

Part I

Introduction to Transnational Fisheries Management

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Chapter 1

Introduction

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The world's tuna fisheries are at a critical juncture, with most tuna stocks fully exploited and some overexploited, and all of them facing growing fishing pressures from overcapacity and the ongoing march of technology. The conservation and management of these tuna stocks are complicated by the transnational nature of these and other highly migratory species, so that the stocks are shared among nations' exclusive economic zones (EEZs), but also extend to the high seas beyond the EEZs. In fact, about 40% of the world's tunas are captured on the high seas. Highly mobile fleets of vessels of multiple gear types from many nations harvest these tunas in the Atlantic, Indian, and Pacific Oceans and adjacent seas. The transnational nature of the tunas and fishing fleets creates conservation and management issues of jurisdiction, property rights, international law, and multilateral cooperation. Limited entry into tuna fisheries, and, in general, an even greater strengthening of property rights, coupled with multilateral cooperation, are required to prevent the inevitable outcome of overexploitation of the world's tuna stocks, further overcapacity, and declining profitability and general socioeconomic benefits.

Recognition of the growing biological, legal, and socioeconomic issues in the world's tuna fish-

eries and the cusp on which conservation and management of these transnational fisheries stands led to this book, *Conservation and Management of Transnational Tuna Fisheries* edited by Robin Allen, James Joseph, and Dale Squires. The genesis of the book lies in a prescient and seminal analysis of these issues, *International Management of Tuna, Porpoise, and Billfish: Biological, Legal, and Political Aspects*, by James Joseph and Joseph W. Greenough, published in 1979. As early as that year, all of the issues faced today were clearly seen, and our current book can be viewed as firmly standing on the shoulders of Joseph and Greenough.

The general theme of *Conservation and Management of Transnational Tuna Fisheries* is the need to adopt systems of property rights to provide effective conservation and management of the stocks of tunas and other highly migratory species, to conserve biodiversity, to manage fishing capacity, and to generate sustainable profits and socioeconomic benefits. Such rights-based management is most effective when transferable harvest or use rights are allocated for catch shares of the different species and held at the vessel level, that is, through individual transferable quotas (ITQs), although sector allocations of catch rights to groups

of vessels in a form of common property can also be effective. The catch rights as a share of the total allowable catch (TAC) for each species can either first be allocated to individual states, which then allocate them to individual vessels or sectors, or be directly allocated to individual vessels without the intermediary of the individual states. The latter approach would allow the greatest gains in economic efficiency and economic rents by least restricting the potential for gains from trade among owners of individual vessels. Property rights to the fish stocks themselves are common, and “owned” by the individual regional fishery management organizations (RFMOs). A third alternative is a corporation that holds all the rights and allows harvesting on its behalf.

Quotas for fishing effort can also be used, but are less effective because of the difficulty in specifying physical measures that directly govern fishing effort. For example, specifying a quota for days fishing can be frustrated by employing larger vessels, limiting vessel size might be overcome by increasing the power of the winch or vessel electronics, and so forth. Nevertheless, there may need to be tradeoffs between the most efficient system and others that are practical for other reasons, including cost. The choice of a particular rights-based management system should of course be informed by careful analysis of its ability to meet the policy objectives of the participants, including expected costs and benefits of the change.

Transferability of rights increases economic efficiency and potential resource rents by allowing quota to rest in the hands of those with lowest costs of harvesting. Transferability also sets the stage for better establishing market prices for the unpriced resources. Duration of the rights can range from a limited period of years to infinite. The longer the duration, the more stable the planning environment for investment. More limited duration allows periodic reallocation of rights for a variety of purposes.

Ample precedent for allocations of rights and rights-based management already exists in transnational tuna fisheries through the Agreement on the International Dolphin Conservation

Program (AIDCP) of annual dolphin mortality limits (DMLs) and limited-entry system used by the Inter-American Tropical Tuna Commission (IATTC), which maintains a closed Regional Vessel Register (RVR) and limits overall fish-carrying capacity in the eastern Pacific Ocean. The allocation of quotas directly to individuals, for example, by an RFMO, has not been analyzed legally, but quotas allocated by RFMOs to nations have then been reallocated by those nations to individuals. Examples of the latter include the Australian quota for southern bluefin tuna, bigeye tuna quotas for the longline fleet of Chinese Taipei in the Atlantic Ocean, and Pacific halibut quotas allocated to Canadian and U.S. fishers in ITQ programs.

The best example of quota allocation to individuals by an international agreement is the AIDCP DMLs for individuals since 1992. The DML is a relatively weak right because it does not provide full exclusivity (there are national mortality limits, which, when reached, curtail individual rights), have a duration of 1 year, or an even shorter period. Limited transferability is allowed, and their security is subject to the potential for various governments to renounce their DMLs or to reallocate them among the vessels of their fleets. The limited-entry system of the IATTC is also a relatively weak rights-based management system. The system provides exclusive access by a vessel to the fishery (through listing in the RVR), and duration is permanent, but the security and transferability are subject to government decisions.

In short, the time is ripe for extending and strengthening rights-based management that aligns the economic incentives of fishers and states to the common overall goal of sustainable fisheries, conservation of biodiversity, reasonable profits, and significant net socioeconomic benefits. As long as property and use rights are nonexistent or weak, the resulting overcapacity and incentives of the “race to fish” will impose pressures on the fisheries, which will severely curtail socioeconomic benefits and lead to overfishing and overfished stocks. Resolution of bycatch and other issues of biodiversity conservation will be even more formidable tasks. The establishment of

a rights-based management framework with well-defined harvest rights might be preceded by buybacks of existing fishing rights. One advantage of an initial buyback is the sidestepping of the difficult negotiation of allocating shares in a fishery among the states with vessels participating in the fishery. Although the initial allocations of catch shares can be fraught with difficulties, failing such allocations, even greater difficulties lie ahead as the fisheries decline and states are pitted against one another in attempts to maintain otherwise falling harvest levels and overcapitalized fleets in the face of declining, or even negative, profits. The current difficulties of achieving consensus among member states to implement the necessary restrictive measures will surely only worsen.

Much of the material for *Conservation and Management of Transnational Tuna Fisheries* comes from a workshop held in October 2006 at the Institute of the Americas, University of California, San Diego, and initiated and organized by Robin Allen, then Director of the IATTC, James Joseph, former Director of the IATTC, and Dale Squires, Southwest Fisheries Science Center, U.S. National Marine Fisheries Service (NMFS), La Jolla, California. Many of the chapters in this book were first presented at that workshop, which was chaired by Robin Allen. The workshop was held after a motion by William Fox of the NMFS at a meeting of the IATTC Stock Assessment Working Group that the IATTC further address the management of transnational tuna fisheries. Considerable organizational support was provided by the IATTC, Professor Theodore Groves of the Department of Economics at the University of California, San Diego, and Dale Squires. Generous financial support, which was coordinated by Dale Squires, was provided by Rita Curtis of the NMFS' Office of Science and Technology and Raymond Clarke of the NMFS' Pacific Island Regional Office. This workshop can also be seen as a fruit of an FAO Technical Advisory Committee project, "Management of Tuna Fishing Capacity: Conservation and Socio-economics," chaired by Robin Allen, in which Allen, Joseph, Squires, and

other participants in the Institute of the Americas workshop participated.

The Institute of the Americas' meeting led to a follow-up workshop in May 2008 at the Scripps Institution of Oceanography sponsored by the IATTC and the World Bank Global Program on Fisheries (PROFISH) and organized by Michael Arbuckle and Kieran Kelleher of the World Bank, Guillermo Compeán, Director of the IATTC, and Allen, Joseph, and Squires. Generous funding was provided by the World Bank and again by the NMFS through Rita Curtis and Raymond Clarke, with coordination by Squires. The origin of the IATTC–World Bank workshop was an after-dinner conversation among Kelleher, Joseph, and Squires at the Rockefeller Bellagio Conference Center, when Joseph and Squires first raised the idea of further exploration into rights-based management of transnational tuna fisheries. The outcome of this IATTC–World Bank meeting, which was chaired by Meryl Williams, former Executive Director of the WorldFish Center, and sponsored by Guillermo Compeán, entered into the results of the *Conservation and Management of Transnational Tunas*, especially Chapter 4.

The balance of the book is organized as follows. Chapter 2 of *Conservation and Management of Transnational Tuna Fisheries*, "Addressing the Problem of Excess Fishing Capacity in Tuna Fisheries," by James Joseph, Dale Squires, William Bayliff, and Theodore Groves, provides the reader with a detailed background on the fundamental issues surrounding global tuna fisheries and rights-based management. This discussion includes an introduction to the status of the world's tuna stocks, an explanation of the basic problem of excess fishing capacity and its effect on tuna stocks, and a review of management options. In addition, the chapter provides an overview of unilateral and multilateral efforts toward sustainable management and descriptions of the RFMOs concerned with tunas and of other relevant international organizations.

After this general overview, Chapter 3, "Property and Use Rights in Fisheries," by Dale Squires, provides a comprehensive reference on types and

characteristics of property rights as further background information for the subsequent chapters in this volume. Chapter 3 introduces and defines terms from law and economics literature and reviews various forms of property rights that have emerged in the fisheries context, including common property, ITQs, sector allocations, territorial use rights in fisheries, and hybrid rights.

Chapter 4, “Rights-Based Management in Transnational Tuna Fisheries,” by Robin Allen, William Bayliff, James Joseph, and Dale Squires, considers property and use rights as a management approach in transnational fisheries for tunas and other highly migratory species. It discusses the types of rights that can be awarded—the right to participate in a fishery, the right to catch a specified quantity of a species of fish, the right to utilize a specified amount of fishing power, and the right to exert a specified amount of fishing effort. It then discusses the allocation of rights—to states or to individuals or groups, and the criteria for allocation of rights.

Chapter 5, “The Benefits and Costs of Transformation of Open Access on the High Seas,” by Robin Allen, William Bayliff, James Joseph, and Dale Squires, discusses the economics behind the transformation of property and use rights away from open access, concluding that the future of fisheries management lies in a system of hybrid rights. Under such a system, fisheries are held as international common property by an RFMO established through customary or formal international law. Rights are then allocated to states in a second step, and in some instances subsequently allocated by the states to individuals or groups. This chapter considers the economics of transforming from open access to a system of hybrid rights, and discusses why international common property and allocation of use rights are more likely to emerge than an expansion of strictly state property beyond the current EEZs or the formation of strictly private property on the high seas or within the EEZs.

Chapters 6 through 12 delve further into the topic of rights-based management, with each chapter covering a specific aspect of a rights-based

management regime in greater depth. Chapter 6, “International Fisheries Law and the Transferability of Quota: Principles and Precedents,” by Andrew Serdy, considers the practical aspects of initiating a system of tradable quotas on catch or effort within the area of concern to the IATTC. The chapter first examines the international legal context for a trading scheme, demonstrating that all RFMO constitutive treaties confer sufficiently broad authority to develop such a scheme. However, implementing a trading scheme on the high seas could be more problematic than creating one within an EEZ, as it may infringe on the “right to fish” on the high seas, a right that is guaranteed to all countries by the United Nations Law of the Sea. This chapter presents the precedents that have been established to date for quota trading by three RFMOs—the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Northwest Atlantic Fisheries Organization, and the International Baltic Sea Fishery Commission, in addition to the relevant precedents within the IATTC itself, including a system of trading limited carrying capacity through the international transfer of fishing vessels. In its conclusion, the chapter outlines some of the main practical aspects of a future international quota trading system that would remain consistent with the freedom to fish.

Chapter 7, “Can Rights Put It Right? Industry Initiatives to Resolve Overcapacity Issues: Observations from a Boat Deck and a Manager’s Desk,” by Daryl R. Sykes, presents the perspective of a New Zealand commercial fisher and head of an industry organization on rights-based management in Australia and in New Zealand, a country that has practiced rights-based management for 20 years. The chapter discusses three examples of fleet and capacity rationalization driven by commercial rights holders in New Zealand and Australia. Two examples are taken from inshore fisheries—southern rock lobster and New Zealand abalone (*paua*)—and the third is taken from an important distant-water fishery in Australia’s sub-Antarctic Islands. Each example has a different background, and a different priority associated with the initiatives that were taken. Common to

all three is that (1) they involve well-specified commercial property rights and (2) the initiatives for action were taken by the rights holders themselves, rather than imposed by the established fishery management agencies. However, those agencies had an equally important role, in that they constructed the incentives for collective action. The chapter highlights the value of communication, information, understanding, response, cooperation, and collaboration at different levels.

Despite inherent efficiency gains of a property rights regime, they remain controversial, limiting, or slow in their adoption. Adopting a new regime can be costly, may have distributional implications as some parties that previously used the resource are denied access, and may negatively impact certain groups within the industry as production inputs change. Chapter 8, "Rights-Based Management of Tuna Fisheries: Lessons from the Assignment of Property Rights on the Western U.S. Frontier," by Gary D. Libecap, examines these issues across a variety of resources and develops generalizations for application of ITQs in fisheries. The chapter examines the assignment of private property rights during the nineteenth and early twentieth centuries to five natural resources: mineral land, timberland, grazing land, farmland, and water on federal government lands in the Far West. The region was richly endowed with natural resources, but assigning property rights to them required adaptation from established, eastern practices, as defined by the federal land laws, and this adaptation provides a laboratory for examining current questions of institutional design in fishery regulation.

Chapter 9, "The Economics of Allocation in Tuna Regional Fishery Management Organizations," by R. Quentin Grafton, Rögnvaldur Hannesson, Bruce Shallard, Daryl Sykes, and Joseph Terry, reviews existing allocation mechanisms in the five tuna RFMOs, and shows that although they have adopted different approaches, none has been able to prevent overcapacity and, for some stocks, overexploitation. As an alternative, the chapter proposes that each tuna RFMO establish TACs by species and area, and then allocate nontransferable

and permanent country shares (as a proportion of the TAC) to member countries. Each country would be free to use or sell the annual allocation of fish determined by the permanent country shares, but sales could be only to fellow member countries. A two-tier allocation of the TAC, first by permanent shares to member countries, and then by annual harvest allocations to vessels of member countries, offers the promise of mitigating, and possibly overcoming, the twin problems of overcapacity and overexploitation of the highly migratory tunas in the high seas fisheries for these species.

Chapter 10, "Allocating Fish across Jurisdictions," by Jon M. Van Dyke, discusses allocation of fish resources that straddle international jurisdictions, and the progress that has been made toward creating an "effective" and "equitable" approach to international allocation and management. This chapter looks at the provisions for interjurisdictional cooperation under the primary international agreements on fisheries management, including the 1982 Law of the Sea Convention, the 1995 Fish Stocks Agreement, and the 2000 Honolulu Convention, which covers the central and western Pacific Ocean region. In particular, the chapter focuses on the ambitious advances made by the Honolulu Convention, including the creation of a regional commission with broad authority to set catch limits and allocate fishing quotas both within and outside of national EEZs. Finally, the author outlines some of the primary considerations in inter-jurisdictional allocation, including the balance between conservation and economic interests, equity concerns, especially for developing and distant-water nations, geographical proximity, and the use of allocation for rewarding or punishing state behavior.

Buybacks of fishing vessels, licenses, and gear can also be applied as a strategic management tool to address overfishing and overcapacity in transnational fisheries. Chapter 11, "Buybacks in Transnational Fisheries," by Dale Squires, James Joseph, and Theodore Groves, explores this policy option. Although a buyback system does not solve the underlying problem of a lack of property

rights, it can facilitate increased cooperation toward further management measures by reducing the numbers of vessels and fishers and increasing the profits for those that remain. This chapter identifies the major preconditions for and the features of an effective buyback program, such as existing measures for limiting entry and conditions to ensure that fishing capacity is not simply reinvested in the fishery. Such a buyback program can be used to address ecological issues as well, by targeting buybacks toward fishing areas and methods with the greatest ecological impacts. The authors then look at funding, sovereignty, and informational asymmetry issues specific to establishing a buyback program that is international in scope, and also some of the main lessons learned from international experience with buybacks thus far.

Chapter 12, "Limited Access in Transnational Tuna Fisheries," by Brian Hallman, Scott Barrett, Raymond P. Clarke, James Joseph, and Dale Squires, discusses the vexing problem of fishing under open access and especially on the high seas. Unlimited fishing on the high seas, like unlimited fishing in territorial waters, can lead to reduced catches and excessive investment in vessels and gear. Unfortunately, however, it is more difficult to limit fishing on the high seas than it is to limit it in territorial waters. One of the most effective policy responses to overfishing and economic inefficiency in transnational tuna fisheries is to limit access to the fishery through closed RVRs, such as that introduced by the IATTC. In the long run, extending and strengthening rights of access through limited entry is a fundamental first step toward addressing excess fishing capacity in transnational tuna fisheries. Stronger forms of rights, such as ITQs or individual transferable effort, may be preferred, but these mechanisms may be out of reach in the foreseeable future in most transnational tuna fisheries. This chapter discusses the most important issues that must be addressed if limiting access to the important stocks of tunas is to be achieved.

Because fishing technologies are not perfectly selective in targeting specific species, the issue of bycatch and biodiversity conservation cannot be excluded from any discussion of fisheries man-

agement. Bycatch of juvenile target fish species, nontarget fish species, marine mammals, seabirds, and sea turtles can have serious ecological consequences, and may even threaten the target resource. Chapters 13 and 14 focus on bycatch management issues and options. Chapter 13, "Individual Transferable Quotas for Bycatches: Lessons for the Tuna-Dolphin Issue," by Rögnvaldur Hannesson, looks at bycatch quotas, using a theoretical model to show how individual transferable bycatch quotas can promote efficiency by minimizing the losses imposed by a bycatch limits and maximizing the total catch for any given bycatch limit. The chapter presents two scenarios—one in which bycatch is a totally random process and one in which bycatch is determined by the skill level of fishermen. In both cases individual transferable bycatch quotas can lead to the optimal outcome, though they are not necessarily superior to a common quota when bycatch is random. The chapter concludes by discussing the implication of these results for the tuna fishery of the eastern Pacific Ocean, in which dolphin bycatch quotas are used, but are not currently transferable.

Chapter 14, "Incentives to Address Bycatch Issues," by Heidi Gjertsen, Martin Hall, and Dale Squires, considers bycatches in the purse-seine fisheries of the eastern Pacific Ocean. After restrictions on dolphin mortality from fishing for tunas associated with dolphins, a large portion of the international fleet switched to alternative methods, the most popular being sets on fish associated with floating objects. The increase in floating-object sets during the 1990s brought about an enormous increase in the bycatches of juvenile tunas, and also sharks, billfishes, dorado, wahoo, and sea turtles. Positive and negative economic incentives generated by property rights, taxes and fees, subsidies, voluntary agreements, and trade measures are evaluated for their utility in bycatch reduction. There are four general options for reducing bycatch per unit of effort: (1) technological solutions (gear modifications, alternative gear); (2) operational solutions (deeper sets, no night sets, closures); (3) performance-based

solutions (selective access for the best fishers); and (4) utilization solutions (use of all bycatches). The chapter concludes that technology standards, including technological and operational solutions, should form the centerpiece of bycatch reduction, that performance standards in the form of bycatch quotas are problematic, and that rights-based regulation may have a role to play.

The final section of this volume focuses on issues of politics, enforcement, and compliance. Chapter 15, "Prospects for Use Rights in Tuna Regional Fisheries Management Organizations," by Frank Alcock, assesses the legal and political challenges of establishing ITQ schemes in RFMOs that manage highly migratory tuna stocks. Four specific challenges are considered: (1) exclusion; (2) initial allocation of quota rights; (3) distributive issues associated with rights transfer; and (4) monitoring and enforcement. This chapter argues that the political challenges for RFMOs and high seas fisheries are much different from those within the EEZs of coastal states. The most significant difference is the lack of an authoritative agent that can impose, coerce, or in some other way forge the distributive bargains that are necessary for such programs to take root. As a consequence, recognition of exclusive access rights, allocation disputes, and monitoring and enforcement issues are more problematic in international waters than in domestic EEZs. Although prospects for ITQ programs remain poor for the near term, the chapter discusses the conditions under which such a program would be possible.

Despite the collective management of RFMOs, many fishing vessels are registered in states that intentionally avoid membership in RFMOs so that they are not bound by the international regulatory process. Rather, these vessels have a strong incentive to free-ride on the conservation efforts of others. Chapter 16, "Flags of Convenience and Property Rights on the High Seas," by Elizabeth R. DeSombre, looks at the incentive structure behind this use of "flags of convenience (FOCs)" to avoid compliance with international agreements. In particular, the chapter examines how four major tuna RFMOs are using new approaches to

address the problem of FOCs, namely by changing the regulatory focus from catch to market access, which can be made excludable through landing and trade restrictions. Denying access to lucrative markets provides strong negative economic incentives for evading international regulation. While this approach is not equivalent to a strict property rights regime and cannot completely solve the problem of illegal, unreported, and unregulated (IUU) fishing, it has increased participation in RFMOs and may indirectly address fishing overcapacity by making it less profitable, thereby driving some participants out of the industry.

Japanese vessels have fished for tunas all over the world since before World War II. Chapter 17, "Japanese Policies, Ocean Law, and the Tuna Fisheries: Sustainability Goals, the IUU Issue, and Overcapacity," by Kathryn J. Mengerink, Harry N. Scheiber, and Yann-Huei Song, looks at the worldwide effort to reduce excess fleet capacity and combat IUU fishing. In particular, the chapter focuses on the role of Japan in these efforts, and its relationships with Chinese Taipei, one of its greatest fishing rivals in the Pacific. The authors discuss international efforts to halt IUU fishing and to reduce capacity through RFMOs such as ICCAT and the Western and Central Pacific Fisheries Commission, and the policy matrix in which Japan's responses to overcapacity and IUU fishing are embedded. The analysis illustrates the complex interplay between IUU fishing and overcapacity, especially regarding ship-flagging practices, and illustrates that "conservation" may be less motivated by preservation and protection of biodiversity than by protection of economic interests for nations wishing to gain access to the resources.

The final chapter, Chapter 18, "Quasi-Property Rights and the Effectiveness of Atlantic Tuna Management," by D.G. Webster, discusses the origins and implications of using quasi-property rights as an international fisheries management tool. Quasi-property rights are national-level quotas that are enforced by tracking trade in the species and applying multilateral sanctions against countries that fish illegally. The chapter traces the origins of quasi-property rights in ICCAT, the

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Convention on International Trade in Endangered Species, and the International Whaling Commission, and details the main aspects of ICCAT's current quasi-property rights system. Finally, the chapter evaluates the effectiveness of ICCAT's trade-based regime. While compliance appears to have improved and some species have rebounded, considerable problems remain with smuggling,

misreporting, setting sustainable TACs, and regulating bycatch and other ecosystem imbalances. This chapter finds that, although this kind of single species management may not be ideal, ICCAT's trade-based measures have at least inhibited fishing effort targeting key commercial species, and may have slowed or reversed the decline of some species.