

International management of tuna fisheries

Arrangements, challenges and a way forward



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A tuna seiner fishing in the eastern Pacific Ocean in the process of retrieving its net (courtesy of Wayne Perryman, Southwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, United States of America).

Preparation of this document

The Marine and Inland Fisheries Service (FIRF) is responsible for all programmes and activities of the Food and Agriculture Organization of the United Nations (FAO) that relate to the management and conservation of fisheries resources. This technical paper was prepared as part of the work programme of FIRF to enhance the understanding of arrangements, challenges and a way forward for the management of tuna fisheries on a global scale, particularly in the light of international standards and modern expectations for fisheries management. The key international standards considered include: (i) the 1982 United Nations Convention on the Law of the Sea; (ii) the 1992 United Nations Conference on Environment and Development; (iii) the 1995 FAO Code of Conduct for Responsible Fisheries; and (iv) the 1995 United Nations Fish Stocks Agreement.

This technical paper was prepared under the direction of Jacek Majkowski, FIRF. The author is Dr Robin Allen, a tuna expert based in New Zealand. He is a former Director of the Inter-American Tropical Tuna Commission in La Jolla, California, United States of America.

Abstract

This paper reviews the current management of tuna fisheries by the five tuna regional fisheries management organizations (RFMOs), focusing on the management of target species in the light of international standards and modern expectations for fisheries management. The key international standards used flow from the 1982 United Nations Convention on the Law of the Sea via the 1992 United Nations Conference on Environment and Development to the 1995 FAO Code of Conduct for Responsible Fisheries and the 1995 United Nations Fish Stocks Agreement. Subsequent to those instruments, other expectations of best practices have been gathered into the expectation that RFMOs undergo performance reviews.

The paper discusses the status of the stocks of the major species of tuna for each of five tuna RFMOs and examines the management response of each RFMO. According to the recommendations of the scientific bodies of the RFMOs, 14 of the major market species are in need of management action. Of those 14 species, the commissions of the RFMOs took action commensurate with the scientific advice in only five cases, and in three of the five cases, the actions only reflected other circumstances.

Conditions that provide incentives for participating governments to take (or not to take) cooperative actions to conserve resources are discussed. Apart from complying with global obligations and expectations, the major necessary condition for successful negotiation is that all participants in a negotiation should benefit from agreement to cooperate rather than from unrestrained competition. The fishery in the eastern Pacific Ocean is used as an example to show that this condition generally cannot be expected to be met.

The use of rights-based management systems is discussed and these systems are advanced as a means to facilitate the addressing of shortcomings in the current conservation and management of tuna fisheries. The elimination of the need to compete for a share of the available catch allows individuals to optimize their investment in fishing effort to match their share of the catch, providing them with the incentive to avoid overcapacity. Secure, exclusive and long-term rights provide fishers with a collective interest in the conservation of the fisheries and the efficient use of the resources. Transferability of rights allows fishing opportunities to be used by those fishers who produce the greatest economic benefits and can provide a means of reaching an agreement among different sectors of the industry via a transfer of fishing rights.

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Acronyms and abbreviations

B_{MSY}	biomass for maximum sustainable yield
CCRF	FAO Code of Conduct for Responsible Fisheries
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CPC	Party, cooperating non-party, fishing entity or regional economic integration organization (collectively IATTC)
CPUE	catch per unit effort
FAD	fish aggregating device
F_{MSY}	fishing effort for maximum sustainable yield
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tuna
IOTC	Indian Ocean Tuna Commission
IUCN	International Union for Conservation of Nature
MSY	maximum sustainable yield
NGO	non-governmental organization
RFMO	regional fisheries management organization
RMO	regional management organization
SCRS	Standing Committee for Research and Statistics (ICCAT)
TAC	total allowable catch
TBAP	Tuna and Billfish Assessment Programme
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Fish Stocks Agreement
VPA	virtual population analysis
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean

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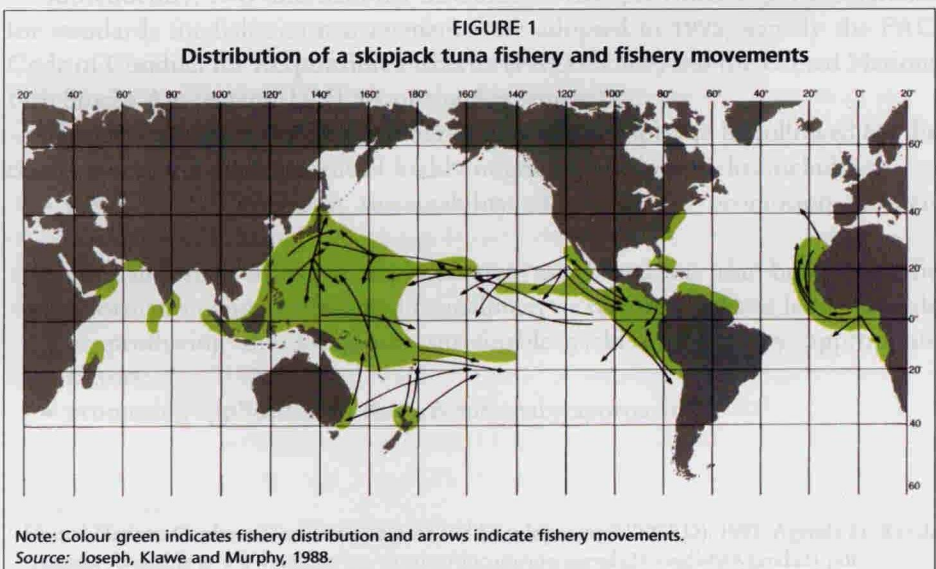
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1. Introduction

This technical paper reviews the current management of tuna fisheries by the five tuna regional fisheries management organizations (RFMOs) in the light of international standards and modern expectations for fisheries management. It discusses conditions that provide incentives for participating states to take (or not to take) cooperative actions to conserve resources. Shortcomings of traditional negotiations among states to allocate access to shared fisheries are identified and finally the use of rights-based systems is advanced for the conservation and management of tuna fisheries as a means of addressing those shortcomings.

It has been understood for many years that tuna fisheries and other fisheries for highly migratory species need international cooperation for their conservation and management. This was recognized during the negotiation for the 1982 United Nations Convention on the Law of the Sea (UNCLOS or the 1982 Convention) when they were singled out with other highly migratory species in an article providing special treatment for the management of their fisheries.

What is it about tunas and tuna-like fisheries that require this special attention? The answer to this question comes from their distribution and movement. Figure 1 illustrates this for skipjack tuna, showing the distribution and movements of the species as it was known during the negotiations for the UNCLOS. It was clear that these fish ranged across the jurisdictions of many countries and that much of the stock was found on the high seas. All of the major market species of tunas make extensive movements and of those species at least albacore and bluefin



tunas undertake regular migrations. If one state tried to conserve the stock within its own area of jurisdiction, or tried to regulate its own fishing fleet to ensure the stock is kept at high levels, other states would be able to capture the benefits of that restraint as free riders. Free riding states would be able to enjoy the benefits of the investment in conservation made by responsible states and might entirely undo the conservation efforts of responsible states. Recognizing this, UNCLOS required that states cooperate to ensure conservation and the promotion of the objective of optimum use of highly migratory fish.

In reality, the states participating in the fisheries for tunas have demonstrated an inability to cooperate effectively to achieve those management goals. The result has been that tuna fleets and their catches have been growing, often unsustainably. Consequently, there are too many tuna fishing vessels for the amount of fish available and many stocks are either at risk of being, or are, overexploited. Increasingly, restrictive measures are necessary to control the potential fishing effort.

Section 2 of this paper discusses modern standards for fisheries management. Section 3 introduces the five tuna RFMOs and reviews the management and status of the major stocks for which they are responsible. Section 4 discusses incentives and disincentives for members of organizations to cooperate within the RFMOs. Section 5 describes recent work that contemplates the use of rights-based management systems to improve the management of tuna fisheries and Section 6 concludes with indications of the most promising way forward.

2. Modern standards of management for tuna fisheries

Article 64 of the 1982 UNCLOS requires cooperation of coastal states and other fishing states, either directly or via international organizations, to ensure the conservation and promotion of optimum utilization of highly migratory species within and beyond the exclusive economic zones.

UNCLOS provided only very basic standards for the management of highly migratory species. As a consequence of increasing international concern about the lack of regulation of high seas fishing fleets, the 1992 United Nations Conference on Environment and Development (UNCED) addressed the need to spell out more detailed requirements to achieve the cooperation envisaged by UNCLOS by recommending in Chapter 17 of the Agenda 21¹ that:

17.49(e) States should convene, as soon as possible, an intergovernmental conference under United Nations auspices, taking into account relevant activities at the subregional, regional and global levels, with a view to promoting effective implementation of the provisions of the United Nations Convention on the Law of the Sea on straddling fish stocks and highly migratory fish stocks. The conference, drawing, inter alia, on scientific and technical studies by FAO....

Subsequently, two international instruments that provided a global reference for standards for fisheries management were adopted in 1995, namely the FAO Code of Conduct for Responsible Fisheries (FAO CCRF) and the United Nations Fish Stocks Agreement (UNFSA or the Agreement).

The UNFSA enumerated a number of general principles to be followed for the conservation and management of highly migratory fishing stocks, including:

- ensuring the long-term sustainability of stocks and promotion of their optimum utilization;
- ensuring that management measures are based on the best scientific information and are designed to maintain or restore stocks at levels capable of producing the maximum sustainable yield qualified by appropriate factors;
- promoting application of the precautionary approach;

¹ United Nations Conference on Environment and Development (UNCED). 1992. Agenda 21. Rio de Janeiro. Available at www.un.org/esa/sustdev/documents/agenda21/english/Agenda21.pdf

- adopting measures for the conservation and management of species belonging to the same ecosystem or associated with or dependent upon the target species and protecting biodiversity; and
- taking measures to prevent or eliminate overfishing and excess fishing capacity.

Similar principles were described in the FAO CCRF.

The precautionary approach to fisheries management was elaborated with the requirement to be more cautious when information is uncertain, unreliable or inadequate and to use the best scientific information and improved techniques for dealing with risk and uncertainty, and with the adoption of target and limit reference points to support management objectives and to constrain harvesting within safe biological limits. The fishing mortality rate that generates maximum sustainable yield and the biomass that would produce maximum sustainable yield were specified as minimum standards for limit reference points.

Further, the FAO CCRF and the UNFSA established the role of the RFMOs as the primary vehicle for cooperation among states to conserve not only the fish that are the object of the fisheries but also other parts of the ecosystems that are affected by fishing. In an ad hoc way, most RFMOs were developed by treaties among states that shared the objective of conserving fish stocks before these global agreements were adopted.

The five tuna RFMOs include the West and Central Pacific Fisheries Commission (WCPFC), the Inter-American Tropical Tuna Commission (IATTC), the International Commission for the Conservation of Atlantic Tuna (ICCAT), the Indian Ocean Tuna Commission (IOTC) and the Commission for the Conservation of Southern Bluefin Tuna (CCSBT). Of these five commissions, only the WCPFC was formed after 1995, with the result that its convention drew heavily on the new global instruments. The first tuna body, the IATTC, began its work in 1950 and the ICCAT, the IOTC, and the CCSBT were formed between 1969 and 1994. In the absence of detailed global standards, the early RFMOs were obliged to develop their own standards.

In recent years, there has been a great deal of discussion and criticism about efforts to conserve and manage fisheries, both national and international. RFMO performance has been examined in a number of reviews published by non-governmental organizations (NGOs) or prepared as background papers for UN consultations. An independent panel based at Chatham House, United Kingdom (Lodge *et al.*, 2007), compared practices of RFMOs with international standards and recommended best practices for RFMOs, including practices for conservation and management.

A new widely accepted standard practice that has emerged from these reviews is that RFMOs should undergo regular independent performance reviews. Three of the tuna RFMOs (CCSBT, ICCAT and IOTC) have completed their first reviews, the WCPFC has scheduled a review in 2010 and the IATTC is considering a review process.

Many of the external reviews mentioned previously have been relatively optimistic in the sense that the changes deemed necessary to improve the performance of RFMOs were addressed to behavioural changes rather than fundamental changes that would require major changes to the conventions of the RFMOs. However, an alternative view is expressed by Hilborn (2007): "The existing governance regimes for high seas fisheries have failed totally. Despite the existence of numerous regional management organizations (RMOs) as mandated by the UN fishing agreements, none of them regulates high seas fisheries to any effect". Governance, particularly decision-making by consensus or super majorities, and the reliance on national governments to monitor and to carry out enforcement of their own fleets is seen by Hilborn as the particular weakness of RFMOs. He goes on to say that fundamental changes to the existing legal framework for governance of the high seas are necessary to achieve conservation goals and implies the need for governments to pass their role in regulating high seas fisheries to a single organization that would set the rules for high seas fisheries with the intention of maximizing their value for all people. In some respects, this followed on from Joseph and Greenough (1979), who explored the idea of a global organization for all tuna fisheries.

Crothers and Nelson (2007) also argue that existing governance arrangements are inadequate and that overfishing in the high seas is a result of the lack of incentives for states or RFMOs to act responsibly in dealing with the effects of an overcapitalized fisheries sector. They offer an alternative of a governance structure with sole owners (High Seas Fisheries Corporations), which would be owned collectively by states and have explicit and exclusive authority to manage the high seas fisheries within their portfolio.

As well as the standards for management provided by international instruments, there have been a number of commentaries on other improvements that could be made in fisheries management, particularly related to failures of management systems to provide the maximum benefits that should be available from a well managed fishery. These improvements relate closely to the UNFSA principles of optimum utilization and the avoidance of overcapitalization.

Tuna RFMOs have given little attention to economic criteria in determining management standards. The reluctance to do this is understandable given the diversity of economies and different economic objectives of their members. Nevertheless, studies have demonstrated that modern fisheries are often extremely wasteful. For example, a World Bank and FAO report² concluded that the difference between actual and potential benefits from world fisheries (including tuna fisheries) was in the order of US\$50 billion per year. The waste (difference between actual and potential benefits) may be caused in several ways. The most obvious waste is the result of overexploitation of fisheries, which is the case in some of the tuna fisheries discussed in Section 3 below. In addition, a fishery

² World Bank and FAO. 2008. *The Sunken Billions: The Economic Justification for Fisheries Reform*. Agriculture and Rural Development Department. Washington DC, World Bank.

that is managed to produce the maximum sustainable yield can be wasteful for several reasons. Waste can occur as a result of management that restricts the use of available fishing capacity to achieve a target, for example, with the use of closed seasons because capacity is not fully utilized for other operational reasons or because, as is normally the case, the economically optimal catch is less than the maximum sustained catch.

For example, for each year between 2003 and 2007, the eastern Pacific Ocean tuna purse-seine fishery was closed for six weeks to maintain the catch at the maximum sustainable yield for yellowfin and bigeye tunas (see Table 2 in the following section), indicating that the fishing capacity was at least 12 percent too large over the period. Further, Joseph (2003) showed that there was significant overcapacity in the eastern Pacific Ocean purse-seine fishery during the period from 1971 to 2000. For part of that period (1980–1997), there were no restrictive management measures that constrained catches, suggesting that the overcapacity in the more recent period was even greater than 12 percent. Joseph also suggested that purse-seine fleets in other regions were also not fully utilized, based on comparisons of catch rates from various areas.

Globally, Reid *et al.* (2005) and Miyake (2005), respectively, reviewed capacity of fleets using two of the most important fishing methods for tuna, the purse-seine and the longline methods. Reid *et al.* showed that there is excess purse-seine fishing capacity in the Pacific Ocean, the Atlantic Ocean and the Indian Ocean and Miyake concluded that the same level of global catches could be achieved with a smaller longline fleet size.

Overcapacity leads to pressures on representatives of states, who negotiate in tuna RFMOs, to seek to maintain or improve fishing opportunities for their own fleets on stocks already at, or approaching full exploitation. This pressure has arguably been a significant cause for the lack of, or poor, decision-making by tuna RFMOs.

The performance of the tuna RFMOs, discussed below, seems to show that their members often do not seem to be able to improve their or their industries' return from the fishery by cooperating with other governments. The international standards that they have agreed to in global forums are being trumped by national interests in the fisheries managed by the tuna RFMOs.

3. The tuna RFMOs and the stocks for which they are responsible

Five RFMOs have been established with mandates that include ensuring the sustainable use, conservation and management of tuna stocks. Some of them also have responsibilities for harvested species other than tunas and all of them address issues of associated and dependent species taken incidentally during tuna fishing operations. All the tuna RFMOs recognize their obligation to ensure the conservation of associated and dependant species. The obligation is addressed either through the application of measures designed to minimize the impact of fishing on species such as marine turtles and seabirds or by measures to constrain catches of other species such as sharks to optimum levels. Nevertheless, for reasons of brevity, this paper will only deal with their role with respect to conservation and management of the major market species of tunas such as albacore tuna, bigeye tuna, bluefin tuna, skipjack tuna and yellowfin tuna.

Earlier it was noted that the highly mobile and in some cases migratory nature of tunas makes international cooperation essential for the management of fisheries for these stocks. Modern tuna vessels, particularly large-scale longline and purse-seine vessels, have the capability to move rapidly to any part of the world. Thus, the tuna RFMOs not only have to deal with migratory fish, but migratory fishing fleets as well. The markets for tuna are global (Jeon, Reid and Squires, 2008; Catarci, 2005). Surpluses and shortages in any one region quickly lead to catches or products flowing to other regions. Surpluses seldom lead to less pressure on stocks, whereas shortages almost always tend to reduce stocks. The global nature of markets aggravates any problems of overfishing.

The CCSBT was established in 1994 and is the only tuna RFMO whose principal mandate is for a single tuna species (southern bluefin tuna) throughout its range. The objective of its governing convention³ is to “ensure, through appropriate management, the conservation and optimum utilisation of southern bluefin tuna”. The CCSBT since its formation in 1994 has had to grapple with trying to rebuild an overfished stock.

The IATTC was founded in 1950 and has responsibility for the conservation and management of tuna species and other species taken by tuna fishing vessels in the eastern Pacific Ocean. The conservation and management objective for the commission⁴ is “to keep the populations of fishes covered by the convention at

³ Article 3, Convention for the Conservation of Southern Bluefin Tuna.

⁴ Article II, Convention for the Establishment of an Inter-American Tropical Tuna Commission.

those levels of abundance which will permit the maximum sustained catch". The IATTC adopted a new convention in 2003 that will come into effect in August 2010 with an objective of *ensuring the long-term conservation and sustainable use of the fish stocks covered by this convention, in accordance with the relevant rules of international law*.

The ICCAT was established in 1969 to be responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas. The conservation and management objective for the commission⁵ is to "maintain the populations of tuna and tuna-like fishes that may be taken in the convention area at levels which will permit the maximum sustainable catch".

The IOTC was established under Article XIV of the FAO constitution and is mandated to manage tuna and tuna-like species in the Indian Ocean and adjacent seas. The IOTC began its work in 1996, following preliminary work of the Indo-Pacific Tuna Development and Management Programme. Its objective⁶ is "to promote cooperation among its Members with a view to ensuring, through appropriate management, the conservation and optimum utilisation of stocks and encouraging sustainable development of fisheries based on such stocks".

Most recently, the WCPFC was created in 2004. The objective of the WCPFC is "to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean in accordance with the 1982 Convention and the Agreement".⁷

The tuna RFMOs use similar processes to develop and agree on conservation and management measures. They collect or assemble data about the fisheries, carry out a scientific assessment of the state of the stocks, using either dedicated scientific experts or a committee of scientists drawn from members and cooperating participants, or some combination of those arrangements. The best scientific advice is presented to their governing commission, which then develops any management measures it believes necessary in the light of the scientific advice and other relevant factors. The commissions generally strive to make such decisions by consensus of their members. For the CCSBT and the IATTC, decisions require unanimity, while the ICCAT, the IOTC and the WCPFC may take conservation and management decisions upon a vote by a qualified majority but then provide the possibility for parties to either opt out or to seek a review of the decision. These rather unwieldy decision-making processes tend to result in lowest common denominator decisions rather than producing forward-looking and precautionary conservation and management measures.

MANAGEMENT AND STATUS OF MAJOR TUNA STOCKS

This section will focus on each of the major market species of tunas for each of the commissions in turn. Majkowski (2007) provides a general review of the development of the fisheries and of the state of the stocks for these species.

⁵ Article VIII, International Convention for the Conservation of Atlantic Tunas.

⁶ Article V: Agreement for the establishment of the Indian Ocean Tuna Commission.

⁷ Article II: Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.