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REVIEW OF IATTC MANAGEMENT MEASURES FOR TUNAS IN THE EASTERN PACIFIC OCEAN, AND CURRENT MANAGEMENT OPTIONS

1. INTRODUCTION

This paper has been prepared to provide the Commission with a summary of the management measures for yellowfin and bigeye tunas that it has adopted since 1966, and to review options it could consider for the future.

Section 2 reviews management measures applied from 1966 until 2007, and Section 3 summarizes the results of the Workshop on Management Strategies, held in October 2006. The final section discusses options for future management, taking account of the most recent recommendations.

2. REVIEW OF MEASURES APPLIED BY THE IATTC

During 1966-1979, the IATTC successfully used a closure of the purse-seine fishery in the Commission's Yellowfin Regulatory Area (CYRA) after a total allowable catch (TAC) limit for yellowfin tuna was reached, and subsequently used similar measures during 1998-2001. There were a number of elaborations on the theme of a closure once the yellowfin TAC was estimated to have been reached; probably the most significant for the purposes of this paper were special allowances for (a) small vessels and developing countries without well-developed fisheries to take additional amounts of yellowfin, and (b) vessels fishing for other species to take a small amount (less than 15%) of yellowfin as an incidental catch after the TAC had been reached. The allowances were first introduced in 1973 and became more significant over time until 1979. The growth of the allowances reflected the interest of the coastal countries in expanding their fisheries.

During the period many nations established 200-mile exclusive economic zones (EEZs), and this led to negotiations about quotas being allocated to participants. The negotiations were ultimately unsuccessful, and their failure led to a lack of agreement on the conservation of yellowfin. Between 1980 and 1986 it was not possible to reach agreement on the implementation of conservation measures; each year a TAC was agreed, but not implemented. The fleet size declined after 1981, and during 1988-1997 the catches were less than the recommended TACs. By the time conservation measures became necessary again in 1998, the composition of the fleet had changed dramatically and the issue of special allocations of catch was not taken up again.

In the years preceding 1968 the fishery expanded offshore, and it was thought that estimates of the maximum sustainable yield (MSY) based on historical data were underestimated. To test this, the Commission established a three-year adaptive management program: in 1969 it set a TAC that was greater than the estimated MSY, with the proviso that the fishery would be closed if the catch rate dropped significantly. This trial established that the expansion of the fishery was associated with greater production from the stock, and subsequent TACs were set at a base conservative level to which increments could be added, at the discretion of the Director, if the data showed that such increments would not harm the stock. This proved to be a useful approach to allow real-time adjustments of the TAC. After conservation measures became necessary again, the use of a base TAC and discretional increments continued from 1998 to 1999 and in 2001. The history of those increments is shown in Table 1.

The closure of the CYRA was generally a successful management measure because:

- 90% of the yellowfin catch was taken by purse-seine,
- fishing outside the CYRA caught large yellowfin, catches of which had a relatively small impact on the stock,
- purse-seine fishing that targeted skipjack was not affected by the closure.

In 1998, the IATTC introduced its first measure to control purse-seine catches of bigeye by prohibiting sets on floating objects after 45,000 t of bigeye had been taken (Resolution C-98-05). A similar measure was adopted in 1999 (Resolution C-99-06), and provisionally for 2000 (Resolution C-99-09).

However, a very strong recruitment of bigeye in 1998 produced very large catches in 2000, which would have led to the fishery on floating objects being closed in the middle of the year, with very serious repercussions on the catches of skipjack. Consequently, the Commission re-visited Resolution C-99-09, and eventually closed the fishery on floating objects from 15 September to 15 December 2000 (Resolution C-00-02).

During the brief period when management measures were in force for bigeye, two difficulties arose. The first was determining in advance the appropriate TAC for bigeye; this was particularly important because bigeye formed a lesser component of the purse-seine catches in sets on floating objects. While stopping fishing for bigeye too early might not have been serious from the point of view of catches of bigeye, it would have been a more serious issue if skipjack catches were curtailed unnecessarily.

The objectives of management measures for bigeye, and the means of achieving them, have varied. During the 1990s, the initial concern with purse-seine catches of bigeye on fish-aggregating devices (FADs) was that the fishery particularly selected small bigeye. The Commission tended to equate purse-seine caught bigeye with small or immature bigeye, and restrictions were aimed at reducing all purse-seine catches. However, in 2000, the bigeye taken by purse-seine vessels were medium-sized, indicating that the fishery could catch a wider range of sizes than hitherto thought. In 2001, the bigeye closure was modified to be triggered by the estimated catch of bigeye less than 60 cm in length (Resolution C-01-06). There was also an emerging problem in monitoring sets on floating objects: even with vessels carrying an observer, there was a trend for vessels to make sets near floating objects and to claim that those sets were on unassociated schools.

In addition, the use of FADs, which were spread throughout the fishery, started to produce catches of small bigeye and, to a lesser extent, yellowfin, outside the CYRA. A CYRA closure was not effective for bigeye, and its rationale for yellowfin was weakened.

As a result of these issues, in 2002 the management measures for purse-seine fishing were switched from TAC-based measures for the CYRA to measures to limit fishing effort for the entire EPO. The recommended reductions in effort for bigeye and yellowfin were comparable, and the conservation resolution for 2002 (Resolution C-02-04) simply closed the whole EPO to purse-seine fishing during the month of December.

In 2003, the December closure, established by Resolution C-03-12, was limited to an area of the EPO that was thought to contain a large part of the fishery in association with FADs (Figure 1).

In a subsequent analysis of the effect of the closed area (Document SAR-5-06), it was determined that the reduction in catch attributable to the closure was negligible, and that, overall, the closure was ineffective. This was because the closure was too short and the area too small, and the fleet was able to catch as much yellowfin and bigeye in regions outside the closed area as it would have if the area were not closed.

Resolution C-03-12 also established that the fishery in the entire EPO would be closed to purse-seining from 1 August to 11 September 2004. This period was chosen because it would achieve the greatest reduction of catches of small bigeye relative to the reduction of skipjack catch: the time of year made

little difference for yellowfin catches. The Resolution also required that each CPC's[1] longline catches of bigeye in 2004 be restricted to the level of 2001; this was the first binding limit on longline catches in the eastern Pacific. At its meeting in June 2004, the Commission debated the most appropriate period for a closure, and eventually adopted Resolution C-04-09, which established an additional six-week closure from 20 November to 31 December, with each CPC having to adopt one of the two closures for its purse-seine fleet, and extended the closures to 2005 and 2006; they were subsequently extended to 2007 (Resolution C-06-02).

An assessment of the effect of the closures in 2004 and 2005 at the 2006 Working Group on Stock Assessment Review Group (Document SAR-7-12) showed that reductions in fishing effort for each set type in 2004 and 2005 were different to those in 2003, and none of them was sufficient to reduce effort to the MSY level. This was in part due to the growth of the purse-seine fleet, and also because many vessels scheduled their normal maintenance during the closure period, and so would not have been fishing anyway.

Resolution C-04-09 also established specific longline catch limits for bigeye for China, Chinese Taipei, Japan, and Korea during 2004-2006, and required other CPCs to limit their catches to the level of 2001; for 2007, that was changed to the greater of 500 t or their catch in 2001 (Resolution C-06-02).

Management measures have generally followed scientific advice closely. The exceptions were before 1966, when members were not able to implement the required domestic legislation; during 1980-1987, when TACs were agreed but allocation negotiations broke down; and during 2003-2006, when the measures applied were less restrictive than recommended by the staff.

3. MANAGEMENT MEASURES OF OTHER TUNA COMMISSIONS

While the circumstances for each of the four other tuna commissions[2] and most of the stocks they administer differ, it may be useful to briefly note the management practices used for yellowfin and bigeye (southern bluefin in the case of CCSBT) in the other organizations. For convenience, the term CPC is used to describe members and cooperating non members of these other organizations.

The most common management measure in the other tuna commissions is a defined or implied quota for each CPC. The quota for each CPC is explicit for southern bluefin tuna in CCSBT, and for bigeye tuna in ICCAT for the CPCs with the largest catches. In other cases (IOTC for bigeye, and WCPFC for yellowfin and bigeye), CPC quotas are limited to recent catch levels.

ICCAT requires that CPCs fishing for yellowfin, and those fishing for bigeye without a quota, restrict their levels of fishing effort.

In addition to other measures, ICCAT maintains a closed area during November of each year for fishing by purse-seiners and pole-and-line vessels to protect juvenile bigeye.

4. THE WORKSHOP ON MANAGEMENT STRATEGIES, OCTOBER 2006

The Stock Assessment Working Group held a workshop in October 2006 to review management options for the IATTC. The report of the meeting discusses the following six options, presenting advantages and disadvantages of each one, especially with regard to likely success, effectiveness, effect on bycatch, practicality in implementation, and research required to assess its potential.

1. Closed season
2. Spatial closure

[1] CPCs: IATTC Parties and cooperating non-Parties, fishing entities or regional economic integration organizations

[2] The Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Indian Ocean Tuna Commission (IOTC), the Western and Central Pacific Fisheries Commission (WCPFC)

3. Catch quotas
4. Size limits
5. Particular restrictions on FADs
6. Individual Vessel Quotas
7. Capacity limits

It was concluded that the existing 6-week closure, while apparently acceptable to the IATTC members and their industries, is insufficient for yellowfin and bigeye conservation because there is too much fishing capacity in the EPO. Therefore, either additional management measures should be implemented, or the duration of the closure should be extended. Approaches that involve industry in a proactive rather than punitive way are more likely to be successful. One approach would be to provide a positive incentive for industry to develop methods to reduce bigeye catch by permitting some vessels to fish for skipjack associated with FADs during the closed period. This could require a designed program with scientists and observers on board to test methods that avoid bigeye catch. Another possibility is to allow all vessels to continue fishing after the catch limit has been reached, provided their catches of yellowfin andigeye are kept below acceptable limits.

5. OPTIONS FOR THE FUTURE

The Commission has adopted separate measures for longline fishing and purse-seine fishing because of the different nature of the fisheries. Because of the nature of the operation, the staff has no suggestions to modify the current method of quotas for each CPC used to limit longline fishing.

Of the possible options for future management of the purse-seine fishery for yellowfin and bigeye, the staff recommends the following for consideration. The options refer to recommendations from the staff this year only to provide a guide to the extent of the measure that might be needed. The staff's recommendations for 2007 will be informed by the decisions from this meeting and the latest stock assessments.

1. Continuation of the present system of closure of the EPO to purse-seining for a period of time during the year. This has been used during 2004-2007 in lieu of the previous TAC. It is based on estimates of target fishing mortality, and can be made more precise than target catches. However, the practice of reducing the fishing season by the same amount as the desired reduction in fishing mortality has not achieved the reductions in fishing mortality sought for yellowfin. The staff recommendations for 2006 were that the closure should be for a period of 69 days. Because reaching the MSY fishing effort requires a greater reduction for bigeye than for yellowfin, additional measures would be needed for the former.
2. Closure of an area of the EPO to fishing on floating objects for a time to reduce the catches of bigeye. This would work in conjunction with Option 1 above, assuming that the closure is not sufficient to for the conservation of bigeye. To be effective, such a closure would involve a large area, for example between 6ºN and 10ºS and 90º and 120ºW (Figure 2), for a significant period.
3. Individual catch limits for purse-seine vessels. Such a measure provides an incentive for captains to reduce their catches of bigeye while maintaining catches of other species. This can be done by moving away from areas in which there are relatively high concentrations of bigeye, or by modifying fishing techniques. This measure has been previously considered, unfavorably, with a fixed catch per vessel. It would also be possible to assign an individual quota to each vessel based on its previous history.
4. Set TACs for yellowfin and bigeye, and allow vessels to continue fishing after the TAC has been approached, providing that the fraction of yellowfin and bigeye in their catch does not exceed specified limits, for example 15% for yellowfin and 3% for bigeye. The ratio would be calculated for each vessel at the end of each fishing trip, based on the observer estimates of species

composition. The Director would be required to determine when the TAC was approached, taking account of the amounts of each species estimated to be taken while fishing after the closures. The TACs could be set with an initial conservative level that could be increased by the Director, if his analysis of the data indicated that no harm would be done to the stock.

These options could be combined with a program of investigation, as suggested by the Management Strategies Workshop; this would provide the opportunity to develop methods to reduce bigeye catches by permitting some vessels to fish for skipjack associated with FADs during the closed period, with a designed program and with scientists and observers on board, to test methods that avoid bigeye catch.

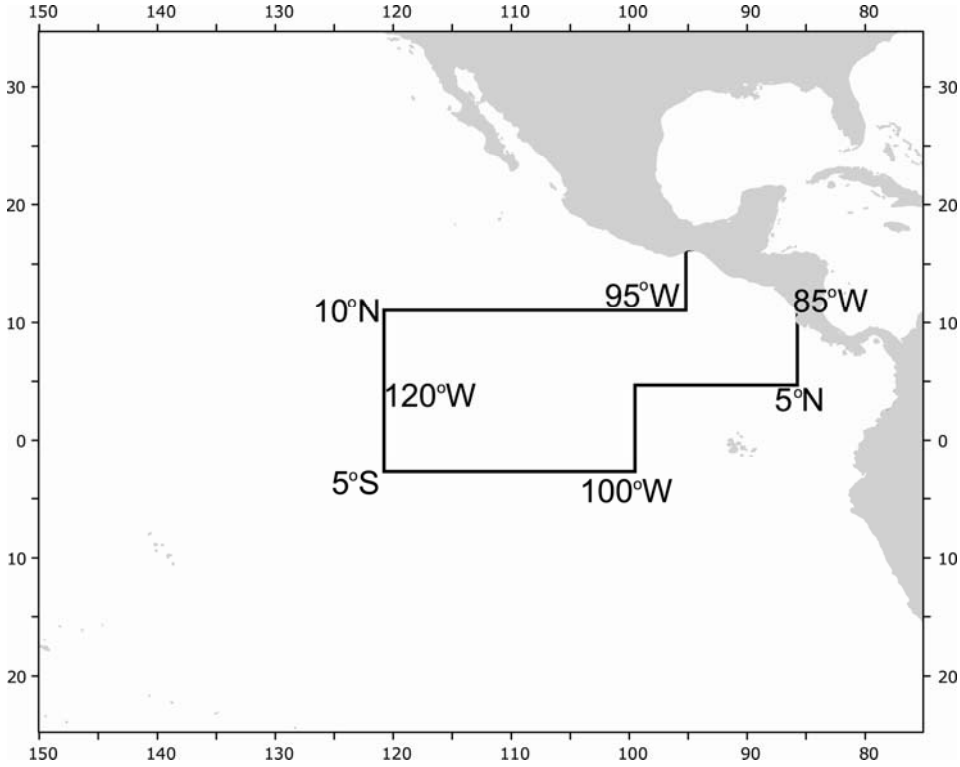

FIGURE 1. Closure zone established by Resolution C-03-12 on tuna conservation.

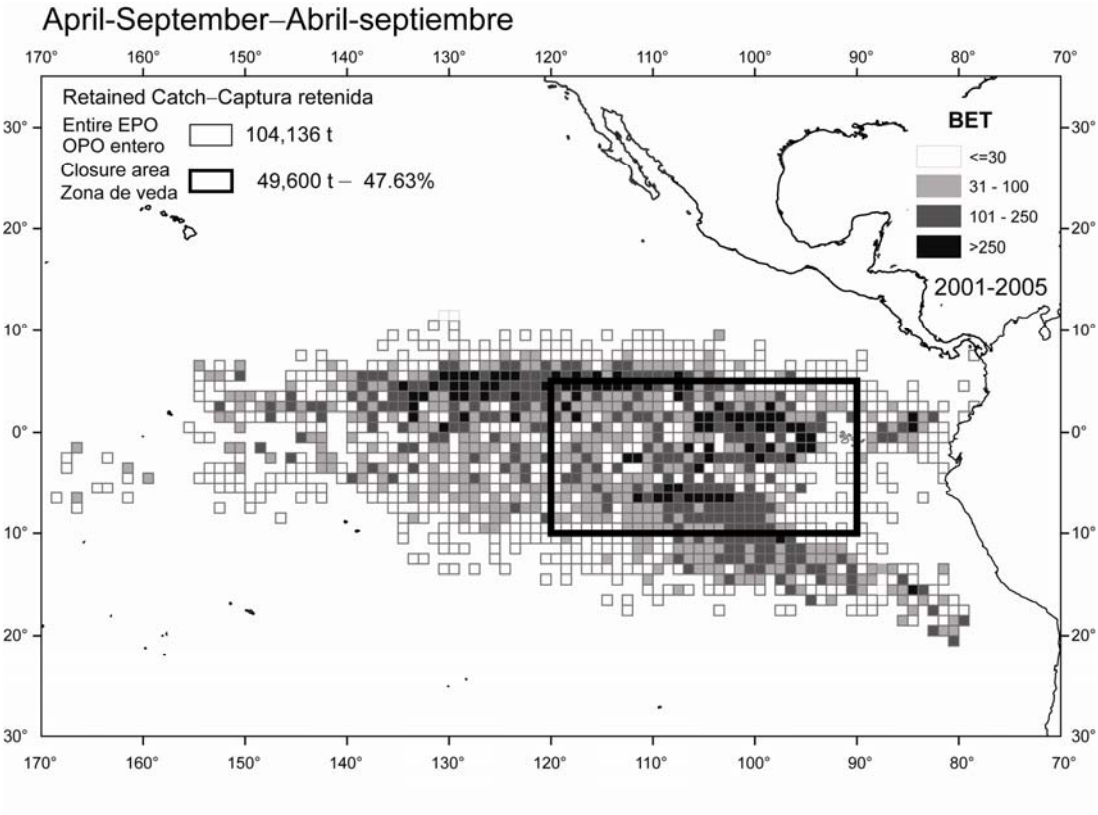

FIGURE 2. Retained catches of bigeye, in metric tons, 2001-2005, and potential closure area.

TABLE 1. Base TACs for yellowfin in the EPO and discretionary increases, in metric tons, 1971-2001.

	Base TAC	**Increments in resolution**
1971	127,000	2 * 9,100
1972	108,900	2 * 9,100
1973	117,900	3 * 9,100
1974	158,800	2 * 9,100
1975	158,800	2 * 9,100
1976	158,800	2 * 9,100
1977	158,800	18,100 +13,600
1978	158,800	18,100 +13,600
1979	158,800	18,100 +13,600
1998	210,000	3 * 15,000
1999	225,000	3 * 15,000
2000	240,000/265,000	
2001	250,000	3 * 20,000