

Atlantic bluefin tuna - Research and management

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Summary

Atlantic bluefin tuna are widely distributed in the Atlantic Ocean (including the Mediterranean Sea) As the market value of high quality big bluefin tuna in Japan has been so high, it attracted many fisheries in past 3 decades. As the results, fishing effort increased considerably and the International Commission for the Conservation of Atlantic Tunas (ICCAT) has to take various conservation measures on bluefin tuna, based on its scientific studies.

This paper discusses the results of latest assessments on bluefin tuna, various conservation measures taken and finally the potential problems foreseen in very near future.

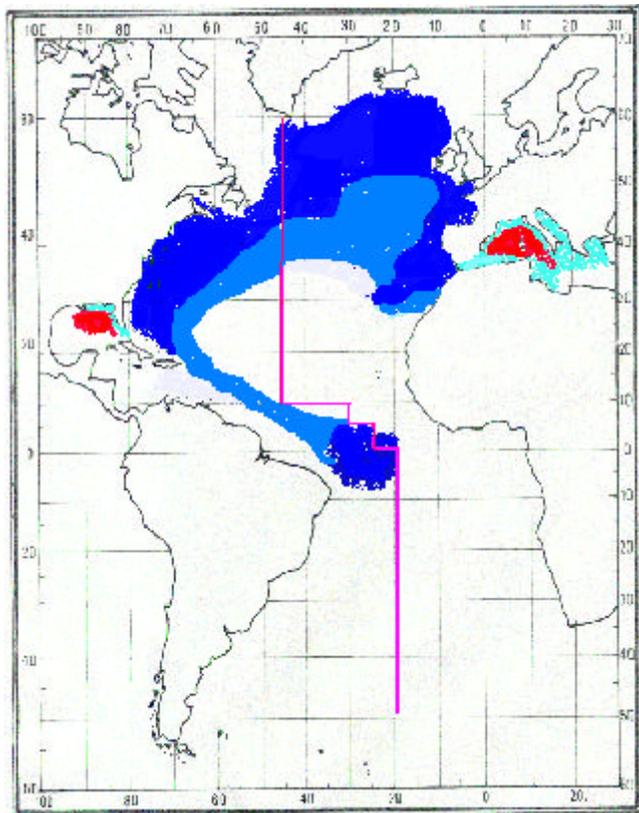


Fig. 1. Distribution of Atlantic bluefin tuna (red; spawning ground, light blue; nursery ground,

DISTRIBUTION AND STOCK HYPOTHESIS

The distribution of bluefin tuna in the Atlantic Ocean (wherever Atlantic is mentioned in this report, the Mediterranean Sea and its adjacent waters are all included) is shown in Figure 1. Since there are two distinct known spawning grounds (in the Gulf of Mexico and in the Mediterranean Sea), stock assessments and managements have been carried out based on two-stock hypotheses, i.e. east and west Atlantic stocks.

However, past accumulated results from many tagging experiments and more so from recent tagging using electronic tags indicated that there are considerable mixing between these two stocks or that there is only one stock in the Atlantic, with two spawning areas. Also fishing grounds in the high seas show continuous distribution between east and west Atlantic, particularly in recent years, when a new fishing ground had been developed in the

north central Atlantic. Therefore, recent evaluation of stocks had to give due consideration on these mixing of two stocks.

FISHERIES AND CATCHES

Figure 2 shows Atlantic blue landings for the entire, east and west Atlantic. Catches in the west Atlantic has been under a strict quota system in last two decades. For the east Atlantic stocks, catch restriction started in 1995 and more strictly in 1998. These explain recent reduction in landings for the west (since 1980) and east (since 1998). Other than these, a rapid increase in the catches of the east bluefin stocks, particularly in the Mediterranean Sea since 1980's are very clear.

Figure 3 shows cumulative catches of east bluefin by fishing gears. The recent increase in catches are mostly achieved by purse seiners, while trap catches have been greatly reduced.

As catch restrictions set by ICCAT for the east bluefin tuna had been based on the catches made in 1993 or 1994 (whichever larger), many Mediterranean countries revised its historical catches upwards. ICCAT accepted only those proposed changes which had been well documented and justified. However, such changes contributed on the data uncertainties as well as effect much on stock assessments.

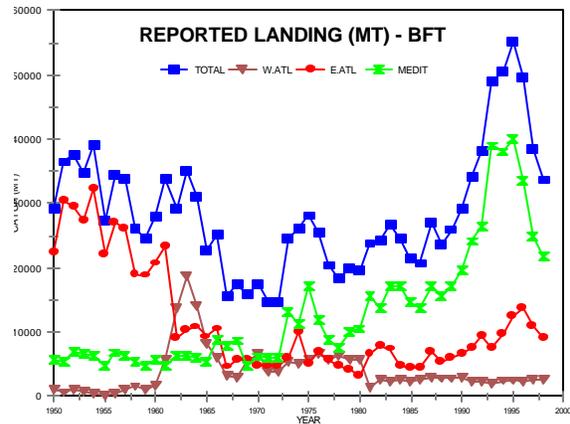


Fig. 2. Reported landing of bluefin tuna by Atlantic regions.

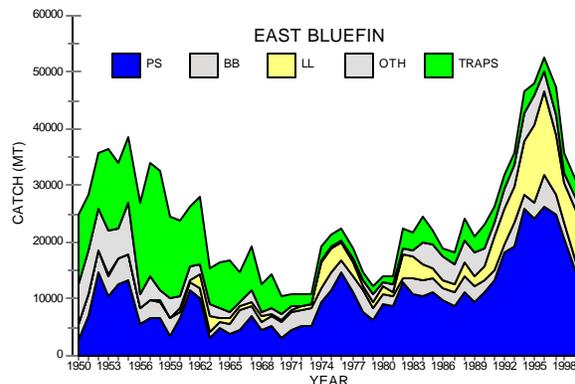


Fig. 3. Reported cumulative landing of east bluefin tuna (including the Mediterranean Sea) by fishing gears.

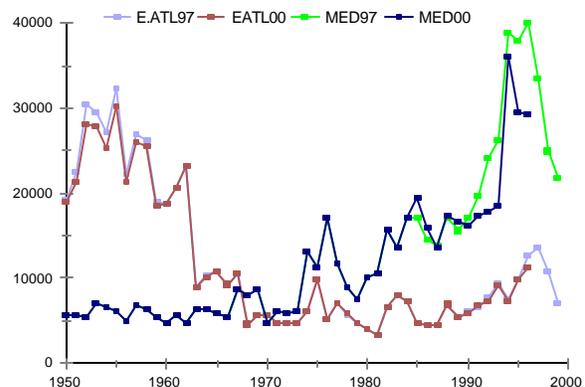


Fig. 4. Reported catches for the east bluefin tuna used in 1997 assessments and those revised and used in 2000 assessments.

STOCK CONDITIONS

ICCAT carried out stock assessments of east and west bluefin stocks at a 2-3 years intervals.

West bluefin stocks

The results of the last west stock evaluations (in 2000) are summarized as follows: spawning stock biomass has been in much lower level than those seen in 1970 (considered as proxy of MSY) but has been stabilized over last 10 years. The recruitment appears increased in last few years. It was recommended by the ICCAT Scientific Committee that the TAC should not be changed significantly from the current level of 2,500 MT per year. Maintaining the annual catch at about the current TAC level gives at least a 50% probability of rebuilding to the 1975 biomass by 2018.

East bluefin stocks

The latest assessments made on east bluefin stocks were in 1998. Single estimate (by VPA) of spawning stock biomass is given in Figure 5. As shown, stock biomass has decreased constantly since 1970 and is now at the lowest level. The stock size projection is given in Figure 6, with a constant fishing mortality at the level of 75% of the 1994.

The ICCAT Scientific Committee concerned about the quality of the catch effort and size data. It also expressed concern about the status of East Atlantic bluefin tuna resources in the light of assessment results and the historically high catches made in 1996-1997 (in excess of 50,000MT). Analyses indicate that future catch levels of 33,000MT or more, are not sustainable. Catches of 25,000MT or less would halt the decline of biomass (Figure 6).

REGULATIONS

For the west stock, scientific monitoring level has been established for various fishing nations since 1980 and those have been strictly implemented. For the east stock, the catch limits have been set since 1995 and since 1999, the limit is even stricter. However, some member countries presented objection for the catch quota, resulting in those objecting countries' fishing without quota.

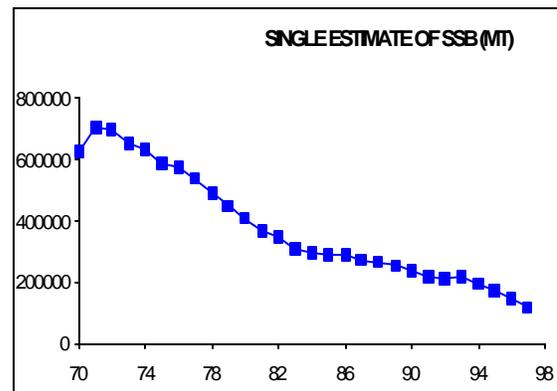


Fig. 5. Estimated spawning biomass (MT) for the east bluefin tuna.

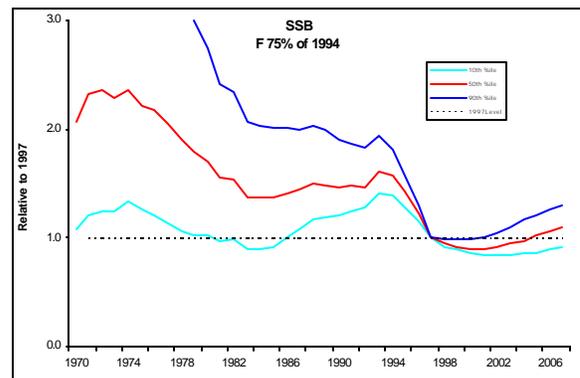


Fig. 6. East bluefin stock projection, with a constant catch at the 75 level of fishing mortality in 1994 (equivalent to the catch quota of 25000MT).

The catch quota for 1999-2001 recommended by the ICCAT is as follows;

	1999	2000-2001	
China	82	76 MT	
Croatia	950	876	
EC	20,165	18,590	
Japan	3,199	2,949	
Korea	672	619	
Tunisia	2,326	2,144	
Morocco*	(820)	(756)	3,028 as self-target level
Libya*	(1,300)	(1,199)	1,570 as self-target level
Non-Cont	2,486	2,291	

*Objected to the quota.

ICCAT has adopted also minimum size regulations for bluefin tuna; i.e. 6.4 kg with 15 % allowance in number of fish and 3.2 kg without any allowance. It appears that either minimum size regulations have not been and are not implemented and/or complied with, particularly in the Mediterranean Sea.

REVIEW OF CURRENT AND NEAR-FUTURE PROBLEMS

Resources (Increasing fishing capacity)

As mentioned in the previous section, both east and west stocks have been over-exploited. Particularly in last several years, the fishing capacity have exceeded the level which the resources can support (namely purse seiners in the Mediterranean and longliners in general). The high price paid for premium meat of bluefin tuna in the Japanese sashimi market is increasingly attracting interest of bluefin fishers. Besides, the increasing activities of fish farming (fattening) also add the value of the fish and having given more pressure for the stocks. As the export route from the Mediterranean area to Japanese market (via air or freezer) has been established, the Japanese market became much more accessible than before. This also helps expanding bluefin tuna fishery in the Mediterranean area.

Illegal fishing (IUU vessels)

Illegal fishing is very serious problem for the ICCAT member countries which are fishing with quotas. The IUU vessels are fishing without license, quota or any restriction on their activities and hence undermine the effectiveness of the regulatory measures taken. Recently international effort to deter IUU fishing activities have been taken (e.g. IPOA for IUU by FAO). ICCAT has taken various methods to combat the IUU fishing. It first collect information on IUU fishing, estimating amount of bluefin tuna caught by illegal fishing. ICCAT established Bluefin Statistical Document program. Then ICCAT adopted a Plan of Action, which specify various measures taken against IUU fishing (i.e. identification of illegal fishing, warning to the flag countries and at the end ban of import of bluefin tuna from those countries). The non-prejudiced trade measures are taken according to the Commission's decision, for the sake of conservation of stocks and according to any other international obligation such as WTO. Up to present, the ban of

bluefin import was imposed for bluefin tuna from Honduras, Belize, Panama (which was later lifted) and Equatorial Guinea. The last country is a member of the ICCAT.

Also landing and transshipment from vessels identified by the Commission as engaging in the IUU activities are restricted. These measures taken has been proved to be effective in reducing IUU activities. However, these illegal vessels change flags very frequently, being chartered by the third countries, and move from one ocean to the other. Therefore establishment of an international monitoring system will be essential for control.

Fish farming (fattening)

The bluefin farming (fattening) in cages is not really a problem, as it would add the value to the fish already caught and bring more economic profit to the fishermen. It is interesting to note that the fish farming resulted in developing middle quality sashimi market in Japan. The Japanese bluefin market used to be consisted with very high quality bluefin (pre-spawners) and cheap bluefin (post spawners and juveniles). Artificially fattened bluefin developed a market to fill in the gap between these two categories.

The consequence is increasing demand for such fish and fish farming is expanding very rapidly throughout the Mediterranean. As live fish have to be provided to these farming, the fishing effort for bluefin is even increasing, giving much higher pressure to the stock. Therefore expansion of bluefin farming would have a negative effect on bluefin stocks.

Bluefin farming may also cause some environmental hazard and sanitary problem (through illegal use of medicine and hormone). However, the worst problem is that this practice is confusing catch statistics, as the fish caught by any nations can be transshipped to the pen at sea without any import-export control (tuna laundry), and also the fish weight at capture is not know. The increase of fish during a few months fattening can be well over 25% of the original mass.

Management failure

As have been demonstrated above, the market demand for bluefin is increasing and all the nations want to have an access to bluefin. Naturally the agreement on share of TAC (i.e. country quota) are not well implemented (particularly in the Mediterranean Sea). Besides, it is getting harder and harder to reach an agreement of quota share, as all the countries are getting more demanding and the TAC is getting smaller.

Even when the quota are accepted, and even if the regulations are implemented by the flag countries, the compliance to the regulations is another story. Currently it is suspected that the quota have been well exceeded by various nations and so is the TAC.

By-catch problems

Finally by-catches (incidental catches) by tuna fishing has been subject of criticism for some time. In case of bluefin tuna fishing, porpoise is not caught together and is not a problem. However, incidental catches of sharks by bluefin tuna could cause a problem for fishing, although it appears that bluefin fisheries do not catch any shark species which might be considered endangered.

More likely by-catch problem may occur in relation to under-sized fish, undesirable species and over quota. If the regulations are very strictly complied (particularly at port and landing site), discards of undersized fish and fish caught over the quota would increase. As small juvenile (under-sized) bluefin are very abundant in the Mediterranean, it can be a serious waste of resources. In this case, time-area closure would be more effective for control. At present, a month is closed for purse seine bluefin fishing in the Mediterranean to protect juveniles.