

Scientific and common English names
of well-studied crayfish featured in this book

<i>Astacopsis gouldi</i>	Tasmanian giant freshwater crayfish
<i>Astacus astacus</i>	Noble crayfish / European crayfish
<i>Astacus leptodactylus</i>	Thin-clawed / Turkish crayfish
<i>Astacus pachypus</i>	Thick-clawed crayfish
<i>Austropotamobius pallipes</i>	White-clawed crayfish
<i>Austropotamobius torrentium</i>	Stone crayfish
<i>Cambaroides japonicus</i>	Japanese crayfish
<i>Cambarus bartonii</i>	Common / Eastern crayfish
<i>Cambarus robustus</i>	Big water crayfish
<i>Cherax cainii</i>	Smooth marron
<i>Cherax destructor</i>	Yabby
<i>Cherax quadricarinatus</i>	Redclaw
<i>Cherax quinquecarinatus</i>	Gilgie
<i>Cherax tenuimanus</i>	Marron / Hairly marron
<i>Euastacus armatus</i>	Murray River crayfish
<i>Euastacus sulcatus</i>	Lamington spiny crayfish
<i>Orconectes immunis</i>	Calico crayfish
<i>Orconectes limosus</i>	Spiny-cheek crayfish
<i>Orconectes longidigitus</i>	Longpincered crayfish
<i>Orconectes propinquus</i>	Northern clearwater / Blue crayfish
<i>Orconectes rusticus</i>	Rusty crayfish
<i>Orconectes virilis</i>	Virile / Fantail crayfish
<i>Pacifastacus fortis</i>	Shasta crayfish
<i>Pacifastacus leniusculus</i>	Californian / Signal crayfish
<i>Paranephrops planifrons</i>	Northern koura
<i>Paranephrops zealandicus</i>	Southern koura
<i>Procambarus acutus</i>	Eastern white river crayfish
<i>Procambarus clarkii</i>	Louisiana / Red swamp crayfish
<i>Procambarus hagenianus</i>	Prairie crayfish
<i>Procambarus zonangulus</i>	Gulf white river crayfish
<i>Procambarus fallax f. virginialis</i>	Marmorkrebs / Marbled crayfish
<i>Samastacus spinifrons</i>	Osorno River crayfish

Management of Freshwater Biodiversity

Crayfish as Bioindicators

Integrating research into freshwater biodiversity and the role of keystone species, this fascinating book presents freshwater crayfish as representatives of human-exacerbated threats to biodiversity and conservation. It uses examples from these and other large decapod invertebrates to explore how communities function and are controlled, alongside the implications of human demands and conflicts over limited resources, notably the severe impacts on biodiversity.

The discussion is structured around three key topics – the present situation of crayfish in world freshwater ecosystems, the application of science to conservation management, and knowledge transfer for successful crayfish management. It outlines the historic exploitation of crayfish, addressing the problems caused by invasive alien forms and explaining the importance of correct identification when dealing with conservation issues. Offering a global perspective on freshwater systems, the book ultimately highlights how the conservation of such large and long-lived species will help protect ecosystem quality in the future.

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Crayfish as Bioindicators

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Preface

This book is not just about freshwater crayfish – it is about the plight of biodiversity in a world of growing demands on resources. Freshwater crayfish are widespread, often dominant, members of many aquatic habitats, and excite interest because of their size and edible nature, but freshwater resources are under heavy and increasing pressure.

Over the past 50 years, humans have altered ecosystems more rapidly and extensively than in any comparable period of time in human history. Introductions of non-native species have been made with the intention of improving our quality of life, but largely in ignorance of ecological consequences. Development of genetically engineered organisms adds a new dimension to the question of introduced species and the threat to biodiversity. The increasing globalization of the economy, with extensive travel and shipment of goods between continents, brings increasing numbers of unintended new invasions.

In addition, the projected rate of global climate change in the coming century is more rapid than any such change that has occurred in the last 10 000 years. According to the International Union for Conservation of Nature (IUCN), some species will be more vulnerable because of climate change, and even where they are able to tolerate changes, they will have to deal with a variety of new competitors, predators, diseases, and alien species for which they have no natural defences.

Many countries have put in place a monitoring framework to assess the extent of freshwater deterioration and to suggest remedial action. In Europe this has been stimulated by the Water Framework Directive (WFD). Internationally, studies are most complete on larger lakes and rivers, but are still poor for other ponds and lakes, which may also have high biodiversity. Thus there are still gaps in our understanding of biodiversity in fresh waters, with uneven geographical and taxonomic coverage. We also need a better understanding of the link between species diversity and ecosystem functioning, particularly the roles of natural communities in recycling nutrients and providing other services.

There is now increasing interest in freshwater decapods, particularly crayfish, both from producing and consuming countries and from those who simply value these large invertebrates for their own sake. Various management, conservation and protective measures have been put in place. All these initiatives are good for preventing further declines in native stocks, but the spread of alien crayfish species remains the paramount problem in most areas, and the extent of their impacts is only now being realized.

There are already several books about freshwater crayfish, from the magisterial volume on a global scale edited by Holdich (2002a) and the one concentrating on the European situation (Gherardi & Holdich, 1999), to several books on a regional scale (e.g. Füreder, 2009). To these we must add the four edited volumes on *European Crayfish* (Vigneux, 1997, 2000, 2001; Souty-Grosset & Grandjean, 2002) and four further volumes from the European network CRAYNET ('European crayfish as keystone species – linking science, management and economics with sustainable environmental quality') in 2003, 2004, 2005 and 2006, all published as Special Issues of *Bulletin Français de la Pêche et de la Pisciculture* (now *Knowledge and Management of Aquatic Ecosystems*), culminating in the *Atlas of Crayfish in Europe* (ed. Souty-Grosset *et al.*, 2006).

The present book does not seek to cover the same ground; instead it uses examples from freshwater decapods, notably the many species of crayfish, to focus on current ideas about how freshwater communities function and are controlled, and on the implications of human demands and conflicts over the limited freshwater resource, including severe impacts on freshwater biodiversity. The failure of the International Year of Biodiversity (2010) to meet its targets proved that we need to try harder to understand and rectify biodiversity loss, and to project the conservation message – and we hope that this book will help towards this important aim.

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