ISSF INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION

ISSF Technical Report 2019-12

STATUS OF THE WORLD FISHERIES FOR TUNA: October 2019

Photo: Jeff Muir

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Topic Categories: Tuna stock status

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Executive Summary

Across the seven species of major commercial oceanic tuna, 23 stocks are recognized for stock assessment and management (6 albacore, 4 bigeye, 4 bluefin, 5 skipjack and 4 yellowfin stocks). This document summarizes the stock status resultant from the most recent scientific assessments of these stocks, as well as the current management measures adopted by the RFMOs. In addition, this report describes the status and management of the 23 stocks using a consistent methodology in terms of three factors: Abundance, Exploitation/Management (fishing mortality) and Environmental Impact (bycatch).

In 2017, the catch of major commercial tunas was 4.9 million tonnes. Fifty-six percent of it was skipjack tuna, followed by yellowfin (30%), bigeye (8%) and albacore (5%). Bluefin tunas accounted for 1% of the global catch.

Globally, 61% of the stocks are at a healthy level of abundance, 17% are overfished and 22% are at an intermediate level. In terms of exploitation, 78% of the stocks are not experiencing overfishing and 22% are experiencing overfishing (**Figure 1**).

From the point of view of total catch (**Figure 2**), 81% of the catch comes from healthy stocks in terms of abundance. This is due to the fact that skipjack stocks contribute more than one half of the global catch of tunas, and they are all in a healthy situation (**Table 1**). In contrast, one bluefin stock, two yellowfin stocks and one bigeye stock are overfished.

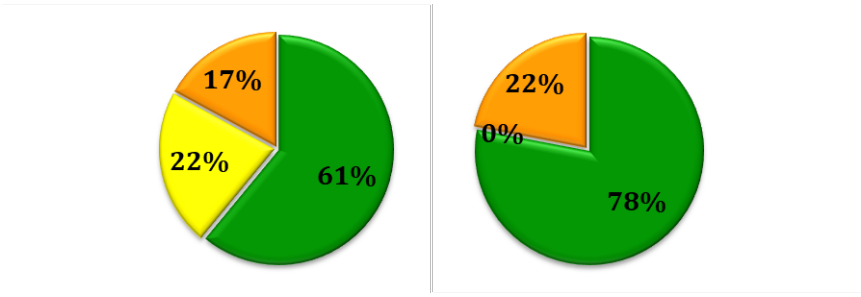


Figure 1. Distribution of stocks of major commercial tunas according to abundance ratings (left) and fishing mortality ratings (right). The percentages correspond to the number of stocks with a given ranking.

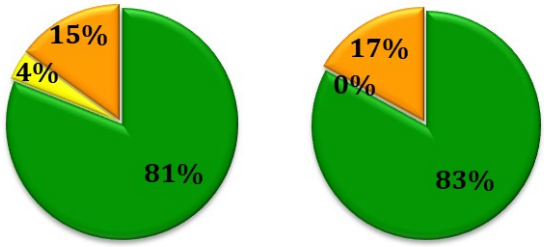


Figure 2. Distribution of catch of major commercial tunas according to abundance ratings (left) and fishing mortality ratings (right). The percentages correspond to the total catch of all stocks with a given ranking.

Table 1. Spawning biomass (SSB), Fishing Mortality (F) and Environmental Impact ratings for 23 tuna stocks. The table is sorted by species. Catch is for 2017 in thousands of tonnes (for 2018 for Pacific Ocean stocks). For an explanation of the methodology for assigning ratings see page 10. Bycatch reflects the percentage of the catch that falls under each rating.

STOCK	CATCH	SSB	F	BYCATCH
Albacore tuna				
PO-ALB-N	56			
PO-ALB-S	69			
AO-ALB-N	28			
AO-ALB-S	14			
AO-ALB-M	3			
IO-ALB	39			
Bigeye tuna				
EPO-BET	94			
WPO-BET	130			
AO-BET	78			
IO-BET	90			
Bluefin tuna				
PO-PBF	10			
AO-BFT-E	24			
AO-BFT-W	2			
SH-SBT	14			
Skipjack tuna				
EPO-SKJ	289			
WPO-SKJ	1766			
AO-SKJ-E	242			
AO-SKJ-W	23			
IO-SKJ	524			
Yellowfin tuna				
EPO-YFT	251			
WPO-YFT	648			
AO-YFT	139			
IO-YFT	409			

Table 2. Spawning biomass (SSB), Fishing Mortality (F) and Environmental Impact ratings for 23 tuna stocks. The table is sorted by ocean or ocean region. Catch is for 2017 in thousands of tonnes (for 2018 for Pacific Ocean stocks). For an explanation of the methodology for assigning ratings see page 10. Bycatch reflects the percentage of the catch that falls

STOCK	CATCH	SSB	F	BYCATCH
Eastern Pacific				
EPO-BET	94			
EPO-YFT	251			
EPO-SKJ	289			
Western Pacific				
WPO-BET	130			
WPO-YFT	648			
WPO-SKJ	1766			
Pacific Ocean				
PO-ALB-N	56			
PO-ALB-S	69			
PO-PBF	10			
Atlantic Ocean				
AO-BET	78			
AO-YFT	139			
AO-SKJ-E	242			
AO-SKJ-W	23			
AO-ALB-N	28			
AO-ALB-S	14			
AO-ALB-M	3			
AO-BFT-E	24			
AO-BFT-W	2			
Indian Ocean				
IO-BET	90			
IO-YFT	409			
IO-SKJ	524			
IO-ALB	39			
Southern Hemisphere				
SH-SBT	14			

Introduction

Purpose

The 23 stocks of the 7 major commercial oceanic tuna species are assessed and managed by five Tuna Regional Fishery Management Organizations (RFMOs). The purpose of this document is to summarize the status of the stocks according to the most recent scientific assessments, as well as the current management measures adopted by the RFMOs. Note that stock status can change between consecutive assessments because the stocks and fisheries are dynamic. In addition, the scientific bodies of the RFMOs sometimes improve the assessment procedures in the light of new methods and more information and these changes also can impact the interpretation of stock status, particularly in relation to MSY-based reference points. While this report does not replace the more detailed information available directly from the RFMOs, it does serve as a single source in which uniform information is presented.

The report is reviewed by the ISSF Scientific Advisory Committee, which provides advice on its content. The report does not advocate any particular seafood purchase decisions.

The report is organized by Ocean or by Ocean Region to try to match as closely as possible the mandates of the different RFMOs.

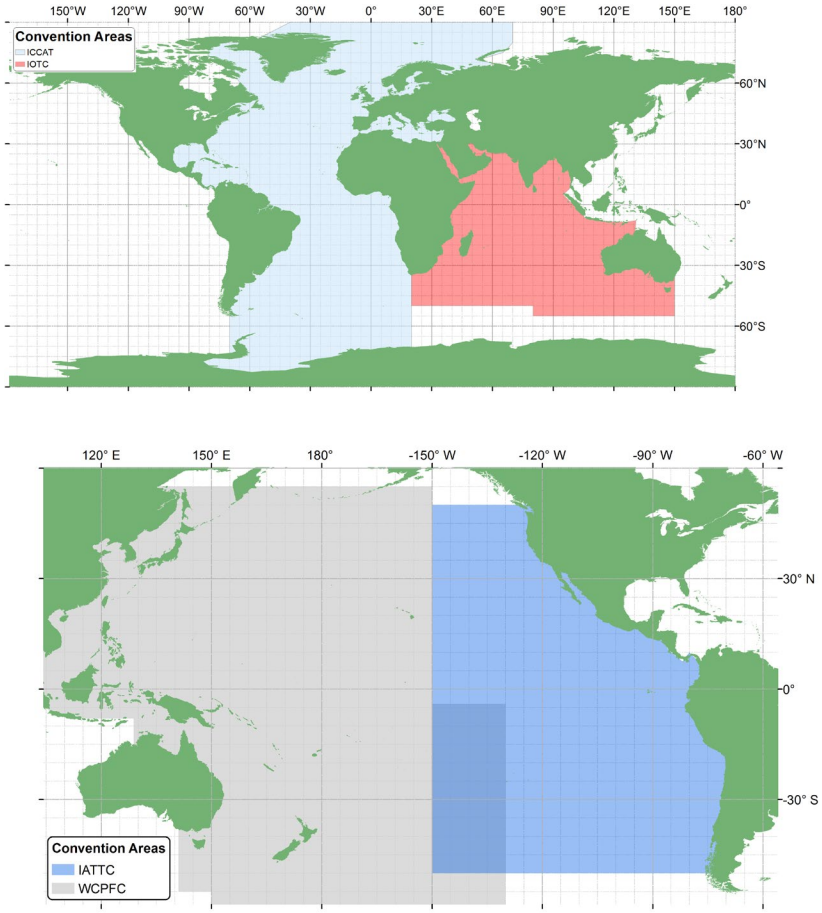


Figure 3. Tuna RMFO Convention Areas. Top: International Commission for the Conservation of Atlantic Tunas (ICCAT) and Indian Ocean Tuna Commission (IOTC). Bottom: Inter-American Tropical Tuna Commission (IATTC) and Western and Central Pacific Fisheries Commission (WCPFC)

In addition, this report describes the status and management of the 23 stocks using a consistent methodology (explained below) in terms of three factors: Abundance, Exploitation/Management and Environmental Impact (bycatch).

This report answers three key questions about each tuna stock:

Is the stock overfished? The report documents the abundance of fish that are able to reproduce each year, called the spawning stock biomass (SSB), and compares it to an estimate of the spawning biomass that would produce maximum sustainable yield (SSB_{MSY}), which is the biomass that results in the highest average catches in the long-term (this is a target of fisheries management). When SSB is below SSB_{MSY} the stock is in an "overfished" state.

Overfishing doesn't necessarily mean that the stock is in immediate danger of extinction or collapse – it means that currently, the fish aren't being allowed to grow and reproduce at their most productive level. If a stock is overfished, the report will note any corrective measures being taken by the relevant fisheries management organization.

Is it in danger of becoming overfished? The report measures the fishing mortality rate (F), a measure of fishing intensity, and compares it to the fishing mortality that produces maximum sustainable yield (F_{MSY}). When F is above F_{MSY}, the stock is in danger of becoming overfished in the future. This is called **overfishing**. If overfishing is taking place, the report will note any corrective measures being taken.

Are the methods used to catch the tuna also catching significant numbers of non-targeted species? The report also measures the environmental impact of fishing in terms of "bycatch" rates. Bycatch is any species caught by the boat that is not the kind of fish the skipper is searching for. All fishing methods result in some bycatch of non-target species. The report identifies the relative bycatch rates by fishing gear and reports on mitigation measures adopted by the RFMOs for various species groups.

This report is updated several times each year, usually after an RFMO assesses the stocks it is responsible for, or adopts management recommendations. Appendix 3 provides a log of the updates.

Note that the IATTC and WCPFC Convention Areas have a region of overlap (**Figure 3**, bottom). In this report, catches of tropical tunas that occur in the overlap region are provided in the EPO summary. Similarly, the CCSBT Convention Area overlaps with those of ICCAT, IOTC and WCPFC. In this report, catches of southern bluefin tuna are provided in the Southern Hemisphere summary.

Ratings methodology

For each stock, ISSF applies color ratings (Green, Yellow, Orange) to each of three factors: stock abundance, fishing mortality and environment.

Each stock is rated separately on these three main criteria and color-coded, to indicate not only the severity of the problem, but also the likelihood that the problem will continue in the future. An orange rating in any of these categories means that there are sustainability concerns (i.e.: that the tuna stock is being overfished, is currently overfished, the bycatch rate is causing adverse population effects, and/or there is insufficient data to understand the impacts of bycatch) and there are no adequate corrective measures in place. A yellow rating means that there are sustainability concerns, but adequate corrective measures are in place. Green rating means that there are no sustainability concerns.

The protocol used is as follows:

1. The Chair of the ISSF Scientific Advisory Committee drafts the text based on reports from the RFMOs and assigns ratings according to the decision table below.
2. Members of the Scientific Advisory Committee review the draft and may revise the ratings based on their knowledge of the RFMO scientific committees.
3. The Scientific Advisory Committee approves the final report with changes as in step 2, above.

COLOR RATINGS DECISION TABLE

STOCK ABUNDANCE		Spawning Biomass (SSB)* is at or above SSB_{MSY}.
		Spawning Biomass is below SSB_{MSY} but it has been stable, increasing, or fluctuating around SSB_{MSY} because the stock is being managed at F_{MSY}**. Yellow is also used in the absence of a stock assessment.
		Spawning Biomass is below SSB_{MSY} and it has not been stable, increasing or fluctuating around SSB_{MSY}**.
FISHING MORTALITY		F is below F_{MSY}.
		F is above F_{MSY} but there are adequate management measures expected to end overfishing.
		F is above F_{MSY} and there are no adequate management measures to end overfishing, or the measures in place are insufficient.
ENVIRONMENT		Adverse population effects on bycatch species are not expected for a given fishing gear/fishing method.
		Adverse population effects on bycatch species are expected for a given fishing gear/fishing method, but there are either management measures or research programs in place expected to mitigate these effects. In addition, there is adequate monitoring of bycatch.
		Adverse population effects on bycatch species are expected for a given fishing gear/fishing method, and there are no management measures or research programs in place expected to mitigate these effects. In addition, bycatch monitoring is inadequate.

** In cases where spawning biomass (SSB) is not available from a stock assessment, total biomass (B) or another measure of abundance is used.*

*** As determined by the ISSF Scientific Advisory Committee based on the results of the stock assessment. Generally, a stable or increasing trend has to be observed for more than two years.*

Environmental ratings are specific to different fishing methods. Appendix 1 provides the default ratings for major gear types.

MANAGEMENT STATUS

The management section for each stock in this report includes a table with scores for Stock management Performance Indicators (PI) from the Marine Stewardship Council (MSC) Fisheries Certification Standard. The scores presented in those tables are based on information in the independent report "An evaluation of the sustainability of Global Tuna Stocks Relative to Marine Stewardship Council Criteria".

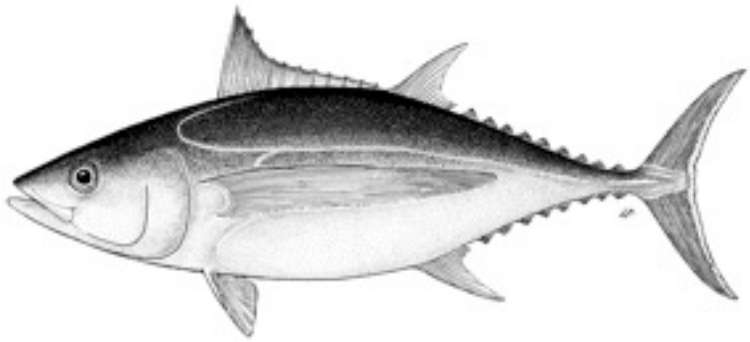
Score	Evaluation
PI < 60	Fail
60 ≤ PI < 80	Condition Needed
PI ≥ 80	Passing Score

Major commercial tunas

Seven species of oceanic tunas are of major commercial importance on a global scale: Three species of bluefin tuna, and one each of albacore, bigeye, yellowfin and skipjack tuna. Due to differences in their distributions and the different fisheries that exploit them, the species are classified as "temperate" or "tropical." The temperate tunas are the bluefins, plus albacore; they are found in waters as cold as 10°C, but can also be found in tropical waters. Skipjack and yellowfin are classified as tropical and are found in waters with temperatures greater than 18° C (although they can dive in colder waters). Bigeye could be classified as intermediate, but is often treated as a tropical species in fishery statistics. Ages/sizes at maturity relate to those at which 50% of females are expected to be mature.

ALBACORE TUNA

Albacore (*Thunnus alalunga*) is a temperate tuna species, widely distributed in temperate and tropical waters of all oceans. The main fisheries are in temperate waters. In the Atlantic, their geographic limits are from 45-50° N and 30-40° S, while in the Indian Ocean, their distribution ranges from 5° N to 40° S with adults occurring from 5° N to 25° S. There are six albacore stocks assessed and managed by the RFMOs: North Pacific Ocean, South Pacific Ocean, North Atlantic Ocean, South Atlantic Ocean, Mediterranean Sea and Indian Ocean.



Albacore tuna. Courtesy of Fisheries and Aquaculture Department/Food and Agriculture Organization of the United Nations.

Albacore tend to travel in single species schools, without the level of mixing with other species seen in other tuna groups (e.g. tropical tuna). Association with floating objects is not common, as seen with tropical tunas. Small albacore are

caught by trolling at the surface in cool water outside the tropics, while larger fish are caught deeper and mainly at lower latitudes (subtropical) using longline gear. Most of the catch is used for producing “white meat” canned tuna.

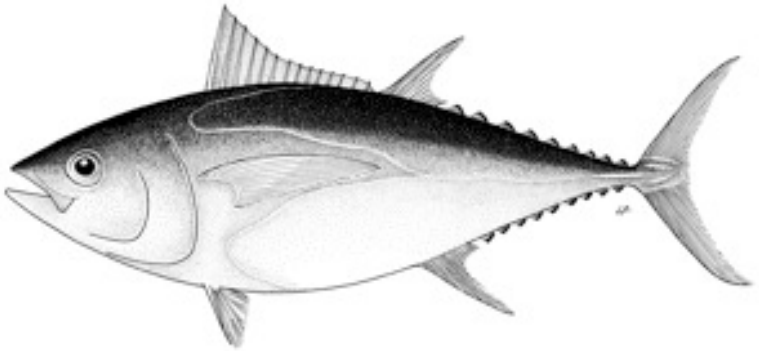
Albacore is one of the smaller major commercial tuna species, reaching sizes intermediate between skipjack and yellowfin. Mature albacore spawn in the spring and summer in tropical and sub-tropical waters between 10° to 25° from the equator.

Albacore: Approximate characteristics

	SIZE (CM)	WEIGHT (KG)	AGE (Y)
COMMON	40-100		
MAXIMUM	130		
MATURITY	75-90	8-15	2-5

BIGEYE TUNA

Bigeye (*Thunnus obesus*) are found in the subtropical and tropical areas of the Atlantic (but not in the Mediterranean), Indian and Pacific Oceans. Their geographical limits range from 55-60° N and 45-50° S. Juveniles and reproductively active adults are found in equatorial waters as well as at higher latitudes. Four stocks are assessed and managed by the RFMOs: Atlantic Ocean, Eastern Pacific, Western Pacific and Indian Ocean.



Bigeye tuna. Courtesy of Fisheries and Aquaculture Department/Food and Agriculture Organization of the United Nations.

Bigeye can form either free schools or those associated with floating objects. Juvenile bigeye will form schools with juvenile yellowfin and skipjack tunas. Smaller bigeye are caught on the surface by a range of gears including handline, ringnet and purse seine and are used mainly for canning, while the majority of larger/older fish are caught by longline fisheries for the sashimi market.

Bigeye reach similar maximum sizes to that of yellowfin. Individuals as large as 150 cm are common in some fisheries. Bigeye tuna are highly fecund and can spawn year round over a wide area of the tropical and subtropical oceans, providing environmental conditions (such as water temperature) are suitable. As with many tropical tuna species, environmental conditions are believed to significantly influence recruitment levels over time.

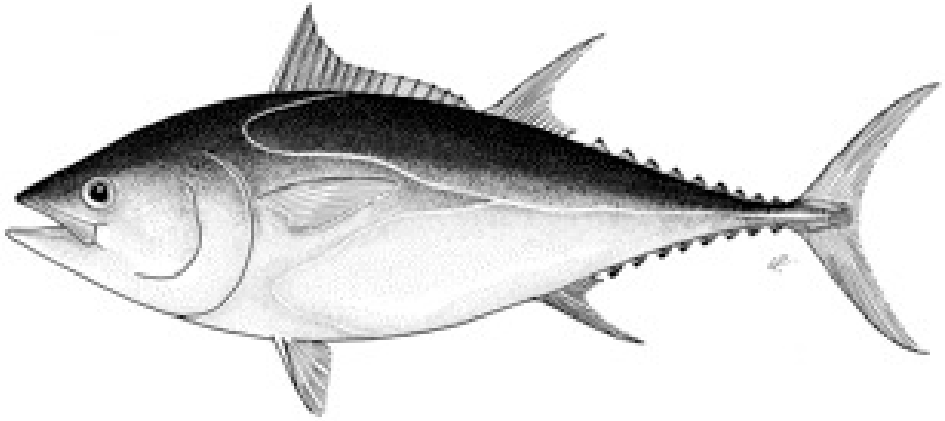
Bigeye: Approximate characteristics

	SIZE (CM)	WEIGHT (KG)	AGE (Y)
COMMON	40-180	1.4-130	
MAXIMUM	230	210	15
MATURITY	102-135	25-57	3-4

ATLANTIC BLUEFIN TUNA

The Atlantic bluefin tuna (*Thunnus thynnus*) is the largest of the tuna species. It can reach 3 meters in length (or nearly 10 feet), although the common size ranges between 80 and 200 cm.

The Atlantic bluefin tolerates a wide range of temperatures. It lives in subtropical and temperate waters of the Atlantic Ocean and the Mediterranean and Black seas, although sightings in the Black Sea are now rare. They are highly migratory and tend to form schools by size. Sometimes bluefin can be seen together with other tuna species like albacore, yellowfin, bigeye, and skipjack.



Atlantic bluefin tuna. Courtesy of Fisheries and Aquaculture Department/Food and Agriculture Organization of the United Nations.

Atlantic Bluefin: Approximate characteristics

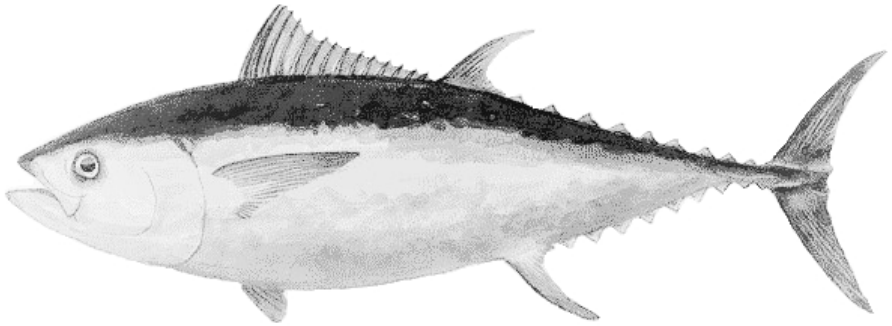
	SIZE (CM)	WEIGHT (KG)	AGE (Y)
COMMON	80-200	145-300	25+
MAXIMUM	458	679	35
MATURITY	110-190	30-120	4-14

PACIFIC BLUEFIN TUNA

Pacific bluefin (*Thunnus orientalis*) is one of three bluefin species, together with Atlantic bluefin and Southern bluefin. Atlantic bluefin and Pacific bluefin only recently came to be viewed by marine scientists as separate species.

Although it is generally smaller than Atlantic bluefin, Pacific bluefin is also one of the largest of the tuna species, ranging between 80–200 cm in length. It has one of the largest geographic range of all tunas, widely distributed throughout the North Pacific Ocean — from East Asia to the North American West Coast — and with a more limited presence in the Southern Hemisphere.

Thunnus orientalis is a temperate tuna species that can also range into tropical waters. It is considered to consist of only one stock and it forms schools by size, sometimes with other tuna and mackerel species.



Pacific bluefin. Courtesy of Inter-American Tropical Tuna Commission (IATTC).

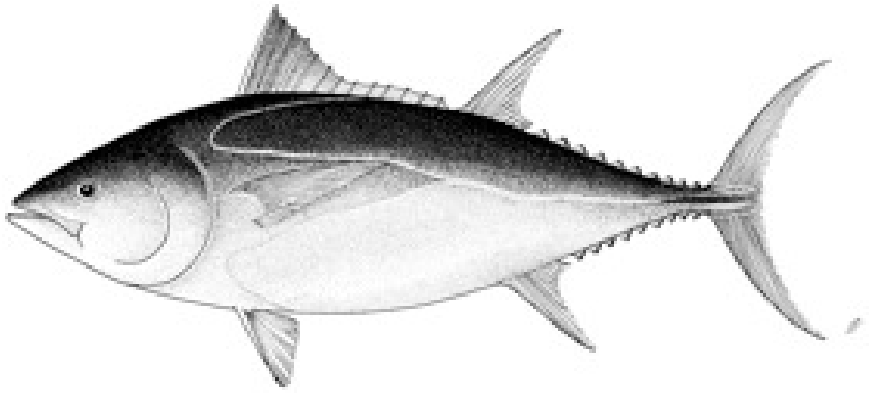
Pacific Bluefin: Approximate characteristics

	SIZE (CM)	WEIGHT (KG)	AGE (Y)
COMMON	120-210	100-260	15+
MAXIMUM	300	540	20
MATURITY	100-150	50-60	3-5

SOUTHERN BLUEFIN TUNA

Southern bluefin tuna (*Thunnus maccoyii*) was the first of the three bluefin tunas to be recognized as a distinct species. Like the other bluefin tunas (*T. thynnus* and *T. orientalis*), Southern bluefin reaches large sizes: adults commonly grow to 180 cm in length.

Thunnus maccoyii is found in the Southern Hemisphere in the temperate and cold waters of the Atlantic, Indian and Pacific oceans. Southern bluefin's thermoregulation capacity enables it to tolerate water temperatures from more than 25°C in the subtropics to less than 3°C in the sub-Antarctic regions. Southern bluefins migrate vast distances and tend to school by size, especially when they are juveniles and during the spawning season.



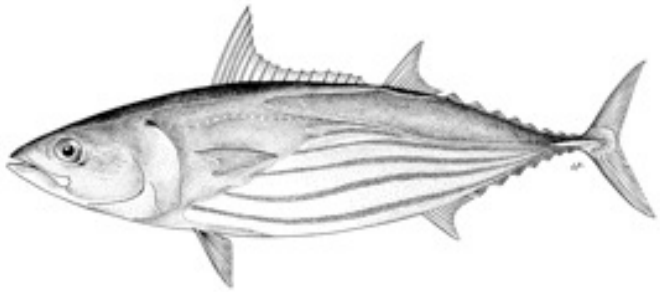
Southern bluefin. Courtesy of Fisheries and Aquaculture Department/Food and Agriculture Organization of the United Nations.

Southern Bluefin: Approximate characteristics

	SIZE (CM)	WEIGHT (KG)	AGE (Y)
COMMON	160	180	14+
MAXIMUM	245	260	40
MATURITY	120-150	100-160	8-12

SKIPJACK TUNA

Skipjack (*Katsuwonus pelamis*) are found mainly in the tropical areas of the Atlantic, Indian and Pacific Oceans. Their geographic limits are 55-60° N and 45-50° S, with the greatest abundance seen in equatorial waters. Five stocks are assessed and managed by the RFMOs: Eastern Atlantic, Western Atlantic, Eastern Pacific, Western Pacific and Indian Ocean.



Skipjack tuna. Courtesy of Fisheries and Aquaculture Department/Food and Agriculture Organization of the United Nations.

Skipjack form both free schools and schools associated with floating objects. They are the principal species associated with FADs and are caught in conjunction with juvenile yellowfin and bigeye tunas.

Skipjack are caught mainly on the surface by purse seine and pole-and-line gear and are the primary species in canned tuna.

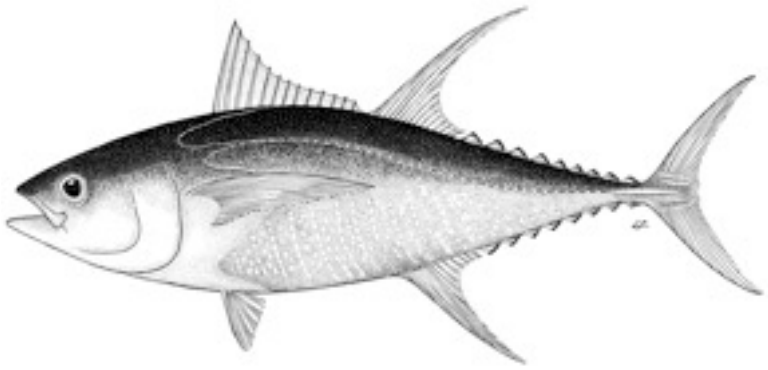
Skipjack are the smallest of the major commercial tuna species. Skipjack are also highly fecund and can spawn year round over a wide area of the tropical and subtropical waters. Environmental conditions are believed to significantly influence recruitment and can produce widely varying recruitment levels between years.

Skipjack: Approximate characteristics

	SIZE (CM)	WEIGHT (KG)	AGE (Y)
COMMON	40-80		
MAXIMUM	108	33	6-10
MATURITY	43	1.6	1-1.5

YELLOWFIN TUNA

Yellowfin (*Thunnus albacares*) are found in the subtropical and tropical areas of the Atlantic, Indian and Pacific Oceans. Yellowfin's geographic limits are from 45°-50° N and South, although in the Pacific they occur mainly from 20° N and South. Four stocks are assessed and managed by the RFMOs: Atlantic Ocean, Eastern Pacific, Western Pacific and Indian Ocean.



Yellowfin tuna. Courtesy of Fisheries and Aquaculture Department/Food and Agriculture Organization of the United Nations.

Yellowfin form both free and associated schools with adults generally forming schools of similarly sized individuals. The free-swimming schools tend to contain large individuals and are mono-specific. In the eastern Pacific, schools are often associated with dolphin pods, an association not common elsewhere.

Small yellowfin are caught on the surface by a range of gears including handline, ringnet, purse seine and pole/line gear and are used mainly for canning, while the majority of larger/older fish are caught by both purse seine and longline fisheries, with the longline catch often shipped fresh to overseas markets.

Yellowfin tuna reach intermediate sizes between albacore and bigeye. Individuals as large as 150 cm are common in some fisheries. Yellowfin are highly fecund and can spawn year round over a wide area of the tropical and subtropical oceans, providing environmental conditions (such as water temperature and forage availability) are suitable. As with many tropical tuna species, environmental conditions are believed to significantly influence recruitment levels over time.

Yellowfin: Approximate characteristics

	SIZE (CM)	WEIGHT (KG)	AGE (Y)
COMMON	40-170	1.2-100	
MAXIMUM	205	194	8
MATURITY	85-108	12-26	2-3

Global summary of catches

The global catch of albacore, bigeye, bluefin, skipjack and yellowfin in 2017 was 4.9 million tonnes, a 2% decrease from 2016. Catches increased steadily until the early 2000s and although they appeared to have stabilized since then, annual catches have kept increasing in recent years (**Figure Global-1**). **Figure Global-2** show trends in catches by species and gear. Ranked by species (using the 2013-2017 average = 4,860,200 tonnes), the majority of the catch is skipjack (58%), followed by yellowfin (28%), bigeye (8%), albacore (5%) and bluefin (1%). In terms of fishing gear, 65% of the catch is made by purse seining, followed by longline (11%), pole-and-line (8%), gillnets (4%) and miscellaneous gears (12%).

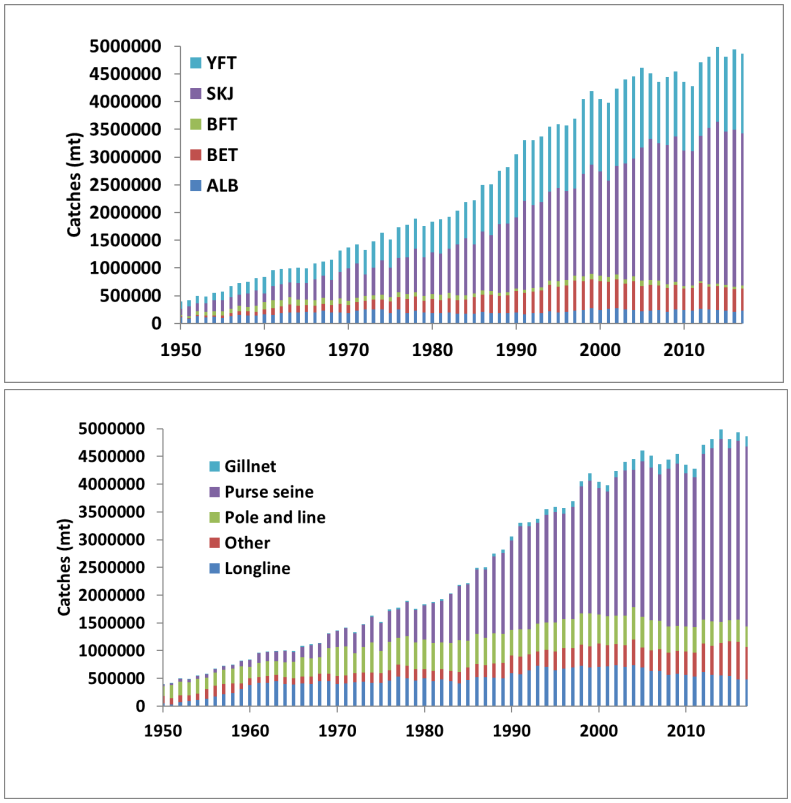


Figure Global-1. Global trends in catch (tonnes) of major commercial tunas, by species (top) and gear (bottom), 1950-2017.

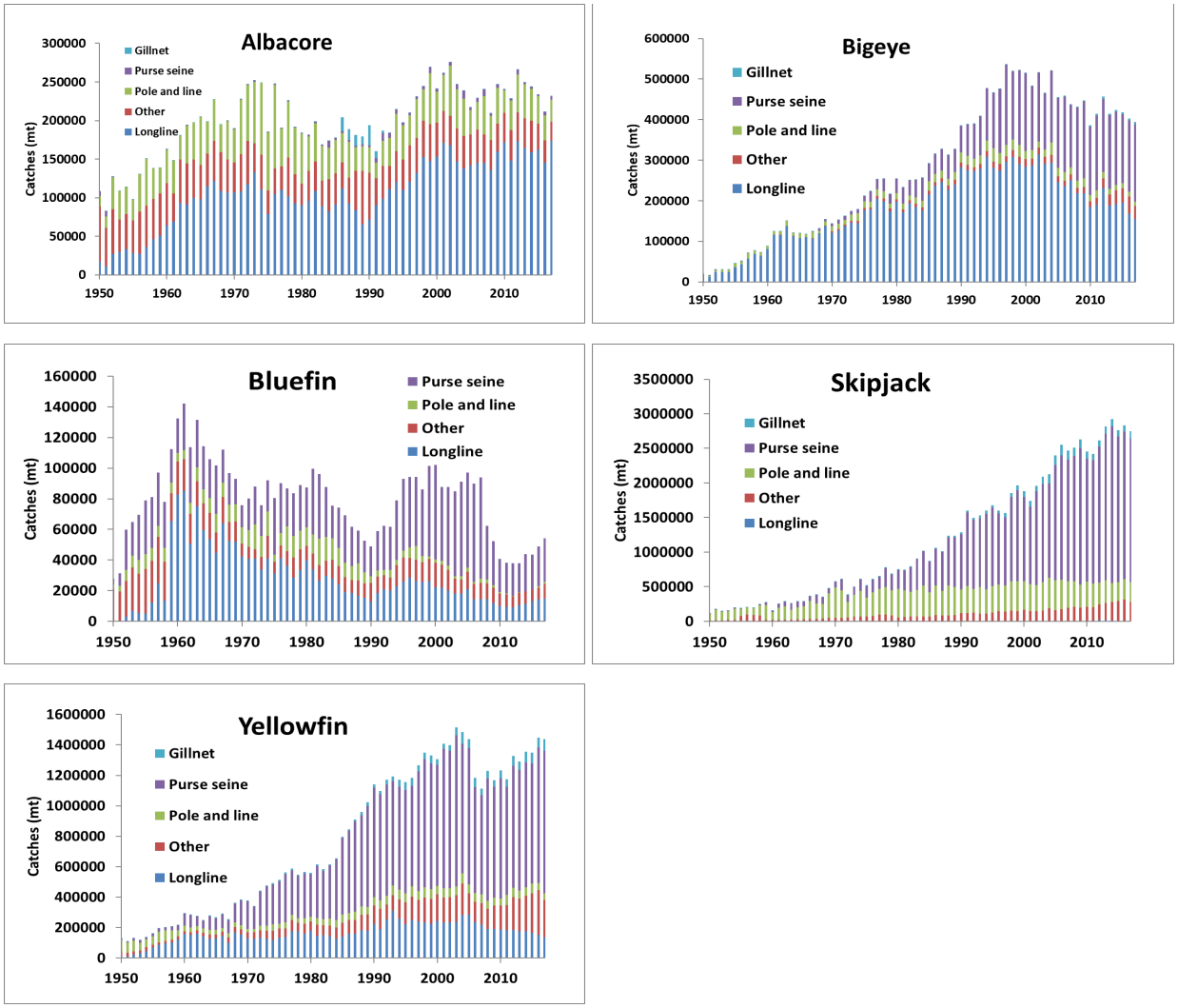


Figure Global-2. Global trends in catch (tonnes) of major commercial tunas, 1950-2017.

Additional resources

ISSF produces other reports that are complementary to this one, and are published as part of the ISSF Technical Reports series (http://iss-foundation.org/knowledge-tools/technical-and-meeting-reports/). Two such reports can be particularly useful in providing additional information:

"Stock Assessment 101: Current practice for tuna stocks" gives a simple introduction to concepts and terms such as F, F_{MSY}, SSB_{MSY}, Recruitment, etc., which are encountered numerous times in this report. Many terms are also defined in the ISSF Glossary.

"Status of the world fisheries for tuna: Management of tuna stocks and fisheries" (updated biannually) provides additional information about the RFMOs: How they are structured, who are their members, how they obtain their scientific advice, how are decisions made, and what management measures they have adopted that are not strictly for tuna stock management or bycatch mitigation.

STOCKS IN THE EASTERN PACIFIC OCEAN

RFMO: Inter-American Tropical Tuna Commission (IATTC). EPO stocks are assessed by the IATTC staff, who makes recommendations to the IATTC. The SAC can also make recommendations to the IATTC.
Last Scientific Committee (IATTC SAC) meeting: May, 2019.
Last Commission meeting: July, 2019.
Tuna stocks managed by IATTC: EPO Yellowfin, EPO Bigeye, EPO Skipjack. Also, North Pacific Albacore, South Pacific Albacore and Pacific Bluefin (also managed by WCPFC; see Stocks in the Pacific Ocean)
Data sources: The main source of information for this section is IATTC (2019), Xu et al. (2018), Xu et al. (2019), Minte-Vera et al. (2019) and Maunder (2019).
Last update: October, 2019.

About 13 percent of the world production of tuna is from the eastern Pacific Ocean (EPO). Catches of skipjack, yellowfin and bigeye in 2018 were 634,100 tonnes, a 3% decrease from 2017. There was a general decline in the total catch since 2003, which recorded the peak catch of 800,000 tonnes of these three species. However, from 2007 onwards catches are steadily increasing (**Figure EPO-1**).

Catches of albacore and Pacific bluefin also occur in the EPO. These stocks are also distributed in the western Pacific and are covered in a different section of this report, under Pacific Ocean.

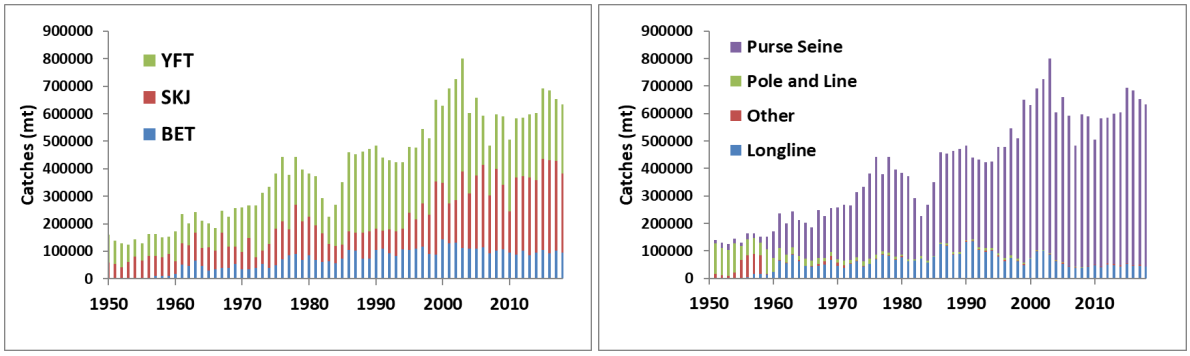


Figure EPO-1. Trends in catch (mt) of bigeye, skipjack and yellowfin in the EPO region, by species (left) and gear (right), 1950-2018.

Average catches for the five-year period 2014-2018 (653,500 tonnes) provide an indication of the recent performance of the fisheries (**Figure EPO-2**): Skipjack accounts for 47% of the catches in weight, followed by yellowfin (38%) and bigeye (15%). Purse-seine vessels take 88% of the total catch, followed by longline (11%).

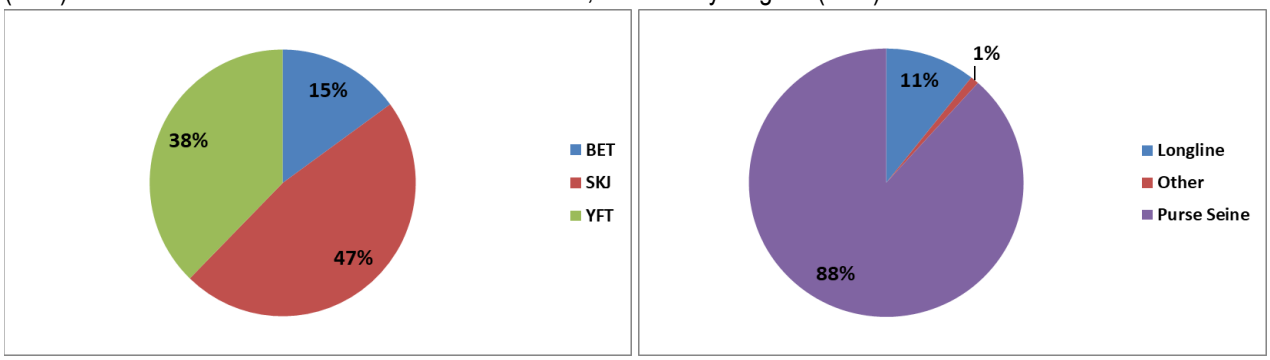


Figure EPO-2. Average 2014-2018 catches of skipjack, yellowfin and bigeye tuna in the EPO. The graph on the left shows the percentages by species, and the graph on the right shows the percentages by gear type.

EPO Bigeye Tuna

Bigeye catches in 2018 were about 94,000 tonnes, an 8% decrease from 2017. Longline fishing dominated the catches in weight until the mid-1990s. However, in recent years purse seine fishing accounts for the majority of catches (64%), while longlining accounts for 36% (**Figure EPO-3**). Bigeye catches in the EPO by other gears are very minor. The bigeye stock in the EPO is not currently overfished, but overfishing may be taking place. Increased fishing effort could significantly reduce spawning biomass and would not increase catches substantially.

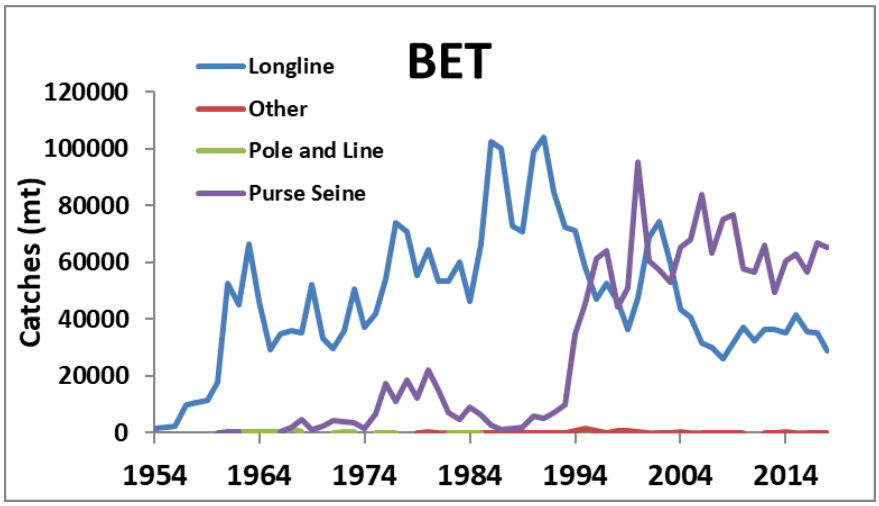


Figure EPO-3. Catches of bigeye tuna in the EPO from 1954 to 2018, by gear type.

STOCK ASSESSMENT

In 2018, the IATTC conducted an update assessment of the stock which gave more pessimistic results relative to the previous assessment. However, the staff noted that the results could be unreliable due to the high levels of uncertainty in the assessment model's assumptions, the reliability of the recent longline data, and other issues that need to be improved in the assessment. The results of the updated assessment indicate the following (EPO-4; note that these are highly uncertain):

1. The current ratio of spawning biomass $SSB_{current}SSB_{MSY}$ is estimated at 1.02 (range: 0.56-1.47). This indicates that the stock is not overfished.

2. The ratio of $F_{current}/F_{MSY}$ is estimated at 1.15 (range: 0.95-1.46), indicating that overfishing was occurring on average in the most recent three years (2015-2017). Fishing capacity of the purse seine fishery continues to increase, as does the number of purse seine sets on floating objects, which is a concern.

3. The estimate of MSY is 95,500 tonnes. MSY has been reduced to about half its level in 1993, when the expansion of the floating-object fishery began, as the overall selectivity from all fleets combined shifted towards smaller individuals. Since bigeye tuna can grow close to 200 cm, catching them when they are small results in a loss of potential yield, i.e. the catches that could be taken by other gears that target larger individuals, such as longlining. This is known as "growth overfishing".

4. As for all stock assessments that use MSY-based reference points, the assessment of stock status is highly sensitive to the assumed relationship between spawning biomass and recruitment. The base case assessment makes a very optimistic assumption that recruitment to the fishery remains high even when the spawning stock is very depleted (i.e. recruitment is not related to the level of SSB). This results in MSY occurring at low levels of spawning stock and consequently the measure used to report stock status, $SSB_{current}/SSB_{MSY}$, remains high even for low stock sizes. The assessed stock status is more pessimistic if a stock-recruitment relationship, which is also plausible and more commonly applied in other tRFMO assessments, is assumed. The assessment results are also more pessimistic if a higher value is

assumed for the average size of the older fish, if lower rates of natural mortality are assumed for adult bigeye, and if the size data from longline fisheries are given higher weight in the analyses.

Due to many uncertainties in this new assessment, the IATTC staff developed alternative empirical fishery indicators to assess the status of the stock and to provide management advice.

In 2019 the IATTC staff updated these indicators. All the indicators, except catch, show strong trends over time, indicating increasing fishing mortality and reduced abundance, and are at, or above, their reference levels. The increasing number of sets and the decreasing mean weight of the fish in the catch suggests that the bigeye stock in the EPO is under increasing fishing pressure and that measures additional to the current seasonal closures, such as limits on the number of floating-object sets, are required. The conclusions reached from analyzing these fishery indicators are qualitatively similar to the updated assessment. Thus, ISSF is taking a cautious view of the status of BET in the EPO and considers that overfishing is taking place.

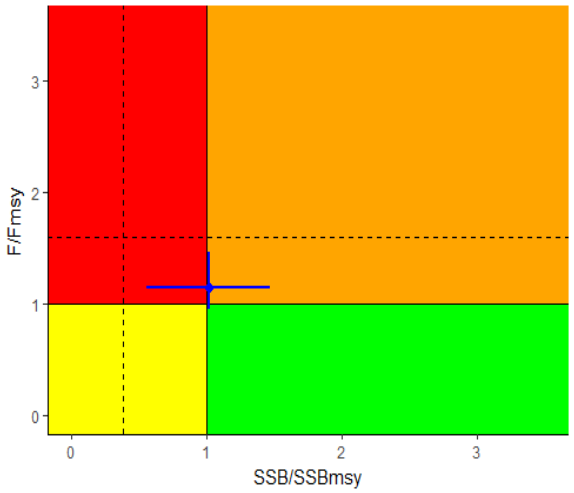


Figure EPO-4. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for EPO bigeye. Solid black lines represent interim target reference points and dashed black lines represent interim limit reference points. Note that the stock assessment results are highly uncertain.

MANAGEMENT

Limit reference point: In 2014, on an interim basis, IATTC agreed to the staff's recommendation of the equilibrium spawning biomass/fishing mortality corresponding to that which produces a 50% reduction in recruitment from the unfished level. This calculation is based on the assumption that the steepness of the stock-recruitment relationship is h=0.75, which is more conservative than the assessment assumption that h=1.0. This corresponds to a spawning biomass that is about 8% of the un-fished level. SSB_{recent}/SSB_0 was estimated to be 0.21, which is above this limit, but this estimate should be taken with caution given the high uncertainty in the 2018 stock assessment.

Target reference point: In 2014, on an interim basis, IATTC agreed to the staff's recommendation of F_{MSY} and SSB_{MSY}. The level of F estimated by the 2018 assessment, which is highly uncertain, is above this level. Alternative fishery indicators suggest that the current management measures are insufficient to constrain F.

Harvest control rule: In 2016, IATTC adopted HCR for the tropical tuna purse-seine fishery based on the interim target and limit reference points adopted in 2014 (Resolution C-16-02). The HCR aims to prevent fishing mortality from exceeding the MSY level for the tropical tuna stock (bigeye, yellowfin or skipjack) that requires the strictest management.

If fishing mortality or spawning biomass are approaching or exceeding the corresponding limit reference point as measured by an estimated probability of 10% or greater of exceeding the limit, the HCR also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock.

The main conservation measures established by the IATTC for bigeye are Resolutions C-17-01 and C-17-02, which include an annual fishing closure for purse seine vessels greater than 182 tons carrying capacity. This measure calls for:

1. A 72-day closure for purse seiners greater than 182 tons capacity through 2020 (vessels with Dolphin Mortality Limits are allowed an additional 10 days of fishing in 2018-2020);

2. A seasonal closure of the purse seine fishery in an area known as "El Corralito", west of the Galapagos Islands, where catch rates of small bigeye are high;

3. A full retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas;

4. Bigeye catch limits for the main longline fishing nations.

5. Limits on the number of active FADs that each purse seiner can have at any time, ranging from 70 FADs/vessel for the smallest ones to 450 FADs/vessel for Class 6 vessels (1,200 m^3 capacity). Class 6 vessels are also required to not deploy FADs 15 days before the selected closure period and to recover within 15 days prior to the start of the closure period a number of FADs equal to the number of FADs set upon during that same period.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score[1]	Evaluation
1.2.1	Harvest Strategy	75	Condition Needed
1.2.2	Harvest control rules and tools	60	Condition Needed
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	75	Condition Needed

[1] These scores have not been updated to reflect latest (2019) changes in stock assessment or management.

SUMMARY

EPO BET	ESTIMATE	YEARS	NOTES
RECENT CATCH	94	2018	
5-YEAR CATCH	98	2014-18	
MSY	95		
F/F_{MSY}	1.15	2015-17	Highly uncertain
SSB/SSB_{MSY}	1.02	Start of 2018	Highly uncertain
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB ~ SSB_{MSY}. Spawning biomass is likely near the MSY level.
FISHING MORTALITY		F>F_{MSY}. The estimate of current F is above F_{MSY} and management measures in place do not seem sufficient to prevent overfishing.
ENVIRONMENT		63% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks, non-target species in general). There is 100% observer coverage on large purse seiners.
		36% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). There will be 5% observer coverage on large longliners.

Last date of a change in Color Ratings: October, 2018.
Changes from the previous (October 2017) Color Ratings: The F rating changed from Yellow to Orange.

EPO Yellowfin Tuna

Yellowfin catches in the EPO in 2018 were about 251,000 tonnes, 12% higher than 2017 catch levels. The main fishing gear is purse seine (95% of the catch), and recent catches by this gear are about 58% of the record high caught in 2002 (**Figure EPO-5**). Catches from longline vessels, although smaller in magnitude, have also declined substantially in recent years. The yellowfin stock in the EPO is currently overfished and overfishing is taking place.

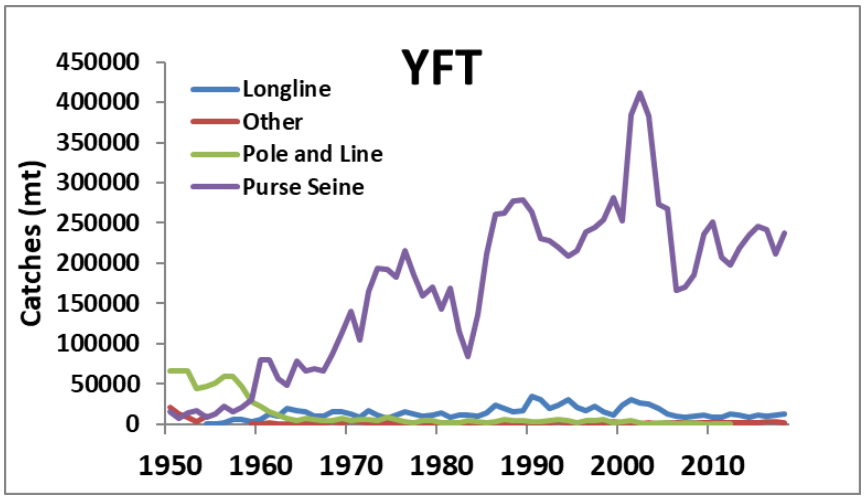


Figure EPO-5. Catches of yellowfin tuna in the EPO from 1950 to 2018, by gear type.

STOCK ASSESSMENT

The 2019 update assessment used the same methodology as the previous one, with updated data. However, the IATTC staff noted the assessment model was unable to reconcile data that apparently carry contradictory signals about the status of the stock in addition to issues similar to those found in the 2018 bigeye assessment which need to be addressed. The assessment results indicated the following (**Figure EPO-6**):

1. The ratio of spawning biomass SSB_{recent}/SSB_{MSY} is estimated to be 0.76 (range: 0.68-0.84), indicating that the stock is overfished.

2. The ratio F_{recent}/F_{MSY} is estimated to be 1.12 (range: 1.01-1.27) indicating that overfishing is occurring. This is a substantial change from the previous assessment, which estimated recent fishing mortality rates around the level corresponding to MSY.

3. MSY is estimated to be 255,000 tonnes. Increasing the average weight of the yellowfin caught could increase the MSY.

4. As for all stock assessments that use MSY-based reference points, the assessment of stock status is highly sensitive to the assumed relationship between spawning biomass and recruitment. The base case assessment makes a very optimistic assumption that recruitment to the fishery remains high even when the spawning stock is very depleted (i.e. recruitment is not related to the level of SSB). This results in MSY occurring at low levels of spawning stock and consequently the measure used to report stock status, $SSB_{current}/SSB_{MSY}$, remains high even for low stock sizes. The assessed stock status is more pessimistic if a stock-recruitment relationship, which is also plausible and more commonly applied in other tRFMO assessments, is assumed. The assessment results are also sensitive to the natural mortality assumed for adult yellowfin and the length assumed for the oldest fish.

In more recent years, the impact of the floating-object fisheries has increased and exceeded that of unassociated fisheries. In 2018 it was estimated that the impact of the floating-object fisheries also surpassed that of the dolphin-associated fisheries. The staff is concerned about this recent trend and its implications for fishing mortality of juvenile fish.

Due to the assessment model being unable to reconcile data as explained above, the IATTC staff did not consider the assessment results reliable and developed a series of fishery indicators to monitor the relative status of the stock. Some indicators show low values for the recent years of the series, which may indicate low abundance. However, the increase in average size for some fisheries is inconsistent with low abundance. Therefore, it is not clear from the indicators whether yellowfin abundance is reduced, or the fisheries are changing. However, the increasing number of sets in the floating object fishery suggests that the yellowfin stock in the EPO may be under increasing fishing pressure and that measures additional to the current seasonal closures, such as limits on the number of floating-object sets, are required. Despite some differences in conclusions reached from analyzing different fishery indicators and the uncertainty in the results of the updated assessment, ISSF is taking a cautious view of the status of YFT in the EPO and considers that the yellowfin stock is overfished and overfishing is taking place based on the updated assessment results.

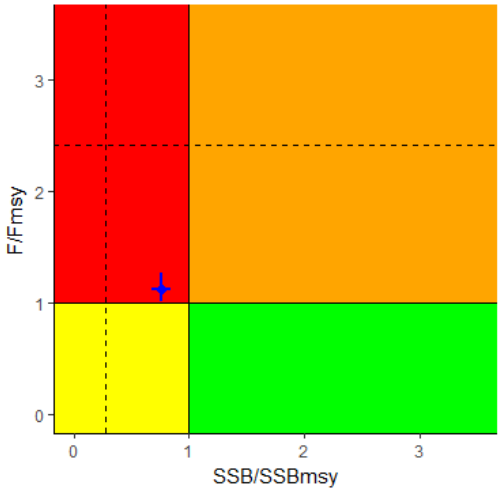


Figure EPO-6. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for EPO yellowfin. Solid black lines represent interim target reference points and dashed black lines represent interim limit reference points.

MANAGEMENT

Limit reference point: In 2014, on an interim basis, IATTC agreed to the staff's recommendation of the equilibrium spawning biomass and fishing mortality corresponding to that which produces a 50% reduction in recruitment from the unfished level. This calculation is based on the assumption that the steepness of the stock-recruitment relationship is h=0.75, which is more conservative than the assessment assumption that h=1.0. This corresponds to a spawning biomass that is about 8% of the unfished level. $SSB_{recent}/SSB_0 = 0.21$, which is above this limit.

Target reference point: In 2014, on an interim basis, IATTC agreed to the staff's recommendation of F_{MSY} and SSB_{MSY}. Both F and SSB are breaching these targets.

Harvest control rule: In 2016, IATTC adopted HCR for tropical tuna purse-seine fisheries based on the interim target and limit reference points adopted in 2014 (Resolution C-16-02). The HCR aims to prevent fishing mortality from exceeding the MSY level for the tropical tuna stock (bigeye, yellowfin or skipjack) that requires the strictest management. If fishing mortality or spawning biomass are approaching or exceeding the corresponding limit reference point as measured by an estimated probability of 10% or greater of exceeding the limit, the HCR also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock.

The main conservation measure established by the IATTC for yellowfin are Resolutions C-17-01 and C-17-02, which include an annual fishing closure for purse seine vessels greater than 182 tons carrying capacity. This measure calls for:

1. A 72-day closure for purse seiners greater than 182 tons capacity through 2020 (vessels with Dolphin Mortality Limits are allowed an additional 10 days of fishing in 2018-2020);

2. A seasonal closure of the purse seine fishery in an area known as "El Corralito", west of the Galapagos Islands, where catch rates of small bigeye are high;

3. A full retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas.

4. Limits on the number of active FADs that each purse seiner can have at any time, ranging from 70 FADs/vessel for the smallest ones to 450 FADs/vessel for Class 6 vessels (1,200 m^3 capacity). Class 6 vessels are also required to not depoy FADs 15 days before the selected closure period and to recover within 15 days prior to the start of the closure period a number of FADs equal to the number of FADs set upon during that same period.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score[2]	Evaluation
1.2.1	Harvest Strategy	80	Passing Score
1.2.2	Harvest control rules and tools	80	Passing Score
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	100	Passing Score

[2] These scores have not been updated to reflect latest (2019) changes in stock assessment or management.

SUMMARY

EPO YFT	ESTIMATE	YEARS	NOTES
RECENT CATCH	251	2018	
5-YEAR CATCH	246	2014-18	
MSY	255	2016-18	
F/F_{MSY}	1.12	2016-18	range: 1.01-1.27
SSB/SSB_{MSY}	0.76	Start of 2019	range: 0.68-0.84
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		$SSB < SSB_{MSY}$
FISHING MORTALITY		$F > F_{MSY}$. In addition, due to the assumption in the base case model that recruitment is independent of stock size, F_{MSY} may be optimistically high.
ENVIRONMENT		59% of the catch is made by purse seining on tuna-dolphin associations. Dolphin mortality is managed and closely monitored by AIDCP, with 100% observer coverage. However, the last dolphin surveys took place in 2006, and therefore the status of these populations is uncertain.
		23% of the catch is made by purse seining on FADs. Several bycatch mitigation measures are in place (turtles, sharks, non-target species in general). There is 100% observer coverage on large purse seiners.
		13% of the catch is made by purse seining on free schools of yellowfin.
		4% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). There will be 5% observer coverage on large longliners.

Last date of a change in Color Ratings: August, 2019.
Changes from the previous (October 2018) Color Ratings: Abundance rating changed from Green to Orange and Fishing mortality rating changed from Yellow to Orange.

EPO Skipjack Tuna

In 2018, skipjack catches were about 289,000 tonnes, an 11% decrease from 2017. Skipjack catches in the EPO are notoriously variable (**Figure EPO-7**). Purse seine fishing dominates the catches (over 99% of the total). The skipjack EPO stock is not overfished and overfishing is not occurring.

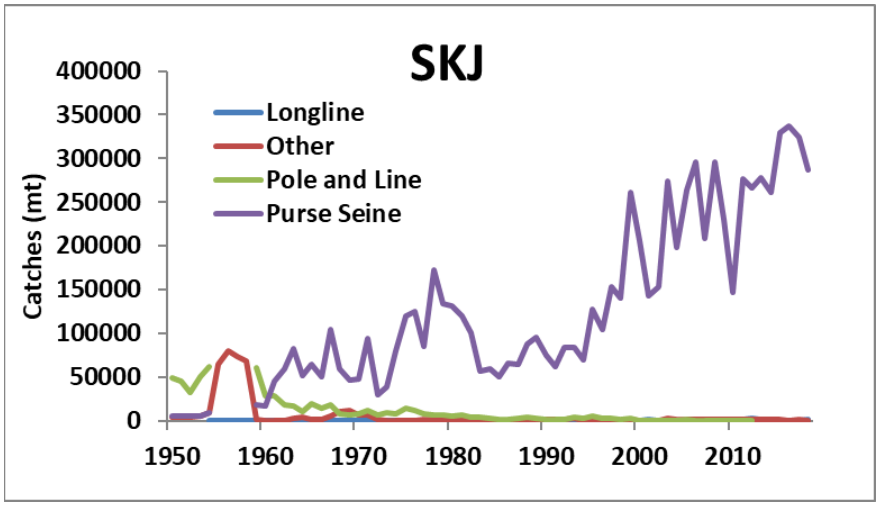


Figure EPO-7. Catches of skipjack tuna in the EPO from 1950 to 2018, by gear type.

STOCK ASSESSMENT

The last assessment for skipjack tuna was in 2012, based on four alternative types of analyses. EPO skipjack assessments have had difficulty in estimating the absolute levels of biomass and exploitation rates and, consequently, indicators associated to reference levels have been used instead to evaluate the status of the stock. In 2019 these indicators were updated to include data up to 2018. While the data- and model-based indicators have yet to detect any adverse impacts of the fishery. some fishery indicators are approaching or exceeding historic reference levels (e.g. average weight is near its lower reference level) and there is concern over the substantial increase in numbers of sets on floating objects in recent years.

MANAGEMENT

Limit reference point: In 2014, on an interim basis, IATTC agreed to the staff's recommendation of the equilibrium spawning biomass and fishing mortality corresponding to that which produces a 50% reduction in recruitment from the unfished level. This corresponds to a spawning biomass that is about 8% of the unfished level. Although no MSY-based reference points are available for EPO skipjack, it is very likely that the stock is above this limit.

Target reference point: In 2014, on an interim basis, IATTC agreed to the staff's recommendation of F_{MSY} and SSB_{MSY}. Although no MSY-based reference points are available for EPO skipjack, it is very likely that the stock is around this target.

Harvest control rule: In 2016, IATTC adopted HCR for tropical tuna purse-seine fisheries based on the interim target and limit reference points adopted in 2014 (Resolution C-16-02). The HCR aims to prevent fishing mortality from exceeding the MSY level for the tropical tuna stock (bigeye, yellowfin or skipjack) that requires the strictest management. If fishing mortality or spawning biomass are approaching or exceeding the corresponding limit reference point as measured by an estimated probability of 10% or greater of exceeding the limit, the HCR also triggers the establishment of additional management measures to reduce fishing mortality and rebuild the stock.

The main conservation measure established by the IATTC for skipjack are Resolutions C-17-01 and C-17-02, which includes an annual fishing closure for purse seine vessels greater than 182 tons carrying capacity. This measure calls for:

1. A 72-day closure for purse seiners greater than 182 tons capacity through 2020 (vessels with Dolphin Mortality Limits are allowed an additional 10 days of fishing in 2018-2020);

2. A seasonal closure of the purse seine fishery in an area known as "El Corralito," west of the Galapagos Islands, where catch rates of small bigeye are high;

3. A full retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas.

4. Limits on the number of active FADs that each purse seiner can have at any time, ranging from 70 FADs/vessel for the smallest ones to 450 FADs/vessel for Class 6 vessels (1,200 m^3 capacity). Class 6 vessels are also required to not deploy FADs 15 days before the selected closure period and to recover within 15 days prior to the start of the closure period a number of FADs equal to the number of FADs set upon during that same period.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score[3]	Evaluation
1.2.1	Harvest Strategy	75	Condition Needed
1.2.2	Harvest control rules and tools	75	Condition Needed
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	80	Passing Score

[3] These scores have not been updated to reflect latest (2019) changes in stock assessment or management.

SUMMARY

EPO SKJ	ESTIMATE	YEARS	NOTES
RECENT CATCH	289	2018	
5-YEAR CATCH	309	2014-18	
MSY	N/A		
F/F_{MSY}	≤1		
SSB/SSB_{MSY}	≥1		
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F ≤ F_{MSY}.
ENVIRONMENT		71% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks, non-target species in general). There is 100% observer coverage on large purse seiners.
		28% of the catch is made by purse seining on free schools of skipjack.

Last date of a change in Color Ratings: None.
Changes from the previous (original) Color Ratings: None.

STOCKS IN THE WESTERN & CENTRAL PACIFIC OCEAN

RFMO: Western and Central Pacific Fisheries Commission (WCPFC). WCPO stocks are assessed by SPC and the results are reviewed by the SC which makes recommendations to the WCPFC.
Last Scientific Committee (SC) meeting: August, 2019.
Last Commission meeting: December, 2018.
Tuna stocks managed by WCPFC: WCPO Yellowfin, WCPO Bigeye, WCPO Skipjack. Also, North Pacific Albacore, South Pacific Albacore and Pacific Bluefin (also managed by IATTC; see Stocks in the Pacific Ocean). Note also that WCPFC and IATTC have an area of overlap; WCPO catch figures reported here do not include those WCPFC Convention Area catches made in the overlap area.
Data sources: The main sources of information for this section are Vincent et al. (2018), Tremblay-Boyer et al. (2017), Vincent et al. (2019), WCPFC (2019a) and WCPFC (2019b).
Last update: October, 2019.

About 52 percent of the world production of tuna is from the western and central Pacific Ocean (WCPO). Provisional catches of skipjack, yellowfin, and bigeye in 2018 were 2,544,000 tonnes, a 5% increase from 2017. There has been a general increase in the total catch since 1980, with a small recess in 2010-2011 (**Figure WCPO-1**). This increase has been particularly pronounced for skipjack tuna.

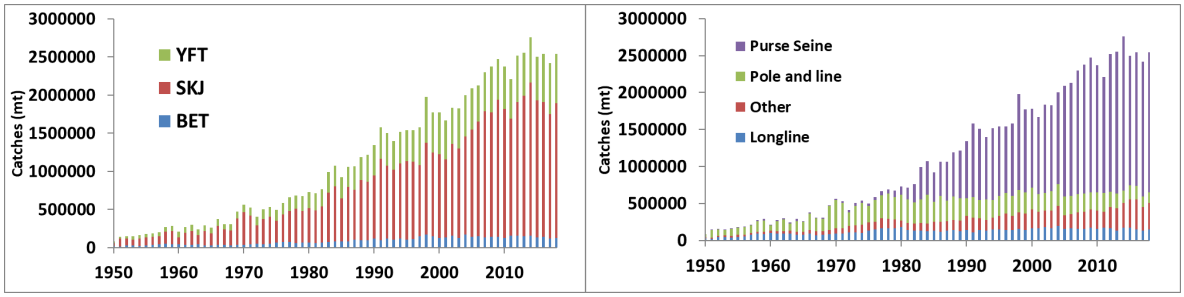


Figure WCPO-1. Trends in catch (mt) of bigeye, skipjack and yellowfin in the WCPO region, by species (left) and gear (right), 1950-2018.

Average catches for the five-year period 2014-2018 (2,552,500 tonnes) provide an indication of the recent performance of the fisheries (**Figure WCPO-2**): Skipjack accounts for 70.2% of the catches in weight, followed by yellowfin (24.4%) and bigeye (5.4%). Purse-seine vessels take 73% of the total catch, followed by pole-and-line (7%), longline (6%), and other gears.

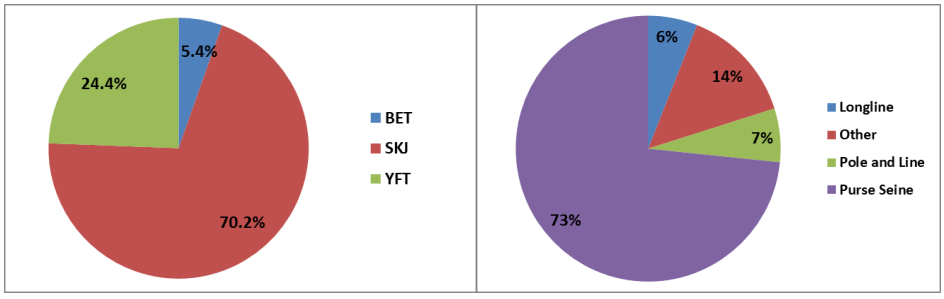


Figure WCPO-2. Average 2014-2018 catches of skipjack, yellowfin and bigeye tuna in the WCPO. The graph on the left shows the percentages by species, and the graph on the right shows the percentages by gear type.

WCPO Bigeye Tuna

Provisional bigeye catches in 2018 were about 129,800 tonnes, a 5% increase from 2017. The main fishing gears are purse seine (5-year average ~44%) and longline (also ~44%) (**Figure WCPO-3**). Bigeye catches in the WCPO by other gears are relatively minor. The latest assessment indicates that the Western Pacific bigeye tuna stock is not overfished, with biomass above the limit reference point established by WCPFC. The management measures in place appear to be sufficient to prevent overfishing.

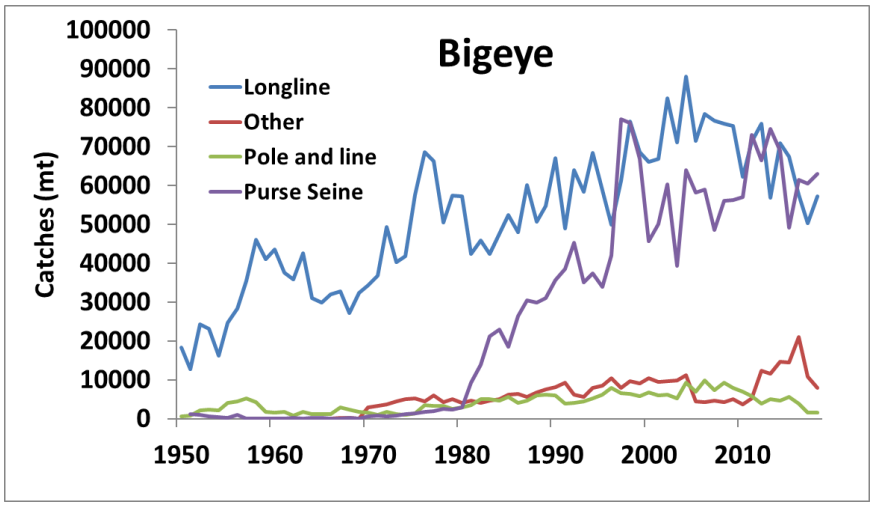


Figure WCPO-3. Catches of bigeye tuna in the WCPO from 1950 to 2018, by gear type.

STOCK ASSESSMENT

In 2017, SPC conducted an assessment that gave results which were more optimistic than in the previous assessment, partly due to the use of a new growth curve. During 2017-2018, more growth data were collected and analyzed, giving further support to the validity of the new growth curve. In 2018, the assessment was updated and the SC decided to remove model runs where the old growth curve was used. The new assessment indicated the following (**Figure WCPO-4**):

1. The median ratio of F_{recent}/F_{MSY} is estimated at 0.77 (90% C.I. range: 0.67 and 0.93), indicating that overfishing is likely not occurring (across all model runs, there is a roughly 6% chance that F_{MSY} is being exceeded).

2. The median ratio of spawning biomass SSB_{recent}/SSB_{MSY} in the model runs is estimated at 1.38 (90% C.I. range: 1.12 to 1.66), indicating that the stock is not overfished. It was estimated that there is a 0% probability that the recent spawning biomass has breached the limit reference point established by WCPFC ($SSB_{recent}/SSB_{F=0}$ =0.2).

3. The median estimate of MSY is 159,000 tonnes. MSY has been reduced to less than half its levels prior to 1970 through harvest of small bigeye ("growth overfishing"). Recent catches (2014-2018 average = 138,600 tonnes) are below MSY.

The updated assessment is clearly more optimistic than previous ones. Still, some uncertainties remain and the SC has recommended that several aspects of the assessment be investigated further to inform future assessments.

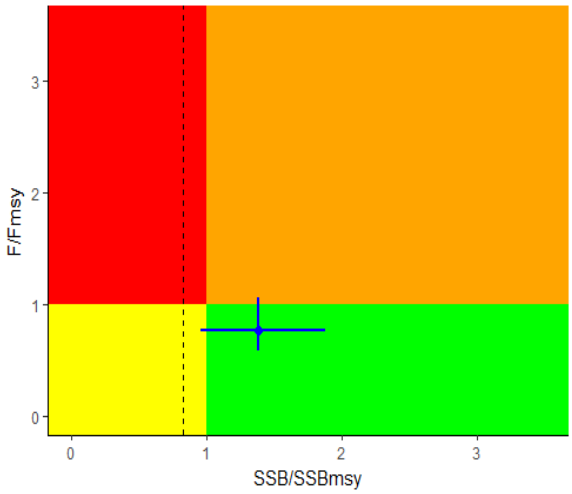


Figure WCPO-4. Latest estimate of SSB/SSB$_{MSY}$ and F/F$_{MSY}$ (in blue, including range) for WCPO bigeye tuna. Dashed black line represents limit reference point.

MANAGEMENT

Limit reference point: 20% of the equilibrium spawning biomass that would be expected in the absence of fishing under current (most recent 10 years of the current assessment, excluding the last year) environmental conditions (20%SSB$_{current, F=0}$). Adopted by the Commission in 2012. The median value of SSB$_{recent}$/SSB$_{F=0}$ is 0.36, which is above this limit.

Target reference point: Not defined for the long term. CMM 2018-01, which acts as a bridge to the adoption of a harvest strategy, establishes that, pending agreement on a TRP, the spawning biomass depletion ratio (SB/SB$_{F=0}$) is to be maintained at or above the average SB/SB$_{F=0}$ for 2012-2015.

Harvest control rule: Not defined. CMM-2014-06 calls for WCPFC to develop and implement a harvest strategy approach that includes target reference points, harvest control rules and other elements. The workplan and its deadlines have been revised in subsequent meetings of the Commission.

The main binding conservation measure for bigeye established by the WCPFC is CMM 2018-01, that aims to provide for a robust transitional management regime that ensures the sustainability of bigeye, skipjack, and yellowfin tuna stocks. It calls for:

1. A 3-month closure (July through September) of fishing on FADs in EEZ waters and on the High Seas between 20°N and 20°S. VMS polling frequency is increased to 30 minutes during the closure;
2. In addition to (1), each member shall choose between extending the FAD closure for two additional sequential months of the year in the High Seas in 2019 and 2020 in either April-May, or in November-December, with some exemptions for Kiribati- and Philippines-flagged vessels;
3. To reduce the entanglement of sharks, marine turtles or any other species, as from 1st January 2020, CCMs shall ensure that any FAD to be deployed in, or that drifts into, the WCPFC Convention Area shall have a lower-entangling design. To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials for FADs should be promoted and the use of non-plastic and biodegradable materials in the construction of FADs is encouraged;
4. A limit of no more than 350 drifting Fish Aggregating Devices (FADs) with activated instrumented buoys deployed at sea at any one time per purse seine vessel;
5. A limitation in the number of vessel days: For PNA members, the limit in their EEZs is the 2010 level. For other coastal states with effort in their EEZs exceeding 1,500 days annually over (2006-2010), the limit is either the 2001-

2004 average or the 2010 level. For non-SIDS members, purse seine effort on the high seas will be limited to levels specified in the CMM;

6. Each member shall not allow the number of fishing days in the high seas to increase above limits specified in the CMM;
7. A full-retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas between 20°N and 20°S;
8. 100% Regional observer coverage for all purse seine vessels fishing on the high seas, on the high seas and in waters under the jurisdiction of one or more coastal States, or vessels fishing in waters under the jurisdiction of two or more coastal States during the same trip; all purse seiners fishing between 20°N and 20°S must have an observer onboard, unless they fish exclusively in their EEZ;
9. A limit between 20°N and 20°S in the number of purse seine and longline vessels with freezing capacity at the current level for most countries (and specifically not including vessels of Small Island Developing States);
10. Flag-specific catch limits for non-SIDS fleets[4] for bigeye caught by longliners, with monthly reporting to monitor the utilization of the limits;

In addition, CMM 2009-02 provides more guidance on the FAD closure and full retention requirements.

The first comprehensive management plan adopted for tropical tunas was CMM 2008-01. This measure has been amended annually in efforts by WCPFC members to reach a compromise and not allow the fisheries to go unmanaged. The CMM is complex with many "either/or" choices, exemptions or exclusions and decisions yet to be made with respect to some measures, which makes it impossible to predict the outcomes in terms of actual future catch and effort levels. In a stochastic evaluation of CMM-2015-01, SPC (2016) defined three possible scenarios of future purse seine effort and longline catch levels, which attempted to capture much of the uncertainty in the implementation of the CMM.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	75	Condition Needed
1.2.2	Harvest control rules and tools	<60	Fail
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	90	Passing Score

[4] Catches of chartered vessels are attributed to the chartering State

SUMMARY

WCPO BET	ESTIMATE	YEARS	NOTES
RECENT CATCH	130	2018	
5-YEAR CATCH	139	2014-18	
MSY	159	2015	Median across model grid
F/F_{MSY}	0.77	2012-15	Median across model grid
SSB/SSB_{MSY}	1.38	2012-15	Median across model grid
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}. The spawning biomass is above the MSY level.
FISHING MORTALITY		F < F_{MSY}. F is below the MSY level.
ENVIRONMENT		44% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). Monitoring is deficient.
		36% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks). There is 100% observer coverage on part of the purse seine fleet.
		8% of the catch is made with purse seining on free schools, with little impact on non-target species.
		3% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish stocks.

Last date of a change in Color Ratings: October, 2018.
Changes from the previous (October 2017) Color Ratings: Abundance and F ratings changed from Yellow to Green.

WCPO Yellowfin Tuna

Provisional yellowfin catches in the WCPO in 2018 were about 648,100 tonnes, a 2% decrease from 2017. The main fishing gear is purse seine (61% of the catch). Twenty-one percent of the catches are also taken by a number of mixed gears in the Philippines and Indonesia, and 14% by longliners (**Figure WCPO-5**). The Western and Central Pacific yellowfin tuna stock is not overfished and overfishing is not occurring. Most of the catches are taken from the tropical region where the stock is considered fully exploited and there is little or no room for increased fishing pressure on the stock overall.

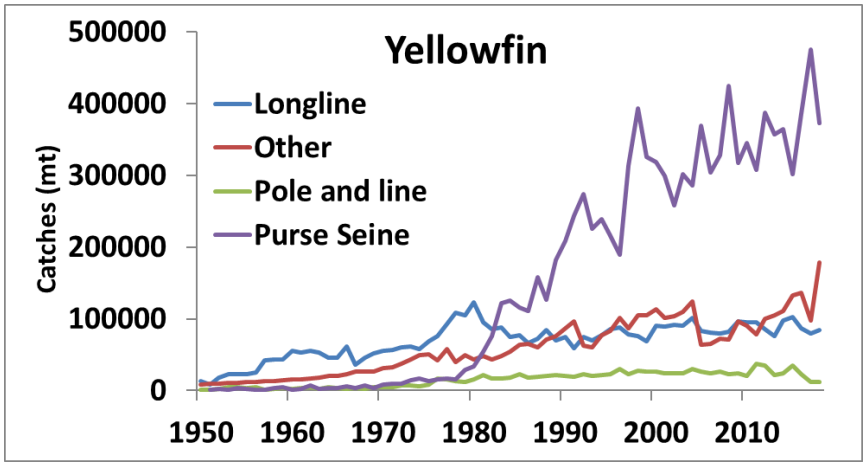


Figure WCPO-5. Catches of yellowfin tuna in the WCPO from 1950 to 2018, by gear type.

STOCK ASSESSMENT

A new yellowfin assessment was conducted in 2017. Developments to the stock assessment included addressing relevant recommendations of the 2014 yellowfin stock assessment report, investigation of an alternative regional structure, exploration of uncertainties in the assessment model, particularly in response to the inclusion of additional years of data, and improving diagnostic weaknesses of previous assessments. The results were similar to those from the previous (2014) assessment and indicated that (**Figure WCPO-6**):

1. The yellowfin stock is not in an overfished state as spawning biomass is above the SSB_{MSY} level (SSB_{latest}/SSB_{MSY} = 1.39, 90% C.I. range: 1.02 and 1.80).

2. The ratio F_{recent}/F_{MSY} (for the period 2011-2014) is estimated to be 0.74 (90% C.I. range: 0.62 and 0.97), indicating that overfishing is likely not occurring.

3. MSY is estimated to be 666,800 tonnes. Current (2018) catch is below MSY.

4. The optimistic estimate of overall stock status should be tempered by the patterns estimated at a sub-regional level. The tropical Pacific, from which most of the catches are taken, is at least fully exploited with no potential for a substantial increase in catches to be sustainable.

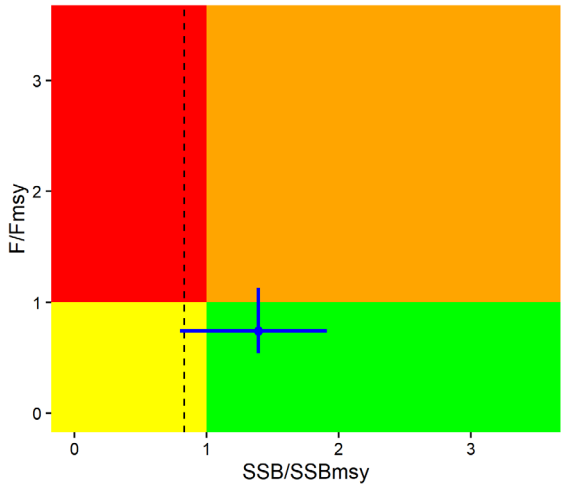


Figure WCPO-6. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for WCPO yellowfin tuna. Dashed black line represents limit reference point.

MANAGEMENT

Limit reference point: 20% of the equilibrium spawning biomass that would be expected in the absence of fishing under current (most recent 10 years of the current assessment, excluding the last year) environmental conditions ($20\%SSB_{current, F=0}$). The yellowfin stock is estimated to be above this limit. The median value of $SSB_{recent}/SSB_{F=0}$ across all models chosen by SC13 to evaluate stock status is 0.33, which is above this limit.

Target reference point: Not defined. CMM 2018-01, which acts as a bridge to the adoption of a harvest strategy, establishes that, pending agreement on a TRP, the spawning biomass depletion ratio ($SB/SB_{F=0}$) is to be maintained at or above the average $SB/SB_{F=0}$ for 2012-2015.

Harvest control rule: Not defined. CMM-2014-06 calls for WCPFC to develop and implement a harvest strategy approach that includes target reference points, harvest control rules and other elements. The workplan and its deadlines have been revised in subsequent meetings of the Commission.

The main binding conservation measure for yellowfin established by the WCPFC is CMM 2018-01, that aims to provide for a robust transitional management regime that ensures the sustainability of bigeye, skipjack, and yellowfin tuna stocks. It calls for:

1. A 3-month closure (July through September) of fishing on FADs in EEZ waters and on the High Seas between 20°N and 20°S. VMS polling frequency is increased to 30 minutes during the closure;
2. In addition to (1), each member shall choose between extending the FAD closure two additional sequential months of the year in the High Seas in 2019 and 2020 in either April-May, or in November-December, with some exemptions for Kiribati- and Philippines-flagged vessels;
3. To reduce the entanglement of sharks, marine turtles or any other species, as from 1st January 2020, CCMs shall ensure that any FAD to be deployed in, or that drifts into, the WCPFC Convention Area shall have a lower-entangling design. To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials for FADs should be promoted and the use of non-plastic and biodegradable materials in the construction of FADs is encouraged;
4. A limit of no more than 350 drifting Fish Aggregating Devices (FADs) with activated instrumented buoys deployed at sea at any one time per purse seine vessel;
5. A limitation in the number of vessel days: For PNA members, the limit in their EEZs is the 2010 level. For other coastal states with effort in their EEZs exceeding 1,500 days annually over (2006-2010), the limit is either the 2001-

2004 average or the 2010 level. For non-SIDS members, purse seine effort on the high seas will be limited to levels specified in the CMM;

6. Each member shall not allow the number of fishing days in the high seas to increase above limits specified in CMM;
7. A full-retention requirement for all purse seine vessels regarding bigeye, skipjack & yellowfin tunas between 20°N-20°S;
8. 100% Regional observer coverage for all purse seine vessels fishing on the high seas, on the high seas and in waters under the jurisdiction of one or more coastal States, or vessels fishing in waters under the jurisdiction of two or more coastal States during the same trip; all purse seiners fishing between 20°N and 20°S must have an observer onboard, unless they fish exclusively in their EEZ;
9. A limit between 20°N and 20°S in the number of purse seine and longline vessels with freezing capacity at the current level for most countries;

In addition, CMM 2009-02 provides more guidance on the FAD closure and full retention requirements.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	75	Condition Needed
1.2.2	Harvest control rules and tools	<60	Fail
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	95	Passing Score

SUMMARY

WCPO YFT	ESTIMATE	YEARS	NOTES
RECENT CATCH	648	2018	
5-YEAR CATCH	623	2014-18	
MSY	667	2011-14	Median across model grid
F/F_{MSY}	0.74	2011-14	Median across model grid
SSB/SSB_{MSY}	1.39	2015	Median across model grid
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		22% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks). There is 100% observer coverage on part of the purse seine fleet.
		39% of the catch is made with purse seining on free schools, with little impact on non-target species.
		21% of the catch is made by other gears such as gillnets, with unknown impacts on non-target stocks.
		14% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). Monitoring is deficient.

Last date of a change in Color Ratings: March, 2019.
Changes from the previous (original 2010 report) Color Ratings: F rating changed from yellow to green to harmonize with ratings methodology.

WCPO Skipjack Tuna

The WCPO Skipjack stock supports the largest tuna fishery in the world, accounting for 37% of worldwide tuna landings. Catches in 2018 were 1,765,900 tonnes, an 8% increase from 2017. Purse seining, which accounts for 80% of the catches, increased steadily over the past three decades. In contrast, pole-and-line fishing (about 8%) has been declining steadily (**Figure WCPO-7**). Overfishing is not occurring and the stock is not overfished.

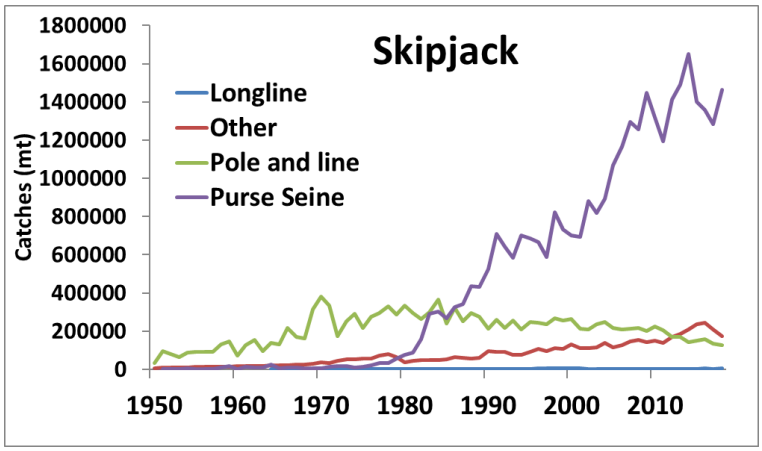


Figure WCPO-7. Catches of skipjack tuna in the WCPO from 1950 to 2018, by gear type.

STOCK ASSESSMENT

The last skipjack assessment was conducted in 2019. Stock status was determined over an uncertainty grid of 54 models (**Figure WCPO-8**):

1. Fishing mortality rates have increased significantly since the beginning of industrial tuna fishing, being at the highest level in most recent year. The median ratio F_{recent}/F_{MSY} is estimated to be 0.45 (90% C.I. range:0.34-0.60), indicating that overfishing is not occurring.

2. The stock is not in an overfished state as spawning biomass (in 2018) is above the SSB_{MSY} level: median SSB_{recent}/SSB_{MSY} = 2.58 (90% C.I. range: 1.89-3.61).

3. Median MSY is estimated to be 2.29 million tonnes. Recent catches are lower than MSY.

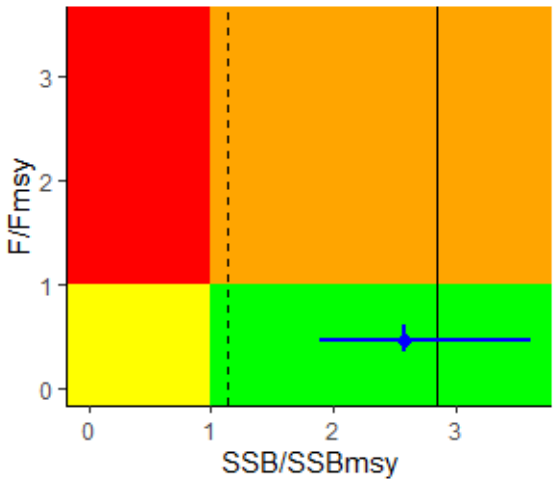


Figure WCPO-8. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue) for WCPO skipjack tuna. Solid black line represents interim target reference point and dashed black line represents limit reference point.

MANAGEMENT

Limit reference point: 20% of the equilibrium spawning biomass that would be expected in the absence of fishing under current (most recent 10 years of the current assessment, excluding the last year) environmental conditions ($20\%SSB_{current, F=0}$). The skipjack stock is above the limit. The value of $SSB_{recent}/SSB_{F=0}$ is 0.44, which is above this limit.

Target reference point: CMM 2018-01, which acts as a bridge to the adoption of a harvest strategy, establishes that, pending agreement on a TRP, the SSB of skipjack tuna is to be maintained on average at a level consistent with the interim target reference point adopted in CMM 2015-06. CMM-2015-06 established an interim target equal to 50% of the equilibrium spawning biomass that would be expected in the absence of fishing under current (most recent 10 years of the current assessment, excluding the last year) environmental conditions ($50\%SSB_{recent, F=0}$). The value of $SSB_{recent}/SSB_{F=0}$ is 0.44, which is now below this target.

Harvest control rule: Not defined. CMM-2014-06 calls for WCPFC to develop and implement a harvest strategy approach that includes target reference points, harvest control rules and other elements. The workplan and its deadlines have been revised in subsequent meetings of the Commission.

The main binding conservation measure for skipjack established by the WCPFC is CMM 2018-01, that aims to provide for a robust transitional management regime that ensures the sustainability of bigeye, skipjack, and yellowfin tuna stocks. It calls for:

1. A 3-month closure (July through September) of fishing on FADs in EEZ waters and on the High Seas between 20°N and 20°S. VMS polling frequency is increased to 30 minutes during the closure;
2. In addition to (1), each member shall choose between extending the FAD closure for two additional sequential months of the year in the High Seas in 2019 and 2020 in either April-May, or in November-December, with some exemptions for Kiribati- and Philippines-flagged vessels;
3. To reduce the entanglement of sharks, marine turtles or any other species, as from 1st January 2020, CCMs shall ensure that any FAD to be deployed in, or that drifts into, the WCPFC Convention Area shall have a lower-entangling design. To reduce the amount of synthetic marine debris, the use of natural or biodegradable materials for FADs should be promoted and the use of non-plastic and biodegradable materials in the construction of FADs is encouraged;
4. A limit of no more than 350 drifting Fish Aggregating Devices (FADs) with activated instrumented buoys deployed at sea at any one time per purse seine vessel;
5. A limitation in the number of vessel days: For PNA members, the limit in their EEZs is the 2010 level. For other coastal states with effort in their EEZs exceeding 1,500 days annually over (2006-2010), the limit is either the 2001-2004 average or the 2010 level. For non-SIDS members, purse seine effort on the high seas will be limited to levels specified in the CMM;
6. Each member shall not allow the number of fishing days in the high seas to increase above limits specified in the CMM;
7. A full-retention requirement for all purse seine vessels regarding bigeye, skipjack and yellowfin tunas between 20°N and 20°S;
8. 100% Regional observer coverage for all purse seine vessels fishing on the high seas, on the high seas and in waters under the jurisdiction of one or more coastal States, or vessels fishing in waters under the jurisdiction of two or more coastal States during the same trip; all purse seiners fishing between 20°N and 20°S must have an observer onboard, unless they fish exclusively in their EEZ;
9. A limit between 20°N and 20°S in the number of purse seine and longline vessels with freezing capacity at the current level for most countries.

In addition, CMM 2009-02 provides more guidance on the FAD closure and full retention requirements.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score[5]	Evaluation
1.2.1	Harvest Strategy	75	Condition Needed
1.2.2	Harvest control rules and tools	60	Condition Needed
1.2.3	Information / monitoring	90	Passing Score
1.2.4	Assessment of stock status	95	Passing Score

SUMMARY

WCPO SKJ	ESTIMATE	YEARS	NOTES
RECENT CATCH	1766	2018	
5-YEAR CATCH	1791	2014-18	
MSY	2294	2014-17	
F/F_{MSY}	0.45	2014-17	
SSB/SSB_{MSY}	2.38	2014-17	
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		37% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks).
		43% of the catch is made with purse seining on free schools, with little impact on non-target species.
		8% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish stocks.
		12% of the catch is made by other gears such as gillnets, with unknown impacts on non-target stocks.

Last date of a change in Color Ratings: None.
Changes from the previous (original) Color Ratings: None.

[5] These scores have not been updated to reflect latest (2019) changes in stock assessment.

PACIFIC-WIDE STOCKS

RFMOs: Western and Central Pacific Fisheries Commission (WCPFC) and Inter-American Tropical Tuna Commission (IATTC). The ISC evaluates North Pacific albacore and Pacific bluefin and the results are reviewed by the IATTC staff, the IATTC SAC and the WCPFC SC, who make recommendations to either IATTC or WCPFC. The SPC evaluates South Pacific albacore and the results are reviewed by the WCPFC SC. The SC makes recommendations to the WCPFC.
Last Scientific Committee meetings:

- WCPFC: August, 2019
- IATTC: May, 2019
- ISC: July, 2019

Last Commission meeting:

- WCPFC: December, 2018
- IATTC: July, 2019

Three of the major commercial tunas with Pacific-wide distributions are warranted treatment as Pacific-wide stocks due to their scales of movement between the WCPO and the EPO: North Pacific albacore, South Pacific albacore and Pacific bluefin. The responsibility for their management is shared between IATTC and WCPFC.
Data sources: The main sources of information for this section are Tremblay-Boyer *et al.* (2018), ISC (2017), ISC (2018a), ISC (2019), WCPFC (2019a) and WCPFC (2019b).
Last update: October, 2019.

PO North Pacific Albacore

North Pacific albacore catches in 2018 were about 56,400 tonnes, a 3% increase from 2017. Approximately a 73% of the catch occurs in the WCPO and a 27% in the EPO. The main fishing gears are longline (43%) and pole-and-line (30%), followed by trolling (21%) (**Figure PO-1**). Catches by longlining have shown a decreasing trend since 1997. The North Pacific albacore stock is likely not overfished nor subject to overfishing. However, increasing fishing effort will not likely result in higher yield.

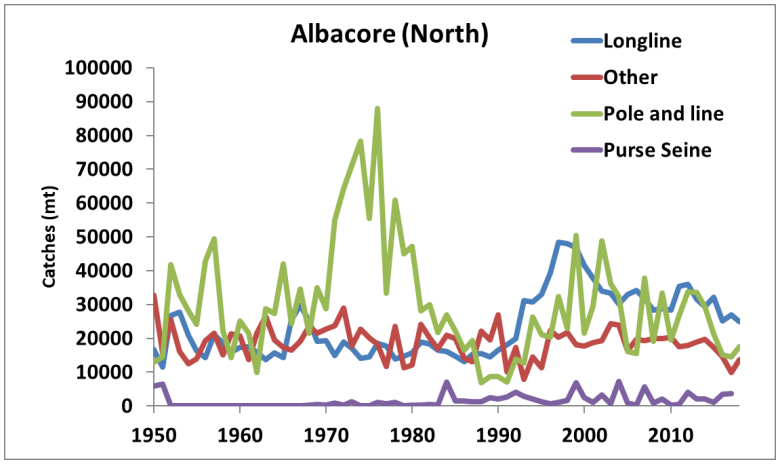


Figure PO-1. Catches of albacore tuna in the North PO from 1950 to 2018, by gear type.

STOCK ASSESSMENT

The latest north Pacific albacore stock assessment was done in 2017. The assessment results indicated that (**Figure PO-2**):

1. The ratio SSB_{latest}/SSB_{MSY} is 3.25, indicating that the stock is not in an overfished state.

2. The ratio $F_{2012\text{-}2014}/F_{MSY}$ is 0.61, indicating that overfishing is not occurring. Fishing mortality is also lower than many commonly-used reference points that are used as proxies for F_{MSY}.

3. The estimate of MSY is 132,072 tonnes

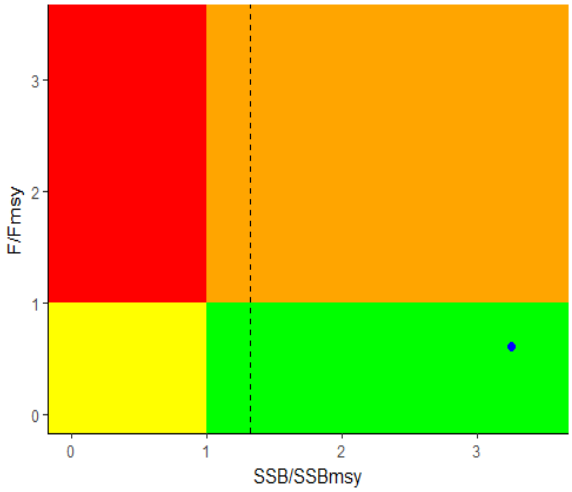


Figure PO-2. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue) for albacore tuna in the northern PO. Dashed black line represents limit reference point.

MANAGEMENT

Limit reference point: The *Interim Harvest Strategy for North Pacific Albacore Fishery* adopted by WCPFC in 2017 established the limit reference point for this stock at 20%SSBcurrent $_{F=0}$. The stock is above the LRP.

Target reference point: Not defined. CMM-2014-06 calls for WCPFC to define target reference points.

Harvest control rule: Not defined. CMM-2014-06 calls for WCPFC to develop and implement a harvest strategy approach that includes target reference points, harvest control rules and other elements. At its 2015 meeting, the WCPFC adopted a workplan for doing so.

The main binding conservation measure for North Pacific albacore established by the WCPFC is CMM 2005-03 which called for members not to increase fishing effort directed at North Albacore beyond the "current level". Similarly, in the IATTC, Resolution C-05-02 called for members not to increase fishing effort directed at North Albacore beyond the "current level". IATTC Resolution C-13-03 supplements C-05-02 and requires the reporting of fishing vessel information for 2007-2012. IATTC Resolution C-18-03 amends Resolution C-13-03 and extends that period to 2017.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	75	Condition Needed
1.2.2	Harvest control rules and tools	<60	Fail
1.2.3	Information / monitoring	90	Passing Score
1.2.4	Assessment of stock status	100	Passing Score

SUMMARY

PO ALB-N	ESTIMATE	YEARS	NOTES
RECENT CATCH	56	2018	
5-YEAR CATCH	64	2014-18	
MSY	132	2015	
F/F_{MSY}	0.61	2012-14	
SSB/SSB_{MSY}	3.25	2015	
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		43% of the catch is made by longlining. Several bycatch mitigation measures are in place (turtles, sharks, sea birds).
		30% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish species.
		21% of the catch is made by trolling, with little impact on non-target species.

Last date of a change in Color Ratings: October, 2017.
Changes from the previous (original) Color Ratings: Fishing mortality rating changed from Yellow to Green to reflect the more optimistic results of the 2017 assessment.

PO South Pacific Albacore

South Pacific albacore extends beyond the WCPFC Convention Area. However, the stock is assessed by WCPFC for the area of the Pacific south of the Equator and between 140°E and 130°W. South Pacific albacore catches in 2018 were about 68,500 tonnes, a 27% decrease from 2017 catches. Approximately 71% of the catch occurs in the WCPO and 29% in the EPO. The main fishing gear is longline, accounting for 97% of the catch. Relatively minor amounts are taken by other gears like trolling (**Figure PO-3**). The Southern Pacific albacore tuna stock is not overfished nor subject to overfishing.

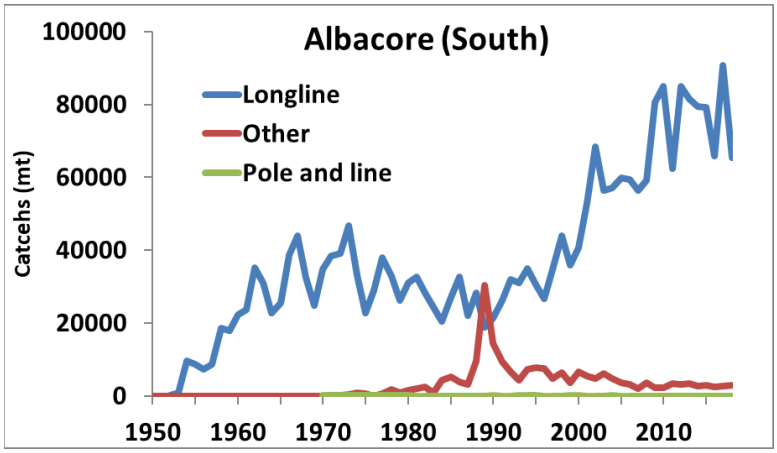


Figure PO-3. Catches of albacore tuna in the South PO from 1950 to 2018, by gear type.

STOCK ASSESSMENT

The last full assessment was conducted by WCPFC in 2018 and covers only the WCPFC Convention Area South of the equator, not taking into consideration part of the catches from the IATTC Convention Area. The 2018 analyses were done using 72 different models which examine additional axes of uncertainty (e.g. assumptions on growth, CPUE standardization approach) as compared with the 2015 assessment. As a consequence, the uncertainty identified is higher than in previous assessments. The assessment results were similar to those in 2015 and indicated the following (**Figure PO-4**):

1. The estimated ratio F_{recent}/F_{MSY} in 2013-2016 is 0.2 (range across all models: 0.06-0.53), indicating that overfishing is not occurring. However, further increases in effort will yield little or no increase in long-term catches and result in further reduced catches. SC14 reiterated its previous advice from SC11, SC12 and SC13 recommending that longline fishing mortality be reduced to avoid further decline in the vulnerable biomass so that economically viable catch rates can be maintained.

2. The estimated ratio of spawning biomass SSB_{recent}/SSB_{MSY} in 2013-2016 is 3.3 (range across all models: 1.58-9.67). This indicates that the stock is not in an overfished state. However, the stock's biomass may be approaching an un-profitably low level.

3. The estimate of MSY is 98,100 tonnes (the median across a large number of plausible model runs).

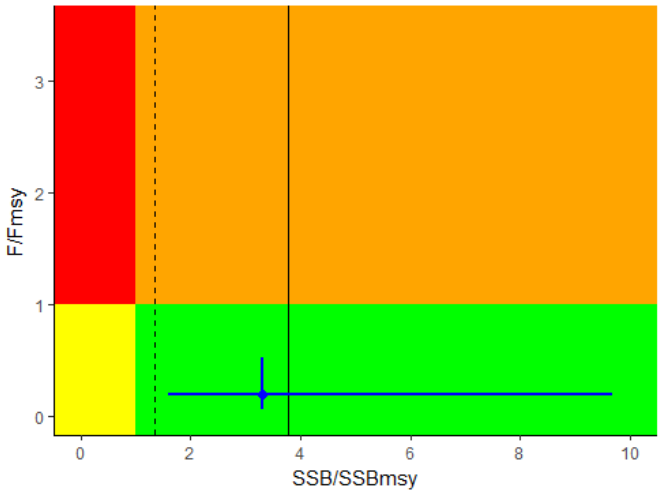


Figure PO-4. Latest estimate of SSB/SSB$_{MSY}$ and F/F$_{MSY}$ (in blue) for albacore tuna in the southern PO. Solid black line represents interim target reference point and dashed black line represents limit reference point. Note that X axis has been adjusted to the SSB/SSB$_{MSY}$ range.

MANAGEMENT

Limit reference point: (WCPFC) 20% of the equilibrium spawning biomass that would be expected in the absence of fishing under current (most recent 10 years of the current assessment, excluding the last year) environmental conditions (20%SSB$_{current,\ F=0}$). The value of SSB$_{current}$/SSB$_{F=0}$ is 0.52, which is above this limit.

Target reference point: In 2018, WCPFC agreed on an interim target reference point (TRP) for south Pacific albacore at 56% of spawning stock biomass in the absence of fishing (0.56 SSB$_{F=0}$). The value of SSB$_{current}$/SSB$_{F=0}$ is 0.52, below the target.

Harvest control rule: Not defined. CMM-2014-06 calls for WCPFC to develop and implement a harvest strategy approach that includes target reference points, harvest control rules and other elements. At its 2016 meeting, the WCPFC refined the workplan for doing so.

The main binding conservation measure for south Pacific albacore established by the WCPFC is CMM 2015-02 which aims to limit fishing mortality by establishing a cap on the number of vessels fishing for South Pacific albacore by each Commission member, with some exemptions for small island developing states. This capacity limitation is for the number of vessels not to increase over the 2005 level, or the 2000-2004 average.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	75	Condition Needed
1.2.2	Harvest control rules and tools	60	Condition Needed
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	85	Passing Score

SUMMARY

PO ALB-S	ESTIMATE	YEARS	NOTES
RECENT CATCH	69	2018	
5-YEAR CATCH	79	2014-18	
MSY	98	2016	Median across model grid
F/F_{MSY}	0.2	2012-2015	Median across model grid
SSB/SSB_{MSY}	3.3	2013-2016	Median across model grid
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		97% of the catch is made by longlining. Several bycatch mitigation measures are in place (turtles, sharks, sea birds).
		3% of the catch is made by trolling, with little impact on non-target species.

Last date of a change in Color Ratings: None.
Changes from the previous (original) Color Ratings: None.

PO Pacific Bluefin Tuna

Reported Pacific bluefin catches in 2018 were about 10,200 tonnes, an 31% decrease from estimates available for 2017. Most of the catch (70%) occurs in the western Pacific. About 68% of the Pacific-wide catch is made by purse seine fisheries, followed by a variety of gears such as coastal set nets and troll (16%) and longline (9%). (**Figure PO-5**). Pacific Bluefin tuna is heavily overfished and overfishing continues.

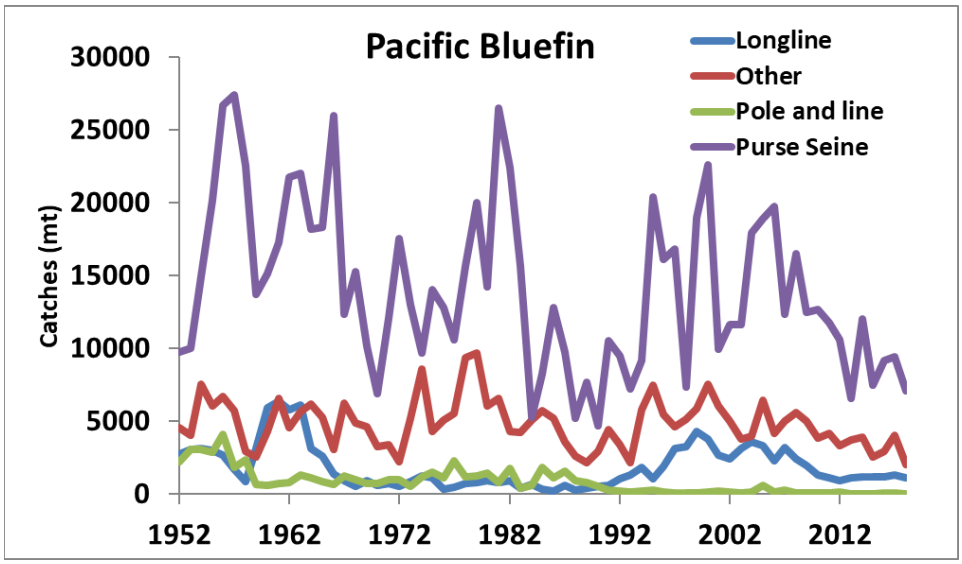


Figure PO-5. Catches of Pacific bluefin tuna from 1952 to 2018, by gear type.

STOCK ASSESSMENT

The last assessment, conducted in 2018, indicates that (**Figure PO-6**):

1. The stock is heavily overfished and the biomass is near historically low levels. The spawning stock biomass steadily declined from 1996 to 2010, but the decline appears to have ceased since then. However, the stock remains near the historic low and SSB was estimated to be 3.3% of the unfished level. This depletion level is considerably below the biomass depletion-based Limit Reference Point of 20% of the unfished stock biomass set by the Commission for all other WCPFC key tuna stocks.

2. The Pacific bluefin stock is subject to overfishing relative to most of the potential fishing intensity-based reference points evaluated in 2018.

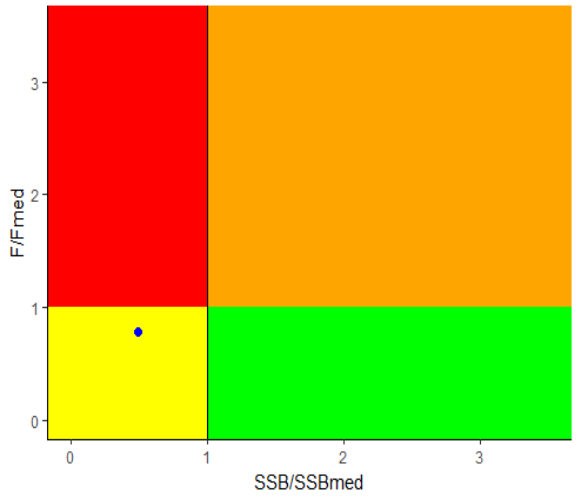


Figure PO-6. Latest estimate of SSB/SSB$_{MED}$ and F/F$_{MED}$ (in blue) for pacific bluefin tuna. Solid black line represents interim initial rebuilding target reference point (WCPFC). SSB$_{MED}$ and F$_{MED}$ are defined as the median spawning biomass for the period 1952-2014.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: WCPFC CMM 2016-04 defines an initial re-building target which corresponds to a spawning biomass of around 7% of estimated unfished spawning stock biomass. IATTC C-16-08 (amended by C-18-02) established an initial rebuilding target of SSB$_{MED}$ (the median spawning biomass for the period 1952-2014) to be achieved with 60% probability by 2024.

Harvest control rule: Not defined. CMM-2014-06 calls for WCPFC to develop and implement a harvest strategy approach that includes target reference points, harvest control rules and other elements. At its 2015 meeting, the WCPFC adopted a workplan for doing so.

WCPFC CMM 2017-08, replaced by CMM 2018-02, was prepared to implement the harvest strategy for Pacific Bluefin tuna fisheries and establishes similar management measures as those included in CMM 2016-04. WCPFC CMM 2016-04 replaced CMM 2015-04, which implemented a multi-annual rebuilding plan commencing in 2015 to rebuild the Pacific bluefin spawning biomass to its historical median level (the median point estimate for 1952-2014) by 2024 with at least 60% probability. This CMM limits total fishing effort north of 20°N to below the average 2002-2004 levels. Members are also required to reduce juvenile (less than 30 kg) catches below the 2002-2004 levels by at least 50%, with any overcatch deducted from the following years TAC. The catch of adults (over 30 kg) is similarly limited, but any member can use part of its juvenile catch limit to catch adults. IATTC Resolution C-18-01 limits commercial catches to 6,600 tons in 2019 and 2020 combined, and encourages members to limit the catch of bluefin less than 30 Kg to 50% of the total catch. IATTC Resolution C-18-02 calls the Commission to consider and develop candidate reference points and harvest control rules by no later than the IATTC meeting in 2020.

SUMMARY

PO-PBF	ESTIMATE	YEARS	NOTES
RECENT CATCH	10	2018	
5-YEAR CATCH	13	2014-18	
MSY	N/A		
F/F_{MSY}	N/A		
SSB/SSB_{MSY}	N/A		
SSB/SSB_0	0.033	2016	
TAC	6.6 (EPO)	2019-2020	

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB relative to SSB_{MSY} was not estimated by ISC. However, SSB is 3.3% of the unfished level and at or near the historically-low level.
FISHING MORTALITY		F relative to F_{MSY} was not estimated by ISC. However, F is substantially higher than some indicators used as proxies for F_{MSY}.
ENVIRONMENT		68% of the catch is made by purse seining on free schools.
		9% of the catch is made by longlining.
		5% of the catch is made by trolling.
		11% of the catch is made by set nets

Last date of a change in Color Ratings: August, 2013.
Changes from the previous (original 2010 report) Color Ratings: Abundance rating changed from Yellow to Orange.

STOCKS IN THE ATLANTIC OCEAN

RFMO: International Commission for the Conservation of Atlantic Tunas (ICCAT). The stocks are assessed by the SCRS who makes recommendations to ICCAT.
Last Scientific Committee (SCRS) meeting: October, 2018.
Last Commission meeting: November, 2018.
Tuna stocks managed by ICCAT: AO Yellowfin, AO Bigeye, Eastern AO Skipjack, Western AO skipjack, North AO Albacore, South AO Albacore, Mediterranean Albacore, Western AO bluefin, Eastern AO bluefin.
Data sources: The main source of information for this section is ICCAT (2018).
Last update: March, 2019.

About 11 percent of the world production of tuna is from Atlantic Ocean (AO) stocks. Catches of skipjack, yellowfin, bigeye, albacore and bluefin in 2017 were 553,700 tons, similar to 2016 catch levels. There was a general tendency for the total catch to decline since the mid-1990s, followed by small increases since 2009 (**Figure AO-1**).

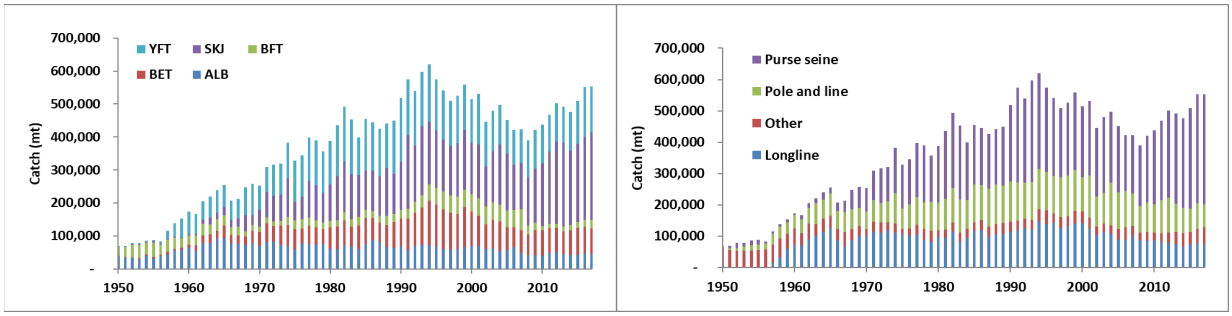


Figure AO-1. Trends in catch (mt) of bigeye, skipjack, yellowfin, albacore and bluefin in the AO region, by species (left) and gear (right), 1950-2017.

Average catches for the five-year period 2013-2017 (516,500 tonnes) provide an indication of the recent performance of the fisheries (**Figure AO-2**): Skipjack accounts for 48% of the catches in weight, followed by yellowfin (25%), bigeye (15%), albacore (9%), and bluefin (4%). Purse seine vessels take 62% of the total catch, followed by pole-and-line (some of which operate jointly with purse seiners, 16%), longline (14%) and other gears (8%).

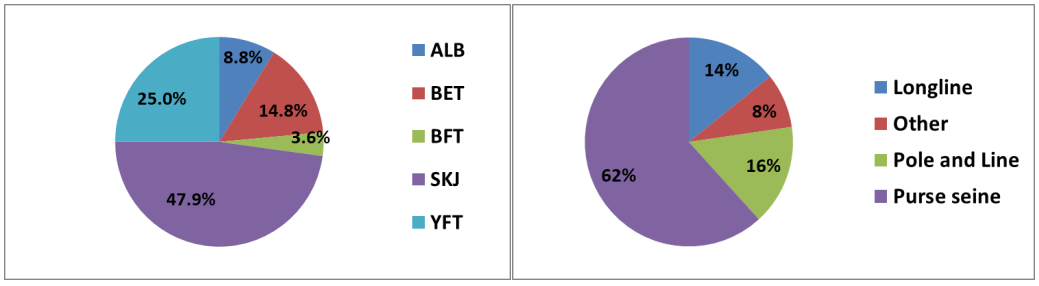


Figure AO-2. Average 2013-2017 catches of skipjack, yellowfin, bigeye, albacore and bluefin tuna in the AO. The graph on the left shows the percentages by species, and the graph on the right shows the percentages by gear type.

AO Bigeye Tuna

Atlantic bigeye catches in 2017 were about 78,500 tonnes, a 2% decrease from 2016. Catches by long-line, the main fishing gear (47% of the catch), declined sharply between 1999 and 2006, but they have been stable during the last few years. Purse seine and pole-and-line vessels account for about 35% and 11% of the catches, respectively (**Figure AO-3**). The stock is estimated to be overfished and overfishing is occurring.

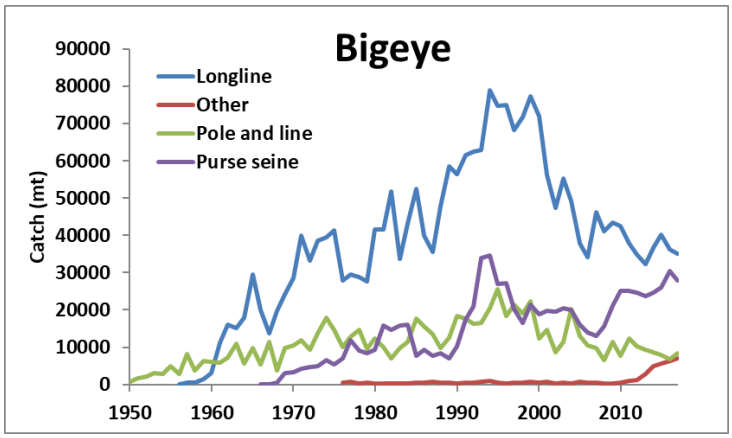


Figure AO-3. Catches of bigeye tuna in the AO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The last (2018) assessment conducted by SCRS (ICCAT Standing Committee on Research and Statistics) gave more pessimistic and more certain results than the 2015 assessment. The following conclusions were reached by SCRS, based on combining several model-data sets: (**Figure AO-4**):

1. The ratio of $F_{current}/F_{MSY}$ in 2017 is estimated at 1.63 (range: 1.14-2.12), indicating that overfishing is occurring.

2. The ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ in 2017 is estimated at 0.59 (range: 0.42-0.80). This indicates that that the stock is in an overfished state.

3. The estimate of MSY is 76,200 tonnes (range: 72,700 to 79,700 tonnes). MSY has been reduced considerably through harvest of small bigeye. Current catches (78,500 tonnes) are above MSY and the TAC of 65,000 tonnes.

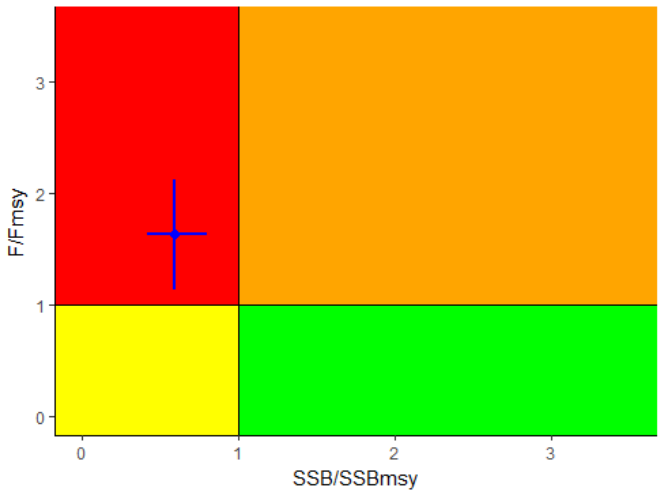


Figure AO-4. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for bigeye tuna in the AO.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined. "Green" quadrant in Kobe plot implied as target (Rec. 11-13).

Harvest control rule: Not defined, but Recs. 11-13 and 15-07 provide a framework.

The main binding conservation measure established by ICCAT for bigeye is Recommendation 16-01, amended by Rec. 18-01, which amended several previous Recommendations. This multi-annual management plan calls for:

1. A Total Allowable Catch of 65,000 tonnes, with catch limits given to ICCAT members. The measure includes detailed provisions for countries to be penalized with lower quotas if their limits are exceeded;

2. A capacity limitation (country-specific) for the number of longline and purse seine vessels over 20 m in length;

3. The establishment of a record of vessels actively fishing for bigeye;

4. A two-month prohibition of fishing on floating objects in an area off West Africa, with 100% observer coverage during this time/area closure;

5. Annual submission of FAD management plans by countries with purse seine and baitboat (pole-and-line) fisheries;

While a TAC of 65,000 tonnes is specified, consistent with SCRS advice, the permissible catch under [16-01] exceeds 65,000 tonnes by a noticeable amount due to catch allowance made for CPCs not included in the allocation table. There is concern that fishing capacity remains high, and is growing due to longline and purse seine vessels moving from the IO and PO into the AO.

Additionally, Recommendation 17-01 establishes a ban on discards of bigeye, skipjack and yellowfin tuna by purse seine vessels.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	60	Condition Needed
1.2.2	Harvest control rules and tools	<60	Fail
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	95	Passing Score

SUMMARY

AO BET	ESTIMATE	YEARS	NOTES
RECENT CATCH	78	2017	
5-YEAR CATCH	76	2013-17	
MSY	76	2017	Range: 73-80
F/F_{MSY}	1.63	2017	Range: 1.14-2.12
SSB/SSB_{MSY}	0.59	2017	Range: 0.42-0.80
TAC	65	2016 and subsequent	

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB < SSB_{MSY}.
FISHING MORTALITY		F > F_{MSY}.
ENVIRONMENT		47% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). Monitoring is deficient.
		29% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks).
		11% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish stocks. Some of the baitboats in the Gulf of Guinea fish together with the purse seiners, thus becoming like a single fleet.
		6% of the catch is made with purse seining on free schools, with little impact on non-target species.

Last date of a change in Color Ratings: November, 2015.
Changes from the previous (original) Color Ratings: The Abundance rating changed from Green to Orange. The Fishing mortality rating changed from Yellow to Orange.

AO Yellowfin Tuna

Yellowfin catches in 2017 were about 139,300 tonnes, an 8% decrease from 2016. The main fishing gear is purse seining (about 69% of the catch) (**Figure AO-5**). Purse seine catches have shown a general decrease since the early 1990s, but started growing again after 2007. About 11% of the catch is made by longlining and 8% by pole-and-line vessels. The yellowfin tuna stock in the Atlantic Ocean is overfished but overfishing is not taking place.

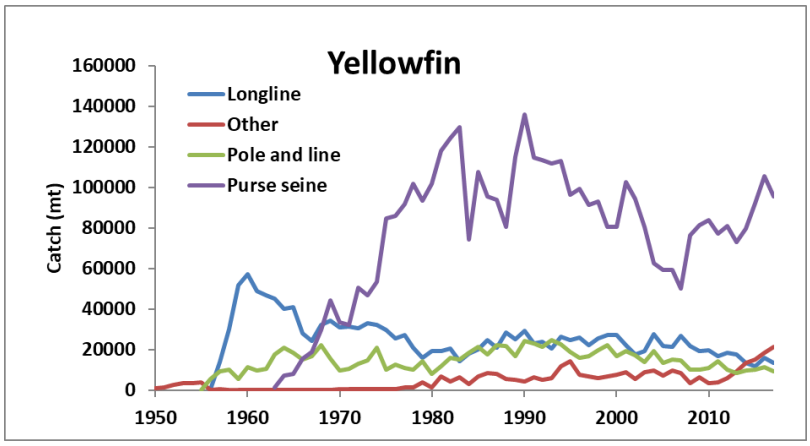


Figure AO-5. Catches of yellowfin tuna in the AO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The most recent full assessment of yellowfin tuna was carried out by SCRS in 2016. The SCRS advice is based on averaging the results from four different models. These results are more optimistic than those of the previous (2011) assessment and indicate that (**Figure AO-6**):

1. The (2014) ratio of $F_{current}/F_{MSY}$ is estimated at 0.77 (range 0.53-1.05), indicating that overfishing is not occurring.

2. The (2014) ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ is estimated at 0.95 (range 0.71-1.36). This indicates that the stock in 2014 is in a slightly overfished state. The SCRS notes that the two main groups (clusters) of abundance indicators used in the models show conflicting trends in the last few years: An increasing trend in biomass with one, and a constant relative abundance since 1990 with the other.

3. The estimate of MSY is 126,300 tonnes (range 119,100-151,300). MSY is lower than in previous decades because the overall fishery selectivity has shifted towards smaller yellowfin, mainly through fishing on FADs. Current catch (139,300 t) is above MSY and above the adopted catch limit (110,000 tonnes).

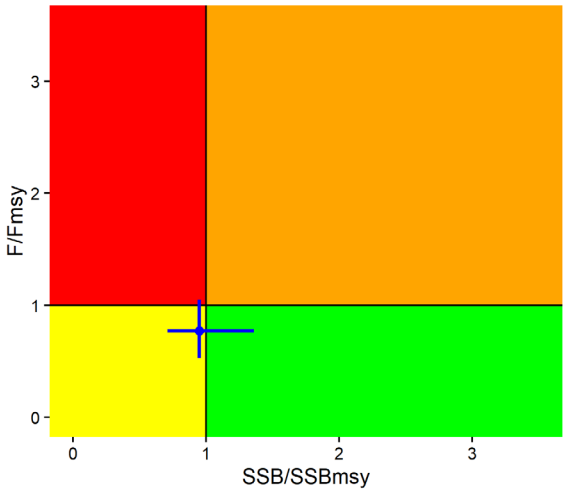


Figure AO-6. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for yellowfin tuna in the AO.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined. "Green" quadrant in Kobe plot implied as target (Rec. 11-13)

Harvest control rule: Not defined, but Recs. 11-13 and 15-07 provide a framework.

The main binding conservation measure established by ICCAT for yellowfin is Recommendation 16-01, amended by Rec. 18-01, which amended several previous Recommendations. This multi-annual management plan calls for:

1. An overall TAC of 110,000 tonnes (unallocated by country);
2. The establishment of a record of vessels actively fishing for yellowfin;
3. A two-month prohibition of fishing on floating objects in an area off West Africa, with 100% observer coverage during this time/area closure;
4. Annual submission of FAD management plans by countries with purse seine and baitboat fisheries.

The TAC adopted by ICCAT in Rec. [16-01] was consistent with the advice provided by SCRS that year. However, recent catches have been above the TAC and the SCRS has warned that it is possible that overfishing is now occurring. The TAC is not allocated between CPCs, which makes it difficult to enforce it.

Additionally, Recommendation 17-01 establishes a ban on discards of bigeye, skipjack and yellowfin tuna by purse seine vessels.

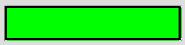
Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	80	Passing Score
1.2.2	Harvest control rules and tools	<60	Fail
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	85	Passing Score

SUMMARY

AO YFT	ESTIMATE	YEARS	NOTES
RECENT CATCH	139	2017	
5-YEAR CATCH	129	2013-17	
MSY	126	2014	Range: 119-151
F/F_{MSY}	0.77	2014	Range 0.53-1.05
SSB/SSB_{MSY}	0.95	2014	Range 0.71-1.36
TAC	110		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB < SSB_{MSY} in 2014. Recent trends in spawning biomass are uncertain because the two clusters of abundance indicators used give conflicting results (one increasing and one stable).
FISHING MORTALITY		F < F_{MSY}. The TAC has been exceeded in recent years and the SCRS notes that it is possible that overfishing is now occurring. A new assessment will be conducted in 2019.
ENVIRONMENT		48% of the catch is made with purse seining on free schools, with little impact on non-target species
		11% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). Monitoring is deficient.
		8% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish stocks. Some of the baitboats in the Gulf of Guinea fish together with the purse seiners, thus becoming like a single fleet.
		21% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks).

Last date of a change in Color Ratings: November, 2016.
Changes from the previous (December, 2011) Color Ratings: The Abundance rating changed from Orange to Yellow. The Fishing mortality rating changed from Yellow to Green.

AO Eastern Skipjack Tuna

There are two (eastern and western) skipjack stocks in the Atlantic. Skipjack catches in the eastern Atlantic Ocean in 2017 were about 242,300 tonnes, a 6% increase from 2016. Purse seine (86%) and pole-and-line (12%) dominate the catches (**Figure AO-7**). The purse seine catches had been decreasing from the early 1990s to 2009, but increased substantially since then; catches by other gears have remained stable. It is estimated that the Eastern Atlantic skipjack stock is not overfished and overfishing is not occurring.

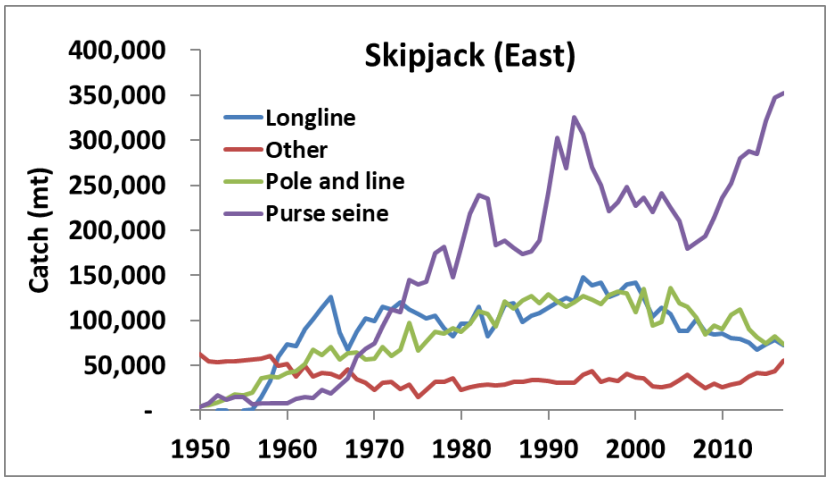


Figure AO-7. Catches of skipjack tuna in the Eastern AO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The stock was assessed by SCRS in 2014, using data up to 2013. Regardless of the model used, the Committee was not in a position to provide a reliable estimate of the maximum sustainable yield and therefore nor provide quantitative advice on the state of the eastern stock. However, the SCRS concluded that:

1. The ratio of $F_{current}/F_{MSY}$ is likely below 1.0, indicating that overfishing is not occurring.

2. The ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ is likely above 1.0, indicating that the stock is not in an overfished state.

3. The value of MSY is probably higher than previously estimated (143,000-170,000 tonnes).

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined. "Green" quadrant in Kobe plot implied as target (Rec. 11-13)

Harvest control rule: Not defined, but Recs. 11-13 and 15-07 provide a framework.

Recommendation 17-01 establishes a ban on discards of bigeye, skipjack and yellowfin tuna by purse seine vessels.

The time-area closure established for bigeye and yellowfin through Recommendation 16-01, amended by Rec. 18-01, also affects this skipjack stock. SCRS has recommended that the catch and effort levels not exceed the level of catch in recent years.

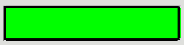
Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	60	Condition Needed
1.2.2	Harvest control rules and tools	60	Condition Needed
1.2.3	Information / monitoring	65	Condition Needed
1.2.4	Assessment of stock status	75	Condition Needed

SUMMARY

AO SKJ-E	ESTIMATE	YEARS	NOTES
RECENT CATCH	242	2017	
5-YEAR CATCH	222	2013-17	
MSY	Probably higher than prev. estimates (~157)		
F/F_{MSY}	Likely <1		
SSB/SSB_{MSY}	Likely >1		
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		79% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks).
		12% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish stocks. Some of the baitboats in the Gulf of Guinea fish together with the purse seiners, thus becoming like a single fleet.
		7% of the catch is made with purse seining on free schools, with little impact on non-target species.

Last date of a change in Color Ratings: None.
Changes from the previous (original) Color Ratings: None.

AO Western Skipjack Tuna

There are two (eastern and western) skipjack stocks in the Atlantic. Skipjack catches in the western Atlantic Ocean in 2017 were about 23,300 tonnes, a 6% increase from 2016. Pole-and-line fishing dominates the catches (83%), followed by purse seining (8%) (**Figure AO-8**). Pole and line catches have remained relatively stable (although highly variable) during the last two decades, while purse seine catches have declined. It is estimated that the Western Atlantic skipjack stock is not overfished and overfishing is not occurring.

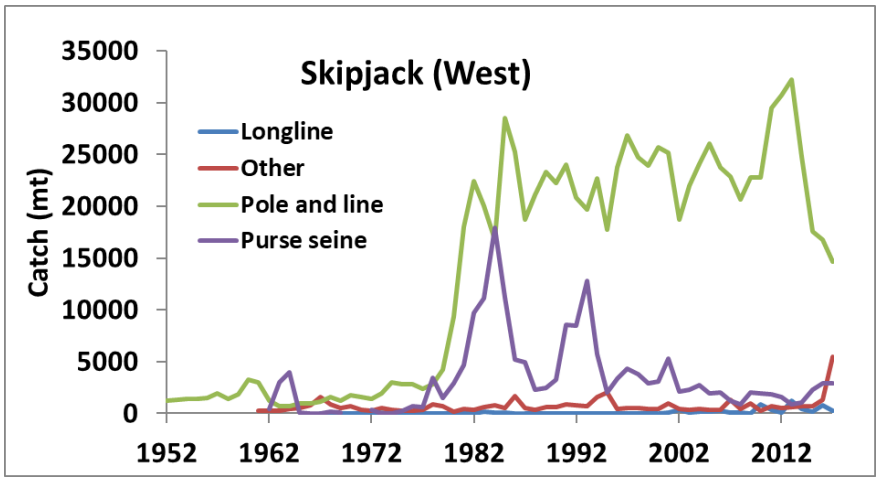


Figure AO-8. Catches of skipjack tuna in the Western AO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The stock was assessed by SCRS in 2014, using data up to 2013. Different models were used, and the results were characterized by high uncertainty. The SCRS concluded that (**Figure AO-9**):

1. The ratio of $F_{current}/F_{MSY}$ is around 0.7, indicating that overfishing is not occurring.
2. The ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ is close to 1.3, indicating that the stock is not in an overfished state.
3. The value of MSY is around 30,000-32,000 tonnes).

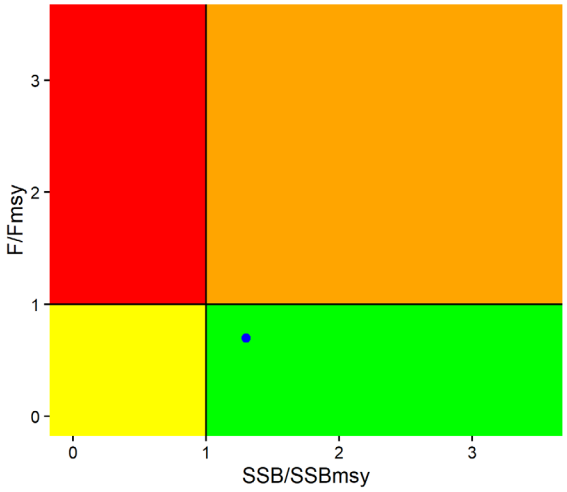


Figure AO-9. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue) for skipjack tuna in the western AO.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined. "Green" quadrant in Kobe plot implied as target (Rec. 11-13)

Harvest control rule: Not defined, but Recs. 11-13 and 15-07 provide a framework.

ICCAT has not adopted conservation and management measures for this stock. SCRS has recommended that catches not be allowed to exceed MSY.

Recommendation 17-01 establishes a ban on discards of bigeye, skipjack and yellowfin tuna by purse seine vessels.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	70	Condition Needed
1.2.2	Harvest control rules and tools	60	Condition Needed
1.2.3	Information / monitoring	65	Condition Needed
1.2.4	Assessment of stock status	85	Passing Score

SUMMARY

AO SKJ-W	ESTIMATE	YEARS	NOTES
RECENT CATCH	23	2017	
5-YEAR CATCH	26	2013-17	
MSY	~ 30-32	2013	
F/F_{MSY}	~ 0.7	2013	
SSB/SSB_{MSY}	~ 1.3	2013	
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		83% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish stocks.
		7% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks).

Last date of a change in Color Ratings: None.
Changes from the previous (original) Color Ratings: None.

AO Northern Albacore Tuna

There are three stocks of albacore tuna in the ICCAT Area: North Atlantic, South Atlantic and Mediterranean. Albacore catches in the North Atlantic in 2017 were about 28,300 tonnes, a 7% decrease from 2016. Catches are made by a variety of fishing gears including pole-and-line (36%), trawl (25%), troll (19%) and longline (19%) (**Figure AO-10**). The North Atlantic albacore stock is not overfished, and overfishing is not occurring due to a rebuilding plan through science-based catch quotas.

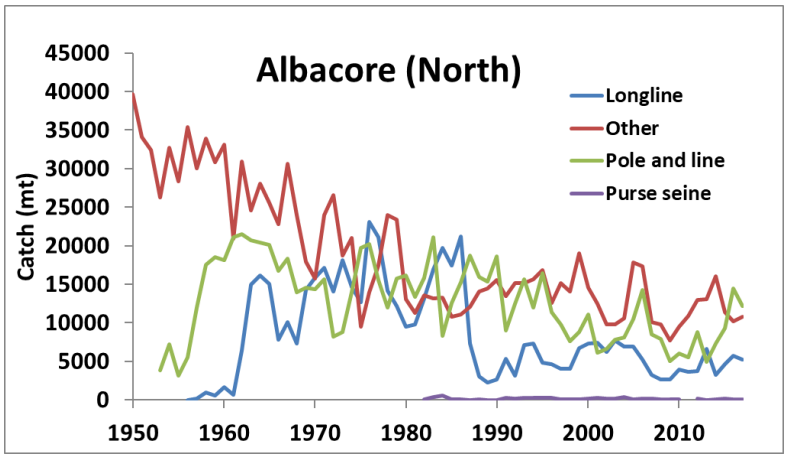


Figure AO-10. Catches of albacore tuna in the North AO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The most recent assessment for the northern albacore stock of albacore was conducted by SCRS in 2016 using data up to 2014. The results indicate that (**Figure AO-11**):

1. The ratio of $F_{current}/F_{MSY}$ is estimated at 0.54 (range 0.35-0.72), indicating that overfishing is not occurring.

2. The ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ is estimated at 1.36 (range 1.05-1.78). This indicates that that the stock is not in an overfished state.

3. MSY is estimated at 37,100 tonnes. Current (2017) catch is 28,300 t. Catches have been below MSY level since 2007.

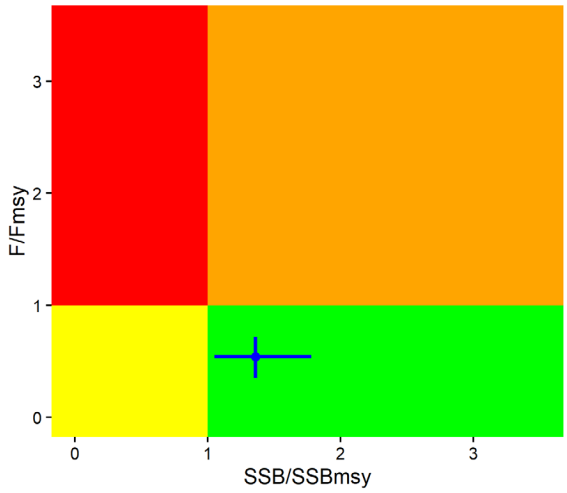


Figure AO-11. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for albacore tuna in the northern AO.

MANAGEMENT

Limit reference point: Rec. 17-04 establishes an abundance limit reference point of $0.4*SSB_{MSY}$.

Target reference point: Rec. 17-04 sets F_{TAR} as $0.8 * F_{MSY}$. While the recommendation does not establish an abundance target reference point, it does set an abundance threshold, that is, the abundance level that triggers pre-agreed management actions to reduce the risk of breaching the limits. In 2017 this threshold was set as equal to SSB_{MSY}.

Harvest control rule: Rec. 17-04 provides a HCR to support the management objectives set by Rec 16-06 for North Atlantic Albacore. According to Rec. 17-04:

1. The North Atlantic albacore stock assessment shall be conducted every three years, with the next stock assessment to occur in 2020.
2. The harvest control rule (HCR) sets a 3-year constant annual TAC using the following three values estimated from each stock assessment:
    a. The estimate of current stock biomass with respect to SSB_{MSY}.
    b. The estimate of the stock biomass at Maximum Sustainable Yield (SSB_{MSY}).
    c. The estimate of the fishing mortality at MSY (F_{MSY}).
3. The HCR shall have the following control parameters set as per below:
    a. The biomass threshold level is equal to the biomass able to deliver the maximum sustainable yield ($B_{THRESH} = B_{MSY}$).
    b. A fishing mortality target corresponding to 80% of F_{MSY} ($F_{TAR} = 0.8*F_{MSY}$) will be applied when the stock status is at, or above, the threshold level (SSB_{THRESH}).
    c. If the current biomass (SSB_{CURR}) is estimated to be below the threshold level (SSB_{THRESH}) and higher than SSB_{LIM}, then fishing mortality will be reduced linearly for the next multiannual management period following the equations included in the Recommendation.
    d. If the current biomass (SSB_{CURR}) is estimated to be at, or below, SSB_{LIM}, then the fishing mortality shall be set at F_{MIN}, with a view to ensure a level of catch for scientific monitoring.
    e. The Maximum catch limits (Cmax) recommended are 50,000 t to avoid adverse effects of potentially inaccurate stock assessments.
    f. The maximum change in the catch limit (Dmax) shall not exceed 20% of the previous recommended catch limit when $SSB_{CURR} \geq SSB_{THRESH}$.

In 2017, as a result of applying the HCR, a three-year constant annual TAC of 33,600 t was established for the period 2018-2020; and the minimum fishing mortality (F_{MIN}) was set at $0.1*F_{MSY}$.

Additionally, the multi-annual management program established by ICCAT for north Atlantic albacore (Rec. 16-06) calls for:

1. A limit in the number of vessels targeting northern Atlantic albacore in each member country to the average level of 1993-1995.
2. The following Management Objective for the Northern Albacore stock:

    a) To maintain the stock in the green zone of the Kobe plot, with at least a 60% probability, while maximizing long-term yield from the fishery, and

b) where the spawning stock biomass (SSB) has been assessed by the SCRS as below the level capable of producing MSY (SSB_{MSY}), to rebuild SSB to or above SSB_{MSY}, with at least a 60% probability, and within as short time as possible, by 2020 at the latest, while maximizing average catch and minimizing inter-annual fluctuations in TAC levels.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	80	Passing Score
1.2.2	Harvest control rules and tools	80	Passing Score
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	90	Passing Score

SUMMARY

AO ALB-N	ESTIMATE	YEARS	NOTES
RECENT CATCH	28	2017	
5-YEAR CATCH	27	2013-17	
MSY	37	2014	
F/F_{MSY}	0.54	2014	Range: 0.35-0.72
SSB/SSB_{MSY}	1.36	2015	Range: 1.05-1.78
TAC	33.6	2018-2020	

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}
FISHING MORTALITY		F < F_{MSY}. There is a TAC to reduce fishing mortality that has been set following scientific advice to rebuild the stock.
ENVIRONMENT		36% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish stocks.
		19% of the catch is made with trolling, with little impact on non-target species.
		25% of the catch is made with pelagic trawling, with some impact onn on-target species. Monitoring of bycatch is poor.
		19% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles). Monitoring is deficient.

Last date of a change in Color Ratings: November, 2016.
Changes from the previous (December, 2013) Color Ratings: The Abundance rating changed from Yellow to Green.

AO Southern Albacore Tuna

There are three stocks of albacore tuna in the ICCAT Area: North Atlantic, South Atlantic and Mediterranean. Albacore catches in the South Atlantic in 2017 were about 13,800 tonnes (**Figure AO-12**), a 4% decrease from 2016. Catches are made primarily by longline (73%) and pole-and-line (26%). The Southern Atlantic Albacore tuna stock is not overfished, and overfishing is not occurring.

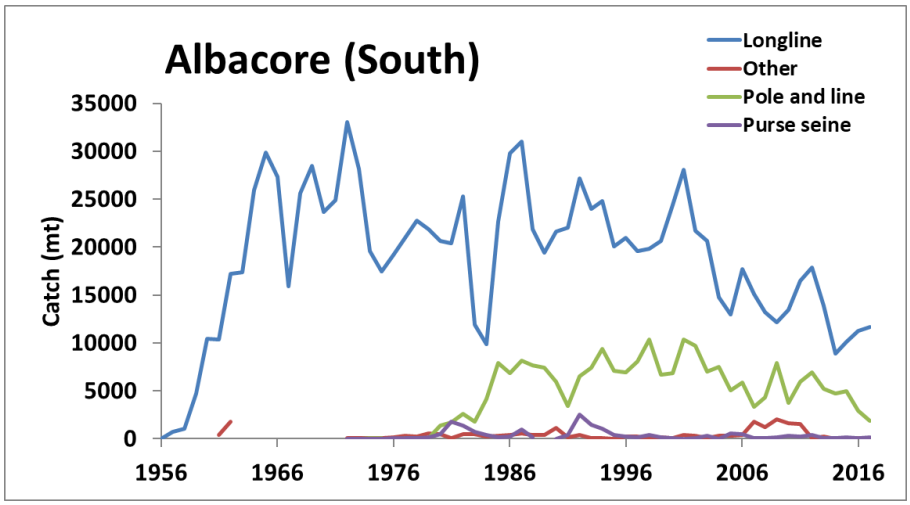


Figure AO-12. Catches of albacore tuna in the South AO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The most recent assessment for the southern stock of albacore was conducted by SCRS in 2016. The assessment used similar models to the previous (2013) one. However, fewer input data series were used after screening of the available catch rate data. The overall analysis gave more optimistic results than the previous assessment. The new analyses indicate that (**Figure AO-13**):

1. The median ratio of $F_{current}/F_{MSY}$ in 2014 is estimated at 0.54 (range 0.31-0.87), indicating that overfishing is not occurring.

2. The ratio of biomass $SSB_{current}/SSB_{MSY}$ in 2015 estimated at 1.10 (range 0.51-1.80). This indicates that that the stock is not in an overfished state.

3. MSY is estimated at 25,900 tonnes. Current (2017) catch is 13,800 t.

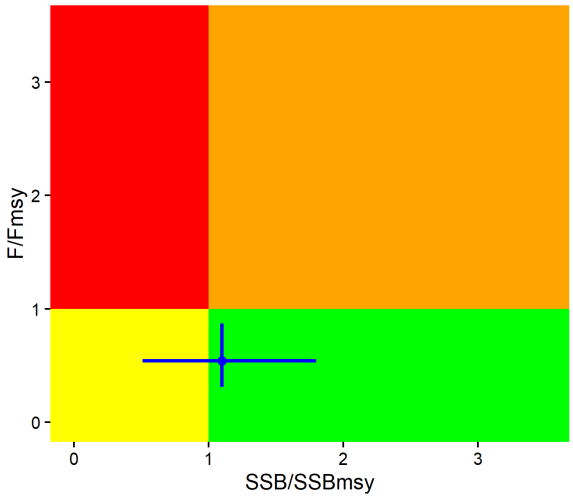


Figure AO-13. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for albacore tuna in the southern AO.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined. "Green" quadrant in Kobe plot implied as target (Rec. 11-13)

Harvest control rule: Not defined, but Rec. 11-13 provides a framework.

Since 2011, following SCRS advice, the TAC was lowered to 24,000 tonnes (ICCAT Recommendations 11-05 and 13-06). However, permissible catch under the Rec. 16-07 exceeds 24,000 tonnes due to individual allocations. The Recommendation requires major fishing countries to improve their monitoring and reporting of catch.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	80	Passing Score
1.2.2	Harvest control rules and tools	60	Condition Needed
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	85	Passing Score

SUMMARY

AO ALB-S	ESTIMATE	YEARS	NOTES
RECENT CATCH	14	2017	
5-YEAR CATCH	15	2013-17	
MSY	26	2014	
F/F_{MSY}	0.54	2014	Range: 0.31-0.87
SSB/SSB_{MSY}	1.10	2015	Range: 0.51-1.80
TAC	24	2017-2020	

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}. The overall TAC has been lowered to 24,000 t following scientific advice to allow the stock to rebuild. Catches since 2013 have been below this level.
ENVIRONMENT		73% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). Monitoring is deficient.
		26% of the catch is made by pole-and-line fishing, with unknown impacts on baitfish stocks.

Last date of a change in Color Ratings: November, 2016.
Changes from the previous (December, 2011) Color Ratings: The Abundance rating changed from Orange to Green. The Fishing mortality rating changed from Yellow to Green.

AO Mediterranean Albacore Tuna

There are three stocks of albacore tuna in the ICCAT Area: North Atlantic, South Atlantic and Mediterranean. Albacore catches in the Mediterranean in 2017 were about 2,800 tonnes, a 36% decrease from 2016. Catches are highly variable and are made primarily by longline (96%) and the remainder by other surface gears (**Figure AO-14**). There is high uncertainty on the status of the Mediterranean Albacore tuna stock due to poor monitoring and basic fishery statistics.

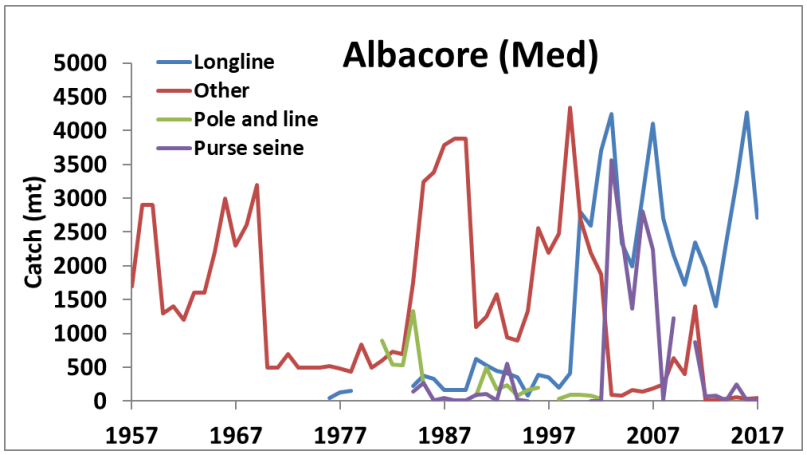


Figure AO-14. Catches of albacore tuna in the Mediterranean Sea from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The Mediterranean albacore stock was assessed in 2017. The data sets used are extremely sparse and indices of abundance are generally lacking. In addition, there is considerable uncertainty with reported catches. The SCRS concluded that (**Figure AO-15**):

1. The ratio of $F_{current}/F_{MSY}$ in 2015 is 0.830 (range: 0.223-2.194). Therefore, overfishing is probably not occurring.

2. The ratio of $SSB_{current}/SSB_{MSY}$ is estimated to be 1.002 (range: 0.456-1.760). Therefore, the stock is not overfished, but near the MSY level.

3. MSY is estimated to be 3,419 t (range: 2,187-7,842 t).

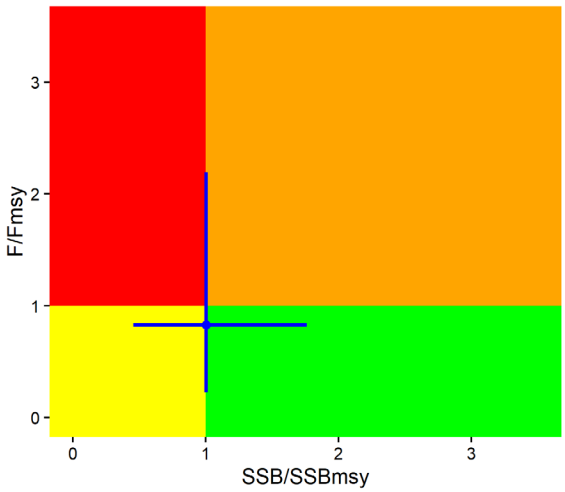


Figure AO-15. Latest estimate of SSB/SSBMSY and F/FMSY (in blue, including range) for albacore tuna in the Mediterranean.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined. "Green" quadrant in Kobe plot implied as target (Rec. 11-13)

Harvest control rule: Not defined, but Rec. 11-13 provides a framework.

Recommendation 17-05 establishes that each CPC shall limit the number of their fishing vessels authorized to fish for Mediterranean albacore to the number of vessels that were authorized in 2017, with a 10% tolerance margin. The Recommendation also establishes a prohibition to fish Mediterranean albacore between 1 October and 30 November inclusive, while the closure period defined by the Mediterranean Swordfish recovery plan (Rec. 16-05) remains in force.

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	<60	Fail
1.2.2	Harvest control rules and tools	<60	Fail
1.2.3	Information / monitoring	60	Condition Needed
1.2.4	Assessment of stock status	85	Passing Score

SUMMARY

AO ALB-M	ESTIMATE	YEARS	NOTES
RECENT CATCH	3	2017	
5-YEAR CATCH	3	2013-17	
MSY	3		
F/F_{MSY}	0.83	2015	Range: 0.22-2.19
SSB/SSB_{MSY}	1.0	2015	Range: 0.46-1.76
TAC			

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		$SSB \geq SSB_{MSY}$. While SSB is slightly above SSB_{MSY}, uncertainty in the assessment is high, therefore, a Yellow rating is given on a precautionary basis.
FISHING MORTALITY		$F \leq F_{MSY}$.
ENVIRONMENT		96% of the catch is officially reported as made by longlining. Several mitigation measures are in place (sharks, turtles). Monitoring is very deficient.
		4% of the catch is made by other surface gears, including gillnets. Monitoring is very deficient.

Last date of a change in Color Ratings: March, 2019.
Changes from the previous (October, 2017) Color Ratings: The F rating changed from Yellow to Green to harmonize with ratings methodology.

AO Eastern Atlantic and Mediterranean Bluefin Tuna

Atlantic bluefin tuna (*Thunnus thynnus*) are found in the entire North Atlantic and its adjacent seas, primarily the Mediterranean Sea. ICCAT recognizes two stocks: Western Atlantic, and eastern Atlantic and Mediterranean bluefin. There is considerable mixing between the two.

Eastern Atlantic bluefin catches have been subject to a high degree of misreporting between the mid-1990s and the recent past, although for the most recent few years, such misreported catch levels are thought to have diminished considerably. In 2017, reported catches were about 23,600 tonnes (**Figure AO-16**), a 23% increase compared to 2016 reported catches. Purse seiners take 61% of the catch, followed by traps (17%), longline (15%), and a variety of surface gears, including pole-and-line, handline and trolling. There is considerable uncertainty on its level of abundance. The TAC in place and strict controls have ended over-fishing.

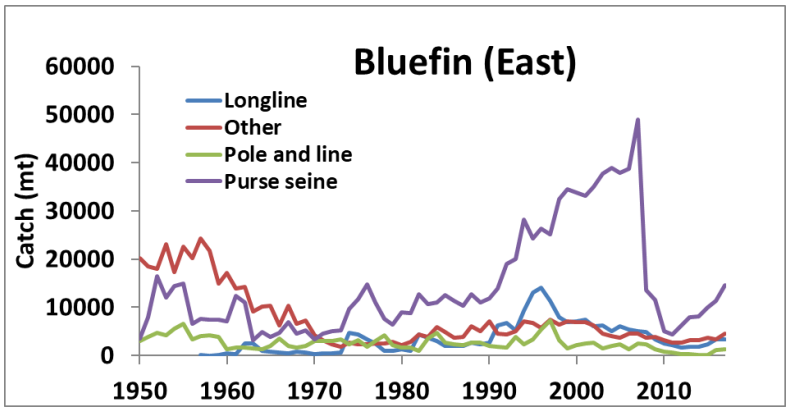


Figure AO-16. Catches of Eastern Atlantic and Mediterranean bluefin from 1950 to 2017, by gear type.

STOCK ASSESSMENT

ICCAT's SCRS assessed the eastern Atlantic bluefin stock in 2017, applying many revisions of the historical data sets. The stock assessment is subject to considerable uncertainties due to scarcity of CPUE data and to high levels of misreporting that took place primarily in the 2000s. The SCRS was unable to estimate biomass-based reference points. The SCRS concluded the following (**Figure AO-17**):

1. The current ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ is unknown.

2. The ratio of F_{recent}/F_{MSY} (using the $F_{0.1}$ proxy) is estimated at 0.34 (range:0.25-0.44) Thus, overfishing is not taking place. Catches have been reduced by over 70% since 2007 due to strict limits and controls.

3. The estimate of MSY is unknown.

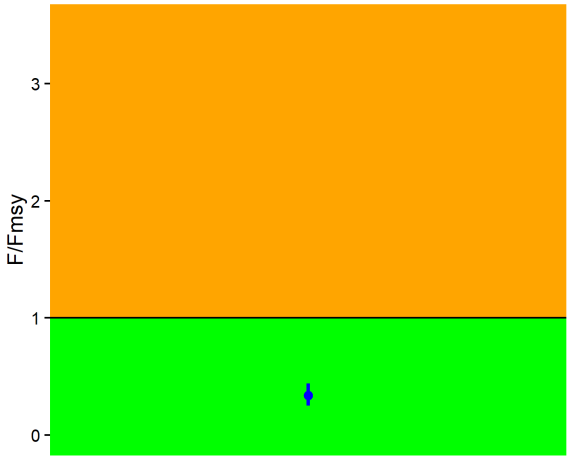


Figure AO-17. Latest estimate of F/F_{MSY} (using proxy; in blue, including range) for bluefin tuna in the Eastern Atlantic and Mediterranean. Solid black line represents interim rebuilding target reference point.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined for the long term. "Green" quadrant in Kobe plot implied as target (Rec. 11-13). Interim target is to achieve SSB_{MSY} through 2022 with at least 60% probability (Rec. 17-07).

Harvest control rule: Not defined, but Recs. 11-13 and 15-07 provide a framework.

Rec. 18-03 establishes candidate operational management objectives to be further developed in 2019 as part of ICCAT's transition to using management procedures for atlantic bluefin tuna stocks.

The eastern Atlantic and Mediterranean bluefin stock has been the subject of a rebuilding program since 2006 (ICCAT Rec. 06-05), which has been amended every year in 2007-2010 and again in 2012 (Rec. 12-03). By adopting Rec. 18-02, ICCAT moved from that rebuilding plan to a management plan starting in 2019 with the objective of maintaining the biomass around $B_{0.1}$.

The management plan is very comprehensive and combines multiple conservation elements with enforcement ones. The TACs for 2019 through 2020 are 32,240 and 36,000 tonnes, respectively. In addition to the TACs, the plan includes the following measures, among others:

1. Manages fishing capacity (including mandated capacity adjustments to make fishing capacity more commensurate with quotas) and farming capacity;
2. Establishes closed fishing seasons for longliners (seven months), purse seiners (11 months), and requires CPCs to provide information on closed fishing seasons for other vessel types in their annual fishing plans;
3. Sets minimum sizes of 8 and 30 kg, depending on the fishery;
4. Establishes records of authorized fishing vessels, authorized traps and authorized farming facilities;
5. Requires weekly catch reports to to ICCAT;
6. Establishes an observer program with 100% coverage for purse seiners and for transfers to cages;
7. Requires VMS on every vessel over 15 m in length, and transmissions of the VMS data to ICCAT;
8. Prohibits trade of bluefin not accompanied by valid catch documents (Rec. 09-01);
9. Establishes procedures for at-sea boarding and inspection;
10. Allows SCRS to access all MCS data from the management plan.

The multiple amendments made to the management plan since 2006 have resulted in increasingly tighter controls of the actual catches. Combined with lower quotas, fishing mortality rates have been reduced substantially (current F is below F_{MSY}). Using the medium recruitment scenario, the SCRS estimates that the stock may have already rebuilt to SSB_{MSY}, although considerable uncertainty remains. SCRS projections indicated that a gradual increase of the TAC up to the most conservative estimate of MSY would allow the stock to rebuild to SSB_{MSY} even in the most pessimistic scenario. Since its annual meeting in 2014, the Commission has followed this advice.

SUMMARY

AO BFT-E	ESTIMATE	YEARS	NOTES
RECENT CATCH	24	2017	
5-YEAR CATCH	17	2013-17	
MSY	N/A		
F/F_{MSY}	0.34	2012-2014	Use $F_{0.1}$ F_{MSY} proxy
SSB/SSB_{MSY}	N/A		
TAC	28, 32 and 36	2018-2020	

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		Unknown but increasing in recent years.
FISHING MORTALITY		$F < F_{MSY}$. Fishing mortality has clearly been reduced through a TAC and strict controls.
ENVIRONMENT		61% of the catch is made by purse seiners that set on free schools.
		15% of the catch is made by longlining. Several mitigation measures are in place.
		17% of the catch is made by fixed traps that have minor impact on sensitive species.
		3% of the catch is made by pole-and-line fisheries that have some impact on baitfish stocks.

Last date of a change in Color Ratings: February, 2015.
Changes from the previous (original) Color Ratings: The Abundance rating changed from Orange to Yellow.

AO Western Atlantic Bluefin Tuna

Atlantic bluefin tuna are found in the entire North Atlantic and its adjacent seas, primarily the Mediterranean Sea. ICCAT recognizes two stocks: Western Atlantic, and eastern Atlantic and Mediterranean bluefin. There is considerable mixing between the two.

Western Atlantic bluefin catches in 2017 were about 1,900 tonnes, a 3% decrease from 2016. Sport gears (hand line, rod-and-reel) take 57% of the catch, followed by longline (34%) and other surface gears. Purse seine catches in recent years have been very minor (**Figure AO-18**). There is uncertainty about stock status but overfishing is not occurring.

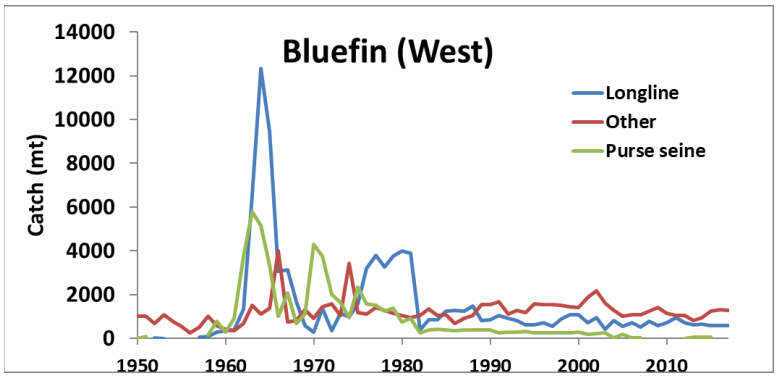


Figure AO-18. Catches of Western Atlantic bluefin tuna from 1950 to 2017, by gear type.

STOCK ASSESSMENT

ICCAT's SCRS assessed the western Atlantic bluefin stock in 2017, applying many revisions of the historical data sets. The Committee was unable to estimate biomass-based reference points. Using these results, the SCRS concluded the following (**Figure AO-19**):

1. The current ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ is unknown.

2. The ratio of $F_{current}/F_{MSY}$ (using $F_{0.1}$ as a proxy for F_{MSY}) is estimated at 0.59 (range: 0.44-0.79) Thus, overfishing is not taking place.

3. The estimate of MSY is unknown.

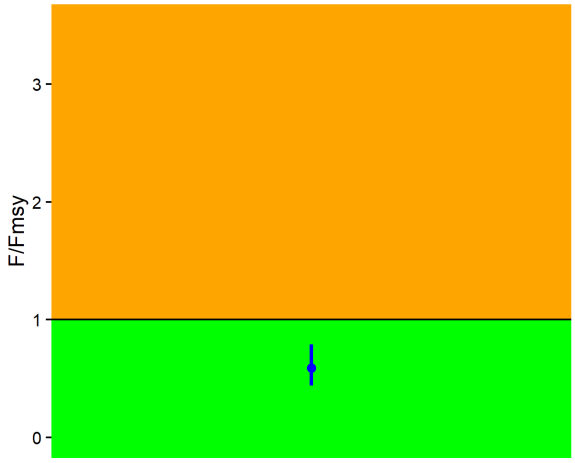


Figure AO-19. Latest estimate of F/F_{MSY} (using proxy; in blue, including range) for bluefin tuna in the Western Atlantic Ocean. Solid black line represents interim rebuilding target reference point.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined for the long term. "Green" quadrant in Kobe plot implied as target (Rec. 11-13). Interim target is to achieve SSB_{MSY} through 2018 with at least 50% probability (Rec. 13-09).

Harvest control rule: Not defined, but Recs. 11-13 and 15-07 provide a framework. According to Rec. 17-05, the scientific committee shall identify HCRs and initiate testing of the associated management procedures in 2018 and the MSE process should result in the Commission selecting a management procedure for adoption and implementation by 2020. Rec. 18-03 establishes candidate operational management objectives to be further developed in 2019 as part of ICCAT's transition to using management procedures for atlantic bluefin tuna stocks.

Western Atlantic bluefin has been the subject of a rebuilding program since 1998 (ICCAT Rec. 98-07), which has been amended in every other year since 2002. Recommendation 17-05 describes an interim conservation and management plan for the 2018-2020 period as a means to support the transition to a management approach based on management procedures. The plan includes revised TACs (2,350 tonnes in 2018, 2019 and 2020), a 30-kg minimum size and the prohibition of directed fisheries in the Gulf of Mexico (the only known spawning area for the stock).

SUMMARY

AO BFT-W	ESTIMATE	YEARS	NOTES
RECENT CATCH	1.9	2017	
5-YEAR CATCH	1.7	2013-17	
MSY	N/A		
F/F_{MSY}	0.59	2012-2014	$F/F_{0.1}$
SSB/SSB_{MSY}	N/A		
TAC	2.35	2018-2020	

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		Unknown but increasing in recent years.
FISHING MORTALITY		$F < F_{MSY}$.
ENVIRONMENT		57% of the catch is made by sport fishing gears (rod-and-reel, handline) with minor amounts of bycatch.
		34% of the catch is made by longlining. Several mitigation measures are in place.

Last date of a change in Color Ratings: October, 2017.
Changes from the previous (February, 2015) Color Ratings: The Abundance rating changed from Orange to Yellow.

STOCKS IN THE INDIAN OCEAN

RFMO: Indian Ocean Tuna Commission (IOTC). The stocks are assessed by the IOTC SC, which makes recommendations to the IOTC.
Last Scientific Committee (SC) meeting: December, 2018.
Last Commission meeting: June, 2019.
Tuna stocks managed by IOTC: IO Yellowfin, IO Bigeye, IO Skipjack, IO Albacore.
Data sources: The main sources of information for this section IOTC (2017), IOTC (2018).
Last update: October, 2019.

About 20 percent of the world production of tuna is from the Indian Ocean (IO), making this the second largest region for tuna fishing after the western and Central Pacific Ocean. Catches of skipjack, yellowfin, bigeye and albacore in 2017 were 1,062,360 tonnes, a 6% increase from 2016. There has been a general tendency for the total catch to decline since 2005, when a record 1.2 million tonnes were caught, followed by an increase in recent years (**Figure IO-1**). Catches of southern bluefin tuna occur substantially in the IO Convention Area. This stock is covered in a different section of this report, under Southern Hemisphere.

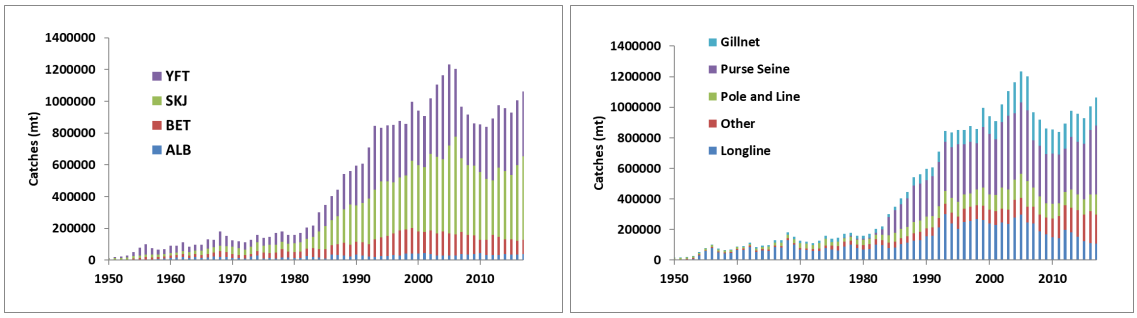


Figure IO-1. Trends in catch (mt) of bigeye, skipjack, yellowfin and albacore in the IO region, by species (left) and gear (right), 1950-2017.

Average catches for the five-year period 2013-2017 (985,700 tonnes) provide an indication of the recent performance of the fisheries (**Figure IO-2**): Skipjack accounts for 46.1% of the catches in weight, followed by yellowfin (40.5%), bigeye (9.7%), and albacore (3.7%). Purse-seine vessels take about 39% of the total catch, followed by gillnets (17%), longline (14%), and pole-and-line (11%). Gillnet fisheries are generally poorly monitored.

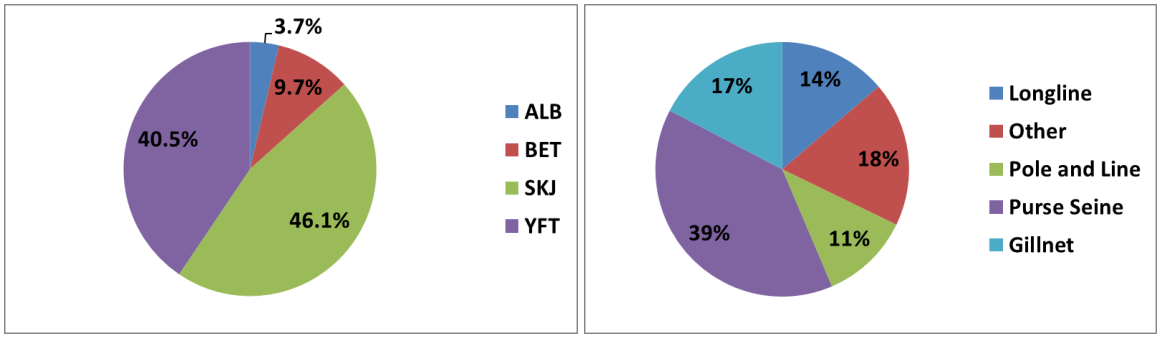


Figure IO-2. Average 2012-2017 catches of skipjack, yellowfin, bigeye and albacore in the IO. The graph on the left shows the percentages by species, and the graph on the right shows the percentages by gear type.

IO Bigeye Tuna

Bigeye reported catches in 2017 were about 90,500 tonnes, a 4% increase from 2016. For the period 2013-2017, the main fishing gear is longline (48%). Catches by this gear have declined dramatically from a high in 2004 (**Figure IO-3**), due to vessels moving away from the main fishing grounds to avoid piracy, but increased sharply in 2012 to decrease again since then. In contrast, catches from purse seine vessels (32.5% on average for 2013-2017) have been relatively stable since 2000. Overfishing is not occurring and the stock is not overfished.

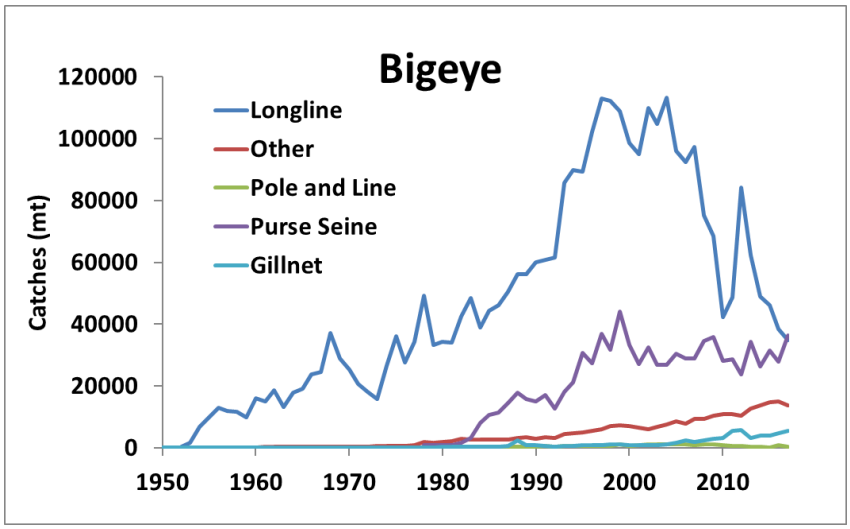


Figure IO-3. Catches of bigeye tuna in the IO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The latest assessment conducted by the Scientific Committee in 2016 was qualitatively similar to the 2013 stock assessment but showed a lower relative biomass and higher relative fishing mortality. The results of the 2016 assessment indicated the following (**Figure IO-4**):

1. The ratio of $F_{current}/F_{MSY}$ is estimated to be 0.76 (range: 0.49 to 1.03), indicating that overfishing is not occurring.

2. The ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ is 1.29 (range: 1.07 to 1.51), indicating that the stock is not in an overfished state.

3. The estimate of MSY is 104,000 tonnes. The 2017 catch was below this level.

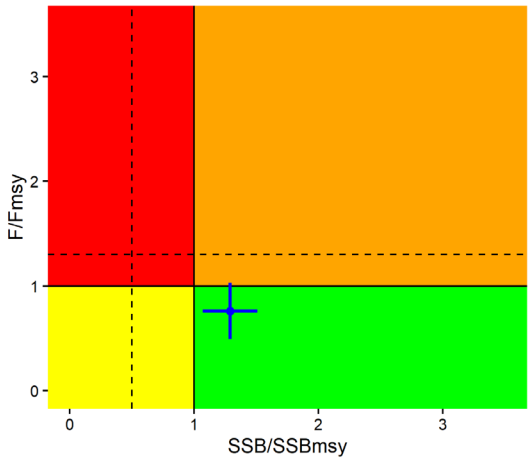


Figure IO-4. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for IO bigeye. Solid black lines represent interim target reference points and black dashed lines represent interim limit reference points.

MANAGEMENT

Limit reference point: Interim limits of $0.5*SSB_{MSY}$ and $1.3*F_{MSY}$ (Resolution 15/10). Resolution16/09 established a Technical Committee on Management Procedures to help guide the Commission on policy choices for establishing Management Procedures. $F_{current}/F_{MSY}$ equals 0.76, which is about 42% below the limit F; $SSB_{current}/SSB_{MSY}$ equals 1.29, which is about 2.6 times above the limit SSB.

Target reference point: Interim targets of SSB_{MSY} and F_{MSY} (Resolution 15/10). Current SSB is above the target SSB and current F is below the target F.

Harvest control rule: Not defined yet. Resolution 16/09 requests IOTC to guide the Commission to agree on Management Procedures including HCRs designed to maintain or restore stocks to the "Green" quadrant of the Kobe plot.

There are no conservation measures established by the IOTC specifically for bigeye. Resolution 19/05 establishes a ban on discards of bigeye, skipjack and yellowfin tuna by purse seine vessels. Resolution 19/02 established procedures on a FADs management plan, including a limit of 300 operational buoys at sea at any one time in relation to each of its vessels; and a limit of 500 instrumented buoys in stock at any time and 500 instrumented buoys to be acquired annually by each fishing vessel. Moreover, Resolution 19/02 requests CPC vessels to use non-entangling FADs constructed without netting material and encourage CPC vessels to use biodegradable FADs and remove from the water, retain onboard and only dispose of in port, all traditional FADs encountered (e.g. those made of entangling materials or designs) from 1 January 2022.

Anticipating the possible need for management measures, Resolution 16/10 was adopted to promote the implementation of IOTC Conservation and Management Measures and Resolution 17/02 established a Working Party on the Implementation of Conservation and Management Measures (WPICMM).

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score[6]	Evaluation
1.2.1	Harvest Strategy	80	Passing Score
1.2.2	Harvest control rules and tools	<60	Fail
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	90	Passing Score

SUMMARY

IO BET	ESTIMATE	YEARS	NOTES
RECENT CATCH	90	2017	
5-YEAR CATCH	96	2013-17	
MSY	104	2015	
F/F_{MSY}	0.76	2015	Range: 0.49 to 1.03
SSB/SSB_{MSY}	1.29	2015	Range: 1.07 to 1.51
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		48% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). Monitoring is deficient.
		24% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks).
		9% of the catch is made with purse seining on free schools, with little impact on non-target species.
		19% of the catch is made by other gears such as gillnet. There is poor reporting by these fisheries which are thought to have substantial amounts of bycatch.

Last date of a change in Color Ratings: None.
Changes from the previous (original) Color Ratings: None.

[6] These scores have not been updated to reflect latest (2019) changes in stock management.

IO Yellowfin Tuna

Yellowfin catches in 2017 were about 409,000 tonnes, similar to 2016 catch levels. The main fishing gears for yellowfin for 2013-2017 period are purse seine (37% of the catch) and longline (12%) (**Figure IO-5**). Catches by gillnet (17%) and miscellaneous gears (29%) have become increasingly important in recent years. Catches by these gears are poorly estimated. Catches from pole-and-line vessels (5%) have been relatively stable. Overall, catches have declined by 20% from a record high of 530,000 tonnes in 2004, but seem to be increasing again, especially in purse seine and other gears fisheries. The stock is estimated to be overfished and overfishing is occurring due to an increase in catch levels in recent years.

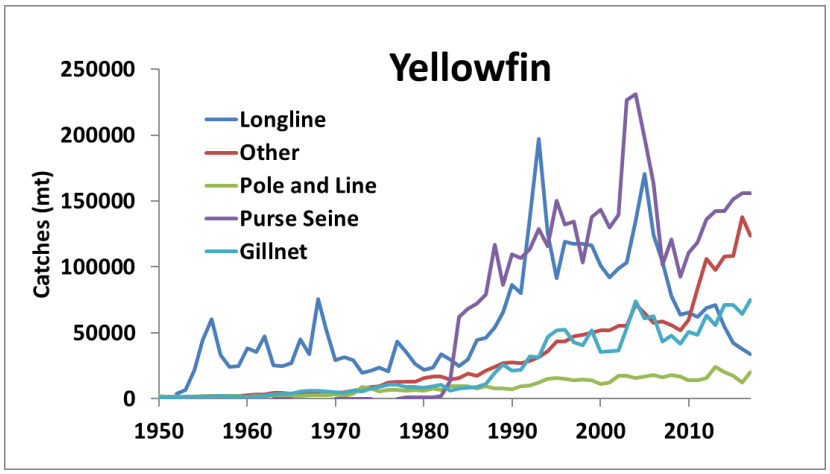


Figure IO-5. Catches of yellowfin tuna in the IO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

In 2018 a new stock assessment was carried out for yellowfin tuna in the IOTC area of competence to update the assessment of yellowfin undertaken in 2016. The model used in 2018 is based on the model developed in 2016 with a series of revisions. The assessment gave overall similar results to the 2016 assessment but is somewhat more pessimistic due to the steeper declining trend of the composite longline CPUE series and sustained large catches in the most recent years. (**Figure IO-6**):

1. The ratio of $F_{current}/F_{MSY}$ is estimated at 1.20 (range: 1.00-1.71), indicating that overfishing is occurring.

2. The stock is in an overfished state as spawning biomass is below the SSB_{MSY} level. $SSB_{current}/SSB_{MSY}$ = 0.83 (range: 0.74-0.97).

3. The value of MSY is estimated to be 403,000 (range: 339,000-436,000 tonnes). Recent catches are above the estimated MSY (~409,000 t in 2017).

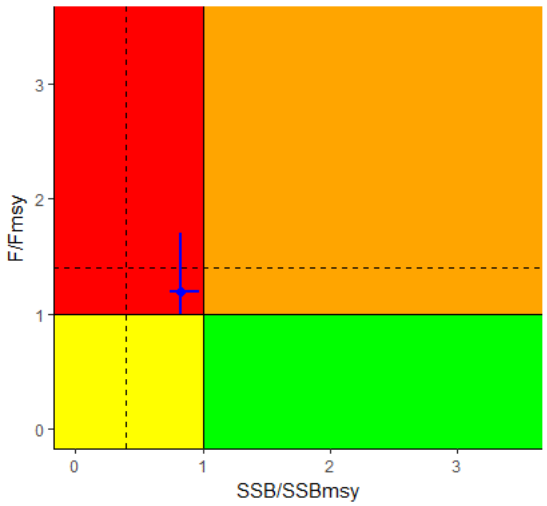


Figure IO-6. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for IO yellowfin. Solid black lines represent interim target reference points and black dashed lines represent interim limit reference points.

MANAGEMENT

Limit reference point: Interim limit reference point of 0.4*SSB_{MSY} and 1.4*F_{MSY} (Resolution 15/10). Resolution16/09 established a Technical Committee on Management Procedures to help guide the Commission on policy choices for establishing Management Procedures. $F_{current}/F_{MSY}$ equals 1.20, which is about 14% below the limit F; $SSB_{current}/SSB_{MSY}$ equals 0.83, which is about 2 times above the limit SSB.

Target reference point: Interim targets of SSB_{MSY} and F_{MSY} (Resolution 15/10). Current SSB and F are breaching these targets.

Harvest control rule: Not defined yet. Resolution 16/09 requests IOTC to guide the Commission to agree on Management Procecures including HCRs designed to maintain or restore stocks to the "Green" quadrant of the Kobe plot.

Resolution 19/01 establishes an interim plan for rebuilding the Indian ocean yellowfin tuna stock in the IOTC area of competence. This plan details yellowfin tuna catch limits by gear and provisions requiring that Parties whose fleets exceed their catch limits will have that over-catch deducted from their annual limits in future years. These catch limits, if applied, will likely result in catches higher than those recommended by the SC to rebuild the stock. Moreover, Resolution 19/01 requests CPCs to gradually reduce supply vessels by 31 December 2022. Resolution 19/05 establishes a ban on discards of bigeye, skipjack and yellowfin tuna by purse seine vessels. Resolution 19/02 established procedures on a FADs management plan, including a limit of 300 operational buoys at sea at any one time in relation to each of its vessels; and a limit of 500 instrumented buoys in stock at any time and 500 instrumented buoys to be acquired annually by each fishing vessel. Moreover, Resolution 19/02 requests CPC vessels to use non-entangling FADs constructed without netting material and encourage CPC vessels to use biodegradable FADs and remove from the water, retain onboard and only dispose of in port, all traditional FADs encountered (e.g. those made of entangling materials or designs) from 1 January 2022.

Anticipating the possible need for additional management measures, Resolution 16/10 was adopted to promote the implementation of IOTC Conservation and Management Measures and Resolution 17/02 established a Working Party on the Implementation of Conservation and Management Measures (WPICMM).

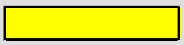
Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score[7]	Evaluation
1.2.1	Harvest Strategy	65	Condition Needed
1.2.2	Harvest control rules and tools	60	Condition Needed
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	90	Passing Score

SUMMARY

IO YFT	ESTIMATE	YEARS	NOTES
RECENT CATCH	409	2017	
5-YEAR CATCH	399	2013-17	
MSY	403	2017	Range: 339-436
F/F_{MSY}	1.20	2017	Range: 1.00-1.71
SSB/SSB_{MSY}	0.83	2017	Range: 0.74-0.97
TAC	N/A	Specified by gear in Res. 19/01	

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB < SSB_{MSY}. The low level of stock biomass is attributable to increased catch levels in recent years.
FISHING MORTALITY		F > F_{MSY}.
ENVIRONMENT		17% of the catch is made by gillnets, which are poorly monitored. Gillnets are thought to have high bycatch rates. No mitigation measures are in place and monitoring is extremely deficient.
		12% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). Monitoring is deficient.
		24% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks).

[7] These scores have not been updated to reflect latest (2019) changes in stock management.

		13% of the catch is made with purse seining on free schools, with little impact on non-target species.
		24% of the catch is made by handlines, expected to have little impact on bycatch species.
		4% of the catch is made by trolling, expected to have little impact on bycatch species.
		5% of the catch is made by pole-and-line fishing, with small bycatch of non-target species but unknown impacts on baitfish stocks.

Last date of a change in Color Ratings: February, 2016.
Changes from the previous (December 2011) Color Ratings: The Abundance rating changed from Green to Orange. The Fishing mortality rating changed from Green to Orange.

IO Skipjack Tuna

Skipjack catches in the Indian Ocean in 2017 were about 524,200 tonnes, a 11% increase from 2016. Purse seine (45%) and gillnets (22%) dominate the catches, followed by pole-and-line (21%) (**Figure IO-7**). Pole-and-line, purse seine and gillnet catches have been decreasing since the mid-2000s, but purse seine catches increased sharply again after 2012. Overfishing is not occurring and the stock is not overfished.

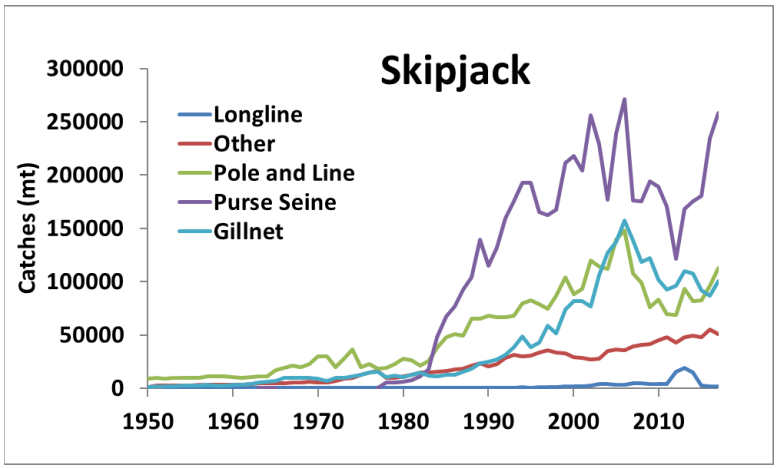


Figure IO-7. Catches of skipjack tuna in the IO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The most recent stock assessment of skipjack was conducted in 2017 and model results differed substantively from the previous (2014 and 2011) assessments. The main reasons were (i) the correction of an error in specifying selectivity for small fish in the previous assessments, (ii) the addition of tag-release mortality in the model and (iii) assuming effort creep of 1% per year since 1995 for the standardized European purse seine CPUE.

The results of the assessment indicate that (**Figure IO-8**):

1. The ratio of $F_{current}/F_{Target}$ is estimated to be 0.93 (range:0.70-1.13). Therefore, overfishing is not occurring.

2. The stock is not in an overfished state as spawning biomass is around the target level ($SSB_{current}/SSB_{Target}$ = 1.00, range: 0.88-1.17).

3. The median estimate of MSY proxy is estimated to be 510,000 tonnes (range: 456,000 to 619,000 t).

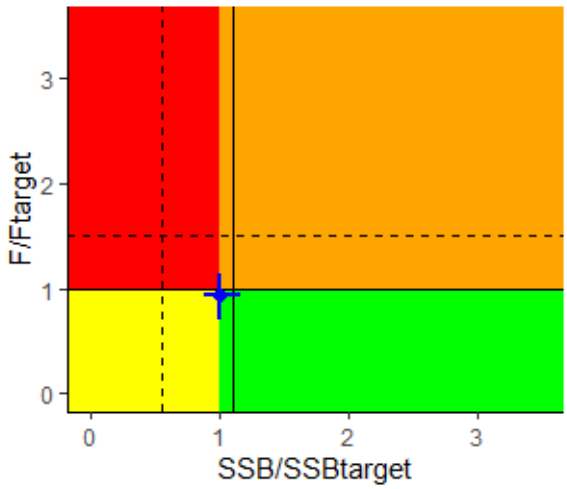


Figure IO-8. Latest estimate of SSB/SSB_{Target} and F/F_{Target} (in blue, including range) for IO skipjack. Solid black lines represent interim target reference points and black dashed lines represent interim limit reference points.

MANAGEMENT

Limit reference point: Interim limits of 0.2*SSB_0 and $F_{0.2SSB0}$ (the fishing mortality value associated with sustaining the stock at 0.2*SSB_0) (Resolutions 16/02 and 15/10). $F_{current}/F_{Target}$ equals 0.93, which is below the F limit; $SSB_{current}/SSB_0$ equals 0.40, which is above the limit SSB.

Target reference point: Interim targets of 0.4*SSB_0 and $F_{0.4SSB0}$ (the fishing mortality value associated with sustaining the stock at 0.4*SSB_0) (Resolutions 16/02 and 15/10). Current F is below the F target and current SSB is around the SSB target.

Harvest control rule: Resolution 16/02 establishes a Harvest Control Rule for skipjack tuna in the IOTC area of competence. The HCR shall recommend a TAC using:

a) The estimate of current spawning stock biomass ($SSB_{current}$)

b) The estimate of the unfished spawning stock biomass (SSB_0)

c) The estimate of the equilibrium exploitation rate (E_{target}) associated with sustaining the stock at SSB_{target}.

Based on the results of the stock assessment of skipjack tuna in 2017, IOTC adopted an annual catch limit of 470,029 tonnes for skipjack for the period 2018-2020 following the application of the Harvest Control Rule in Resolution 16/02. Total catches in 2017 (about 524,200 t) were 12% larger than the catch limit adopted for 2018–2020 and, hence, IOTC needs to ensure that catches of skipjack in the 2018–2020 period do not exceed the agreed limit.

There are no other conservation measures established specifically for skipjack. Resolution 19/01 on yellowfin request CPCs to gradually reduce supply vessels by 31 December 2022. Resolution 19/05 establishes a ban on discards of bigeye, skipjack and yellowfin tuna by purse seine vessels. Resolution 19/02 established procedures on a FADs management plan, including a limit of 300 operational buoys at sea at any one time in relation to each of its vessels; and a limit of 500 instrumented buoys in stock at any time and 500 instrumented buoys to be acquired annually by each fishing vessel. Moreover, Resolution 19/02 requests CPC vessels to use non-entangling FADs constructed without netting material and encourage CPC vessels to use biodegradable FADs and remove from the water, retain onboard and only

dispose of in port, all traditional FADs encountered (e.g. those made of entangling materials or designs) from 1 January 2022.

Anticipating the possible need for management measures, Resolution 16/10 was adopted to promote the implementation of IOTC Conservation and Management Measures and Resolution 17/02 established a Working Party on the Implementation of Conservation and Management Measures (WPICMM).

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score[8]	Evaluation
1.2.1	Harvest Strategy	80	Passing Score
1.2.2	Harvest control rules and tools	75	Condition Needed
1.2.3	Information / monitoring	80	Passing Score
1.2.4	Assessment of stock status	90	Passing Score

SUMMARY

IO SKJ	ESTIMATE	YEARS	NOTES
RECENT CATCH	524	2017	
5-YEAR CATCH	454	2013-17	
MSY	510	2016	$Yield_{40\%SSB}$ Range: 456-619
F/F_{TARGET}	0.93	2016	$E_{2016}/E_{40\%SSB}$ Range: 0.70-1.13
SSB/SSB_{TARGET}	1.00	2016	$SB_{2016}/SB_{40\%SSB}$ Range: 0.88-1.17
TAC	N/A		

Catches and MSY in 1000 tonnes.

[8] These scores have not been updated to reflect latest (2019) changes in stock management.

STOCK ABUNDANCE		SSB ~ SSB_{MSY}.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		22% of the catch is made by gillnets, a gear expected to have high bycatch rates. No mitigation measures are in place and monitoring is extremely deficient.
		33% of the catch is made by purse seining on floating objects (including FADs). Several bycatch mitigation measures are in place (turtles, sharks).
		21% of the catch is made by pole-and-line fishing, with small bycatch of non-target species but unknown impacts on baitfish stocks.
		2% of the catch is made with purse seining on free schools, with little impact on non-target species.

Last date of a change in Color Ratings: December, 2011.
Changes from the previous (original) Color Ratings: The Abundance rating changed from Yellow to Green.

IO Albacore Tuna

Albacore catches in the Indian Ocean in 2017 were about 38,700 tonnes, a 9% increase from 2016. Almost all catches are made by drifting longlines (**Figure IO-9**). The Indian Ocean albacore stock is estimated to not be overfished or subject to overfishing. However, there is considerable uncertainty associated with this determination.

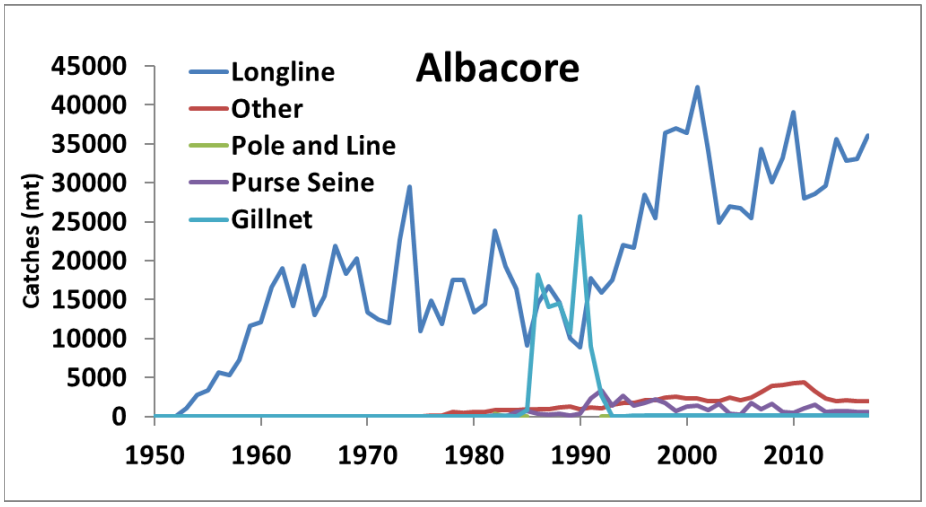


Figure IO-9. Catches of albacore tuna in the IO from 1950 to 2017, by gear type.

STOCK ASSESSMENT

The latest assessment was performed by the SC in 2016, using data through 2014. The conclusions from the assessment indicate that (**Figure IO-10**):

1. The ratio of $F_{current}/F_{MSY}$ is estimated to be 0.85 (range: 0.57-1.12). Therefore, overfishing is not likely occurring. Piracy in the western tropical Indian Ocean displaced much of the longline fishing effort to the South and East, which are traditional fishing grounds for albacore.
2. The stock is not in an overfished state as spawning biomass is above the SSB_{MSY} level ($SSB_{current}/SSB_{MSY}$ = 1.80).
3. The median estimate of MSY is estimated to be 38,800 tonnes.

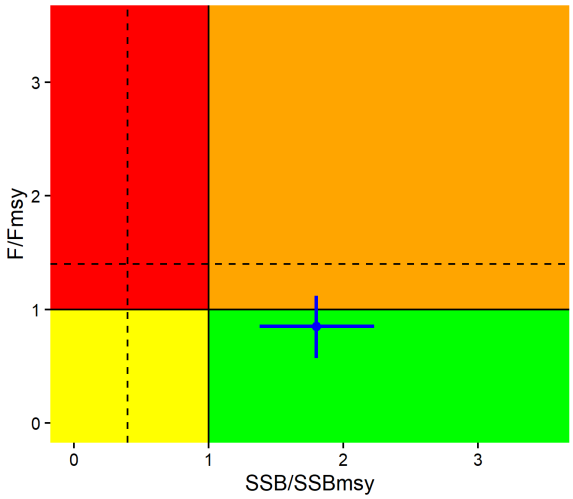


Figure IO-10. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for IO albacore. Solid black lines represent interim target reference points and black dashed lines represent interim limit reference points.

MANAGEMENT

Limit reference point: Interim limits of 0.4*SSB_{MSY} and 1.4*F_{MSY} (Resolution 15/10). Resolution16/09 established a Technical Committee on Management Procedures to help guide the Commission on policy choices for establishing Management Procedures. The value of $SSB_{current}/SSB_{MSY}$ is 1.80, about 4.5 times higher than the SSB limit. F/F_{MSY} is 0.85, which is about 39% below the limit F.

Target reference point: Interim targets of SSB_{MSY} and F_{MSY} (Resolution 15/10). Current F is below the F target and current SSB is above the SSB target.

Harvest control rule: Not defined yet. Resolution 16/09 requests IOTC to guide the Commission to agree on Management Procecures including HCRs designed to maintain or restore stocks to the "Green" quadrant of the Kobe plot.

There are no conservation and management measures adopted by IOTC for albacore. Anticipating the possible need for management measures, Resolution 16/10 was adopted to promote the implementation of IOTC Conservation and Management Measures and Resolution 17/02 established a Working Party on the Implementation of Conservation and Management Measures (WPICMM).

Management status against MSC standard:

MSC PI no.	MSC Performance Indicator (PI)	Score	Evaluation
1.2.1	Harvest Strategy	65	Condition Needed
1.2.2	Harvest control rules and tools	<60	Fail
1.2.3	Information / monitoring	75	Condition Needed
1.2.4	Assessment of stock status	85	Passing Score

SUMMARY

IO ALB	ESTIMATE	YEARS	NOTES
RECENT CATCH	39	2017	
5-YEAR CATCH	36	2013-17	
MSY	38.8	2014	Range: 33.9-43.6
F/F_{MSY}	0.85	2014	Range: 0.57-1.12
SSB/SSB_{MSY}	1.80	2014	Range: 1.38-2.23
TAC	N/A		

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB > SSB_{MSY}. However there is considerable uncertainty in the assessment results.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		Almost 100% of the catch is made by longlining. Several mitigation measures are in place (sharks, turtles, sea birds). Monitoring is deficient.

Last date of a change in Color Ratings: October, 2017.
Changes from the previous (February, 2015) Color Ratings: Fishing mortality rating was changed from Yellow to Green to reflect the more optimistic results of the updated 2016 assessment.

RFMO: Commission for the Conservation of Southern Bluefin Tuna (CCSBT). The stock is assessed by the SC who makes recommendations to the CCSBT.
Last Scientific Committee meeting: September, 2018.
Last Commission meeting: October, 2018.
Tuna stocks managed by CCSBT: Southern bluefin tuna.
Data sources: The main source of information for this section is CCSBT (2018).
Last update: March, 2019.

SH Southern Bluefin Tuna

Southern bluefin tuna (*Thunnus maccoyii*) is found in the southern hemisphere, mainly in waters between 30° and 50° S. The stock is assessed and managed by the Commission for the Conservation of Southern Bluefin Tuna (CCSBT). While the IATTC, ICCAT, IOTC and WCPFC have in principle a mandate to manage all tunas in their respective Convention Areas, in practice they defer to CCSBT for management of southern bluefin. Practically all of the catches are made in the IOTC, ICCAT and WCPFC convention areas (56% in the Indian Ocean, 28% in the Pacific Ocean and 16% in the Atlantic Ocean).

Southern bluefin catches in 2017 were about 13,900 tonnes, a 3% decrease from 2016. Virtually all of the catches are made by longline (64%) and purse seine (36%). Current catches are nearly a 17% of what they were at their peak, in 1961. (**Figure SH-1**). The stock of southern bluefin is heavily over-fished. However, overfishing is not occurring due to measures taken in a rebuilding plan.

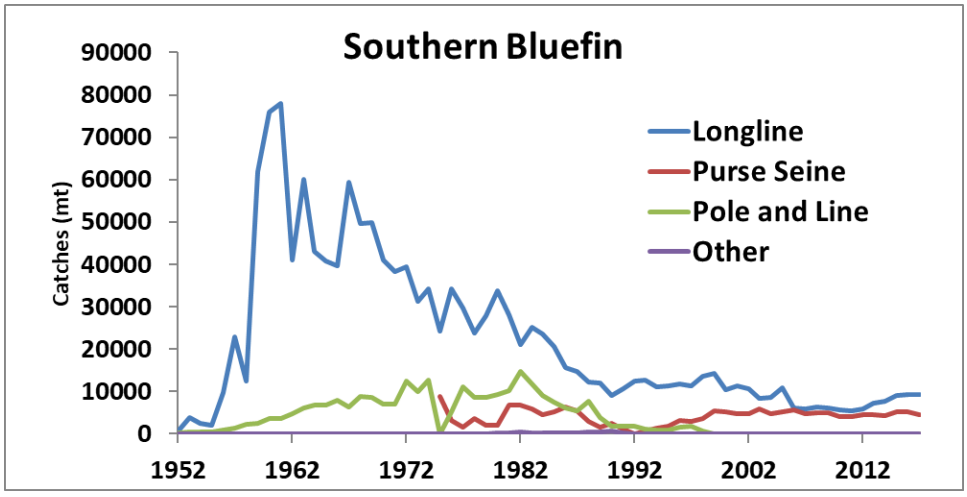


Figure SH-1. Catches of southern bluefin tuna from 1952 to 2017, by gear type.

STOCK ASSESSMENT

Southern bluefin tuna is assessed by the Extended Scientific Committee (ESC) of the CCSBT. The latest stock assessment was conducted in 2017. The review of fishery indicators in 2018 did not suggest new conclusions from those drawn in the 2017 assessment (**Figure SH-2**):

1. The current ratio of spawning biomass $SSB_{current}/SSB_{MSY}$ is estimated at 0.49 (range: 0.38-0.69). This indicates that the stock is in an overfished state. Spawning biomass is estimated to be between 11% and 17% of the unfished level. Spawning biomass has been rebuilding since the implementation of CCSBT's management procedure.

2. The ratio of $F_{current}/F_{MSY}$ is estimated at 0.50 (range: 0.38-0.66), indicating that overfishing is not occurring. While overfishing was taking place in recent years, current fishing mortality has been reduced below the MSY level following reductions in overall catch.

3. The estimate of MSY is 33,000 tonnes.

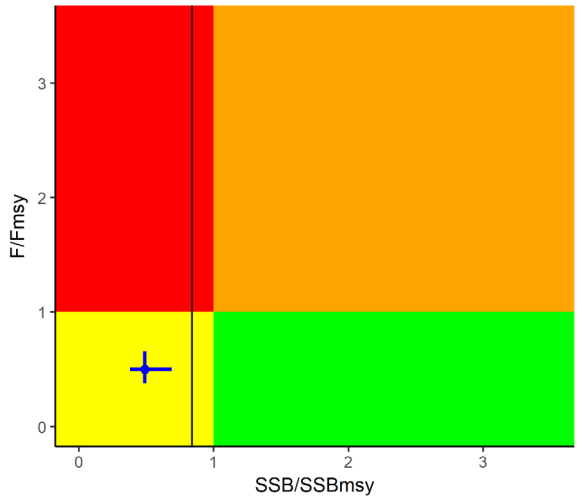


Figure SH-2. Latest estimate of SSB/SSB_{MSY} and F/F_{MSY} (in blue, including range) for southern bluefin tuna. Solid black line represents rebuilding target reference point.

MANAGEMENT

Limit reference point: Not defined.

Target reference point: Not defined for the long-term. 20% of the unfished biomass ($20\%SSB_0$) is used as an interim target to be achieved with 70% probability by 2035.

Harvest control rule: Harvest rules via a TAC, that is the average catch value from two formulas designed to achieve the recovery target and tuned to juvenile surveys and CPUE. 0.7 probability of re-building to $20\%SSB_0$ by 2035.

Southern bluefin tuna is managed primarily through annual TACs that aim, as an interim target, to rebuild the stock to 20% of the unfished level by 2035. The TACs are set through a process known as a Management Procedure (MP), adopted in 2011, that specifies the actions to be taken depending on the outcomes of the assessment made by the ESC (in essence, a Harvest Control Rule).

TACs under the MP are set for three-year periods to maintain the stock on the planned rebuilding trajectory. The MP specifies the minimum and maximum permissible changes in TAC (either increase or decrease, depending on stock status relative to the rebuilding trajectory). The TAC for 2018 to 2020 will be 17,647 tonnes.

SUMMARY

SBT	ESTIMATE	YEARS	NOTES
RECENT CATCH	14	2017	
5-YEAR CATCH	13	2013-17	
MSY	33	2017	Range: 30-36
F/F_{MSY}	0.50	2017	Range: 0.38-0.66
SSB/SSB_{MSY}	0.49	2017	Range: 0.38-0.69
TAC	17.6	2018-2020	

Catches and MSY in 1000 tonnes.

STOCK ABUNDANCE		SSB < SSB_{MSY}. Stock abundance is very low, about 13% of the unfished level. However, there is evidence that the stock is rebuilding as a result of the management procedure in place.
FISHING MORTALITY		F < F_{MSY}.
ENVIRONMENT		64% of the catch is made by longlining. Several mitigation measures are in place (sea birds).
		36% of the catch is made by purse seining on free schools of southern bluefin.

Last date of a change in Color Ratings: February, 2018.
Changes from the previous (February, 2015) Color Ratings: The SSB rating changed from Orange to Yellow, as there is evidence that the stock is rebuilding.

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Glossary and Acronyms

TERM	MEANING
AIDCP	The Agreement on the International Dolphin Conservation Program
ALB	Albacore tuna, *Thunnus alalunga*.
AO	Atlantic Ocean
B	Biomass. The total stock size, in weight.
BET	Bigeye tuna, *Thunnus obesus*.
BFT	Atlantic bluefin tuna, *Thunnus thynnus*.
B_{MSY}	(also "Biomass at MSY" or "MSY Biomass Level"). This is the stock size (biomass) that would result on average if FMSY was applied constantly year after year. BMSY is sometimes measured by the total biomass of the stock and sometimes by the biomass of the spawners ("spawning biomass", or SSB).
CCSBT	Commission for the Conservation of Southern Bluefin Tuna (www.ccsbt.org)
EPO	Eastern Pacific Ocean
F	Instantaneous fishing mortality rate, a measure of the intensity with which a stock is being exploited. The catch of a stock is roughly proportional to F multiplied by abundance.
FAD	Fish Aggregating Device. An inanimate object that attracts tunas and other marine life. In this report, "FAD" is used broadly for natural logs, as well as man-made objects, both anchored and drifting.
FIP	Fishery Improvement Project
Fishery Progress	FisheryProgress.org is a web site that stores updated information on the progress of global fishery improvement projects (FIPs).
F_{MSY}	(also "Fishing Mortality at MSY" or "MSY Fishing Mortality Level"). This is the level of fishing intensity that, if applied constantly year after year, would result in MSY.
IATTC	Inter-American Tropical Tuna Commission (www.iattc.org)
ICCAT	International Commission for the Conservation of Atlantic Tunas (www.iccat.int)
IO	Indian Ocean
IOTC	Indian Ocean Tuna Commission (www.iotc.org)
ISC	International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (isc.ac.affrc.go.jp)
LRP	Limit Reference Point
MSC	Marine Stewardship Council.
MSE	Management Strategy Evaluation
MSY	The largest average catch or yield that can continuously be taken from a stock under existing environmental conditions. (For species with fluctuating recruitment, the maximum might be obtained by taking fewer fish in some years than in others.)
PBF	Pacific bluefin tuna, *Thunnus orientalis*

PNA	Parties to the Nauru Agreement
PO	Pacific Ocean
RFMO	Regional Fishery Management Organization
SBT	Southern bluefin tuna, *Thunnus maccoyii*
SH	Southern hemisphere
SIDS	Small Island Developing States
SKJ	Skipjack tuna, *Katsuwonus pelamis*
SPC / OFP	Secretariat of the Pacific Community (Oceanic Fisheries Programme)
SSB	Spawning stock biomass. The weight of spawners (usually females only) in the stock at any given time. SSB is a proxy for the reproductive output of a stock.
SSB_0	Spawning stock biomass at an unfished (F=0) level. Sometimes $SSB_{F=0}$ is used.
SSB_{MSY}	(also "spawning biomass at MSY" or "MSY Biomass Level"). This is the stock size (biomass) of spawners that would result on average if F_{MSY} was applied constantly year after year. SSB_{MSY} is often measured by the biomass of female spawners.
Stock	In general, a stock is a biological unit of one species forming a group of similar ecological characteristics and, as a unit, is the subject of assessment and management. However, there are many uncertainties in defining spatial and temporal geographical boundaries for such biological units that are 100% compatible with established tuna RFMO Convention Areas. The stocks listed in this report correspond to the assessment/management units established by the tuna RFMOs, even if there is migration of the same species to and from adjacent areas.
Stock Assessment	The application of statistical and mathematical tools to relevant data in order to obtain a quantitative understanding of the status of the stock relative to management benchmarks (e.g. B_{MSY}) as needed to make quantitative predictions of the stock´s reactions to alternative management measures.
TAC	Total Allowable Catch
TRP	Target reference point
WCPFC	Western and Central Pacific Fisheries Commission (www.wcpfc.int)
WCPO	Western and Central Pacific Ocean
YFT	Yellowfin tuna, *Thunnus albacares*

For extended definitions for these and other terms, please refer to the ISSF Glossary.

APPENDIX 1. Bycatch

Impacts by gear type

All fishing gears have some level of environmental impact, and bycatch is one of the most noticeable ones. This summary presents the overall ratings given by default to various gear types. Deviations from these color ratings may occur for individual stocks, due to advice from the ISSF Scientific Advisory Committee; these are noted for each particular stock in which deviations may occur.

This summary is presented only for non-target (non-tuna) species. Note that in some ocean regions, fishing modes such as FAD-based purse seining and pole-and-line fishing can result in high catches of small individuals of bigeye and yellowfin, which are undesirable. In this stock status report, these impacts are measured directly under the status section for these stocks.

Sources of information used for these ratings include the following: Amandè et al. (2010), Clarke and Harley (2010), FAO (2009), Gillett (2011), Gilman (2011), Harley, et al. (2011), IATTC (2012), IOTC (2005), IOTC (2015), Matsumoto and Bayliff (2008), Morizura el al. (1999), Olson (2010), Pianet et al. (2010a), Pianet et al. (2010b), SPC/OFP (2008), SPC/OFP (2010) and Justel-Rubio and Restrepo (2015).

GILLNET FISHING

Gillnet fisheries take substantial amounts of tunas in various ocean regions, especially in the Indian Ocean. For the most part, these are poorly monitored but it is known that they tend to catch many different species at the same time. Bycatch rates of many non-target species tends to be high. Large-scale driftnets are generally prohibited on the high seas but appear to continue to be used.

Sharks. Silky, oceanic whitetip and scalloped hammerhead sharks are common in gillnet fisheries. All of these species are of concern because of their low productivity and vulnerability to overfishing.

Sea Turtles. Sea turtle bycatch is thought to be highest in gillnet fisheries compared to other gears.

Sea birds. The incidental catch of sea birds in gillnet fisheries is largely unknown.

Other finfish. Gillnet operations catch a number of other finfishes. Some of these include very productive species such as dolphinfish ("mahi-mahi") that are not of immediate concern.

HANDLINES

This mode of fishing typically results in small bycatch rates.

LONGLINING

Sharks. Longline fisheries tend to have very high catch rates of sharks (in some areas, 30% of the longline catches are sharks). In some cases the sharks can be a target of the fishing operations, at least for parts of a trip. Sharks caught include a wide range of species, some of which are thought to be resilient to fishing (blue shark), and others which are likely to be more vulnerable because of their low reproductive rates (e.g., porbeagle and thresher sharks).

Sea Turtles. Some turtles are also caught in longline operations as bycatch, many of which are discarded (including live releases). All RFMOs have some type of mitigation measure in place. Roughly one half, or more, of the turtles caught are alive, so the main mitigation measures aim to dehook them and release them alive.

Sea birds. Some sea birds are also caught in longline operations as bycatch, especially in higher latitudes. Most (~90%) sea birds caught are dead when brought onboard, so the best practice for mitigation is to avoid their being hooked, which is the main type of mitigation measure used by the RFMOs. Of particular concern are albatrosses and petrels.

Other finfish. After tunas and sharks, longline operations catch a number of other finfishes. Some of these include very productive species such as dolphinfish ("mahi-mahi") that are not of immediate concern. Longlining also catches marlins, some of which are estimated to be overfished.

MID-WATER TRAWLING

This mode of fishing has a small bycatch rate of cetaceans.

POLE-AND-LINE FISHING

There are no major concerns with the catch of vulnerable non-target species by this gear. However, the method requires the use of live baitfish (small pelagics) that are used to keep the schools of tunas attracted to the fishing vessels while they are fished. The effects of fishing on these populations is largely unknown; however, they should be managed in order to support pole and line fisheries. Gillett (2011) notes that the amount of baitfish

available in the WCPO is a limiting factor to the amount of pole and line fishing that can occur. In addition, the bait species captured are generally more fragile than temperate baitfish species.

PURSE SEINING ON FREE SCHOOLS

This mode of fishing typically results in small bycatch rates of non-target species.

PURSE SEINING ON FADS

Purse seining on FADs (anchored FADs, drifting FADs and natural logs) generally has bycatch rates of non-target species that are higher than those of free school sets.

Sea Turtles. The number of turtles that die in purse seine fishing operations is very small. Nevertheless, it is relatively easy to release turtles when caught alive and this is the main mitigation measures used by RFMOs.

Sharks. FAD purse seine fishing operations catch several species of sharks, some of which, based on catch trends, may have been declining in abundance in recent years, such as oceanic white tip and silky sharks. Entanglement can be a significant problem, especially if FAD designs use underwater netting materials with large mesh sizes. ISSF is advocating for RFMOs to require non-entangling designs.

Sea birds. Mortality of other sensitive species like seabirds in FAD operations is almost nonexistent.

Other finfish. FAD fishing does result in large catches of other finfish such as dolphinfish ("mahi-mahi"). Currently, it appears that these catches do not adversely impact the abundance of these species which are very productive and resilient to fishing. Rather, the main problem with these bycatches is one of utilization (waste), since the majority of these are discarded at sea so that the fish holding tanks can be reserved for the more valuable tunas.

PURSE SEINING ON TUNA-DOLPHIN ASSOCIATIONS

Marine mammals. In the EPO, purse-seine fishermen have learned to take advantage of the association between yellowfin schools and herds of dolphins that is prevalent in the region. Fishermen maximize their catches of yellowfin by setting their nets around these associations. Mortality of dolphins was very high early on, but the IATTC estimates that it has since the late 1980s declined by 98% after fishermen and scientists developed techniques for releasing the dolphins alive after a set, and retaining the tunas. Some scientists believe that there is an un-quantified level of mortality after the sets, caused by stress, and this remains a controversial issue. Based on fishery-independent surveys, the abundance of most dolphin populations in the region was estimated to be either stable or increasing, while a few may have been declining. The last such survey was in 2006 and as a result there is uncertainty in the current status of those populations. Thus, the rating for this fishing method has changed from Green to Yellow (November, 2015). The Agreement on the International Dolphin Conservation Program (AIDCP) establishes allowable dolphin mortality limits; current (2011) levels are one-fourth of that level. There is a 100%-coverage observer program in place for these operations. Catches of non-target species in these operations are very small.

TROLLING

This mode of fishing typically results in very small bycatch rates of non-target species.

TUNA TRAPS

Migrating schools of bluefin tuna have been caught by traps that are fixed near the shoreline, especially in the eastern Atlantic and Mediterranean. Most of the catch in these traps consists of scombrids, including bluefin, and up to 99% of it is utilized. There are no major bycatch issues known with this passive gear, although it occasionally catches sharks.

RFMO bycatch mitigation and monitoring

The following is a summary of the major mitigation and monitoring measures adopted by the various tuna RFMOs.

CCSBT

Sea birds, sharks and turtles. With only one exception, all CCSBT Members and Cooperating Non-Members are also Parties or Cooperating Parties to IOTC, WCPFC and/or ICCAT. As a consequence, any binding bycatch mitigation measure of these RFMOs is in practice binding on the CCSBT Member/Cooperating Non-Member when fishing within that Convention Area. Additionally, the non-binding Recommendation to Mitigate the Impact on Ecologically Related Species - ERS - of Fishing for Southern Bluefin Tuna (updated 2011) strongly encourages CCSBT members to comply with mitigation measures on sea birds, sharks and sea turtles adopted by ICCAT, IOTC and WCPFC. The Resolution to align CCSBT's ERS measures with those of other tuna RFMOs (adopted in 2018) lists all ERS Measures in place.
Sea birds. Mandatory use of Tori poles is required by all members in all southern bluefin longline fisheries South of 30°S.
Monitoring and mitigation research. CCSBT members are required to exchange information concerning new or refined techniques to reduce incidental catch of seabirds and cooperate in developing and assessing the effectiveness of such techniques. Most CCSBT Members and Cooperating Non-Members have achieved 10% scientific observer coverage (in catch and effort) for their fisheries; the 10% level is a non-binding target.

IATTC

General. Resolution 04-05 requires the release of non-target species caught in purse seine fisheries.
Sea Turtles. Resolution C-19-04 requires fishermen to release sea turtles sighted in purse seine nets or accidentally caught in longlines following the handling and release guidelines detailed in the resolution. CPC are also required to report annually information on sea turtle interactions. Resolution C-19-01 requires the use of non-entangling FADs in purse seine fisheries.
Sharks. Resolution C-16-04 discourages shark retention and establishes a limit in the amount of shark fins that can be landed, relative to the total weight of shark bodies that must be retained. This ratio of fin-to-body-weight acts as a disincentive to target sharks because the shark carcasses occupy hold space on the vessel and have little market value. The Resolution also mandates reporting of shark catches to IATTC. Resolution C-11-10 prohibits the retention of oceanic whitetip sharks and requires the release of specimens that are alive when caught. Resolution C-19-01 requires the use of non-entangling FADs in purse seine fisheries. Resolution C-19-06 prohibits deliberate setting on whale sharks. C-16-05 calls for a workplan for completing full stock assessments of silky and hammerhead sharks, and requires catch data collection for those species. C-19-05 defines other shark conservation measures with an emphasis on silky shark.
Rays. Resolution C-15-04 requires CPCs to prohibit retaining onboard, transshipping, landing, storing, selling, or offering for sale any part or whole carcass of Mobulid rays and to release all Mobulid rays alive wherever possible.
Sea birds. The IATTC Resolution C-11-02 requires longline vessels operating in high latitudes (North of 23°N, South of 30°S and around the Galapagos Islands) to employ at least two sea bird mitigation techniques such as night setting or weighted branch lines.
Dolphins. The AIDCP establishes total per-stock and per-year limits on incidental dolphin mortality (DMLs), with a structured protocol for allocating and keeping track of DMLs (using observers). A vessel must stop setting on dolphin associations for the rest of the year once its DML has been reached.
Monitoring and mitigation research. Through the Agreement on the International Dolphin Conservation Program (AIDCP), there is 100% observer coverage on all large purse seiners (> 363 tons in carrying capacity) and lower coverage on smaller vessels. This level of observer coverage, coupled with the information from fishing logbooks, allows the IATTC to maintain a very complete accounting of the bycatch taken in purse seine fisheries in the EPO. Several IATTC Recommendations and Resolutions encourage research that could make FAD-based purse seining and longlining more species-selective. These are non-binding, however, and depend on the IATTC member nations making the necessary resources available. ISSF has a research program for bycatch mitigation in purse seine fisheries, and IATTC scientists are taking part in this program (IATTC, 2010). Resolution C-11-08 now requires 5% scientific observer coverage for large longliners.

NOTE: Major fleets such as Japan that use longlining in the EPO reported catches of non-target species to IATTC (particularly sharks and billfishes; Matsumoto and Bayliff, 2008), and in this sense they were relatively better than longline fleets elsewhere. However, it is apparent that this level of monitoring and reporting has not been maintained.

ICCAT

General. Recommendation 16-01 requires a transition to non-entangling FADs.
Sharks. Recommendation 04-10 established a limit on the ratio of fin weight to total shark weight that can be retained onboard a fishing vessel, and encouraged the release of live sharks in fisheries that do not target sharks. Recommendation 07-06 limits mortality on porbeagle and North Atlantic shortfin mako. Recommendation 14-06 aims to improve data collection and reporting for SMA. Recommendation 16-12 establishes limits on catches, aims to improve data collection and encourages scientific research on blue sharks. Recommendation 15-06 prompts CPCs to promptly release unharmed and to ensure the collection of Task I and Task II data for porbeagle sharks. Recommendations 09-07, 10-07, 10-08 and 11-08 prohibit the retention on board of bigeye thresher, oceanic white tip, several species of hammerhead sharks, and silky sharks. All of these measures have a reporting requirement associated with them

(Recommendation 12-05 requires all parties in 2013 to report on their compliance with Recs. 04-10, 07-06, 09-07, 10-08, 10-07, 11-08, and11-15). Recommendation 10-06 prohibits the retention of shortfin mako onboard vessels flagged to countries that do not report catches for this species. Rec. 17-08 requires the release of SMA sharks, but lists a series of exemptions. Recommendation 18-06 prompts CPCs to submit a check sheet with details of their implementation of and compliance with shark conservation and management measures.

Sea Turtles. Recommendations 10-09 and 13-11 set up reporting requirements for sea turtle interactions and mandates its scientific committee to assess, by 2014, the impact of tuna fisheries on sea turtle populations. The measure has specific requirements for longline operators to be trained on appropriate handling and release of live turtles so as to maximize their survival.

Sea birds. Recommendation 07-07 required longliners operating south of 20°S to use at least two of several mitigation measures such as weighted branch lines or tori (bird-scaring) lines. The measure also required ICCAT members to collect and report data on interactions between fisheries and sea birds. Recommendation 11-09 strengthened the mitigation measures in 07-07, especially for longliners fishing south of 25°S, and in the Mediterranean.

Other finfish. Longliners and other fisheries also take Atlantic blue and white marlin as bycatch, both of which are thought to be overfished. ICCAT adopted Recommendation 06-09, later superseded by 15-05 and 18-04, which includes a rebuilding plan with catch limits by country for blue and white marlins. Rec. 18-05 requires that all CPCs submit a check sheet with details of their implementation of and compliance with billfish conservation and management measures.

Monitoring and mitigation research. ICCAT has specific requirements for reporting data on sharks, sea turtles and sea birds. For the most part these are not complied with fully, but the situation is improving over time. Recommendation 10-10 requires members to have at least 5% observer coverage (for vessels over 15 m) in their national observer programs for longline, purse seine and pole-and-line fisheries. Recommendation 11-10 requires CPCs to collect and report data on bycatch and discards either through observer programs and logbooks (for vessels to which Rec. 10-10 applies) or via alternative means (for artisanal and semi-industrial fisheries). Recommendation 11-15 establishes penalties for CPCs that do not report annual catch data (including zero catches) by prohibiting them from retaining such species in the following year.

IOTC

Sharks. The IOTC has adopted measures that address shark conservation concerns. Resolution 17/05 established that CPCs shall take the necessary measures to require that their fishermen fully utilize their entire catches of sharks, with the exception of species prohibited by the IOTC. Resolution 18/02 asks CPCs to ensure that effective management measures are in place to support the sustainable exploitation of blue shark by improving data reporting and scientific research. Resolution 12/09 prohibits the retention on board of all species of thresher sharks, a group that is thought to be particularly vulnerable due to its low productivity. In addition, Resolution 12/09 requires data reporting to IOTC, especially for fisheries targeting sharks. Resolution 13/05 prohibits intentional purse seine setting on tunas associated with whale sharks. Resolution 13/06 prohibits the retention of oceanic whitetip sharks. Resolution 19/02 calls for the use of non-entangling FADs in purse seine fisheries and a transition to biodegradable FADs by 2022.

Rays. Resolution 19/03 prohibits intentional setting on mobulid rays as well as retaining onboard, transhipping, landing or storing any part or whole carcass. Live release handling procedures are detailed in the resolution.

Sea Turtles. Resolution 12/04 (which supersedes various prior measures) requires IOTC members to mitigate sea turtle mortality and to provide data on turtle bycatch to the SC. The measure has specific requirements for longline and purse seine operators to facilitate the appropriate handling and release of live turtles. Resolution 19/02 calls for to the use of non-entangling FADs in purse seine fisheries and a transition to biodegradable FADs by 2022.

Sea birds. Resolution 12/06 (which supersedes various prior measures) requires longliners operating south of 25°S to use at least two of several mitigation measures such as weighted branch lines or tori (bird-scaring) lines. The measure also requires IOTC members to provide data on interactions between fisheries and sea birds to the SC.

Cetaceans. Resolution 13/02 prohibits deliberate purse seine sets around cetaceans and requires reporting of interactions.

Other finfish. Resolution 18/05 requires IOTC members to ensure that the level of catches of striped marlin, black marlin, blue marlin and indo-pacific sailfish do not exceed their MSY level (or proxy). It also requires the release of specimens of those species if brought alive on board.

Monitoring and mitigation research. Resolution 10/04 established a regional observer program that requires at least 5% coverage for vessels over 24 m, and for smaller vessels operating in the high seas. Resolution 08/04 requires longliners greater than 24 m overall, as well as smaller longliners operating in the high seas, to have electronic logbooks and record and report data on target and non-target species to the SC. Monitoring of bycatches in the gillnet fisheries is extremely poor.

WCPFC

Sea Turtles. CMM 2018-04 instructs WCPFC members to implement the FAO guidelines for reducing sea turtle mortality and ensure the safe handling of all captured sea turtles. It requires longline operators to use line cutters and de-hookers to handle and promptly release sea turtles caught or entangled. The measure also requires purse seine operators to avoid setting on turtles if possible and to disentangle/release them when caught alive.

Sharks. CMM-2010-07 requires reporting of shark catches and discards by gear type and species. The measure also established a limit on the ratio of shark fins to total shark weight that can be retained onboard fishing vessels, and encourages the release of live sharks. CMM-2011-04 prohibits the retention on board of oceanic white tip sharks and CMM-13-08 does the same for silky sharks. CMM-2012-04 prohibits deliberate purse seine sets around whale sharks and requires reporting of interactions. From December 2015 the Commission

endorses the whale shark and rays handling guidelines from its Technical and Compliance committee. For longline fisheries that target tunas and billfishes, CMM-2014-05 requires Members to either not use wire trace as branch lines or not use shark lines; for fisheries targeting sharks, it requires a management plan to limit shark catches. WCPFC initiated a research plan aimed at improving statistics and observer coverage on sharks and conducting assessments for key shark species (Clarke and Harley, 2010).

Sea birds. CMM 2018-03 sets specific requirements for longliners operating north of 23°N, between 25-30°S or south of 30°S on the use of seabird bycatch mitigation measures such as weighted branch lines, tori (bird-scaring) lines or hook-shielding devices. The measure also encourages mitigation research to be conducted by WCPFC members.

Cetaceans. CMM-2011-03 prohibits deliberate purse seine sets around cetaceans and requires reporting of interactions.

Other finfish. Striped marlin are also caught as bycatch in longline fisheries; this species is of more concern because it has been declining in abundance. The WCPFC adopted CMM 2010-01 which sets a cap on the catch of striped marlin for each member relative to historical levels.

Monitoring and mitigation research. With the exception of sharks under CMM 2009-04, reporting of bycatch species is not mandatory at WCPFC, so much of the information available comes from observer programs. The WCPFC has a Regional Observer Program that, since 2010, is intended to have 100% coverage on purse seine vessels that fish on the high seas or between two or more EEZs. As these data become available and are analyzed by the Scientific Committee, monitoring should improve. National observer programs are also run by WCPFC members, but it is not clear that all of the bycatch information collected in those programs is made available to the SC for integrated analyses. For longline

APPENDIX 2. MSC-Certified Tuna Fisheries

One of the objectives of ISSF is to improve the sustainability of global tuna stocks by developing and implementing verifiable, science-based practices, commitments and international management measures that result in tuna fisheries meeting the MSC certification standard without conditions. This Appendix lists tuna fisheries that are MSC-certified (as of October, 2019). Readers should consult MSC for more details and the latest information. Other fisheries that have entered Fishery Improvement Projects (FIPs) that will eventually seek MSC certification can be found in the FISHERYPROGRESS.ORG database.

FISHERY	STOCKS	GEARS
AAFA and WFOA North Pacific Albacore Tuna	North Pacific Albacore	Pole and line and troll/ jig
AAFA and WFOA South Pacific Albacore Tuna	South Pacific Albacore	Pole and line and troll/ jig
American Samoa EEZ Albacore and Yellowfin Longline Fishery	South Pacific Albacore, WCPO yellowfin	Longline
Canada Highly Migratory Species Foundation (CHMSF) British Columbia Albacore Tuna North Pacific	North Pacific Albacore	Troll/ jig
Echebastar Indian Ocean purse seine skipjack tuna	IO Skipjack	Purse seine
Fiji albacore and yellowfin tuna longline	WCPO Yellowfin; South Pacific Albacore	Longline
French Polynesia albacore and yellowfin longline fishery	South Pacific Albacore, WCPO yellowfin, EPO yellowfin	Longline
Ishihara Marine Products albacore and skipjack pole and line fishery	WCPO skipjack; North Pacific Albacore	Pole and line
Japanese Pole and Line skipjack and albacore tuna fishery	WCPO skipjack; North Pacific Albacore	Pole and line
MIFV RMI EEZ Longline Yellowfin and Bigeye Tuna	WCPO Yellowfin, WCPO Bigeye	Longline
New Zealand Albacore Tuna Troll Fishery	South Pacific Albacore	Troll
North Atlantic Albacore Artisanal Fishery	North Atlantic Albacore	Pole and line and troll
Northeastern Tropical Pacific Purse Seine Fishery for Yellowfin and Skipjack Tuna	EPO Yellowfin; EPO Skipjack	Purse seine (sets on free swimming schools and tuna-dolphin associations)
PNA Western and Central Pacific skipjack and yellowfin, unassociated / non FAD set, tuna purse seine	WCPO Yellowfin; WCPO Skipjack	Purse seine (sets on free swimming schools and natural logs)

Pole and Line Skipjack Fishery in the Maldives	IO Skipjack	Pole and line
PT Citraraja Ampat, Sorong pole and line Skipjack and Yellowfin Tuna	WCPO Yellowfin; WCPO Skipjack	Pole and line
Sant Yago TF Unassociated purse seine Atlantic yellowfin tuna fishery	AO Yellowfin	Purse seine (sets on free swimming schools)
Solomon Islands skipjack and yellowfin tuna purse seine and pole & line	WCPO Yellowfin; WCPO Skipjack	Pole and line, purse seine (sets on free swimming schools and anchored FADs)
SZLC CSFC & FZLC FSM EEZ Longline (Bigeye UoA)	WCPO Bigeye	Longline
SZLC CSFC & FZLC FSM EEZ Longline (Yellowfin UoA)	WCPO Yellowfin	Longline
SZLC, HNSFC & CFA Cook Islands EEZ south Pacific albacore and yellowfin longline fishery	WCPO Yellowfin; South Pacific Albacore	Longline
Talley's New Zealand Skipjack Tuna Purse Seine	WCPO Skipjack	Purse seine (sets on free swimming schools)
TriMarine Western and Central Pacific Skipjack and Yellowfin Tuna	WCPO Yellowfin; WCPO Skipjack	Purse seine (sets on free swimming schools)
US North Atlantic Swordfish	North Atlantic Albacore; Atlantic Yellowfin	Longline and handline
Walker Seafoods Pty Ltd Australian Albacore and Yellowfin Tuna and Swordfish Longline Fishery	WCPO Yellowfin; South Pacific Albacore	Longline
WPSTA Western and Central Pacific skipjack and yellowfin free school purse seine	WCPO Yellowfin; WCPO Skipjack	Purse seine (sets on free swimming schools)

APPENDIX 3. Version Log

DATE	TECH REP.	CHANGES
10/2019	2019-12	- Updated IATTC catch data, stock status and management - Updated IOTC management - Updated WCPFC catch data and stock status - Updated Pacific-Wide catch data - Added Management status against MSC standard for each stock
03/2019	2019-07	- Updated WCPFC management - Updated Pacific-Wide management - Updated ICCAT management - Updated IOTC catch data and stock status - Updated CCSBT catch data and stock status - Updated MSC-certified fisheries by stock
10/2018	2018-21	- Updated IATTC catch data, stock status and management - Updated WCPFC catch data and stock status - Updated Pacific-Wide catch data, stock status and management - Updated ICCAT catch data and stock status - Updated IOTC management - Updated MSC-certified fisheries by stock
02/2018	2018-02	- Updated WCPFC management - Updated Pacific-Wide management - Updated ICCAT management - Updated IOTC catch data and stock status - Updated CCSBT catch data, stock status and management. - Updated MSC-certified fisheries by stock
10/2017	2017-02A	- Updated IATTC catch data, stock status and management - Updated WCPFC catch data and stock status - Updated Pacific-Wide catch data and stock status - Updated ICCAT catch data and stock status - Updated IOTC management - Harmonized stock status plots ("Kobe plots") - Added MSC-certified fisheries by stock
02/2017	2017-02	- Updated IATTC catch data and management - Updated WCPFC management - Updated Pacific-Wide catch data and management - Updated ICCAT management - Updated IOTC catch data and stock status
11/2016	2016-05B	- Updated ICCAT catch data and stock status - Updated IATTC management of PBF. - Updated CCSBT catch data and management of southern bluefin.

09/2016	2016-05A	- Updated IATTC catch data, stock status and management - Updated WCPFC catch data and stock status - Updated Pacific-Wide catch data, stock status and management - Updated IOTC catch data and management
02/2016	2016-05	- Updated IATTC catch data - Updated WCPFC catch data and management - Updated Pacific-Wide catch data and management - Updated ICCAT catch data and management - Updated IOTC catch data and stock status - Updated CCSBT catch data
11/2015	2015-03A	- Updated IATTC catch data, stock status and management - Updated WCPFC catch data - Updated Pacific-Wide catch data, stock status - Updated ICCAT catch data, stock status - Updated IOTC management - Changed Purse Seine - Dolphin-tuna assoc. fishing method rating from Green to Yellow
02/2015	2015-03	- Updated WCPFC catch data and management - Updated ICCAT stock status and management - Updated IOTC stock status - Updated CCSBT stock status and management - Updated PBF management
08/2014	2014-09	- Updated IATTC stock status and management - Updated WCPFC stock status - Updated IOTC management - Updated Pacific-wide stock status
12/2013	2013-04B	- Updated ICCAT stock status and management - Updated IOTC stock status - Updated WCPFC stock status and management - Updated CCSBT management
08/2013	2013-04A	- Updated IATTC stock status - Updated Pacific bluefin - Updated IATTC management measures - Updated IOTC management measures
04/2013	2013-04	- Updated WCPFC catch data - Separated gillnet catches from "other" gears in the IO - Disaggregated Pacific-wide stocks - Added section on HCRs and Reference points for each stock
12/2012	2012-04B	- Updated ICCAT stock status and management - Updated WCPFC stock status and management for tropical tunas - Updated Pacific-wide stock status - Updated CCSBT status and management - Updated general introduction - Modified life-history tables (K. Schaefer review)
07/2012	2012-04A	- Updated EPO stock status - Updated WCPFC, IOTC and IATTC conservation measures adopted in 2012 - Corrected F status for North Pacific albacore - Updated Pacific bluefin catches
04/2012	2012-04	- Added 4 bluefin stocks - Reformatted entire report - Added Exec. Summary, Glossary and Introductory sections - Reorganized presentation of stocks to match regions

12/2011	2011-04C	- Updated IO stock status to reflect 12/2011 IOTC SC meeting - Updated AO management to reflect 11/2011 ICCAT Comm. meeting
11/2011	2011-04B	- Updated AO stock status to reflect 10/2011 ICCAT SCRS meeting - Updated WCPO stock status to reflect 08/2011 WCPFC SC meeting
08/2011	2011-04A	- Updated EPO management to reflect 06/2011 IATTC Comm. Meeting Note: Doc header erroneously labeled "May" instead of "August"
05/2011	2011-04	- Updated EPO stock status to reflect 05/2011 IATTC SAC meeting - Added new rating factor Environment (bycatch) -Added more exhaustive information on RFMO resolutions
02/2011	--	- IOTC stock status update
10/2010	--	- ICCAT stock status update
09/2010	--	- WCPFC stock status update
09/2010	--	- IATTC stock status update
05/2010	--	- Updated entire report - Added color ratings for F and Biomass
05/2009	--	- First stock status report for 19 stocks

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