International Seafood Sustainability Foundation

STATUS OF THE WORLD FISHERIES FOR TUNA

SECTION A-1 – INTRODUCTION

This section presents a brief summary of the fisheries for the four main species of tunas – yellowfin, bigeye, skipjack, and albacore – exploited by those fisheries in each of the ocean areas covered by the four regional fisheries management organizations (RFMOs) responsible for the conservation and management of these species, and of the most important challenges facing these organizations. These issues, and others related to the status of the world's tuna populations and their conservation, are discussed in greater detail in the other sections of this report[1].

1. INTRODUCTION

Tunas are widely but sparsely distributed throughout the oceans of the world, generally in tropical and temperate waters between about 45 degrees north and south of the equator. They are grouped taxonomically in the family Scombridae, which includes about 50 species. The most important of these for commercial and recreational fisheries are yellowfin (*Thunnus albacares*), bigeye (*T. obesus*), bluefin (*T. thynnus*, *T. orientalis*, and *T. macoyii*), albacore (*T. alalunga*), and skipjack (*Katsuwonus pelamis*).

Tunas have a rapid growth and high fecundity, resulting in large biomasses that support major fisheries around the world. As with any other living renewable resource, the rate at which they are harvested affects their ability to sustain future exploitation, and some form of management is essential to maintain their long-term abundance at desirable levels.

Tunas are highly migratory fish, and their travels carry them through the fishing zones of many nations and onto the high seas, beyond the jurisdiction of any nation. It is this propensity for travel that sets the management of tunas apart from that of less nomadic species; since the level of fishing in one area can affect the abundance of the fish in other areas, international cooperation is essential if management is to be effective.

Between 1940 and the mid-1960s, the annual world catch of the five principal market species of tunas rose from about 300 thousand tons[2] to about 1 million tons, most of it taken by hook and line. With the development of purse-seine nets, now the predominant gear, catches have risen to

[1] This report is based on data available on 15 April 2009
[2] All tonnages are expressed in metric tons (t)

more than 4 million tons annually during the last few years. Of these catches, about 68 percent are from the Pacific Ocean, 22 percent from the Indian Ocean, and the remaining 10 percent from the Atlantic Ocean and the Mediterranean Sea. Skipjack makes up about 60 percent of the catch, followed by yellowfin (24 percent), bigeye (10 percent), albacore (5 percent), and bluefin the remainder. Purse-seines take about 62 percent of the world production, longline about 14 percent, pole and line about 11 percent, and a variety of other gears the remainder[3].

In terms of total tonnage landed, the catch of the principal market species of tuna represents less than 5 percent of the world catch of all marine fish, but in terms of value it is much more important, representing more than 12 percent of the value of all marine fish.

The historical dominance of the Japanese and U.S. fleets and markets has declined as fleets of coastal developing states have increased and markets outside the U.S. and Japan have grown. At present, vessels from more than 80 nations roam the oceans of the world in search of tunas. Tuna fisheries and associated processing facilities provide a major source of employment and foreign exchange for many coastal developing states, and significant national industries for many developed states.

2. THE TUNA FISHERIES

Purse-seine vessels, which catch primarily skipjack and yellowfin, average about 60-75 m in length, and can carry 1 to 2 thousand tons of frozen tuna in their storage wells, are responsible for about 62 percent of all tuna captured, with most of this catch destined for the canned tuna market. They make sets on three types of schools of tuna: unassociated, free-swimming schools, schools associated with floating objects, such as parts of trees, and schools associated with marine animals, mostly dolphins. The floating objects include artificial fish-aggregating devices (FADs) deployed by fishing vessels.

About 14 percent of the world production of tuna is caught with longlines, which consist of a mainline, kept afloat with buoys, from which branch lines are suspended, each with a hook attached to the end. Longline vessels vary in size: small vessels use relatively short lines, and normally operate in coastal waters, whereas the larger vessels can remain at sea for extended periods, and deploy longlines up to about 140 km long, with up to 500 buoys and 2500 branch lines. Longline gear is considered a passive fishing gear, but selecting the area and depth at which the hooks are set can increase the probability of capturing certain species. Much of the catch of longliners is destined for the higher priced *sashimi* trade. Japanese vessels have historically accounted for most of the longline catches, followed by vessels of Chinese Taipei, South Korea, and Indonesia.

Prior to 1960, most of the world's tuna fleet was comprised of pole-and-line vessels, which use live bait to attract tuna, which are then caught with hooks and lines attached to the end of a pole. These vessels vary in size from small vessels of less than 15 m in length, with a crew of 3 or 4, that fish mostly along the coast, to large ocean-going vessels of up to 60 m in length with crews of 20 to 25. Currently, pole-and-line fishing accounts for about 11 percent of the world's production of tuna.

Albacore tuna is the main target of troll fisheries, which use lines with lures towed from outrigger poles and from the stern of the vessel, which are usually less than 20 m in length. This form of fishing, used throughout the world, accounts for less than 2 percent of the world catch of tu-

[3] The foregoing numbers are based on 2007 catches.

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The remainder of the world catch of tuna is taken by a variety of fishing gears, such as traps, hand-lines, harpoons, recreational gear, and drift gillnets. Gillnets are very effective in catching tunas, but they also catch birds, sea turtles, and marine mammals. Because of this, and because lost or abandoned gillnets continue to catch fish ("ghost fishing"), their use is now banned in many parts of the world.

3. MANAGEMENT AND CONSERVATION

Tunas are like any other renewable resource: the rate at which they are harvested affects their abundance and their ability to sustain various levels of exploitation. As fishing pressure for tuna increases on a global scale, management and conservation measures are essential if the populations of tunas are to remain at desired levels of abundance. However, the management of tunas is complicated by their migratory nature, and calls for special cooperation among nations, since no one nation can manage tuna effectively. This is reflected in Article 64 of the United Nations Convention on the Law of the Sea, which calls on States to co-operate directly or through appropriate international organizations to ensure the conservation of highly-migratory species. Currently there are five regional fisheries management organizations (RFMOs) dedicated to the conservation and management of tunas (the Inter-American Tropical Tuna Commission (IATTC), the Western and Central Pacific Fisheries Commission (WCPFC), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Indian Ocean Tuna Commission (IOTC), and the Commission for the Conservation of Southern Bluefin Tuna (CCSBT)), whose common objective is to maintain the populations at or above levels of abundance that can support the maximum sustainable yield (MSY). However, as demand for tuna continues to rise, and with it the levels of exploitation, these organizations find it ever more difficult to reach agreement on the implementation of effective management measures.

4. INSTITUTIONAL ARRANGEMENTS FOR THE MANAGEMENT AND CONSERVATION OF TUNAS

4.1. Eastern Pacific Ocean

About 16 percent of the world production of tuna is from the eastern Pacific Ocean (EPO). Over the last several years catches have averaged 675 thousand tons, about 32 percent yellowfin, 49 percent skipjack, and 19 percent bigeye. Purse-seine vessels take 88 percent of the catch, longline 11 percent, and other types of gear the remainder.

The IATTC, established in 1950, was the first tuna RFMO, and is responsible for the conservation and management of tunas in the EPO. Unlike other RFMOs, it employs an independent staff to conduct its scientific studies, and has a long history of tuna management, dating back to 1966; like other RFMOs, it faces serious challenges, which must be resolved if it is to meet its objectives. The main issues are:

1) **Insufficient financial resources.** Field research is needed to improve estimates of vital parameters for tunas, such as the rates of natural mortality, fishing mortality, migration, and mixing. Large-scale tagging programs are useful for this, but they are costly. The IATTC budget is insufficient for such programs, so there is a strong need to seek funding from other sources.

2) **Decision making.** The IATTC scientific staff provides sound advice and recommendations for conservation, but the Commission frequently fails to fully implement them in its resolu-

tions, for two main reasons: the will of the member governments to make short-term sacrifices for long-term gain and restrict the activities of their fishing fleets, and the ability of any government to veto a decision by the Commission. Both of these factors need to be examined, to see whether conservation agreements can be reached more easily and in a more timely fashion.

3) **Compliance and enforcement.** The effectiveness of any conservation measure depends on strict compliance by all fishing vessels. To date, no punitive or restrictive actions have been taken against vessels identified as engaged in illegal, unregulated and unreported (IUU) fishing. Even though these vessels are few, it is important that their activities be curtailed; otherwise, if they continue to operate with impunity, it could act as an incentive for others to do the same. It is essential that the Commission institute measures to ensure compliance by all vessels in the fishery.

4) **Bycatches.** The very complex issue of bycatches in the fishery is of great concern to governments and stakeholders. An example of the complexity of the problem is the fishery on fish-aggregating devices (FADs), which targets skipjack, and in which the bycatches of other species are greatest: more than half the world skipjack catch is taken on FADs so, if FAD fishing is prohibited in order to protect bycatch species, the catch of skipjack will drop precipitously. Any measures to deal with this issue must be based on sound science if they are to be effective in reducing bycatches and maintaining sustainable fisheries. Obtaining the data needed to quantify the impact of bycatches on the various species will entail expanding observer programs to longline fleets, and require scientific studies of the ecosystem to which the bycatch species and tunas belong and research into the development of fishing gear and technology that will allow the target species to be caught without harming the bycatch species. All of this will require considerable resources, both human and financial.

5) **Fleet capacity.** The purse-seine fleet has reached its highest level in the history of the fishery, with nearly 200 thousand tons of carrying capacity. The tuna populations are being heavily fished, and conservation measures have so far been inadequate to reduce fishing mortality to the desirable level. The long-term solution to this problem is to limit, and then reduce, fleet capacity in the EPO, but this is not easy to achieve. The Commission has taken measures to do this, but they fall short of what needs to be done.

4.2. Western and Central Pacific Ocean

The western and central Pacific Ocean (WCPO) supports the largest tuna fishery of the world. In 2007 about 2,358,000 tons of tuna, about 56 percent of the world production, were caught there; of this, skipjack accounted for 1,727 thousand tons (73 percent), yellowfin 432 thousand tons (18 percent), bigeye 140 thousand tons (6 percent), and albacore 59 thousand tons (3 percent). Purse-seine vessels take about 72 percent of the total catch, longliners 11 percent, pole-and-line vessels 10 percent, and a variety of other gears the remainder. Almost 30 nations harvest tuna from the WCPO, but 6 of them account for about 80 percent of the catch.

The Western and Central Pacific Fisheries Commission (WCPFC), established in 2004, has primary responsibility for managing the tuna and tuna-like species in the region; its objective is to ensure the long-term conservation and sustainable use of the stocks of fish covered by the Convention. Because of differences over how tunas should be managed in the northern portions of the WCPO, particularly around Japan, a Northern Committee was established for dealing with management and conservation issues to the north of 20ºN. Unlike the IATTC, which has its own

scientific staff, the WCPFC conducts scientific work through a Scientific Committee and a Technical and Compliance Committee.

The WCPFC, as a very young organization, has a number of pressing problems that it must address during the coming years. Among these are

1) **Catch statistical data from Indonesia and the Philippines**. Data on the several hundred thousand tons of tuna caught by the fleets of these nations are inadequate, and the catches may be significantly greater than available statistics suggest.
2) **Implementation of effective management measures.** Coastal developing states without fleets or industry want to participate in the fishery, while some larger fishing states do not see an unequivocal need for such measures. Reconciling these views and reaching agreement on management measures has proven a difficult, but very important task for the Commission.
3) **Fishing capacity.** There is more fishing capacity in the WCPO purse-seine tuna fishery than needed to take the available catch, and since 2007 there has been an influx of vessels from the EPO. The WCPFC's Vessel Day Scheme is designed to resolve this issue by controlling fishing effort.
4) **Control and compliance.** The WCPFC needs effective tools and procedures for monitoring and control, and means of deterring non-compliance and IUU fishing.
5) **Bycatches.** Data on bycatches in the WCPO, particularly of seabirds, marine turtles, and sharks, are scarce, and need to be improved. This situation should improve with the proposed plan to expand observer coverage. Also, as with the other RFMOs, greater effort needs to be directed toward developing gear and fishing technology to reduce bycatches.

4.3. Albacore in the Pacific

Unlike the other species of tunas in the Pacific Ocean, albacore are divided into a northern and a southern stock; therefore, the IATTC and the WCPFC are jointly responsible for managing the Pacific albacore stocks, and the Pacific population of the species is treated separately in this report.

In the north the catch is roughly evenly divided between surface gears and longlines; in the south, longline vessels account for about 90 percent of the catch, and trolling gear the remainder. Since 1965, the total Pacific catch of albacore has varied between 70 thousand tons in 1965 and about 170 thousand tons in 2002; in 2007 it was about 146 thousand tons. Prior to 2002, about 65 percent of the total Pacific catch of albacore was taken from the northern stock, but after 2002 this share dropped to about 50 percent.

In 2005, both the IATTC and the WCPFC approved resolutions to limit fishing effort for North Pacific albacore tuna to current levels.

4.4. Atlantic Ocean

About 10 percent of the global catches of tuna are taken in the Atlantic Ocean and the Mediterranean Sea. Catches reached a peak of nearly 600 thousand tons in 1990, but fell to about 400 thousand tons in 2007. Prior to 1990, yellowfin was the major species taken, but currently skipjack accounts for 38 percent of the total catch, yellowfin for 25 percent, bigeye for 17 percent, albacore for 12 percent, and bluefin for about 8 percent. Longline vessels dominated the fishery until the early 1970s, but now purse-seine vessels take about 40 percent of the catch, followed by pole-and-line with 27 percent, longline 19 percent, trolling 4 percent, trawl 3 percent, and other

gear types the remaining 7 percent. More than 35 nations reported catches of tuna from the Atlantic Ocean during 2007.

The International Commission for the Conservation of Atlantic Tunas (ICCAT) is responsible for making scientifically-based recommendations designed to maintain the populations of tunas and tuna-like species in the Atlantic Ocean and adjacent seas at levels of abundance which will permit maximum sustainable yields, and has implemented a number of management measures for a variety of tuna and billfish species under its jurisdiction. Scientific advice is provided by the Standing Committee on Research and Statistics (SCRS), comprised of scientists from member nations, but some stock assessments need updating; for example, the last assessment for yellowfin was in 2003. Some of the major issues facing ICCAT are:

1) **Overcapacity in some of the tuna fisheries** has been a persistent problem, particularly those for northern albacore and yellowfin, in both longline and purse-seine fleets. ICCAT has implemented a number of management measures designed to limit fishing capacity, but decreases in the capacity of the purse-seine fleet have probably been offset by increased efficiency.
2) **Compliance with conservation initiatives**. IUU fishing continues to be a problem in the Atlantic and Mediterranean tuna fisheries. ICCAT has recommended measures on compliance and enforcement, but information for evaluating their effectiveness, and for determining whether states have complied with them, is limited.
3) **Mitigating discards and bycatch**. Observer coverage and information on bycatch are sparse and need improvement. Many species of seabirds interact with longline gear, and significant interactions with sea turtles are likely. ICCAT has implemented regulations for reducing these bycatches, and has encouraged educational programs.

The key issues are similar to those in the Pacific Ocean: consensus on implementing management measures; overcoming the reluctance of governments to agree to effective conservation measures; improving compliance and enforcement; and mitigating bycatches, particularly with respect to turtles, birds and sharks.

4.5. Indian Ocean

After the entry of French and Spanish purse-seine fleets into the Indian Ocean, catches increased rapidly from about 150 thousand tons to about 800 thousand tons in 1994. They have continued to increase since then, but at a slower pace, reaching a peak of about 1,150 thousand tons in 2005; in 2007 the catch was 910 thousand tons, or about 22 percent of the world catch. Skipjack makes up about 46 percent of the total catch, yellowfin about 35 percent, bigeye about 14 percent, albacore about 4 percent, and bluefin 1%. Purse-seine vessels account for about 40 percent of the catch, gillnet and longline 20 percent each, pole-and-line about 12 percent, trolling and hand-lines about 4 percent, and a variety of other gears the remaining 4 percent.

The Indian Ocean Tuna Commission (IOTC), responsible for the management of tuna and tuna-like fishes of the Indian Ocean, began operations in 1996. Data are provided by member countries, and science is coordinated through a Scientific Committee, comprised of scientists from member countries.

There are a number of important issues that the IOTC will need to address if the tuna and bycatch species are to be managed effectively.

1) **Fishing capacity**. Studies have indicated overcapacity exists in the purse-seine fishery in the

Indian Ocean. In an effort to address this problem, several measures have been approved calling on states to not exceed the number of vessels they had fishing at various earlier times, but they have had limited success in controlling fleet growth.

2) **Compliance**. The IOTC has implemented a number of measures to improve compliance with conservation measures. However, many of the nations do not provide the information needed to monitor compliance.

3) **Data**. The IOTC lacks catch-statistical data for some of the important fisheries in the Indian Ocean, which hinders its ability to make comprehensive stock assessments, timely conservation and management recommendations, and to monitor compliance. Data on discards and bycatches are also lacking.

4) **IUU fishing**. The IOTC has introduced a number of measures to control IUU fishing, but few of these have been implemented by member nations.