

Review of the state of world marine fishery resources

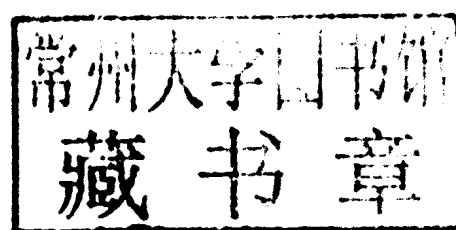


Review of the state of world marine fishery resources

FAO
FISHERIES AND
AQUACULTURE
TECHNICAL
PAPER

569

Marine and Inland Fisheries Service
Fisheries and Aquaculture Resources Use and Conservation Division
FAO Fisheries and Aquaculture Department



The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views of FAO.

ISBN 978-92-5-107023-9

All rights reserved. FAO encourages reproduction and dissemination of material in this information product. Non-commercial uses will be authorized free of charge, upon request. Reproduction for resale or other commercial purposes, including educational purposes, may incur fees. Applications for permission to reproduce or disseminate FAO copyright materials, and all queries concerning rights and licences, should be addressed by e-mail to copyright@fao.org or to the Chief, Publishing Policy and Support Branch, Office of Knowledge Exchange, Research and Extension, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy.

Preparation of this document

This document, the *Review of the state of world marine fishery resources*, was prepared by the Marine and Inland Fisheries Service, Marine and Aquaculture Resources Use and Conservation Division, FAO Fisheries and Aquaculture Department. It is part of the regular programme activities and a partial fulfilment of the Organization's role with regards to the monitoring and reporting on global marine resources and relevant environmental and ecological changes. The main objective of this review is to provide the FAO Committee on Fisheries (COFI), policy-makers, fishers, civil society and managers of world fishery resources with a comprehensive, objective and global review of the state of the living marine resources. This document updates the information provided in FAO Fisheries Technical Paper No. 457, *Review of the state of world marine fishery resources*, issued in 2005, and also updates and expands the information provided in relevant fishery resources sections of the more recent FAO publications on *The state of world fisheries and aquaculture* (SOFIA). It is intended that this *Review of the state of world marine fishery resources* will be completely revised every five years, with briefer updates provided biennially.

Relevant sections of this review have been compiled by FAO and selected invited experts, as indicated by the authorship of each chapter. Yimin Ye was responsible for the general coordination and final technical editing of this document, with the valuable assistance of David Milton. Fabio Carocci prepared tables and illustrations for this report.

Abstract

Marine fisheries are very important to the economy and well-being of coastal communities. Maintaining the long-term prosperity and sustainability of marine fisheries is not only of political and social significance but also of economic and ecological importance. This review presents an updated assessment of the current status of the world's marine fishery resources. Its aim is to provide the FAO Committee on Fisheries, policy-makers, civil society, fishers and managers of world fishery resources with a comprehensive, objective and global review of the state of the living marine resources of the oceans. The review was based mainly on official catch statistics up until 2009 and relevant stock assessment and other complementary information available until 2010.

This review consists of four major components. The first is a global overview of marine fishery production and the state of marine fish resources. The second part is divided into chapters that summarize and compile the information available for each FAO major fishing area, together with a discussion of the major trends and changes that have occurred with the main fishery resources exploited in each area and comments on the stock assessment work undertaken in support of fisheries management in each region. The third section is allocated to special topics that attract great attention in the international community, including tuna and tuna-like species, sharks, the Pacific islands region, deep-sea fisheries, and fisheries and long-term climate variability. The final part lists all the tables that provide details about historical and recent catches for the major marine resources and, where possible, assessments of the most current state of exploitation of fish stocks.

FAO

Review of the state of world marine fishery resources.

FAO Fisheries and Aquaculture Technical Paper No. 569. Rome, FAO. 2011. 334 pp.

Acknowledgements

This publication is one of the initiatives of the Marine and Inland Fisheries Service to assess and monitor the state of world marine fishery resources. In addition to the authors listed in each chapter, many staff members, both inside and outside the Service, made valuable contributions to the assessment and preparation of this review report. The Statistics and Information Service assisted with catch statistic data, Luca Garibaldi in particular. The library of the Fisheries and Aquaculture Department provided valuable service for references. Michel Lamboeuf, Juan Ignacio de Leiva Moreno, and Jean-Jacques Maguire assisted with analyzing FAO's catch statistic data. Tina Farmer provided various assistances with the publication of this report. A large number of regional fishery management organizations/authorities have provided data, information, comments and suggestions and are gratefully acknowledged. The final revisions and inputs of the report were provided by technical editor David Milton and FAO editor Julian Plummer. The graphic layout was prepared by Jose Luis Castilla Civit. Thanks are also expressed to many others who with our regrets are not being listed due to the large number. Nevertheless and while fully recognizing the assistance received from different sources, the full responsibility for what is presented in this review lies entirely with the Organization and the authors of each chapter.

Abbreviations and acronyms

ABF	Angola-Benguela Front
ACE	annual catch entitlement
ACOM	Advisory Committee (ICES)
ACS	Association of Caribbean States
AFMA	Australian Fisheries Management Authority
APEC	Asia-Pacific Economic Cooperation
APFIC	Asia-Pacific Fishery Commission
ASEAN	Association of Southeast Asian Nations
CalCOFI	California Cooperative Ocean Fisheries Investigation Program
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CDS	catch documentation scheme
CECAF	Fishery Committee for the Eastern Central Atlantic
CFMC	Caribbean Fisheries Management Council
CFP	Common Fisheries Policy
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLME	Caribbean Large Marine Ecosystem
CMM	conservation and management measure
Code	Code of Conduct for Responsible Fisheries
COFI	Committee on Fisheries
CPUE	catch per unit of effort
CRFM	Caribbean Regional Fisheries Mechanism
CTMFM	Joint Technical Commission for the River Plate Maritime Front
CTS	Commonwealth trawl sector (Australia)
DEPM	Daily egg production method
DFO	Department of Fisheries and Oceans, Canada
EA	Eastern Arctic
EEZ	exclusive economic zone
ENSO	El Niño-Southern Oscillation
EU	European Union
F	fishing mortality
FAD	fish aggregating device
FFA	Forum Fisheries Agency
FMA	Fisheries Management Act 1991 (Australia)
FMP	Fishery Management Plan
GCC	Cooperation Council
GEF	Global Environment Facility
GFCM	General Fisheries Commission for the Mediterranean
GSA	geographical subarea (GFCM)
HSP	Commonwealth Fisheries Harvest Strategy: policy and guidelines (Australia)
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
IOTC	Indian Ocean Tuna Commission

IPOA-Sharks	FAO International Plan of Action for the Conservation and Management on Sharks
ISSCAAP	International Standard Statistical Classification of Aquatic Animals and Plants
ISSF	International Seafood Sustainability Foundation
ITQ	individual transferable quota
IUCN	International Union for Conservation of Nature
IUU	illegal, unreported and unregulated (fishing)
IWC	International Whaling Commission
MCS	monitoring, control and surveillance
ML-TZ	Mid-Latitude “Transition Zone”
MPA	marine protected area
MSY	maximum sustainable yield
NAFO	Northwest Atlantic Fisheries Organization
NASCO	North Atlantic Salmon Conservation Organization
NEAC	Northeast Atlantic Commission (NASCO)
NEAFC	North East Atlantic Fisheries Commission
NEI	not elsewhere included
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPAFC	North Pacific Anadromous Fish Commission
NPOA	national plan of action
OECS	Organization of Eastern Caribbean States
OLDEPESCA	Latin American Organization for fishery Development
OMZ	oxygen minimum zone
ORCP	Orange Roughy Conservation Programme
OSPESCA	Central American Organization for the Fisheries and Aquaculture Sector
QMA	quota management area
QMS	quota management system
RAC	Regional Advisory Council
RBC	recommended biological catch
RECOFI	regional Commission for Fisheries
RFMO/A	regional fisheries management organization/arrangement
SAC	Scientific Advisory Committee (GFCM)
SEAFDEC	Southeast Asian Fisheries Development Centre
SciCOM	Science Committee (ICES)
SEAFO	South East Atlantic Fisheries Organisation
SICA	Sistema de la Integración Centroamericana
SIOFA	Southern Indian Ocean Fisheries Agreement
SlopeRAG	Slope Resource Assessment Group
SP-NWA	Sub-Polar Northwest Atlantic
SPC	Secretariat of the Pacific Community
SPRFMO	South Pacific Regional Fisheries Management Organisation
SSB	spawning stock biomass
SST	sea surface temperature
STECF	Scientific, Technical and Economic Committee for Fisheries
SWIOFC	South West Indian Ocean Fisheries Commission
TAC	total allowable catch
TACC	total allowable commercial catch
TAFIRI	Tanzania Fisheries Research Institute
TMP	Tuna management plan
t-RFMO	tuna regional fisheries management organization

UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Fish Stocks Agreement
UNGA	United Nations General Assembly
VME	vulnerable marine ecosystem
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean
WECAFC	Western Central Atlantic Fisheries Commission
WFC	World Fish Center
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature

Contents

Preparation of this document	iii
Abstract	iv
List of figures, tables and boxes	vii
Acknowledgements	viii
Abbreviations and acronyms	ix
Part A – Global overview	1
Global overview of marine fishery resources	3
Part B – Regional reviews	19
B1. Northwest Atlantic – FAO Statistical Area 21	21
B2. Northeast Atlantic – FAO Statistical Area 27	37
B3. Western Central Atlantic – FAO Statistical Area 31	49
B4. Eastern Central Atlantic – FAO Statistical Area 34	67
B5. Mediterranean and Black Sea – FAO Statistical Area 37	77
B6. Southwest Atlantic – FAO Statistical Area 41	93
B7. Southeast Atlantic – FAO Statistical Area 47	107
B8. Western Indian Ocean – FAO Statistical Area 51	121
B9. Eastern Indian Ocean – FAO Statistical Area 57	133
B10. Northwest Pacific – FAO Statistical Area 61	141
B11. Northeast Pacific – FAO Statistical Area 67	151
B12. Western Central Pacific – FAO Statistical Area 71	163
B13. Eastern Central Pacific – FAO Statistical Area 77	173
B14. Southwest Pacific – FAO Statistical Area 81	185
B15. Southeast Pacific – FAO Statistical Area 87	197
B16. Southern Ocean – FAO Statistical Areas 48, 58 and 88	217
Part C – Special topics	225
C1. Tuna and tuna-like species	227
C2. Sharks	245
C3. Pacific Islands Region – FAO Statistical Areas 71 and 77	255
C4. Deep-sea Fisheries	265
C5. Climate change impacts on the world fisheries resources	279
Part D – Marine resources tables	291
Appendix – Assessment methodology	327

List of tables, figures and boxes

LIST OF TABLES

Table B3.1	Locality and area of the major coastal shelf zones in the WECAF area	50
Table B5.1	Summary of the exploitation status of the species assessed by the SAC-GFCM or the SGMED-STEFC in the period 2009–2010	83
Table C1.1	Industrial tuna fisheries operating entirely or partially on the high seas, with an indication of some fishing countries	232
Table C3.1	Marine fishery production in Pacific Island countries, 2007	257
Table C3.2	Resources that support subsistence fishing in Pacific Island countries	258
Table C3.3	The tuna species of major commercial importance in the Pacific Islands Region	261
Table C4.1	Main groups of deep-sea species	269
Table C5.1	Examples of impact of climate change on marine fisheries resources	281
Table D1	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Northwest Atlantic (FAO Statistical Area 21), 1950–2009	293
Table D2	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Northeast Atlantic (FAO Statistical Area 27), 1950–2009	295
Table D3	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Western Central Atlantic (FAO Statistical Area 31), 1950–2009	297
Table D4	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Eastern Central Atlantic (FAO Statistical Area 34), 1950–2009	299
Table D5	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Mediterranean and Black Sea (FAO Statistical Area 37), 1950–2009	301
Table D6	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Southwest Atlantic (FAO Statistical Area 41), 1950–2009	303
Table D7	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the South Eastern Atlantic (FAO Statistical Area 47), 1950–2009	305
Table D8	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Southern Atlantic Ocean (FAO Statistical Area 48), 1950–2009	307
Table D9	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Western Indian Ocean (FAO Statistical Area 51), 1950–2009	308
Table D10	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Eastern Indian Ocean (FAO Statistical Area 57), 1950–2009	310
Table D11	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Southern Indian Ocean (FAO Statistical Area 48), 1950–2009	312
Table D12	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Northwest Pacific (FAO Statistical Area 61), 1950–2009	313
Table D13	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Northeast Pacific (FAO Statistical Area 67), 1950–2009	315
Table D14	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Western Central Pacific (FAO Statistical Area 71), 1950–2009	317

Table D15	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Eastern Central Pacific (FAO Statistical Area 77), 1950–2009	320
Table D16	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Southwest Pacific (FAO Statistical Area 81), 1950–2009	321
Table D17	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Southeast Pacific (FAO Statistical Area 87), 1950–2009	323
Table D18	State of exploitation and annual nominal catches of selected species and ISSCAAP groups fished in the Southern Pacific Ocean (FAO Statistical Area 48), 1950–2009	325
Table D19	State of exploitation and annual nominal catches of tuna and tuna-like species in all Oceans, 1950–2009	326
Appendix		
Table 1	Criteria for the classification of fish stock status	329
Table 2	Criteria for the classification of fish stocks status in previous assessments	332

LIST OF FIGURES

Figure A1	FAO marine major fishing areas for statistical purposes	4
Figure A2	World production from different sectors of fisheries and aquaculture	5
Figure A3	FAO Statistical Areas showing fluctuations in fish landings	6
Figure A4	FAO Statistical Areas showing a decreasing trend in fish landings	6
Figure A5	FAO Statistical Areas showing an increasing trend in fish landings	6
Figure A6	World marine catch by main species groups in 2009 (million tonnes and percentages)	9
Figure A7	Catches over time by three groups – pelagic, demersal and others	10
Figure A8	Temporal catch patterns of the top ten pelagic species	10
Figure A9	Temporal catch patterns of the top ten demersal species	11
Figure A10	Cath species composition by main species groups in major fishing areas in 2009	11
Figure A11	Global trends in marine fish stock status from 1974 to 2009	12
Figure A12	Percentages of fish stocks in different status by major fishing areas in 2009	14
Figure A13	Percentages of fish stocks in different status by three groups in 2009	14
Figure A14	Percentages of assessed stocks involving different uncertainty levels by major fishing areas in 2009	16
Figure A15	Temporal variation in the percentage of catches reported as “NEI” in the FAO statistical database	17
Figure B1.1	The Northwest Atlantic (Area 21)	21
Figure B1.2	Long-term annual-mean temperature	22
Figure B1.3	Annual nominal catches by ISSCAAP species groups in the Northwest Atlantic (Area 21)	24
Figure B1.4	Annual nominal catches of selected species in ISSCAAP Group 32, Northwest Atlantic (Area 21)	24
Figure B1.5	Annual nominal catches of selected species in ISSCAAP Group 35, 37, Northwest Atlantic (Area 21)	24
Figure B1.6	Annual nominal catches of selected species in ISSCAAP Group 31, Northwest Atlantic (Area 21)	25
Figure B1.7	Annual nominal catches of selected species in ISSCAAP Groups 43, 45, 55, 56, Northwest Atlantic (Area 21)	25
Figure B2.1	The Northeast Atlantic (Area 27)	37
Figure B2.2	Annual nominal catches by ISSCAAP species groups in the Northeast Atlantic (Area 27)	38
Figure B2.3	Annual nominal catches of selected species in ISSCAAP Group 32, Northeast Atlantic (Area 27)	38
Figure B2.4	Annual nominal catches of selected species in ISSCAAP Group 32, Northeast Atlantic (Area 27)	39

Figure B2.5	Annual nominal catches of selected species in ISSCAAP Group 35, 37, Northeast Atlantic (Area 27)	39
Figure B2.6	Annual nominal catches of selected species in ISSCAAP Groups 31, 33, 34, 45, Northeast Atlantic (Area 27)	39
Figure B3.1	The Western Central Atlantic (Area 31)	49
Figure B3.2	Annual nominal catches by ISSCAAP species groups in the Western Central Atlantic (Area 31)	51
Figure B3.3	Annual nominal catches of selected species in ISSCAAP Group 35 in the Western Central Atlantic (Area 31)	51
Figure B3.4	Annual nominal catches of selected species in ISSCAAP Groups 33, 35 in the Western Central Atlantic (Area 31)	52
Figure B3.5	Annual nominal catches of selected soft-bottom species, Western Central Atlantic (Area 31)	53
Figure B3.6	Annual nominal catches of selected reef species in the Western Central Atlantic (Area 31)	53
Figure B3.7	Annual nominal catches of selected species in ISSCAAP Group 36 in the Western Central Atlantic (Area 31)	54
Figure B3.8	Annual nominal catches of selected species in ISSCAAP Group 36 in the Western Central Atlantic (Area 31)	55
Figure B3.9	Annual nominal catches of selected species in ISSCAAP Group 38 in the Western Central Atlantic (Area 31)	55
Figure B3.10	Annual nominal catches of selected species in ISSCAAP Groups 43, 45 in the Western Central Atlantic (Area 31)	55
Figure B3.11	Annual nominal catches of common octopus and stromboid conchs in the Western Central Atlantic (Area 31)	56
Figure B4.1	The Eastern Central Atlantic (Area 34)	67
Figure B4.2	Annual nominal catches by ISSCAAP species groups in the Eastern Central Atlantic (Area 34)	68
Figure B4.3	Annual nominal catches by coastal States and foreign fleets, Eastern Central Atlantic (Area 34)	69
Figure B4.4	Annual nominal catches of selected species in ISSCAAP Group 35, Eastern Central Atlantic (Area 34)	69
Figure B4.5	Annual nominal catches of selected species in ISSCAAP Group 37, Eastern Central Atlantic (Area 34)	69
Figure B4.6	Annual nominal catches of selected species in ISSCAAP Group 36, Eastern Central Atlantic (Area 34)	70
Figure B4.7	Annual nominal catches of selected species in ISSCAAP Group 32, Eastern Central Atlantic (Area 34)	70
Figure B4.8	Annual nominal catches of selected species in ISSCAAP Group 45, Eastern Central Atlantic (Area 34)	70
Figure B4.9	Annual nominal catches of selected species in ISSCAAP Group 57, Eastern Central Atlantic (Area 34)	71
Figure B5.1	The Mediterranean and Black Seas (Area 37)	77
Figure B5.2	Total annual nominal catches from the Mediterranean and Black Seas from 1950 to 2009, grouped by major ISSCAAP groups	79
Figure B5.3	Annual nominal catches of selected species in ISSCAAP Groups 24 and 35	79
Figure B5.4	Annual nominal catches of selected species in ISSCAAP Group 37	79
Figure B5.5	Annual nominal catches of selected species in ISSCAAP Groups 33 and 37	80
Figure B5.6	Annual nominal catches of selected species in ISSCAAP Groups 32 and 33	80
Figure B5.7	Annual nominal catches of selected species in ISSCAAP Group 33	80
Figure B5.8	Annual nominal catches of selected species in ISSCAAP Group 57	81
Figure B5.9	Annual nominal catches of selected species in ISSCAAP Groups 43 and 45	81
Figure B5.10	Annual nominal catches of selected species in ISSCAAP Group 36	81
Figure B5.11	Definition of the GFCM Geographical Sub-Areas (GSAs)	82
Figure B6.1	The Southwest Atlantic (Area 41)	93
Figure B6.2	Annual nominal catches by ISSCAAP Groups in the Southwest Atlantic (Area 41)	95
Figure B6.3	Annual nominal catches of selected species in ISSCAAP Group 32, Southwest Atlantic (Area 41)	95

Figure B6.4	Annual nominal catches of selected species in ISSCAAP Groups 33 and 34, Southwest Atlantic (Area 41)	95
Figure B6.5	Annual nominal catches of selected species in ISSCAAP Groups 35 and 36, Southwest Atlantic (Area 41)	96
Figure B6.6	Annual nominal catches of selected species in ISSCAAP Group 57, Southwest Atlantic (Area 41)	96
Figure B6.7	Annual nominal catches of selected species in ISSCAAP Groups 42, 43 and 45, Southwest Atlantic (Area 41)	97
Figure B7.1	The Southeast Atlantic (Area 47)	107
Figure B7.2	Annual nominal catches by ISSCAAP species groups for the Southeast Atlantic (FAO Area 47)	109
Figure B7.3	Annual nominal catches of selected species in ISSCAAP Group 37, Southeast Atlantic (FAO Area 47)	109
Figure B7.4	Annual nominal catches of selected species in ISSCAAP Group 35, Southeast Atlantic (FAO Area 47)	109
Figure B7.5	Annual nominal catches of selected species in ISSCAAP Group 32, Southeast Atlantic (FAO Area 47)	110
Figure B7.6	Annual nominal catches of selected species in ISSCAAP Group 34, Southeast Atlantic (FAO Area 47)	
Figure B7.7	Annual nominal catches of selected species in ISSCAAP Group 33, Southeast Atlantic (FAO Area 47)	111
Figure B7.8	Annual nominal catches of selected species in ISSCAAP Groups 42, 43 and 45, Southeast Atlantic (FAO Area 47)	112
Figure B7.9	Annual nominal catches of selected species in ISSCAAP Groups 52 and 57, Southeast Atlantic (FAO Area 47)	113
Figure B8.1	The Western Indian Ocean (FAO Area 51)	121
Figure B8.2	Annual nominal catches by ISSCAAP species groups for the Western Indian Ocean (FAO Area 51)	123
Figure B8.3	Annual nominal catches of selected species in ISSCAAP Group 33, Western Indian Ocean (FAO Area 51)	123
Figure B8.4	Annual nominal catches of selected species in ISSCAAP Group 36, Western Indian Ocean (FAO Area 51)	124
Figure B8.5	Annual nominal catches of selected species in ISSCAAP Group 39, Western Indian Ocean (FAO Area 51)	124
Figure B8.6	Annual nominal catches of selected species in ISSCAAP Group 45, Western Indian Ocean (FAO Area 51)	124
Figure B8.7	Annual nominal catches of selected countries in Western Indian Ocean (FAO Area 51)	125
Figure B8.8	Annual nominal catches of countries in RECOFI area	125
Figure B8.9	Total annual nominal catches in Red Sea and Gulf of Aden area	126
Figure B8.10	Annual nominal catches of selected countries in the SWIOFC area	127
Figure B9.1	The Eastern Indian Ocean (Area 57)	133
Figure B9.2	Annual nominal catches by ISSCAAP species groups in the Eastern Indian Ocean (Area 57)	135
Figure B9.3	Annual nominal catches of selected species in ISSCAAP Group 33, Eastern Indian Ocean (Area 57)	136
Figure B9.4	Annual nominal catches of selected species in ISSCAAP Group 35, Eastern Indian Ocean (Area 57)	136
Figure B9.5	Annual nominal catches of selected species in ISSCAAP Groups 34 and 37, Eastern Indian Ocean (Area 57)	136
Figure B9.6	Annual nominal catches of selected species in ISSCAAP Groups 24, 36, 45 and 57, Eastern Indian Ocean (Area 57)	137
Figure B10.1	The Northwest Pacific (Area 61)	141
Figure B10.2	Annual nominal catches by ISSCAAP species groups in the Northwest Pacific (Area 61)	142
Figure B10.3	Annual nominal catches of selected countries in Northwest Pacific (Area 61)	142
Figure B10.4	Annual nominal catches of selected species in ISSCAAP Groups 32 and 34, Northwest Pacific (Area 61)	143

Figure B10.5	Annual nominal catches of selected species in ISSCAAP Groups 35 and 37, Northwest Pacific (Area 61)	143
Figure B10.6	Annual nominal catches of selected species in ISSCAAP Groups 55, 56 and 57, Northwest Pacific (Area 61)	144
Figure B10.7	Annual nominal catches of selected species in ISSCAAP Group 23, Northwest Pacific (Area 61)	144
Figure B10.8	Annual nominal catches of selected species in ISSCAAP Groups 42 and 45, Northwest Pacific (Area 61)	144
Figure B11.1	The Northeast Pacific (Area 67)	151
Figure B11.2	Annual nominal catches by ISSCAAP Group in the Northeast Pacific (Area 67)	152
Figure B11.3	Annual nominal catches of selected species in ISSCAAP Group 32, Northeast Pacific (Area 67)	152
Figure B11.4	Annual nominal catches of selected species in ISSCAAP Group 23, Northeast Pacific (Area 67)	152
Figure B11.5	Annual nominal catches of selected species in ISSCAAP Groups 32, 33 and 34, Northeast Pacific (Area 67)	153
Figure B11.6	Biomass estimates for selected species in ISSCAAP Group 31, Northeast Pacific (Area 67)	153
Figure B11.7	Annual nominal catches of selected species in ISSCAAP Groups 32, 33 and 34, Northeast Pacific (Area 67)	154
Figure B11.8	Annual nominal catches of selected species in ISSCAAP Groups 42 and 44, Northeast Pacific (Area 67)	154
Figure B11.9	Annual nominal catches of selected species in ISSCAAP Group 35, Northeast Pacific (Area 67)	155
Figure B12.1	The Western Central Pacific (Area 71)	163
Figure B12.2	Annual nominal catches by ISSCAAP species groups in the Western Central Pacific (Area 71)	165
Figure B12.3	Annual nominal catches of selected species in ISSCAAP Group 36, Western Central Pacific (Area 71)	165
Figure B12.4	Annual nominal catches of selected species in ISSCAAP Group 35, Western Central Pacific (Area 71)	166
Figure B12.5	Annual nominal catches of selected species from ISSCAAP Groups 33 and 38, Western Central Pacific (Area 71)	166
Figure B12.6	Annual nominal catches of selected species in ISSCAAP Group 45, Western Central Pacific (Area 71)	166
Figure B12.7	Annual nominal catches of selected species in ISSCAAP Group 57, Western Central Pacific	167
Figure B12.8	Annual nominal catches of distant-water countries' fleets, Western Central Pacific (Area 71)	167
Figure B13.1	The Eastern Central Pacific (Area 77)	173
Figure B13.2	Annual nominal catches by ISSCAAP species groups in the Eastern Central Pacific (Area 77)	174
Figure B13.3	Annual nominal catches of selected species in ISSCAAP Group 35, Eastern Central Pacific (Area 77)	175
Figure B13.4	Annual nominal catches of selected species in ISSCAAP Group 37, Eastern Central Pacific (Area 77)	176
Figure B13.5	Annual nominal catches of selected species in ISSCAAP Group 36, Eastern Central Pacific (Area 77)	176
Figure B13.6	Annual nominal catches of selected species in ISSCAAP Groups 45 and 47, Eastern Central Pacific (Area 77)	176
Figure B14.1	The Southwest Pacific (Area 81)	185
Figure B14.2	Annual nominal catches by ISSCAAP species groups in the Southwest Pacific (Area 81)	186
Figure B14.3	Annual nominal catches by major fishing countries, Southwest Pacific (Area 81)	187
Figure B14.4	Annual nominal catches of selected species in ISSCAAP Group 32, Southwest Pacific (Area 81)	187
Figure B14.5	Annual nominal catches of selected species from ISSCAAP Group 34, Southwest Pacific (Area 81)	187
Figure B14.6	Annual nominal catches of selected species from ISSCAAP Group 57, Southwest Pacific (Area 81)	188

Figure B15.1	The Southeast Pacific (Area 87)	197
Figure B15.2	Annual nominal catches by ISSCAAP species groups in the Southeast Pacific (Area 87)	199
Figure B15.3	Annual nominal catches of selected species in ISSCAAP Group 35, Southeast Pacific (Area 87)	200
Figure B15.4	Annual nominal catches of selected species in ISSCAAP Group 37, Southeast Pacific (Area 87)	200
Figure B15.5	Annual nominal catches of selected species in ISSCAAP Group 36, Southeast Pacific (Area 87)	201
Figure B15.6	Annual nominal catches of selected species in ISSCAAP Groups 32 and 33, Southeast Pacific (Area 87)	201
Figure B15.7	Annual nominal catches of selected species in ISSCAAP Group 57, Southeast Pacific (Area 87)	202
Figure B16.1	The Southern Ocean (Areas 48, 58 and 88)	217
Figure B16.2	Annual nominal catches in Areas 48, 58 and 88	219
Figure B16.3	CCAMLR boundaries of statistical reporting areas in the Southern Ocean	219
Figure B16.4	Annual nominal catches of selected species in Area 48	220
Figure B16.5	Annual nominal catches of selected species in Area 58	221
Figure B16.6	Annual nominal catches of selected species in Area 88	221
Figure B16.7	Annual nominal catches of selected species in Areas 48, 58 and 88	219
Figure C1.1	Distribution of principal market tunas and fishing areas	228
Figure C1.2	Annual global catches of tuna and tuna-like species	233
Figure C1.3	Annual global catches of selected tunas	233
Figure C2.1	Global trends in nominal shark and ray catches, 1990–2008	246
Figure C2.2	The most important FAO Statistical Area for shark and ray captures, 1990–2008	246
Figure C2.3	The top five countries/territories contributing to shark and ray captures, 1990–2008	247
Figure C2.4	The global value of shark landings, 1990–2006	247
Figure C2.5	Proportion of batoid captures, top five countries, 1990–2008	248
Figure C2.6	Global trends in blue shark catches, 1997–2008	248
Figure C2.7	Trends in dogfish catches, 1990–2008	248
Figure C3.1	The Pacific Islands Region	255
Figure C3.2	Marine fishery production by volume and by fishery category, Pacific Islands Region, 2007	257
Figure C3.3	Coastal fishing production in the Pacific Islands Region, 2007	258
Figure C3.4	Composition of the tuna catches in the EEZs of Pacific Island countries	261
Figure C4.1	Annual nominal catches of deep-sea species	268
Figure C4.2	Annual nominal catches of orange roughy	271
Figure C4.3	Annual nominal catches of Oreo dories	271
Figure C4.4	Annual nominal catches of alfonsino	272
Figure C4.5	Annual nominal catches of toothfish	273
Figure C4.6	Annual nominal catches of pelagic armourhead	273
Figure C4.7	Annual nominal catches of blue grenadier	273
Figure C5.1	Examples of consequences of global warming on the four components of food security: stability, access, utilization and availability of aquatic foods	280
Appendix		
Figure 1	Diagram of the decision tree for the classification of fish stock status	331

LIST OF BOXES

Box C5.1	Definitions of climate change	279
Box C5.2	The uncertain impacts of ocean acidification	286

PART A

Global overview