

Status Survey

# Sharks, Rays and Chimaeras: The Status of the Chondrichthyan Fishes

Compiled and edited by Sarah L. Fowler, Rachel D. Cavanagh,  
Merry Camhi, George H. Burgess, Gregor M. Cailliet,  
Sonja V. Fordham, Colin A. Simpfendorfer and John A. Musick



IUCN/SSC Shark Specialist Group

## **Donors to the SSC Conservation Communications Programme and *Sharks, Rays and Chimaeras Status Survey: The Status of the Chondrichthyan Fishes***

The IUCN Species Survival Commission (SSC) is committed to communicating important species conservation information to natural resource managers, decision makers and others whose actions affect the conservation of biodiversity. The SSC's Action Plans, Occasional Papers, newsletter *Species* and other publications are supported by a wide variety of generous donors including:

***The World Wide Fund for Nature (WWF)*** provides significant annual operating support to the SSC. WWF's contribution supports the SSC's minimal infrastructure and helps ensure that the voluntary network and publications programme are adequately supported. WWF aims to conserve nature and ecological processes by: (1) preserving genetic, species, and ecosystem diversity; (2) ensuring that the use of renewable natural resources is sustainable both now and in the longer term; and (3) promoting actions to reduce pollution and the wasteful exploitation and consumption of resources and energy. WWF is one of the world's largest independent conservation organisations with a network of National Organisations and Associates around the world and over 5.2 million regular supporters. WWF continues to be known as World Wildlife Fund in Canada and in the United States of America.

***Asian Nature Conservation Foundation (ANCF), India*** is a public charitable trust and non-profit organisation involved with ecological and conservation issues including scientific research and surveys, education and training, and field conservation activities. It endeavours to facilitate the gaining of knowledge through scientific research and assessments that ought to form the basis for the formulation of effective nature conservation policies and strategies. The foundation is presently involved in the applied research and direct field conservation activities pertaining to the Asian elephant and its habitat, and Dhole.

***Chester Zoo*** or the North of England Zoological Society is a charitable trust that significantly contributes to the protection of species and habitats worldwide through a combination of field and zoo-based conservation. In addition to conservation activities within the zoo, it works together extensively with many conservation organisations worldwide on many outreach projects, working directly to protect threatened plants and animals, and their habitats, in the wild. Projects range from the support of Black Rhino anti-poaching activities in East Africa to the conservation of wildlife in the Forest Reserves of China.

***Department for Environment Food and Rural Affairs (DEFRA)***, a department of the Government of United Kingdom, works for the essentials of life – food, air, land, water, people, animals and plants. It aims towards Sustainable development that will mean a better quality of life for everyone, now and for generations to come, including: a better environment at home and internationally, and sustainable use of natural resources; economic prosperity through sustainable farming, fishing, food, water and other industries that meet consumers' requirements; and thriving economies and communities in rural areas and a countryside for all to enjoy.

***Indian Institute of Science (IISc)*** A premier institution of research and advanced instruction, IISc has more than 2000 active researchers in forty academic departments working in almost all frontier areas of science and technology. One of the oldest and finest centres of its kind in India, it has a very high international standing in the academic world as well.

***The U.S. Fish and Wildlife Service (FWS)*** of the United States government is charged with the management and protection of 500 National Wildlife Refuges of the National Wildlife Refuge System, the world's largest and most diverse collections of lands set aside for wildlife, with the mission to work with others to conserve, protect, and enhance fish, wildlife, and plants and other habitats. The service's major responsibilities are for migratory birds, endangered species, certain marine mammals, and freshwater and anadromous fish.

***Wildlife Trust*** (formerly Wildlife Preservation Trust International) works worldwide in more than 20 countries to save threatened species from extinction, protect habitat, and link nature protection with health through collaborative projects with local scientists. It aims to improve humankind's ability to save nature and protect ecological health in a world that is increasingly fragmented and dominated by humans, especially in those parts of the world where rapidly growing human populations are placing wildlife species at great risk, and where professional capacity for conservation activity is limited.



# Sharks, Rays and Chimaeras: The Status of the Chondrichthyan Fishes





Status Survey

# **Sharks, Rays and Chimaeras: The Status of the Chondrichthyan Fishes**

**Compiled and edited by Sarah L. Fowler, Rachel D. Cavanagh,  
Merry Camhi, George H. Burgess, Gregor M. Cailliet,  
Sonja V. Fordham, Colin A. Simpfendorfer and John A. Musick**

IUCN/SSC Shark Specialist Group

**IUCN – The World Conservation Union  
2005**

The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this publication do not necessarily reflect those of IUCN.

Published by: IUCN, Gland, Switzerland and Cambridge, UK

Copyright: © 2005 International Union for Conservation of Nature and Natural Resources

Reproduction of this publication for educational or other non-commercial purposes is authorised without prior written permission from the copyright holder provided the source is fully acknowledged.

Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: Fowler, S.L., Cavanagh, R.D., Camhi, M., Burgess, G.H., Cailliet, G.M., Fordham, S.V., Simpfendorfer, C.A. and Musick, J.A. (comp. and ed.). 2005. *Sharks, Rays and Chimaeras: The Status of the Chondrichthyan Fishes. Status Survey*. IUCN/SSC Shark Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. x + 461 pp.

ISBN: 2-8317-0700-5

Cover photo: Oceanic whitetip shark *Carcharhinus longimanus*. Jeremy Stafford-Deitsch

Proofreader: Bryan Hugill

Layout by: NatureBureau, Newbury, UK

Produced by: NatureBureau, Newbury, UK

Printed by: Information Press, Oxford, UK

Available from: IUCN Publications Services Unit  
219c Huntingdon Road, Cambridge CB3 0DL, United Kingdom  
Tel: +44 1223 277894, Fax: +44 1223 277175  
E-mail: [books@iucn.org](mailto:books@iucn.org)  
[www.iucn.org/bookstore](http://www.iucn.org/bookstore)  
A catalogue of IUCN publications is also available.

*The text of this book is printed on 90 gsm Fineblade Smooth, which is made from 100% sustainable fibre sources using chlorine-free processes.*

# Contents

<b>Foreword</b> .....	vii	5.1 Targeted fishing (direct exploitation) .....	48
<b>Editor's Note</b> .....	viii	5.2 Bycatch (indirect exploitation) .....	50
<b>Acknowledgements</b> .....	ix	5.3 Habitat loss and degradation .....	51
<b>Executive Summary</b> .....	x	5.4 Other threats .....	52
<b>Chapter 1. Introduction</b> .....	1	5.5 Summary .....	54
JOHN A. MUSICK		5.6 References .....	54
References .....	3	<b>Chapter 6. International Conservation and Management Initiatives for Chondrichthyan Fish</b> .....	58
<b>Chapter 2. Classification of Chondrichthyan Fish</b> .....	4	SARAH L. FOWLER AND RACHEL D. CAVANAGH	
LEONARD J.V. COMPAGNO, DOMINIQUE A. DIDIER AND		6.1 Introduction .....	58
GEORGE H. BURGESS		6.2 International fisheries agreements .....	59
2.1 Introduction .....	4	6.3 International natural resource management agreements .....	61
2.2 Elasmobranchs .....	7	6.4 Regional agreements and management bodies ....	64
2.3 Chimaeras .....	9	6.5 National chondrichthyan fish conservation and management initiatives .....	66
2.4 References .....	10	6.6 The IUCN Red List Programme .....	66
<b>Chapter 3. Ecology and Life History Characteristics of Chondrichthyan Fish</b> .....	12	6.7 Conclusions .....	67
GREGOR M. CAILLIET, JOHN A. MUSICK,		6.8 Acknowledgements.....	68
COLIN A. SIMPFENDORFER AND JOHN D. STEVENS		6.9 References .....	68
3.1 Introduction .....	12	<b>Chapter 7. Regional Overviews</b> .....	70
3.2 Ecological role .....	12	7.1 Introduction .....	70
3.3 Life history characteristics .....	13	RACHEL D. CAVANAGH	
3.4 Life history constraints on exploitation .....	15	7.2 Northeast Atlantic (including Mediterranean and Black Sea) .....	71
3.5 References .....	16	PADDY WALKER, RACHEL D. CAVANAGH,	
<b>Chapter 4. Socio-economic Significance of Chondrichthyan Fish</b> .....	19	MATHIEU DUCROCQ AND SARAH L. FOWLER	
SHELLEY CLARKE, GEORGE H. BURGESS, RACHEL D. CAVANAGH,		7.3 Northwest Atlantic .....	95
GERALD CROW, SONJA V. FORDHAM, MATTHEW T. MCDAVITT,		COMPILED BY GEORGE H. BURGESS	
DEBRA A. ROSE, MARK SMITH AND COLIN A. SIMPFENDORFER		WITH CONTRIBUTIONS FROM MERRY CAMHI,	
4.1 Introduction .....	19	SONJA V. FORDHAM, JOHN A. MUSICK, RAMÓN BONFIL,	
4.2 Markets and production .....	20	STEVEN BRANSTETTER, CHRISTINE CHAN A SHING,	
4.3 Regional fisheries and trade .....	24	LEO WALTER GONZALES AND THOMAS HOFF	
4.4 Cultural significance .....	30	7.4 Subequatorial Africa .....	113
4.5 Ecotourism .....	32	LEONARD J.V. COMPAGNO, RACHEL D. CAVANAGH,	
4.6 Shark attack .....	34	MALCOLM J. SMALE, SHELDON F. J. DUDLEY,	
4.7 Education .....	35	SID F. COOK, ANDREW COOKE, WARWICK SAUER AND	
4.8 Public aquaria .....	38	HANNES HOLTZHAUSEN	
4.9 Summary .....	42	7.5 Southwest Atlantic .....	131
4.10 Acknowledgement .....	42	RAMÓN BONFIL, ALBERTO AMORIM AND	
4.11 References .....	42	COLIN A. SIMPFENDORFER	
<b>Chapter 5. Threats Faced by Chondrichthyan Fish</b> .....	48	7.6 Indian Ocean .....	140
JOHN D. STEVENS, TERENCE I. WALKER, SID F. COOK AND		R. CHARLES ANDERSON AND COLIN A. SIMPFENDORFER	
SONJA V. FORDHAM		7.7 Northwest Pacific .....	150
		COLIN A. SIMPFENDORFER, RACHEL D. CAVANAGH,	
		SHO TANAKA AND HAJIME ISHIHARA	
		7.8 Southwest Pacific, Australasia and Oceania .....	161
		JOHN D. STEVENS, COLIN A. SIMPFENDORFER AND	
		MALCOLM FRANCIS	

7.9 Northeast Pacific .....	172	<b>Glossary and Acronyms .....</b>	<b>394</b>
GREGOR M. CAILLIET AND MERRY CAMHI			
7.10 Southeast Pacific .....	186	<b>Appendix 1: Global Checklist of Living</b>	
RAMÓN BONFIL, COLIN A. SIMPFENDORFER		<b>Chondrichthyan Fishes .....</b>	<b>401</b>
AND ENZO ACUÑA		LEONARD J.V. COMPAGNO	
7.11 References .....	193		
<b>Chapter 8. Species Status Reports .....</b>	<b>213</b>	<b>Appendix 2: International Plan of Action for the Conservation</b>	<b>and Management of Sharks (IPOA-Sharks) .....</b>
COMPILED BY SARAH L. FOWLER AND			<b>424</b>
RACHEL D. CAVANAGH		<b>Appendix 3: Regional Fisheries Organisations'</b>	<b>Actions Regarding Chondrichthyan Fishes .....</b>
8.1 Introduction .....	213		<b>428</b>
S.L. FOWLER		<b>Appendix 4: Key International and Regional</b>	<b>Organisations and Conventions .....</b>
8.2 Wide-ranging marine species .....	213		<b>431</b>
GEORGE H. BURGESS AND JOHN A. MUSICK		<b>Appendix 5: Summary of Life-history Traits of</b>	<b>Some Chondrichthyan Species .....</b>
8.3 Endemic marine species .....	214		<b>436</b>
LEONARD J.V. COMPAGNO		<b>Appendix 6: IUCN Red List Categories and Criteria</b>	<b>(1994 and 2001) .....</b>
8.4 Freshwater species .....	215		<b>448</b>
LEONARD J.V. COMPAGNO AND SID F. COOK		<b>Appendix 7: CITES Resolution Conf. 12.6:</b>	<b>Conservation and Management of Sharks .....</b>
8.5 Deepwater species .....	216		<b>450</b>
LEONARD J.V. COMPAGNO AND JOHN A. MUSICK		<b>Appendix 8: Contributing Authors' Contact Details ...</b>	<b>452</b>
8.6 Rarities .....	217		
LEONARD J.V. COMPAGNO		<b>Appendix 9: Summary of IUCN Red List</b>	<b>Assessments .....</b>
8.7 IUCN Red List assessments .....	218		<b>454</b>
SARAH L. FOWLER, RACHEL D. CAVANAGH AND			
MERRY CAMHI			
8.8 Species accounts .....	222		
8.9 Acknowledgements .....	361		
8.10 References .....	361		

# Foreword

This Status Report represents over a dozen years of volunteer effort by many dedicated scientists and conservationists, many of them obsessed by the plight of sharks. Prior to the 1990s there was little interest in protecting sharks and their relatives (the batoids and chimaeras). Although a few of us had been clamouring for management of dwindling stocks, chondrichthyan fisheries were of such low value that we were getting nowhere. In 1988, a series of articles on shark finning raised US public awareness. A hue and cry against this 'cruel and wasteful' process got the attention of US legislators, who began to take action.

The 1990 American Elasmobranch Society (AES) annual meeting voiced its concerns and agreed to address overfishing through a special Symposium on elasmobranch exploitation the following year. Dr George Rabb, then Chairman of the IUCN Species Survival Commission (SSC), rose from the audience and dramatically announced that he had selected me to establish the Shark Specialist Group (SSG) by forming a group of scientists and conservationists interested in documenting, raising awareness and eventually controlling the increasing threats to sharks and their relatives. I was struck dumb because, as a research scientist, I felt entirely inadequate to the task and had no real experience with conservation or the often-bizarre domestic and international politics that go with it. But 'fools rush in where angels fear to tread' and, with a small grant from IUCN and the blessing of the AES, I began to search out experts willing to identify conservation problems in their regions. The enthusiastic response was truly gratifying; a group of passionate experts was quickly assembled.

Meanwhile, planning was underway for the 1991 'Sharks Down Under' Conference in Sydney, Australia. Billed as 'the inaugural international conference on shark conservation', it aimed to assess current knowledge of the environmental crisis faced by sharks and establish future directions for action. The meeting provided the first opportunity for SSG founder members to discuss drafting a Chondrichthyan Status Report and Action Plan. I gave a short speech to open the Conference and several SSG members presented seminal papers, published in a dedicated issue of a respected Australian journal, making the point that the SSG was an intellectual force to be reckoned with. Shark conservation was becoming a reality!

In November 1993, the SSG summarised progress at the 4th Indo-Pacific Fish Conference in Bangkok, Thailand. Twenty-two members, including most regional chairs, attended an SSG meeting. We defined our mission statement, established a Trade Subgroup, set our schedule for publication of the SSG Chondrichthyan Status Report

and Conservation Action Plan by 1995 (naïve, but we were on a steep learning curve) and planned our newsletter *Shark News*. At least one international SSG meeting has been held every year since.

The culmination of my efforts took place in November 1994, when I testified in Fort Lauderdale, Florida, at the 9th meeting of the Conference of the Parties (CoP) to CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora). The political oratory that day led to the adoption of a Resolution calling, *inter alia*, for a full review by the UN Food and Agriculture Organization (FAO) and the CITES Animals Committee of the global status of sharks. The Resolution clearly understood the SSG's importance and international standing: '*RECOGNISING that the members of the IUCN Species Survival Commission's Shark Specialist Group are currently reviewing the status of sharks and the global trade in their parts and derivatives in the course of developing an action plan on shark conservation...*'. This led to national and international shark conservation and management initiatives, most recently the adoption of an updated Shark Resolution at the 12th CITES CoP, November 2002, which will drive much future work. The Parties also formally recognised CITES' role in marine resource management with the listing of the whale shark and basking shark in Appendix II: a 'first' for commercially exploited marine fish.

In August 1995, after five and a half years at the helm, I tendered my resignation to IUCN and returned to pure research, asking my deputies, Sarah Fowler and Merry Camhi, to take over the reins as Acting and Deputy Chairs, respectively. (In 1997, Sarah became Co-Chair with Jack Musick.) Today, we have seen important advances in the worldwide recognition of the plight of sharks by the public, the conservation community and governments. When I established the SSG 14 years ago, I would not have expected such a difference. However, we still have a long way to go and the SSG's work is far from complete. This Status Report goes a long way towards systematically laying out the rationale and need for sustainable management and conservation of chondrichthyan stocks. The information it presents lays the foundation for a Conservation Action Plan, a companion document to be published separately in the near future. A Status Report and Action Plan have been a crucial objective of the SSG since 1991, to provide both scientific information and advice that will lead to rational and responsible management as well as effective conservation of chondrichthyan species worldwide. I am delighted to introduce this volume to our readers.

**Samuel H. Gruber, Bimini, Bahamas, December 2004**

# Editor's Note

There are several key points we urge readers to take note of before reading this report.

## Future updates

This is the IUCN/SSC Shark Specialist Group's (SSG) first major attempt to synthesise information on the global status of chondrichthyans in one volume. It has been a long-term effort by many contributors. However, as we go to press we are already aware of several shortcomings. As noted in the Foreword, writing and compiling this *Status Report* has been underway for more than 12 years and, prior to the employment of our Programme Officer in 2001, this was an entirely voluntary effort by SSG members resulting in unavoidable delays in progress. Some sections and facts are already outdated because of significant advances in such fora as CITES and FAO and extensive progress with our recent Red Listing efforts. Data presented on landings and trade were current at the time of writing the various sections; it is inevitable that this information will be out of date by the time of publication. Availability of domestic data and SSG regional contacts at the time of writing dictated the level of detail that could be included for each country in the regional reports, and these vary widely.

Despite these shortcomings the decision was made to print this large volume to facilitate its distribution and use throughout the world. But, through periodic updates, this status report will become a 'living document' on SSG's website [www.flmnh.ufl.edu/fish/organizations/ssg/ssg.htm](http://www.flmnh.ufl.edu/fish/organizations/ssg/ssg.htm). Therefore, we welcome additional information, corrections, and updates from readers, particularly for countries for which we currently have little or no information.

## Classification

The official classification system used by SSG follows Compagno – see Chapter 2 for details. However, since some of the sections were written several years ago, there may be minor discrepancies with species names and distributions in this report. Readers are advised to refer to the checklist in Appendix I for clarification. Common names used throughout the report are the official FAO names in most cases, with the exception in some regional contexts where the most commonly used regional names (which may or may not appear in Appendix I) have been used.

## Landings and trade data

**FAO data:** FAO data are often the only available source of catch and landings data for chondrichthyan fisheries in many countries, but may be highly inaccurate as discussed

in Chapter 4. Some national catches are unmonitored and some FAO statistics are based solely on extrapolations of poor quality data published in other years. Data from national fisheries offices may be underestimates because of widespread lack of reporting, inaccurate record keeping, or willful under-reporting. These data may not account for subsistence catches, recreational catches, landings in foreign ports, transshipments at sea, and/or bycatch discarded at sea. It has been estimated that global catches may be twice that published by FAO. Caution should, therefore, be exercised when attempting to draw conclusions from this source.

We have used data from FAO, 2002, FISHSTAT Plus (v. 2.30), Capture Production Database, 1950–2000. Where possible, this has been compared with information from national fisheries organisations and/or anecdotal and individual project research data (such information will be made available at a later date as graphics and/or tables in the regional sections of the SSG website, and updated regularly). For the sake of consistency, we have used our standard form of graphics and tables in Chapter 7 to show overall regional trends in landings reported to FAO since the 1950s, and to highlight the main chondrichthyan fishing nations in each region. Where a country falls within two SSG regions (e.g., USA, Mexico) FAO landings data were divided by ocean of landing. The use of 't' refers to metric tonnes.

**Data on fin trade:** One way to assess the global trade in shark fins is to examine import records from Hong Kong, the world's largest trading centre for fins. All quoted figures for export of shark fins to Hong Kong cited as 'Anon 2001' in Chapter 7 are based on declared imports from each particular country in the Hong Kong customs databases and were compiled by summing weights of unprocessed dried fins and unprocessed salted or frozen fins (without adjusting for water content). For more details, refer to Chapter 4. It should also be noted here that where 'finning' is mentioned, this refers to the practice of slicing off a shark's valuable fins and discarding the body at sea.

## IUCN Red List assessments

Several of the IUCN Red List species status assessments presented in Chapter 8 and referred to in other sections are already outdated (see Appendix 9 for summary of updates). The majority of assessments in this report were submitted to IUCN for inclusion in the 2000 *IUCN Red List of Threatened Species*<sup>TM</sup>. Unless stated otherwise, the 2000 assessments were based on the previous *IUCN Red List Categories and Criteria* (1994). In particular, it should be noted that the 'Conservation Dependent' category no longer

exists. Since 2003, a number of Red Listing workshops have been held around the world by SSG to continue to evaluate the status of chondrichthyan species in more detail. Some of the resulting species assessments can be viewed on the SSG website others are still under review and will be posted there in due course. The IUCN Red List Programme is ongoing and readers are urged to regularly consult the SSG (updated regularly) and IUCN Red List ([www.redlist.org](http://www.redlist.org) – updated annually) websites.

### **Regional assessments**

IUCN Red List assessments attempt to address the global status of a species, synthesising information on all known populations, and this is our ultimate aim. For some species, however, information is not yet available throughout their entire range hence regional assessments have been undertaken by SSG members in the interim to provide useful guidance for conservation and management on a regional basis. However, only the global assessments are displayed on the IUCN Red List website, unless the population in a region is considered a separate subpopulation by IUCN definition (see [www.redlist.org](http://www.redlist.org)), and then only displayed if this is more threatened than the overall global assessment. Note that where a species is

endemic to a region, the ‘regional assessment’ is considered the ‘global assessment’, and will appear as such in the IUCN Red List. SSG plans to make all regional assessments available on its website in due course.

### **Chondrichthyans, elasmobranchs and sharks**

Readers may note the interchange between the terms chondrichthyans, elasmobranchs and sharks. The strict definitions of chondrichthyans (encompassing sharks, batoids and chimaeras) and elasmobranch (sharks and batoids) are provided in Chapter 2. The editors have made every effort to make the use of the terms consistent as far as possible. Similarly, with the terms batoid, skate and ray. However, FAO tends to use ‘elasmobranch’ in many of their statistics which can sometimes include chimaeras, and ‘shark’ when referring to all chondrichthyans in the context of the IPOA-Sharks (International Plan of Action for the Conservation and Management of Sharks). Some authors may also use ‘sharks’ in the broader sense, for reasons of simplicity.

**Rachel Cavanagh**  
**IUCN Shark Specialist Group Programme Officer**  
**December 2004**

## **Acknowledgements**

Many people have contributed to the writing and compilation of this report over several years. It is difficult to recall all those who have generously given their time and we apologise if anyone who has helped with this publication has been omitted below. We would particularly like to thank Shelley Clarke, Leonard Compagno, John Stevens and Terry Walker for their extensive contributions, as well as all of the other named authors of the chapters, regional reports and species accounts. We acknowledge all the members of the IUCN/SSC Shark Specialist Group volunteer network from around the world (and their institutions) for answering endless queries and contributing to this report. We thank John Thomas and Rowena Millar for their editing expertise, and Mandy Haywood, Peter Kyne, Alison Rosser, Amie Brautigam, Sarah Ashworth and Natalia Wase for their valuable assistance and support.

The National Audubon Society Living Oceans Program, NatureBureau International, IUCN/SSC Sir Peter Scott Fund for Conservation Action, The David and Lucile Packard Foundation, US State Department, UK Defra, Wildlife Conservation Society, The Ocean Conservancy, Moss Landing Marine Laboratories Pacific Shark Research Center, the Florida Museum of Natural History Florida Program for Shark Research, Virginia Institute of Marine Science, Mote Marine Laboratory Center for Shark Research and the National Shark Research Consortium have generously provided funds and/or support for editorial meetings, printing and publication. Particular thanks are due to the National Audubon Society Living Oceans Program for providing a base and facilities for our meetings, and John Thomas, Tasha and Zoe Camhi for allowing us to take over their living space on many occasions.

# Executive Summary

Sharks and their relatives – the batoids (including skates, rays, guitarfishes and sawfishes) and chimaeras – are a diverse group of cartilaginous fishes (class Chondrichthyes), comprising about 1,200 living species. Unfortunately, the life-history traits that have served these species well during their 400 million years of evolution (slow growth, late maturity, and low rates of population increase) also make many of them vulnerable to intense human exploitation.

Shark fisheries have historically been undervalued and ignored by fishing interests, managers and conservationists. But no longer: many species are now taken in vast numbers in both directed commercial, subsistence and recreational fisheries, and as bycatch in fisheries targeting other species. Rapid expansion of the trade in shark fins in recent decades has led to the widespread practice of shark finning and altered the landscape of shark management and conservation. Sharks are now among the world's most versatile and valuable fishery resources, providing an important source of protein in some regions and luxury goods in others.

With this rise in commercial value of sharks, the threats to their populations have also escalated. These include directed fishing, bycatch, habitat loss and habitat degradation from a variety of assaults. Fishing is, by far, the largest cause of chondrichthyan depletion worldwide. Many historic shark fisheries were characterised by boom-and-bust cycles of exploitation, making the fishery economically unviable while leaving behind a locally depleted population to recover over time. But as fisheries have expanded during the past two decades, in many waters to meet the growing demand for shark fins, few shark populations now remain unexploited or are given the opportunity for recovery. Reported global landings have increased steadily since the early 1950s, when they were around 200,000t. By 2000, 828,364t were landed according to the United Nations Food and Agriculture Organization's (FAO) fisheries data, yet even this is likely to be a gross underestimate of actual mortality. It is impossible to predict the effect that such exploitation, when compounded by the insidious and poorly quantified threats from habitat loss and global climate change, will have on the oceans' sharks.

Despite increasing concern over the vulnerability of sharks to this overexploitation, effective international shark conservation and management remains woefully lacking. Some progress has been made through the adoption of the FAO International Plan of Action for the

Conservation and Management of Sharks, but its implementation is extremely slow. Only a very few depleted species that enter international trade are listed in the CITES Appendices (Convention of International Trade in Endangered Species of Wild Fauna and Flora). Many other conservation and management tools are available to help ensure sustainable shark fisheries, but the political will to implement these tools must still be generated.

The IUCN/SSC Shark Specialist Group (SSG) has prepared this Status Survey to provide a comprehensive resource documenting the biology, threats, and opportunities for global action for the conservation of chondrichthyan fishes. The Survey arose out of widespread concern that many populations are in serious decline worldwide, resulting from expanding exploitation largely in the absence of fisheries management, conservation measures, or reliable data to guide sustainable fisheries. Its eight chapters include information on taxonomy, biology, and life history; the products, trade, and economics of exploitation; regional reports summarising shark fisheries from nine geopolitical SSG regions and their fishing nations; and status assessments for more than 100 species. The wealth of information collected here reflects the wide variety of work undertaken by the global SSG network.

This Status Survey will be widely distributed to SSG members, research and academic institutions, fisheries departments, the Food and Agriculture Organization, regional fishery organisations, conservation groups and concerned individuals, in the hope that it will inspire and form a strong scientific foundation to promote the conservation and sustainable management of chondrichthyan populations and their habitats around the world. It will also regularly be updated and expanded on the SSG website <http://www.flmnh.ufl.edu/fish/organizations/ssg/ssg.htm>.

The Status Survey also sets the stage for a Conservation Action Plan, which will be published as a separate document to identify priorities and a global strategy for the conservation of sharks and their relatives.

The SSG will use this report and the forthcoming Action Plan to guide its future activities, encourage and direct research, conservation and precautionary management activities from international to domestic levels, and for fundraising to support these efforts. Without such initiatives, chondrichthyan populations and the fisheries they support will not be viable for much longer.