean that we need to prioritize conservation interventions for those species that are on the edge of extinction based on their conservation status and the extinction threats that they face. Conservation action plans now need to be developed that are aimed at developing measures to prevent further losses, and these plans depend on cooperation between scientists, conservation managers, educators, funding agencies, and policymakers, as well as conservation agencies such as the IUCN.

Finally, the idea for the present volume arose at the 2013 summer meeting of The Crustacean Society in San Jose, Costa Rica, when we [Tadashi Kawai (TK) and Neil Cumberlidge (NC)] shared our common concerns for the urgent need to protect the hundreds of species of threatened decapod crustaceans that depend on freshwater habitats for their survival. As a result, we developed a proposal to Springer Publishers for a multi-authored invited volume that was based on two symposia on decapod conservation held at conferences in Germany and Japan. The first of these symposia was "Conservation and Biology of Freshwater Decapoda" held at the 2014 International Crustacean Congress 9 (ICC9) in Frankfurt, Germany, that included presentations by many of the authors who have contributed a chapter to this book. In addition, one of the editors (NC) was also an invited

plenary speaker at ICC9 who presented a talk on “Developing Conservation Strategies for Threatened Freshwater Decapods Worldwide”. The second symposium was “Conservation of Freshwater Decapods” at the “International Association of Astacology (IAA) and Carcinological Society of Japan (CSJ) Joint international Conference on Crustacea, IAA 20” held later in 2014 in Sapporo, Japan. This conference was organized by TK and included presentations on decapod conservation by several authors of the present volume, and by NC, who gave a talk in the plenary session on “Freshwater Crabs and the Biodiversity Crisis: Meeting the Conservation Challenges”. These three meetings formed the core of the 15 chapters in the present volume that have been authored by 38 leading specialists from all parts of the world. In this way, we were able to obtain global coverage that provided us with global coverage of the latest information on the biology and conservation of freshwater decapods.

In organizing and editing this book, we have enjoyed the support and input from active specialists in decapod biology and conservation from around the world. We would especially like to acknowledge the following individuals and organizations for their help: Dr. Hanamura Yukio (Japan), Dr. Elena Tricarico (Italy), Ms. Heide Türkay (Germany), the International Association of Astacology, The Crustacean Society, The Carcinological Society of Japan, and Zarigani Kenkyukai (Japan). We are especially grateful for the capable support of Judith Terpos and Alexandrine Cheronet of Springer Publishers who have guided us expertly throughout all of the steps in this long and complex process.

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