International Seafood Sustainability Foundation

STATUS OF THE WORLD FISHERIES FOR TUNA

UPDATE ON THE STATUS OF THE TUNA STOCKS IN THE ATLANTIC OCEAN

DECEMBER 2009

This document updates the assessment of the status of the tuna stocks in the Atlantic Ocean in the ISSF report on the status of the world's tuna stocks published in August 2009, which was based on data available as of 15 April 2009. The International Commission for the Conservation of Atlantic Tunas (ICCAT) is responsible for assessing and managing Atlantic tuna stocks. ICCAT's Standing Committee on Research and Statistics (SCRS) last met in October 2009, and the Commission met in November. This report takes into account the information presented at those meetings, and the conclusions and decisions that were reached.

1. SUMMARY

The preliminary estimate of the landings (which do not include fish caught but discarded at sea)

TABLE 1.1. Summary of landings and status of Atlantic tuna stocks, in thousands of tons.

Species	Landings		MSY	Status
	2004-2008	2008		
Yellowfin	108	107	124-150	$B_c<B_{MSY}$, $F_c<F_{MSY}$
Bigeye	75	70	90-93	$B_c<B_{MSY}$, $F_c<F_{MSY}$
Skipjack- East	124	127	143-170	$B_c>B_{MSY}$, $F_c<F_{MSY}$
Skipjack - West	26	22	30-36	$B_c>B_{MSY}$, $F_c<F_{MSY}$
Albacore - North	28	20	29	$B_c<B_{MSY}$, $F_c\approx F_{MSY}$
Albacore - South	21	19	30-37	$B_c\approx B_{MSY}$, $F_c<F_{MSY}$

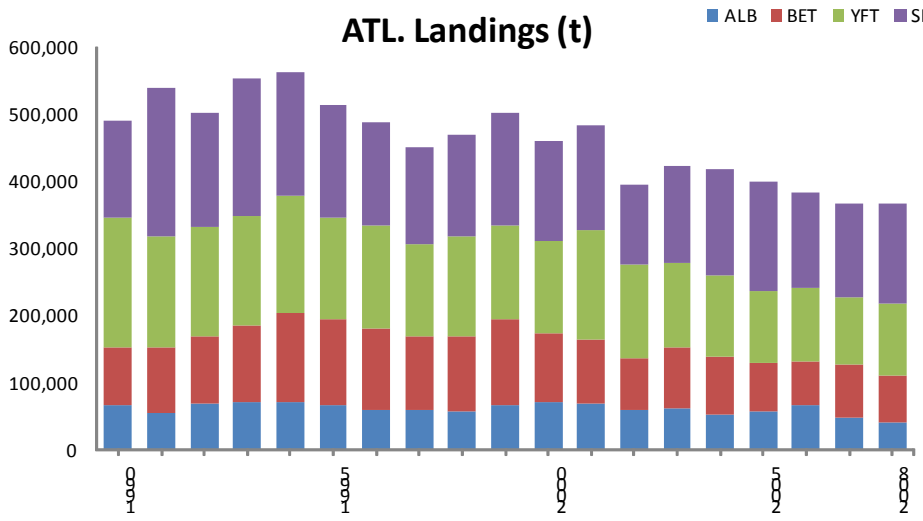

FIGURE 1.1. Landings of skipjack, bigeye, yellowfin and albacore in the Atlantic Ocean, 1990-2008.

of yellowfin (YFT), skipjack (SKJ), and bigeye (BET) tunas from the Atlantic Ocean during 2008 is about 326,000 metric tons (t), which remains low relative to the level of landings in the early 1990s (Figure 1.1). Of these landings in 2008, 46% corresponded to skipjack, 33% to yellowfin and 21% to bigeye.

Albacore landings in the Atlantic (North and South combined) declined by 7% in 2008, to a level of 39,000 t (Figure 1.1). Mediterranean landings also decreased, to a reported figure of 2,600 t, but this is probably incomplete.

The status of yellowfin, bigeye, skipjack, and albacore tunas in the Atlantic Ocean is summarized in Table 1.1.

2. YELLOWFIN

Atlantic yellowfin are distributed widely throughout tropical and subtropical waters. Surface fisheries for them occur in the eastern Atlantic between Portugal and South Africa, and in the western Atlantic between the Gulf of Mexico and southern Brazil; longline fisheries occur throughout the entire tropical and temperate Atlantic. The primary spawning ground for yellowfin is in the Gulf of Guinea, with lesser spawning activity in the Gulf of Mexico. Because tagging data show a number of trans-Atlantic migrations and longline data show a continuous

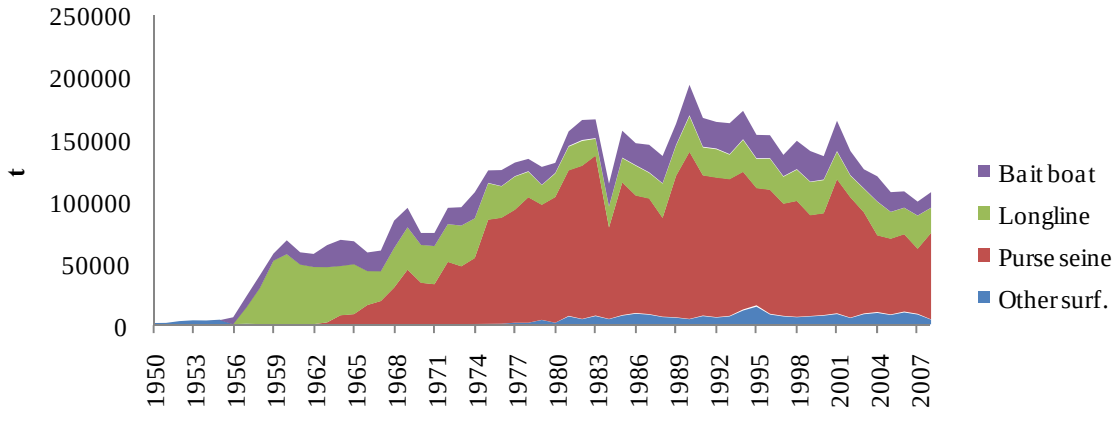

FIGURE 2.1. Landings of yellowfin in the Atlantic Ocean by gear type, 1950-2008. (Bait boat = pole and line.)

distribution across the Atlantic, yellowfin throughout the Atlantic are considered to belong to a single stock for management purposes. As in other oceans, surface-caught yellowfin are generally small and are found in mixed schools with skipjack and small bigeye; the larger yellowfin are taken mostly by longline fishing.

A variety of fishing gear is used to harvest yellowfin in the Atlantic, but purse-seine accounts for nearly 58 percent of the harvest, longline 22 percent, pole-and-line for 13 percent, and a variety of other gears for the remaining. The top five producers of yellowfin from the Atlantic are in descending order: France, Spain, Ghana, Panama, and Japan.

Yellowfin catches in the Atlantic have declined by about 45 percent since the peak catch of 194 thousand tons in 1990, and from 2001 to 2007 declined steadily to less than 100 thousand tons (Figure 2.1). During 2007-2008, catches increased by nearly 8,000 tons. These trends in catches largely reflect the trend in the number of purse seiners operating in the Atlantic Ocean, which declined from 71 in 1991 to 22 in 2006, and then increased (Figure 2.2). The recent increase in purse-seine effort and catches has been due to vessels moving from the Indian Ocean to the eastern Atlantic.

2.1. Most recent stock assessment

The most recent full assessment of yellowfin tuna, which used data through 2006, was carried out in 2008. In that analysis, the ASPIC version of a production model, and VPA and Yield/Recruit forms of age-structured models, were used. In the production model mostly catch and effort data are used, while age-structured models use information on the numbers and weights of fish caught, by age groups, natural mortality rates, starting or ending fishing mortality rates, and other biological parameters.

The production model analysis estimates the MSY to be about 147 thousand tons, and shows the 2006 fishing mortality to be 89 percent of what the equilibrium fishing mortality would be at MSY, and the relative biomass to be 0.83, or the current biomass to be slightly less than that corresponding to MSY.

The estimate of MSY for the age-structured or VPA model was about 131 thousand tons; the same analysis estimated that fishing mortality during 2006 was about 84 percent of the level corresponding to MSY, and the ratio of the biomass during 2006 to the biomass at MSY was estimated to be 1.09, or that the biomass was about 10 percent greater than that corresponding to MSY.

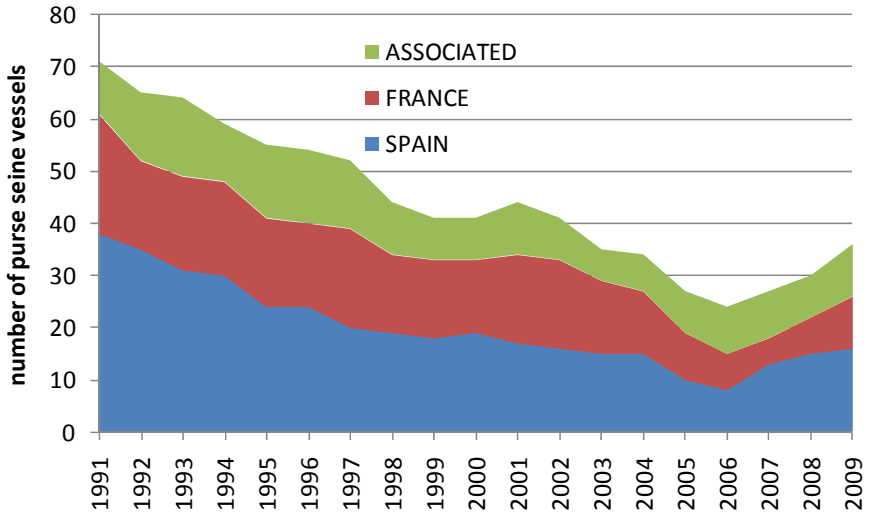

FIGURE 2.2. Number of purse seiners of European Union and associated flags operating in the Atlantic Ocean, 1991-2009.

Trend estimates from the VPA show that overfishing had occurred in the past, but is not occurring currently. The ASPIC

modeling indicates that there has been both overfishing and an overfished state in recent years, but that overfishing was not occurring in 2006, the last year of the assessment. Combining the results of the two models produces an estimate that there is a 60% chance that the stock biomass is below the MSY level (Figure 2.3).

Using the VPA model results projections were made considering a number of constant catch possibilities. These projections suggested that catches of 130 thousand tons or less are sustainable; catches in excess of that amount would result in overfishing. Therefore, the recent level of catches (under 110 thousand tons) is expected to allow the stock to continue rebuilding to a biomass above the MSY level.

Additional analyses also corroborate earlier findings that if the catch of small yellowfin could be reduced, gains in potential yield and spawning biomass would be realized.

Based on the 2008 assessment it appears the stock is **not currently being overfished** and, though it may be in **a slightly overfished state** (catches for the past five years have been less than the MSY), it is rebuilding.

2.2. Next scheduled stock assessment

The date for the next stock assessment of Atlantic yellowfin has not been set.

2.3. Conservation and management of yellowfin

One of the earliest management measures implemented by ICCAT was the establishment of a minimum size limit of 3.2 kg for yellowfin in 1973. The rationale behind this measure was that by protecting small yellowfin the yield per recruit and the total yield could be increased. However, after many years of observing that a large share of the catch of purse-seine and pole-and-line vessels was comprised of fish under the 3.2 kg limit, the measure was repealed in 2005.

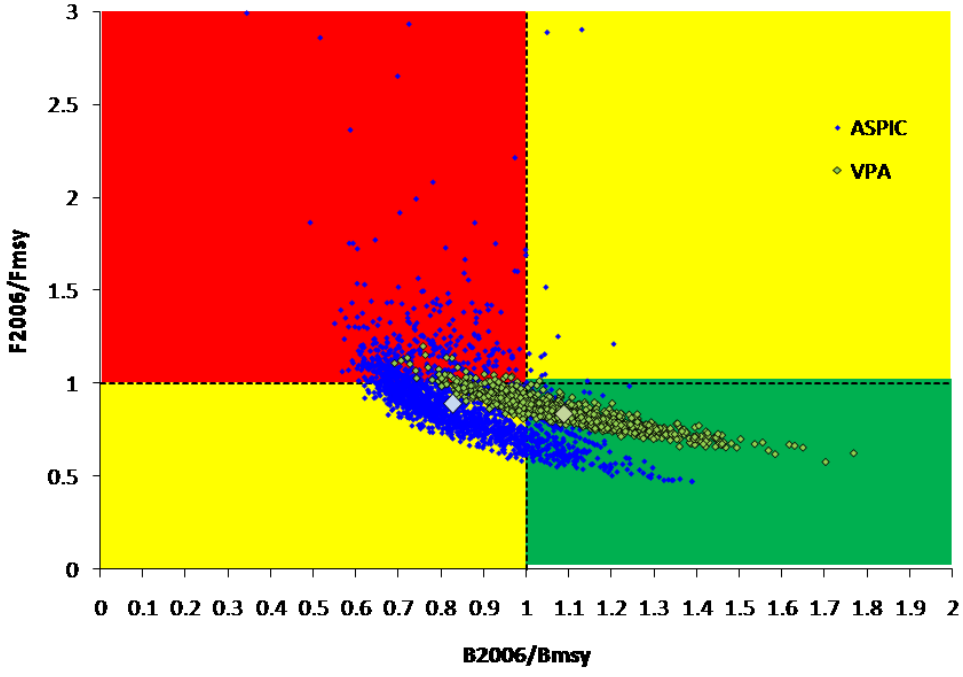

FIGURE 2.3. Current status of yellowfin, showing uncertainty, based on VPA and production models. The point estimates are shown as the large diamonds and the array of points reflect bootstrap estimates of uncertainty (SCRS-ICCAT).

In 1993 the Commission implemented an additional management measure stipulating that there be no increase in the level of effective fishing effort exerted on Atlantic yellowfin tuna over the level observed in 1992. Effective fishing effort is effort that is proportional to fishing mortality as compared to nominal fishing effort which does not take into account changes in efficiency. For example if a fleet spent 100 days at sea fishing in 1993 the nominal fishing effort would be 100 days. If that same fleet did not change its efficiency and in 2003 spent 100 days at sea fishing the effective fishing effort would not have changed, it would still be 100 days, the same as the nominal effort. If however, the same fleet improved its efficiency 3 percent per year, and then spent 100 days fishing in 2003, its nominal effort would still be 100 days, but its effective effort would more than 130 days. This measure has been implemented each year since 1993.

In order to protect small bigeye, in 2004 ICCAT implemented a measure to close the area in the Gulf of Guinea between the equator and 5°N from 10ºE to 20°E to fishing by purse-seine and pole-and-line vessels during November. Although the intent was to protect small bigeye, the measure offers protection to small yellowfin as well, since they occur in that area during November. In November 2010, ICCAT will consider possible changes to this time-area closure.

3. BIGEYE

Bigeye are distributed throughout the Atlantic Ocean between about 50ºN and 45ºS; they are not found in the Mediterranean. Large bigeye in the Atlantic, like bigeye in other oceans, spend much of there time during daylight hours at depth, coming to the surface more frequently at night. Small bigeye tend to spend more time near the surface, particularly when they associate with floating objects, whale sharks and seamounts. It is this behavior that makes them vulnerable to purse-seine nets. They spawn widely throughout tropical waters and as they grow larger tend to move to more temperate areas in the Atlantic. One of the major nursery grounds for juvenile bigeye is the Gulf of Guinea. Genetic information, tagging data, and the spatio-temporal distribution of catches suggest a single interbreeding population Atlantic wide.

Portuguese pole-and-line fishermen were the first to harvest bigeye on a large commercial scale; this gear continues to account for about 15 percent of the bigeye catch from the Atlantic. Japanese longline vessels began fishing bigeye in the Atlantic during the mid-1950s; longline fleets from Japan, Chinese Taipei, China and a number of other nations continue to take about 50-60 percent of the bigeye catch from the Atlantic. Purse-seine vessels have always taken some bigeye since they first began fishing in the Atlantic in the late 1960s, but the amount was small

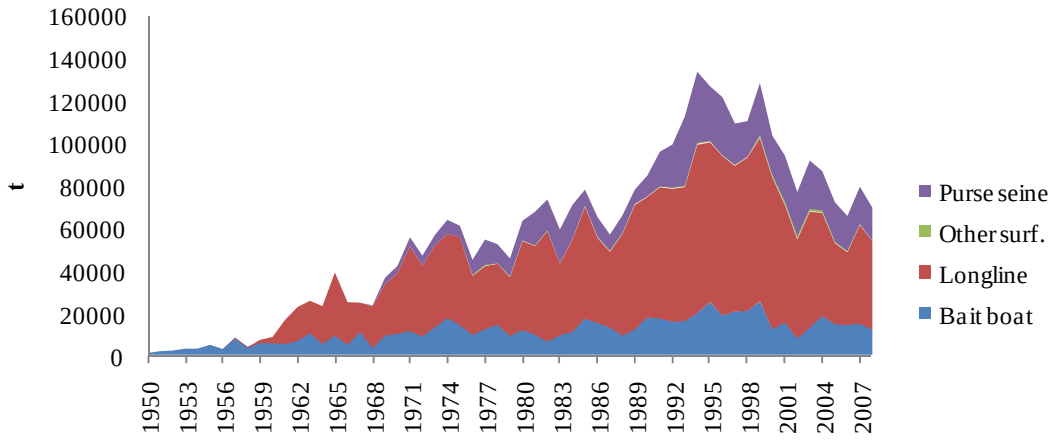

FIGURE 3.1 Trend in catches of bigeye tuna in the Atlantic Ocean, 1950-2008. (Bait boat = pole and line.)

until the development of the fishery on fish-aggregating devices (FADs); they now account for about 25 percent of the catch. Longline takes bigeye averaging 40-50 kg, pole-and-line take bigeye average about 20-30 kg, and purse-seine caught fish average 3-4 kg.

Catches of bigeye have increased steadily since the 1950s and peaked in 1994 at about 132 thousand tons; they have declined steadily since then, and since 2005 have oscillated between 65 and 75 thousand tons, about half those of the peak year (Figure 3.1). All of the major fisheries for bigeye in the Atlantic suffered declines in catch. The declines were concurrent with reductions in the number of purse-seine vessels and with declines in the catch rate for longline and pole-and-line vessels.

3.1. Most recent stock assessment

The most recent stock assessment for Atlantic bigeye was conducted in 2007. Several different models, including VPA, MULTIFAN-CL, and general production models were used in the assessments. There was a range of evaluations of the stock of bigeye that resulted from the various model applications and not all of them were considered to be equally likely. Most of the conclusions regarding the status of the stock were based on general production models. The analysts noted that there were shortcomings in data for some fisheries as well as a lack of data from IUU fishing (estimated to be as high as 25 thousand tons during the 1990s), and these were considered to be cause for concern.

The MSY was estimated to be 90-93 thousand tons. Bigeye biomass showed a sharp declining trend beginning in the late 1980s, falling below the MSY level in 1997, and has remained slightly below MSY since. The trend in fishing mortality shows a similar, but inverse pattern, increasing rapidly during the mid-1980s and exceeding the MSY level in 1993; it has remained above that level since, with the exception of 2006; F_{2006}/F_{MSY} is 0.87, or less than needed to take the MSY.

Using the models to make projections of the stock under varying levels of catch it was estimated that if catches were maintained at or below 85 thousand tons, the biomass would rebuild to the

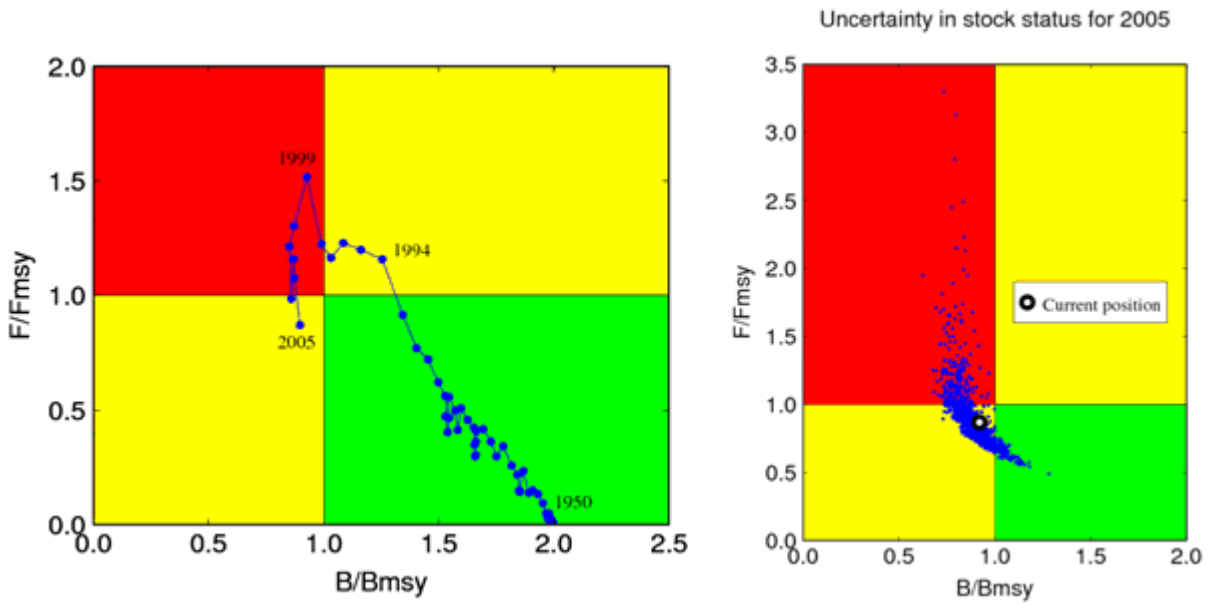

FIGURE 3.2 Current status of Atlantic bigeye. Left: trend in biomass and fishing mortality ratios over time. Right: Status in 2005 and spread of uncertainty.

MSY level within a few years, however if catches were kept constant at 90 thousand tons or more the biomass would decline further.

Based on the most recent assessments, the biomass of bigeye in the Atlantic Ocean is about 92 percent of the size it should be at MSY, in other words **the stock is currently in a slightly overfished state** (Figure 3.2), however, if catches remain at the 2006-2007 level the stock will increase to above the level corresponding to MSY. Because fishing mortality during 2006-2008 was below the MSY level, **the stock is not being overfished,** and should be increasing slightly as long as catches do not exceed 85 thousand tons.

3.2. Next scheduled stock assessment

The next assessment of Atlantic bigeye is scheduled for July 2010.

3.3. Conservation and management of bigeye

Over the years ICCAT has established a number of conservation and management measures for bigeye tuna in the Atlantic. One of the first was a minimum size limit of 3.2 kg; this limit was set in 1979 in order to enhance the enforcement of the yellowfin minimum size limit, because small yellowfin and bigeye are difficult to distinguish. A large portion of purse-seine caught bigeye is below this minimum size limit, and as for yellowfin, the size limit was repealed because it could not be enforced.

A number of bigeye measures were introduced between 1997 and 2003 to require CPCs to keep the number of vessels, the levels of effort, and the levels of catch to no more than 1992-1993 averages.

In 2004 a series of controls on bigeye fishing were approved and implemented for 2005-2008: 1) Limit the numbers of fishing vessels to less than the average number that fished during 1991 and 1992; 2) limit China to 45 longline vessels, Chinese Taipei to 98 longline vessels, Philippines to 8 longline vessels and Panama to 3 purse-seine vessels; 3) bigeye catch limits were assigned for 2005-2008 with the current limits being 5.9 thousand tons for China, 24 thousand tons for European Union vessels, 5 thousand tons for Ghana, 25 thousand tons for Japan, 3.5 thousand tons for Panama, and 16.5 thousand tons for Chinese Taipei; 4) a total allowable annual catch (TAC) of 90 thousand tons; and 5) a prohibition against fishing by purse-seine and pole-and-line vessels, as described in Section 2 above.

In 2009, the controls adopted in 2004 were amended to lower the TAC to 85 thousand tons, and to allow additional longline vessels for Chinese Taipei (7) and the Philippines (2). In addition, a number of quota transfers were permitted.

During 2005-2007, ICCAT took several measures against Chinese Taipei because of IUU fishing activities by its vessels. These measures included quota reductions, mandatory scrapping of vessels, limits on the amount of bigeye taken as bycatch, and 100% observer coverage.

There are substantial uncertainties regarding the bigeye catches taken historically by the Ghanaian fleet, due to insufficient or incomplete sampling for species composition and total catches. ICCAT has mandated Ghana to submit in 2010 an action plan to strengthen the collection of fishery statistics and to develop control measures to ensure the full implementation of ICCAT management measures.

4. SKIPJACK

Skipjack tuna are found throughout the tropical and subtropical waters of the Atlantic Ocean

between roughly 45°N and 35°S; they grow rapidly, do not live as long as other species of tunas, and have a high population turnover rate making them more difficult to overfish than other tuna species. The population of skipjack in the Atlantic is divided into an eastern and western stock. The fishery on the eastern stock takes about 80 percent of the total catch and the western stock 20 percent. Total catches increased steadily from the 1950s to a peak of 208 thousand tons in 1991, with a rapid increase in the 1980s due to the introduction of FAD fishing. After 1991 catches declined, and in recent years have averaged 150 thousand tons. The 2008 catches were 127 thousand tons and 22 thousand tons in the western and eastern Atlantic, respectively (Figure 4.1).

In the eastern Atlantic about 64 percent of the catch is taken by purse-seine vessels, 32 percent by pole-and-line vessels, and the remainder by a wide variety of gear; for the western Atlantic the corresponding figures are 7 percent and 90 percent, respectively. The major purse-seine fisheries in the eastern Atlantic are carried out by Spain, Ghana, Panama and France. For pole-and-line, the major fishing countries are Ghana, Spain and Portugal.

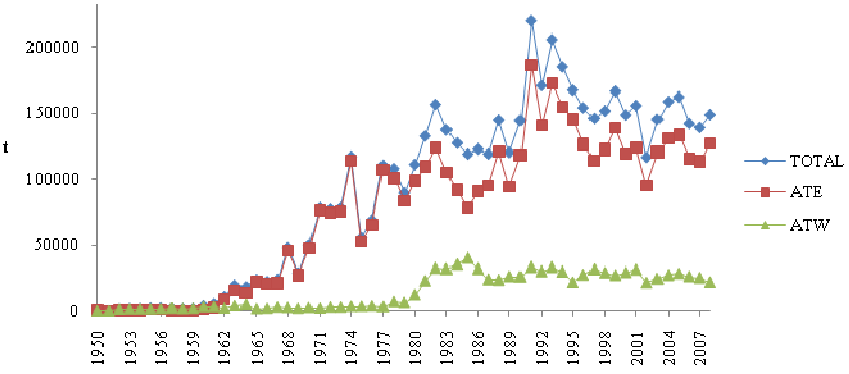

FIGURE 4.1 Skipjack landings in the Atlantic Ocean, 1950-2008.

Nominal fishing effort on skipjack tuna, although not measured, is assumed to have decreased substantially in the purse-seine fishery; carrying capacity of purse-seine vessels declining from about 70 thousand tons in 1982 to less than 35 thousand tons in 2006. However during this same period, vessel efficiency was estimated to have increased on the average 3 percent per year, also total mortality in the fishery due to fishing increased somewhat.

4.1. Most recent stock assessment

The last stock assessment of Atlantic skipjack tuna was carried out in 2008. Based on tagging data, catch distributions, and other biological parameters, the Atlantic skipjack population is considered to be comprised of two independent, non-mixing stocks, one in the east and the other in the west, and as such, each is treated separately for management purposes.

For the eastern stock, assessments were conducted using several models and eight available series of catch-per-unit-of-effort (CPUE) data. The CPUE series were adjusted to reflect an assumed increase in effective fishing effort of 3% per year The estimates of MSY from these models ranged from 143 to 170 thousand tons. The models run were not very informative, because there is little contrast in the fishery data, which leads to large uncertainties. However, most models led to the conclusion that the stock has not experienced overfishing to date.

The assessment for the western stock also used data that were not very informative in terms of contrast, and the results also suggest that the stock has not yet experienced overfishing. The estimates of MSY for the western stock range from 30 to 36 thousand tons.

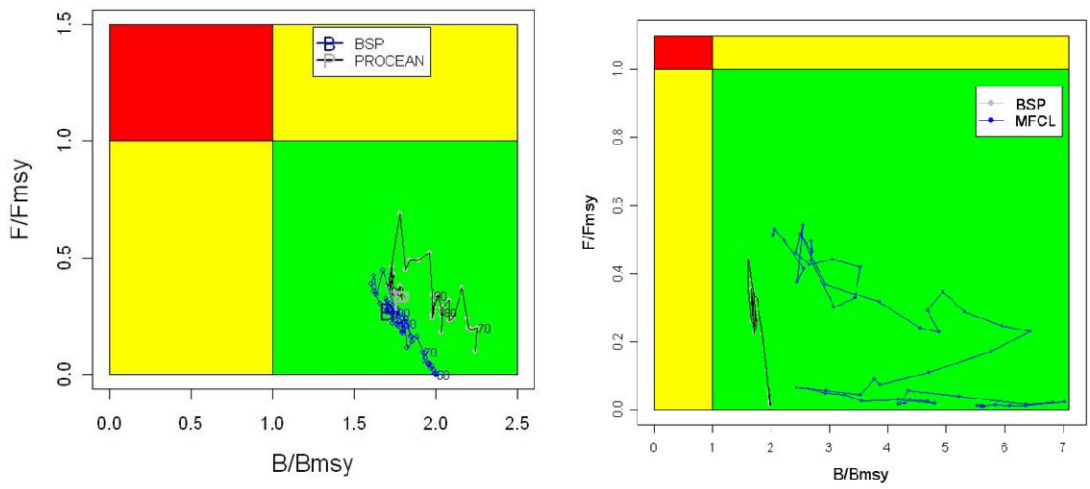

FIGURE 4.2 Status of skipjack in the eastern Atlantic (top) and western Atlantic (bottom). The lines show the trends in the estimated biomass and fishing mortality ratios over time, using different assessment models (SCRS-ICCAT).

In summary, there is **no evidence that either stock of skipjack is in an overfished state or that overfishing is occurring** (Figure 4.2).

4.2. Next scheduled stock assessment

There is no schedule for the next full assessment of skipjack tuna in the Atlantic.

4.3. Conservation and management of skipjack

There currently is no specific regulation in effect for the management of skipjack, nor has the SCRS recommended any management measures for this species. However, the moratoria applied voluntarily by the Spanish and French industry, which closed a certain section of the fishery with floating objects during November-January from 1997 through 1999, and the ICCAT recommendation to close a similar area during subsequent years, has had an effect on skipjack catches made on FADs. The average annual catch of skipjack per vessel decreased by about 18 percent as a result of the moratoria; the average annual catches by purse-seine fleets that implemented the moratoria decreased by 42 thousand tons (41 percent), but the overall decrease in effort as a result of less purse-seine vessels operating in the Atlantic probably contributed to this decline as well.

The status of yellowfin, bigeye, and skipjack is summarized in Table 1.1.

5. ALBACORE

Albacore are distributed widely throughout the Atlantic Ocean between about 60°N and 50ºS. The stocks support large surface fisheries in the Bay of Biscay, near the Canary Islands, around the Azores, and off southern Africa. Atlantic-wide catches (not including the Mediterranean) have shown a great deal of variability between 1982 and 2008, but with a slight decreasing trend. The all-time high of about 91 thousand tons was taken in 1964-1965, after which catches declined to a low of about 40 thousand tons in 2008, due primarily to decreasing catches in the northern Atlantic (Figure 5.1).

Although the distribution of albacore is continuous throughout the Atlantic, scientists consider that there is a northern and southern stock, separated at 5°N, and a separate stock in the

Mediterranean Sea. It is likely that there is some mixing of young albacore from the southern stock with albacore from the Indian Ocean, although to what extent is not known. Catches from the northern and southern stock are similar, averaging 28 and 21 thousand tons, respectively, since 2003.

Catches in the Mediterranean have averaged about 5 thousand tons per year, about half taken by longline and the other half by purse-seine vessels; Italian fleets harvest about 70 percent of the Mediterranean catch. The Mediterranean stock has never been assessed. However, ICCAT has scheduled a data-preparatory meeting in June 2010 to compile more complete fishery statistics, with the objective of assessing the stock in 2011.

5.1. North Atlantic albacore

Most of the catch of northern albacore is made by surface fishing gear; over the last five years pole-and-line vessels accounted for 35 percent of the catch, trolling vessels for 28 percent, trawlers for 17 percent, and longline about 17 percent. The Spanish fishery accounts for about 62 percent of the north Atlantic catch, followed by France with 16 percent, and Chinese Taipei with 8 percent. The surface fisheries of Spain, France, and Portugal operate mainly in the Bay of Biscay and around the Azores and Canary Islands during the summer and fall, and they generally take young fish between 3 and 15 kg. Longline vessels operate throughout the year in the north Atlantic and target fish between 5 and 45 kg.

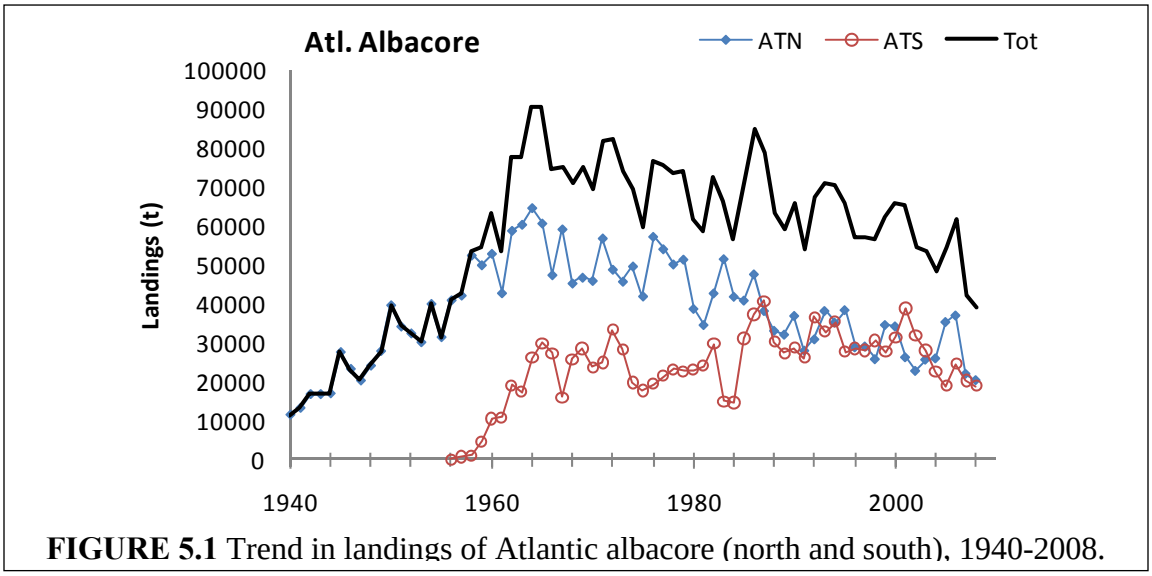

FIGURE 5.1 Trend in landings of Atlantic albacore (north and south), 1940-2008.

Catches of northern albacore reached about 65 thousand tons in the mid-1960s, the highest in the history of the fishery, but have declined since to a low of about 20 thousand tons in 2008 (Figure 5.1). Some of this decline in catch is attributed to a reduction of fishing effort by several of the traditional surface and longline fisheries. The Spanish troll and pole-and-line fleets, particularly the latter, have been increasing their catches, while catches of other fleets associated with the European Union have decreased. Catches by surface fisheries are very variable from year to year, as environmental effects influence the availability of albacore to these fisheries.

5.1.1. Most recent stock assessment

The most recent assessment for the northern stock of albacore was conducted in 2009. The MULTIFAN-CL model that was used in the 2007 assessment was updated, using data from 1930 to 2007.

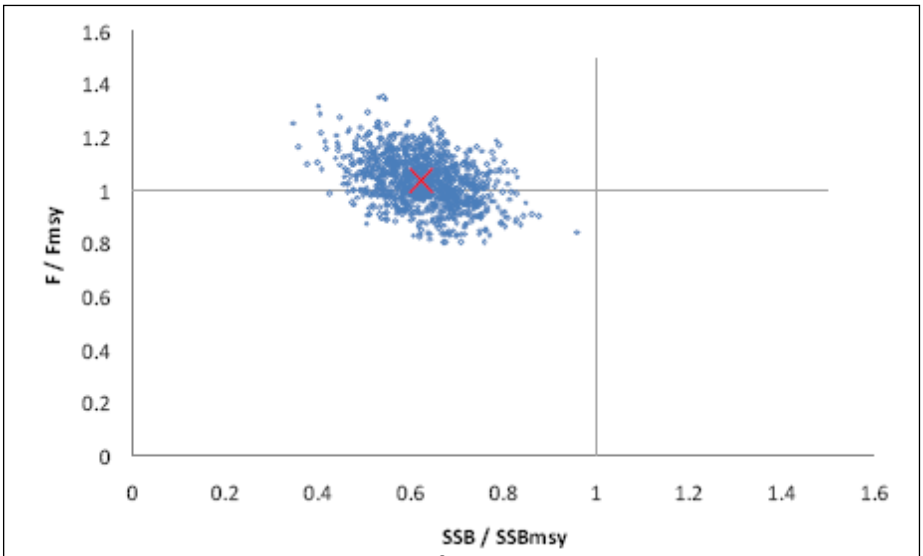

FIGURE 5.2 Current status of north Atlantic albacore, showing uncertainty. The point estimate is shown as an X and the array of points reflects bootstrap estimates of uncertainty (SCRS-ICCAT)

Recruitment showed a great deal of variability among the years examined, the highest being about 30 million 1-year old recruits and the lowest about 5 million. During recent years recruitment has averaged about 8 million fish. The abundance of the population in the coming years is highly dependent on the level of recruitment.

Trends in the ratio of the fishing mortality exerted by the fishery in each year to the fishing mortality when the population is at a level capable of supporting the MSY were examined to determine if overfishing had been occurring. The results showed that, with few exceptions, since 1955 the ratio was greater than one, indicating that overfishing had been occurring. In 2007, the ratio was slightly above one (F_{2007}/F_{MSY}=1.04).

Trends in the biomass in each year to the biomass at MSY were also examined, and they showed that since 1993 the biomass had been less than biomass at MSY. The stock is currently about 40 percent below the MSY level (B_{2007}/B_{MSY}=0.6). Also, in the spawning biomass showed decreasing trend since the inception of the fishery, and is currently about one quarter of the level it was when the fishery began.

The estimates of MSY for the northern stock have varied between about 26 and 34 thousand tons, dependent upon the age-specific fishing mortality being exerted. When larger fish are taken, on average MSY tends to increase, but decreases when more small fish are harvested. The current estimate of MSY is 29 thousand tons. Four out of ten of the most recent annual catches have exceeded the MSY. The catch in 2008 was 30% below the MSY.

Based on the current assessment **the stock of northern albacore is in an overfished state**, and **slight overfishing is taking place**, which is reflected in the phase plot shown in Figure 5.2.

If fishing mortality continues high and recruitment remains average or less, biomass will continue to decrease, however, these decreases could be offset if catches remain low.

5.1.2. Next scheduled stock assessment

No date has been set for the next stock assessment of northern albacore, although it may be conducted jointly with the next assessment of southern albacore in 2011.

5.1.3. Conservation and management of north Atlantic albacore

In 1998 ICCAT approved a recommendation calling on all CPCs with fleets fishing for northern albacore to limit, beginning in 1999, the numbers of vessels in their fleets to no more than the average number of their vessels fishing for albacore during 1993-1995. Each CPC was required

to submit a list of the vessels it authorized to fish for albacore during 1999, and to resubmit a list of such vessels for each year thereafter. Japan was specifically requested to limit its catch of albacore to no more than 4 percent of its total longline catch of bigeye tuna. The provisions to limit fleets would not apply to nations whose fleets harvested less than 200 tons of northern albacore per year.

An additional resolution applying to northern albacore was approved by ICCAT in 2003 for application during 2004 to 2006; it restricted catches to the then current levels of catch, or a TAC of 34.5 thousand tons, with specific allocations for different members. The resolution allowed for adjustments to be made for over-catches, under-catches, and transfers of under-catches to other parties, and also sustained the measures for limiting the number of vessels authorized to fish for northern albacore. A resolution was approved in 2006 extending all of these measures through 2007.

In 2007 the Commission, following the scientific advice of the SCRS, established a TAC of 30.2 thousand tons for 2008 and 2009. In 2009, again following SCRS advice, the TAC was reduced to 28 thousand tons for 2010 and 2011.

5.2. South Atlantic albacore

Catches of albacore in the south Atlantic have varied between a high of 41 thousand tons in 1987 and a low of 15 thousand tons in 1984. From 1988 to 2001 catches were relatively stable, averaging 30 thousand tons per year; they peaked in 2001 at 39 thousand tons, and then declined. The most recent 5-year average is 21 thousand tons (Figure 5.1).

During recent years, south Atlantic albacore landings have been primarily attributable to three fisheries: longline vessels from Chinese Taipei (56%), and pole-and-line fleets from South Africa (18%) and Namibia (13%). Over the last few years, longline fleets have taken nearly 70 percent of the catch from the south Atlantic, and pole-and-line fleets 25 percent. Catches by the Brazilian longline fleet, which fished mostly off the east coast of South America and caught more than 4 thousand tons per year, have recently declined by nearly 90 percent. This was likely attributable to the exodus of Chinese Taipei longline vessels that previously fished under special arrangements with Brazil. The Chinese Taipei fleet operates throughout the south Atlantic, and targets fish between 5 and 35 kg; some of the Chinese Taipei catch is from a directed albacore fishery, and some is taken as bycatch in the bigeye and swordfish fishery.

Surface fisheries in the south Atlantic operate mainly during October to May and capture juvenile and sub-adult fish between 7 and 16 kg.

5.2.1. Most recent stock assessment

The most recent stock assessment of southern albacore was conducted during 2007. The analysis carried out was similar to that completed for the northern stock; MULTIFAN-CL was used in the assessment, using data up to 2005. The catch rates used to tune the model showed a decreasing trend for the longline indices, but stability in the case of the surface fisheries.

As was the case for northern albacore, the estimate of recruitment for the most recent year class of the southern stock entering the fishery was above average, although confidence in the estimate will remain low until the year class is subjected to fishing for another year or two.

The biomass has shown a general decreasing trend as would be expected as exploitation increases, but at the end of 2005 was very near the MSY level, the point estimate being more than 90 percent of that level, with a range of 0.71-1.16.

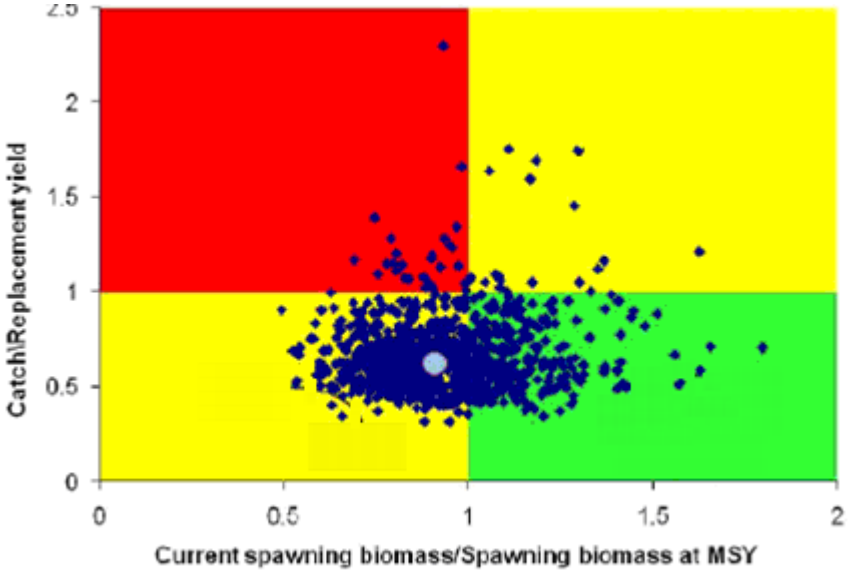

FIGURE 5.3. Phase plot for south Atlantic albacore, showing uncertainty in 2005 point (ICCAT).

The ratio of current fishing mortality to fishing mortality at MSY shows that in recent years it has been less than 1, and in 2005 was 0.6, or only 60 percent of the MSY level.

The current estimate of MSY is 33.3 thousand tons, ranging between 29.9 and 36.7 thousand tons. Only one out of the last ten years has exceeded the AMSY estimate, and since 2004 none of the catches have exceeded the replacement yield of 28.8 thousand tons. This implies that biomass should be increasing and, if current levels of catch are maintained, will soon exceed, or may have already exceeded, what it should be at MSY.

Based on these analyses, **the southern stock of albacore is not being overfished, but conservatively speaking, it may be in a slightly overfished state** (Figure 5.3)**.** It should be noted however, that since catches have been substantially below the replacement yield and fishing mortality below the MSY level for an extended period, it is likely that the stock is not in an overfished state.

5.2.2. Next scheduled stock assessment

The next stock assessment of south Atlantic albacore will take place in 2011.

5.2.3. Conservation and management of south Atlantic albacore

In 2004 ICCAT approved a resolution designed to limit the catch of albacore south of 5ºN to no more than 30,915 tons, which was based on the then best estimate of MSY. The resolution stipulated that if the catch in 2004 exceeded 29,200 tons, the TAC of 30,915 for 2006 would be reduced by the excess of the overage. Likewise if the 2005 catch exceeded the 2006 TAC, the 2007 TAC would be reduced by the overage. Also, CPCs that caught no more than 100 tons during 1992-1996 would be allowed to increase their catch by 10 percent. The current TAC for south Atlantic albacore is 29,200 tons. For 2009-2011 the TAC was set for 29,200 tons; and again, if the catch in 2008 exceeds the 29,900 tons the catch in 2009 shall be reduced through the full amount of the excess. If the catch in any year until 2011 should exceed the replacement yield of 28,800 the conservation measures for southern albacore will be reviewed. Those CPCs that caught less than 100 tons during 1992-1996 are subjected to an annual catch limit of 100 tons, and those catching more than 100 tons to a catch limit of 110 percent of their average catch during 1992-1996. In the case of Japan, it shall endeavor to limit its catch of southern albacore to 4 percent by weight of its total longline bigeye catch in the Atlantic south of 5°N.

The status of north and south Atlantic albacore is summarized in Table 1.1.