SECOND EDITION

SUSTAINABLE FISHERY SYSTEMS

ANTHONY CHARLES

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Sustainable Fishery Systems

Second Edition

Anthony Charles
Saint Mary's University
Halifax, Nova Scotia, Canada

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Contents

Preface and Guide to the Book

Decades have passed since the original edition of this book appeared, early in the 2000s. I am pleased to say that the content of that book has stood the test of time – the various themes that were covered in it remain valid today. That said, a great deal has happened over the decades.

There has been widespread analytical focus on social-ecological systems, and a global policy focus on ocean and biodiversity conservation. Those developments reinforce the crucial nature of the two areas emphasised in the original book – using systems approaches and moving towards sustainable fisheries. Along those lines, the emergence of conservation tools such as marine protected areas, and management tools such as marine spatial planning, has been so extensive that their interaction with fisheries needs to be examined. And without doubt, the dire worldwide threats of climate change have major impacts on fishery systems in many ways.

Further, there has been an unprecedented spotlight in recent decades on small-scale fisheries around the world, with what is likely the most important fishery document in that time period being the international *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries* developed by FAO. This ties in with an increasing recognition of the impressive role fishers, fishworkers, and fishing communities play in managing their fishery resources and conserving their local aquatic environments.

Related to this has been a major shift in how we consider the knowledge needed for fishery decision-making – while in the past, the focus might have been on 'fishery research' we now see it is at least equally from the traditional, fisher, and community knowledge held by those engaged in the fishery. Shifts in fishery governance to more engagement and participation support these shifts over time.

All the above newly prominent considerations call out for attention in a book such as this, and the second edition of *Sustainable Fishery Systems* covers them all.

It has been a joy to write this second edition. Not all the time, mind you, but certainly overall. I imagine that writing any book is a labour of love, and this is no exception. What you have before you is in some ways a culmination of interests I have had, throughout my career, in the holistic and systematic analysis of fisheries, and in seeking out approaches to improving the sustainability and resilience of fisheries.

I have sought, in writing this, to produce something accessible to everyone interested in looking at fisheries from an integrated perspective and in exploring the various routes to more sustainable fisheries. I hope that this would include undergraduate and graduate

students from various disciplines, as well as professionals in the fishery field, whether academics, those in science and management, or those within fisher organisations and the fishery sector itself.

With that in mind, the aim here is to present a fairly comprehensive coverage of the many aspects of fishery systems, what fisheries are all about, and where they are heading (or should be heading). So, the content and organisation reflect the diverse nature of fisheries, the components of fisheries and their changes over time, the fishery governance and management system, the challenges in fishery systems and modern approaches to dealing with them, and the links of fisheries to major elements beyond the fishery. The various chapters of the book can be viewed as pieces of the puzzle, all adding up to give a full sense of the fishery system and how it can be sustained today.

The following gives a short guide to the contents. . .

- Part I of the book (Chapters 1–5) focuses on Fishery Systems, their structure, and dynamics. This begins in Chapter 1 with an overview of fishery systems, emphasising how these systems are depicted, and how they are characterised. Chapters 2 and 3 provide an overview of the natural system: the fish, the ecosystems, and the biophysical environment. Chapters 4 and 5 explore the human system, including the fishers and fishworkers, the post-harvest sector, households and communities, and the broader socioeconomic environment. Each of Chapters 2–5 discusses both the structure of the corresponding component of the fishery system, and its dynamics – how it changes over time.
- Part II of the book (Chapters 6–9) focuses on the Fishery Governance and Management System, providing a basis on the values, objectives, tools, and approaches that go into this – with Chapters 6 and 7 covering those two topics of governance and management, followed by Chapter 8 on ideas of fishery development, and Chapter 9 on the knowledge-building (and research) in fisheries.
- Part III of the book (Chapters 10–12) examines Three Major Challenges in Fishery Systems, namely (Chapter 10) the ubiquitous presence of uncertainty in fisheries, the various forms this uncertainty takes, and the connection between uncertainty and risk, (Chapter 11) the major role conflict plays in fishery systems, along with a typology of fishery conflicts, and (Chapter 12) the problems that can arise when those in the fishery have poor attitudes, and specifically the story of how such attitudes led to the massive collapse of Canada's Atlantic cod fishery.
- Part IV of the book (Chapters 13–17) moves from challenges to solutions, namely 'Modern Strategies for Fishery Systems'. The discussion begins in Chapter 13 with an examination of the nature of sustainability and resilience, and how to do sustainability assessment. Chapter 14 focuses on approaches to living with uncertainty through the use of adaptive management, robust management and a Precautionary Approach to fishery decision-making. Chapter 15 discusses the benefits of an Ecosystem Approach to Fisheries, inherently based on a systems approach. Chapter 16 presents human rights and fishing rights (use rights and management rights, guiding the access to and use of fishery resources) as key ingredients for sustainability and resilience. Then Chapter 17 examines the widespread move to fishery co-management and the longstanding and expanding role of community-based management.
- Part V of the book (Chapters 18–21) looks at 'Fisheries and the Bigger Picture' – the interactions of fisheries (and fishery governance/management) with four of the biggest

drivers of change in today's fisheries, ones from beyond the fishery system per se. These four are (Chapter 18) marine protected areas and 'other effective area-based conservation measures' (OECMs), with a focus on their fishery interactions; (Chapter 19) biodiversity conservation, how its governance interacts with that of fisheries, and specific challenges of dealing with endangered species; (Chapter 20) multi-sectoral management of oceans and other aquatic areas, including integrated management and marine spatial planning; and (Chapter 21) the omnipresent threat of climate change, and how responses in the form of mitigation and adaptation interact with fishery systems.

- Finally, Part VI of the book (Chapter 22) provides conclusions and a review of the key messages of the book.

A key goal for the book is to be widely accessible. The style of presentation is generally informal, with the aim of making the text easy to read. Technical aspects are sometimes placed in boxes, and mathematical details are either omitted, or placed in separate boxes or appendices. In order to be as accessible as possible, some topics are presented at a relatively basic rather than 'expert' level. For example, most of Chapters 2 and 3 will not be new to those familiar with biological and oceanographic aspects of fisheries, and similarly Chapters 4 and 5 will not be new to those familiar with the human dimensions of fisheries. Those familiar with certain topics are welcome to skip over the chapters (or sections of chapters) that cover those topics.

The book is written in a non-disciplinary manner. Each chapter, rather than focusing on a single discipline, draws on material from a range of disciplines. There are abundant references provided for those wishing to explore topics in further depth, and considerable use is made of 'boxes' throughout the book, often as case studies or more in-depth illustrations of particular points, or as optional side-trips from the main text. In many cases, the boxes are not referred to specifically in the text itself, but each box is titled, so the reader can decide whether to read the content or not, depending on the topic.

The reader may wonder about the order in which topics appear in the book, and whether it is crucial to follow that order in reading. The answer is that the chapters can generally be read in any order desired – with four exceptions. Chapter 1 introduces the major ideas of the book and really should be read first. Chapter 6 provides a natural opening to Part II on the Fishery Governance and Management System. Similarly, Chapter 13 properly opens Part IV on 'Modern Strategies for Fishery Systems'. And Chapter 22, the concluding chapter, can be read either last, as intended, or by itself, if the reader wishes to have a rapid sense of the 'key messages' of the book. While otherwise the order is not critical, the reader will see, in places, comments about how the current discussion is linked to what is coming up later in the book, or how it relates to what has come before, in previous chapters.

Welcome to Sustainable Fishery Systems. I hope you find this book not only useful but also stimulating and perhaps even provocative.

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Anthony Charles
Saint Mary's University
Halifax, Canada

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Part I

Fishery Systems

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