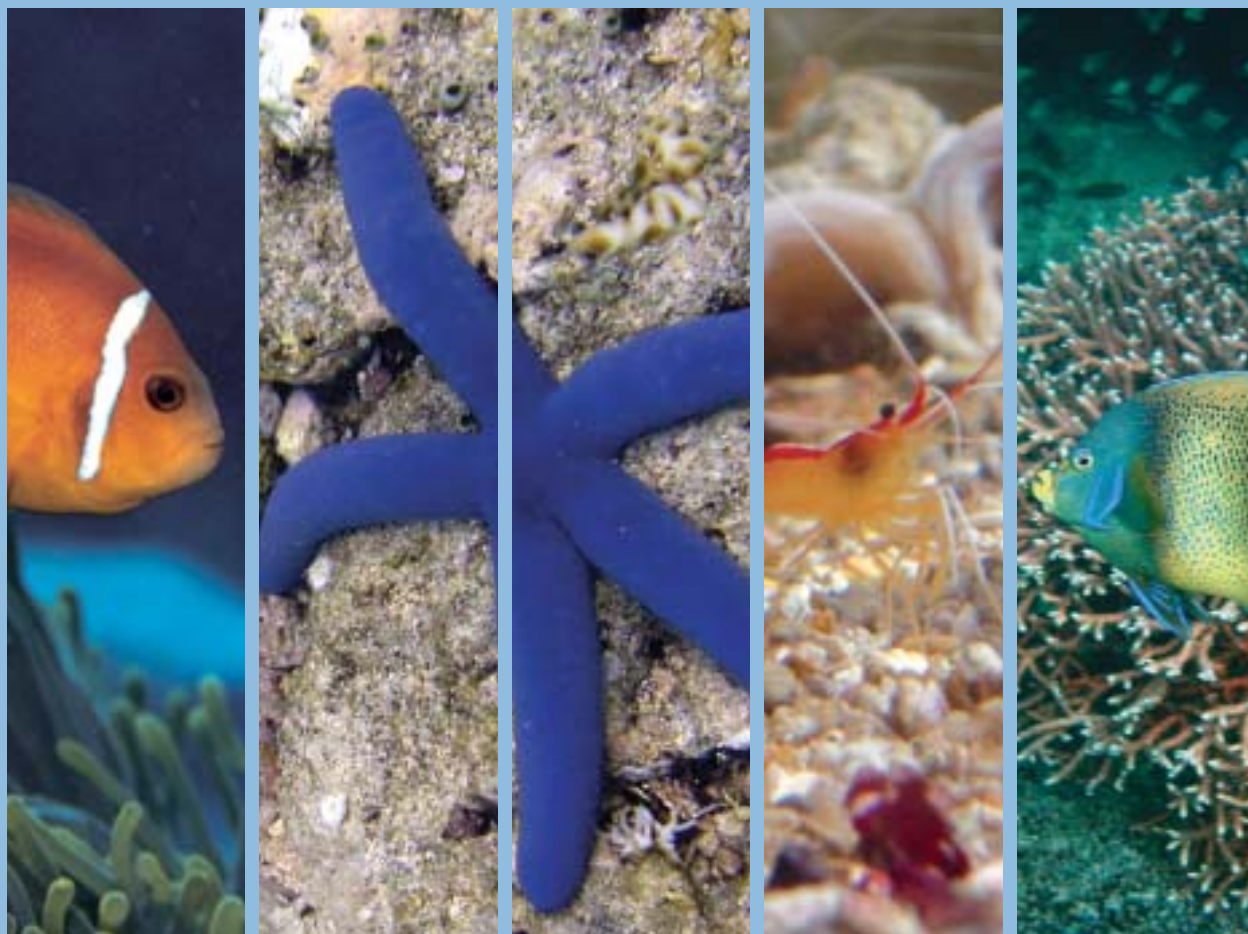


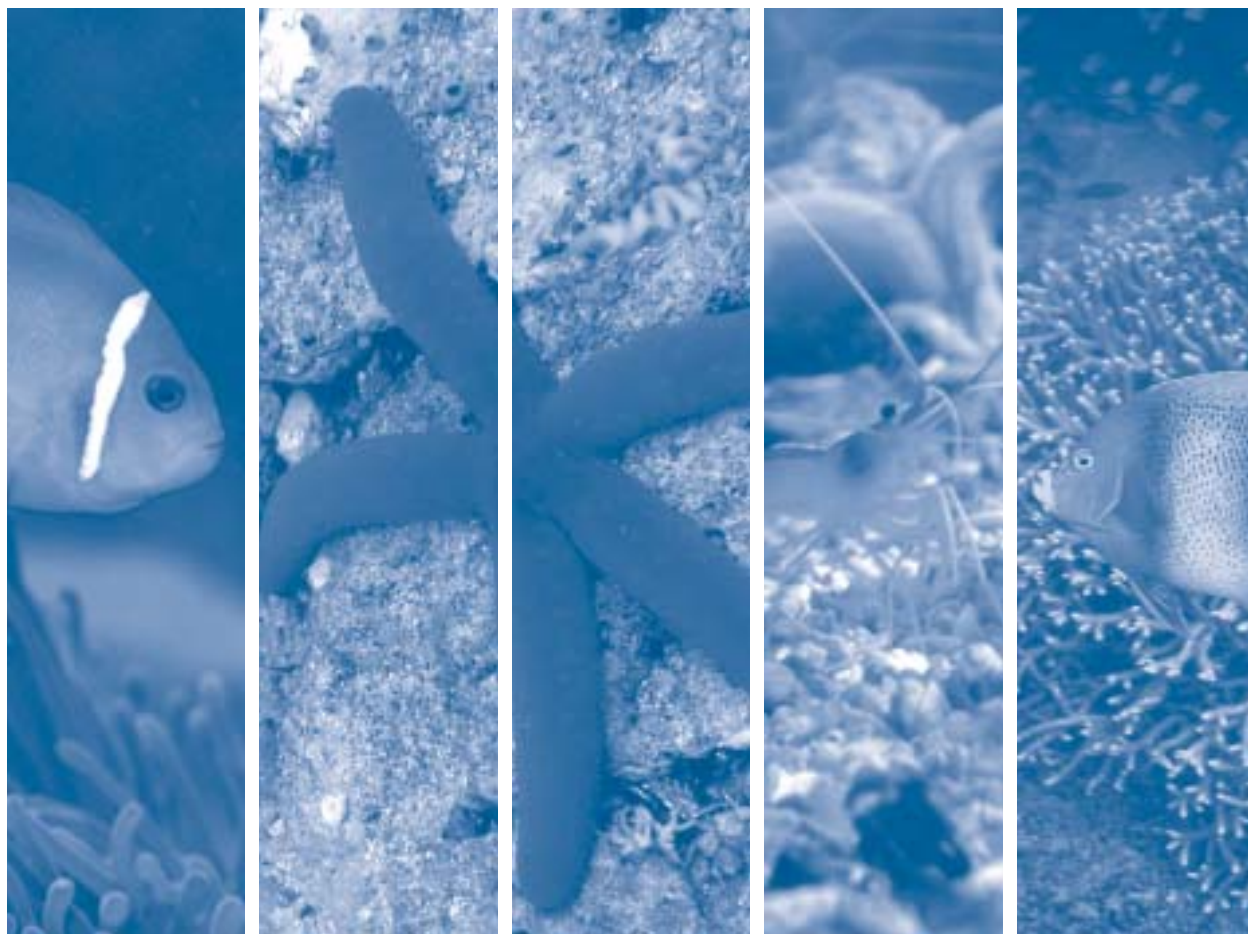
From **Ocean** to **Aquarium**



The global trade in marine ornamental species

Colette Wabnitz, Michelle Taylor,
Edmund Green and Tries Razak

From **Ocean** to **Aquarium**



The global trade in marine ornamental species

Colette Wabnitz, Michelle Taylor,
Edmund Green and Tries Razak

**UNEP World Conservation
Monitoring Centre**

219 Huntingdon Road
Cambridge CB3 0DL, UK
Tel: +44 (0) 1223 277314
Fax: +44 (0) 1223 277136
E-mail: info@unep-wcmc.org
Website: www.unep-wcmc.org

Director: Mark Collins

THE UNEP WORLD CONSERVATION MONITORING CENTRE is the biodiversity assessment and policy implementation arm of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organization. UNEP-WCMC aims to help decision makers recognize the value of biodiversity to people everywhere, and to apply this knowledge to all that they do. The Centre's challenge is to transform complex data into policy-relevant information, to build tools and systems for analysis and integration, and to support the needs of nations and the international community as they engage in joint programmes of action.

UNEP-WCMC provides objective, scientifically rigorous products and services that include ecosystem assessments, support for implementation of environmental agreements, regional and global biodiversity information, research on environmental threats and impacts, and development of future scenarios for the living world.

Sponsors

Major financial support from the David and Lucile Packard Foundation is gratefully acknowledged, as is some contributing support from the Bloomberg Foundation.

ACKNOWLEDGEMENTS

This report would not have been possible without the participation of many colleagues from the Marine Aquarium Council, particularly Aquilino A. Alvarez, Paul Holthus and Peter Scott, and all trading companies who made data available to us for inclusion into GMAD. The kind assistance of Akbar, John Brandt, John Caldwell, Lucy Conway, Emily Corcoran, Keith Davenport, John Dawes, MM Faugère et Gavand, Cédric Genevois, Thomas Jung, Peter Karn, Firoze Nathani, Manfred Menzel, Davide di Mohtarami, Edward Molou, Wolfgang Mueller, James O'Carroll, Jan Olsen, Gayatri Reksodiardjo-Lilley, Martin Selch, Claude Schuhmacher, Craig Shuman, Derek Thomson, Caroline Raymakers, Paul West, and Miriam and Danny Winkels is also very much appreciated.

The authors would like to thank Helen Corrigan for her help with the analyses of CITES data, and Sarah Ferriss for assisting in assembling information and analysing Annex D and GMAD data on *Hippocampus* spp. We are grateful to Neville Ash for reviewing and editing earlier versions of the manuscript.

Thanks also for additional comments to Katharina Fabricius, Daphné Fautin, Bert Hoeksema, Caroline Raymakers and Charles Veron; for providing reprints, to Alan Friedlander, Julie Hawkins, Sherry Larkin and Tom Ogawa; and for providing the picture on p 41, to Yvonne Sadovy.

We are grateful to Marie-Annick Moreau and Kristin Lunn for information on Banggai cardinalfish and to Craig Shuman for information on the sea anemone fishery in the Philippines.

PHOTOGRAPHS

Photos illustrating this report were kindly provided by the following.
© as listed

Front cover and title page, left to right:

A. Edwards, F. Benzoni, C. Genevois, O. Hoegh-Guldberg.

Back cover: C. Genevois.

Pages: Francesca Benzoni: p 28; Eran Brokovich: p 16 (right); CSIRO: p 39 (both); Alasdair Edwards: pp 6, 36, 43 (both); Cédric Genevois: pp 11, 25 (left), 30, 38, 50; Edmund Green: pp 8 (lower),

25 (right), 46, 48, 53 (left), 55; Ove Hoegh-Guldberg: pp 9 (both), 37, 45, 55; Ofri Johan: pp 24, 34, 56 (right); Marc Kochzius: pp 7 (lower right), 16 (left), 17, 18, 21 (left), 33, 47 (right), 56 (left); Ed McManus: p 26; George Mitcheson/National Geographic Society: p 41; Project Seahorse: pp 10 (A. Vincent), 21 (A. Vincent), 35 (D. McCorry), 52 (A. Vincent); Peter Scott: pp 7 (upper two and lower left), 8 (top), 12, 13, 14 (both), 47 (left), 53 (right), 57, 58; Colette Wabnitz: pp 15, 40; Zoological Survey of India, Chennai: p 29.

© UNEP World Conservation Monitoring Centre 2003

Citation: Wabnitz, C., Taylor, M., Green, E., Razak, T. 2003. *From Ocean to Aquarium*. UNEP-WCMC, Cambridge, UK.

URL: http://www.unep-wcmc.org/resources/publications/UNEP_WCMC_bio_series/17.htm

A Banson production

Printed in the UK by Swaingrove Imaging

The contents of this report do not necessarily reflect the views or policies of UNEP or contributory organizations. The designations employed and the presentations do not imply the expressions of any opinion whatsoever on the part of UNEP or contributory organizations concerning the legal status of any country, territory, city or area or its authority, or concerning the delimitation of its frontiers or boundaries.

Foreword

Most of us at some time or another have enjoyed the relaxing experience of gazing into an aquarium, in a dentist's waiting room or during a special visit to a public aquarium. In admiring the playfulness of clownfish wriggling amongst the anemones' tentacles, the grace of angelfish swimming in open water and in our delight at spotting reclusive shrimp and crabs crawling behind iridescent living corals, it is all too easy to overlook the fact that all these wonderful creatures are far from their natural home. The great majority of animals in aquaria across Europe and North America were collected from coral reefs far away and flown, bagged in plastic and packed in styrofoam boxes, thousands of miles to our hospitals and living rooms.

This report, *From Ocean to Aquarium: The Global Trade in Marine Ornamental Species*, takes a clear objective look at this international industry. A potential source of income for communities living close to coral reefs, the aquarium trade has been heavily criticised for the use of unsustainable collection techniques and poor husbandry practices. Policy makers have been faced with something of a dilemma in trying to control the environmentally

undesirable aspects of the industry without risking the economic incentive which aquarium fishers have in caring for the coral reefs that provide their livelihoods. Where previously much controversy existed between opponents and supporters of the aquarium trade, most of it based on polarized opinion and poor information, this publication presents sound quantitative data on the species in trade. Through linking trade data to what is known about the life histories of the target organisms, conservation priorities and management recommendations are identified.

I have great pleasure in presenting this report and wish to extend the gratitude of the authors to the long list of collaborating organizations and companies that have made it possible. I am confident that the information contained here will assist efforts to promote sustainable practice within the industry, as well as providing information to casual admirers of marine organisms.

Mark Collins

Director

UNEP World Conservation Monitoring Centre

Contents

Acknowledgements	2	CONSERVATION ISSUES	33
Foreword	3	Destructive harvesting practices	33
EXECUTIVE SUMMARY	6	Cyanide	33
Fish	6	Impacts on populations	35
Corals	7	Life histories	37
Invertebrates	8	Sex-selective fisheries	42
INTRODUCTION	9	Species suitability	43
ORGANIZATION OF THE TRADE	12	Fishes	43
Collection	12	Corals	45
Airline transport	13	Post-harvesting mortality	46
At destination	13	Invasive species	47
Transshipping	13	User conflict	47
Governments	14	CONSERVATION EFFORTS	48
Associations	14	Marine Aquarium Council and certification	48
SOURCES OF TRADE DATA	15	Mariculture	49
The Global Marine Aquarium Database (GMAD)	16	Corals	49
ANALYSIS OF TRADE DATA	18	Fish	51
Fish	18	Invertebrates	54
Seahorses	20	Management initiatives for the trade	54
Corals	22	Limited access to the fishery	55
Stony corals	22	Quotas	55
Soft corals and sea fans	25	Size limits	56
Live rock	27	Marine reserves	56
Invertebrates	29	Temporary closures	57
Giant clams	29	CONCLUSIONS AND RECOMMENDATIONS	58
		ENDNOTES	59
		REFERENCES	60

Executive summary

Between 1.5 and 2 million people worldwide are believed to keep marine aquaria. The trade which supplies this hobby with live marine animals is a global multi-million dollar industry, worth an estimated US\$200-330 million annually, and operating throughout the tropics. Ornamental marine species (corals, other invertebrates and fish) are collected and transported mainly from Southeast Asia, but also increasingly from several island nations in the Indian and Pacific Oceans, to consumers in the main destination markets: the United States, the European Union (EU) and, to a lesser extent, Japan.

Very few of the species in trade are exploited directly for other purposes, and there is little doubt that aquarium animals are the highest value-added product that can be harvested from a coral reef. If managed sustainably, the trade could support jobs in predominantly rural, low-income coastal communities and so provide strong economic incentives for coral reef conservation in regions where other options for generating revenue are limited. However, damaging techniques occasionally used to collect the animals, possible over-harvesting of some species and the high levels of mortality associated with inadequate handling and transport of sensitive living



Bluestreak cleaner wrasse, *Labroides dimidiatus*.

organisms undermine this potential, and continue to pose significant challenges to achieving sustainability. As a result the trade has seldom been free of controversy as traders try to generate a profit, conservationists try to avoid further decline in coral reefs also suffering from other pressures, and policy makers try to assemble a legislative framework that protects coral reefs without threatening a legitimate business activity or the incomes of communities engaged in aquarium fishing.

In the main, this debate has taken place without access to impartial and quantitative data on the trade and, with so many different viewpoints, achieving consensus on its impacts, and hence the identification of suitable responses, has been difficult. In 2000, the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), the Marine Aquarium Council (MAC) and members of various aquarium trade associations began, in collaboration, to address this need for better information and created the Global Marine Aquarium Database (GMAD). Trade data have been obtained from wholesale exporters and importers of marine aquarium organisms, most often through copies of trade invoices, integrated and standardized into quantitative, species-specific information which has been placed in the public domain: www.unep-wcmc.org/marine/GMAD. Fifty-eight companies, approximately one-fifth of the wholesalers in business, and four government management authorities have provided data to GMAD. In August 2003 the dataset contained 102,928 trade records (7.7 million imported and 9.4 million exported animals) covering a total of 2,393 species of fish, corals and invertebrates and spanning the years 1988 to 2003. These data have permitted the most accurate quantitative estimates to date of the size of the global trade in marine ornamental fish and corals, and the first ever estimates for invertebrates other than corals, a previously overlooked section of the industry.

FISH

A total of 1,471 species of fish are traded worldwide with the best estimate of annual global trade ranging between



Copperhead butterflyfish, *Chelmon rostratus*: from ocean to aquarium.

20 and 24 million individuals. Damselfish (Pomacentridae)

bluestreak cleaner wrasse (*Labroides dimidiatus*: GMAD

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_11905

