

## YELLOWFIN TUNA OVERFISHING

On October 25, 2006, Council Chairman Hansen received a letter from the National Marine Fisheries Service (NMFS) Southwest Regional Administrator discussing their determination, as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA), that overfishing is occurring on the Eastern Pacific Ocean (EPO) yellowfin tuna stock. At that time, Section 304(e) of the MSA (16 U.S.C. 1854(e)) applied. It states that within one year of such a notification, "...the appropriate Council ... shall prepare a fishery management plan, plan amendment, or proposed regulations for the fishery to which the identification or notice applies..." However, a new section was inserted in the MSA (§304(j)) when it was reauthorized, which likely applies to yellowfin tuna. The section reads:

- (i) INTERNATIONAL OVERFISHING.—The provisions of this subsection shall apply in lieu of subsection (e) to a fishery that the Secretary determines is overfished or approaching a condition of being overfished due to excessive international fishing pressure, and for which there are no management measures to end overfishing under an international agreement to which the United States is a party. For such fisheries—
- (1) the Secretary, in cooperation with the Secretary of State, immediately take appropriate action at the international level to end the overfishing; and
  - (2) within 1 year after the Secretary's determination, the appropriate Council, or Secretary, for fisheries under section 302(a)(3) shall—
    - (A) develop recommendations for domestic regulations to address the relative impact of fishing vessels of the United States on the stock and, if developed by a Council, the Council shall submit such recommendations to the Secretary; and
    - (B) develop and submit recommendations to the Secretary of State, and to the Congress, for international actions that will end overfishing in the fishery and rebuild the affected stocks, taking into account the relative impact of vessels of other nations and vessels of the United States on the relevant stock.

This new language has several implications. First, it does not reference the development of a fishery management plan or plan amendment (as does section 304(e)), indicating that an FMP amendment need not be prepared to address overfishing. Instead, the Council *shall* develop recommendations for domestic regulations. Second, the issue is raised whether a proposal for domestic regulation is compulsory or if a Council may recommend that no such regulations are necessary, for example, if existing domestic regulations are considered sufficient. Third, it states the Council shall submit recommendations through the Secretary (NMFS) to, in this case, the Inter-American Tropical Tuna Commission (IATTC) for international actions to end overfishing. It is unclear whether such recommendations should be proposed just once or on an ongoing basis. (Under Agenda Item J.5, the Council will discuss procedures for the ongoing provision of advice to regional fishery management organizations such as the IATTC.)

The Council should also consider recent and ongoing activity by the IATTC with respect to yellowfin tuna overfishing. On February 5-6, 2007, the IATTC held an ad hoc meeting to discuss conservation measures for both yellowfin and bigeye tunas. Attachment 1 is a summary of the meeting prepared on behalf of the U.S. delegation. Attachment 1 includes the proposal put forward by the U.S. delegation to address overfishing of bigeye and yellowfin tuna. Attachment 2 is a background paper prepared by IATTC staff discussing past and potential conservation

measures to address overfishing. Attachment 3, also prepared by IATTC staff, presents information on catches of yellowfin tuna in 2006. As outlined in that paper, a key issue is the substantial decline in the average weight of yellowfin tuna being caught, especially in purse seine fisheries targeting floating objects (generally, artificial fish aggregating devices, or FADs, deployed by the purse seine vessels themselves). It is also worth noting that West Coast landings of yellowfin tuna—in 2005, 286 mt by commercial fisheries, according to the highly migratory species (HMS) Stock Assessment Fishery Evaluation (SAFE)—are tiny in comparison. As discussed in Attachment 1, the ad hoc meeting made several recommendations for further analysis and deferred further discussion of conservation measures until after the next round of stock assessments to be produced in May 2007. (The 8th Working Group on Stock Assessments meeting is currently scheduled for May 7–11.) Thus, at this time it is very difficult to predict the types of measures the IATTC may adopt to address overfishing of these stocks. Any such action will occur at the June 18–29, 2007, annual meeting in Cancun, Mexico, which immediately follows the June Council meeting.

Because of these developments, at their February 7–8, 2007, meeting the Highly Migratory Species Advisory Subpanel and Highly Migratory Species Management Team (HMSMT) strongly recommended that the Council defer the adoption of alternatives to address yellowfin tuna overfishing from the April meeting to a later Council meeting. Instead, at this time the Council may wish to discuss and obtain guidance on the implications of section 304(i) in the reauthorized MSA. As part of this discussion, the Council could clarify what domestic regulations, if any, would be appropriate. Under Agenda Item J.6 the Council will have the opportunity to formulate recommendations to the U.S. delegation for the June 2007 annual IATTC meeting for conservation measures the delegation should propose for adoption. Under the current agenda item, the Council may wish to clarify whether that action would satisfy section 304(i)(2)(B) (assuming the Secretary determines this section is applicable to yellowfin tuna), considering that such recommendations may be made on an ongoing (multi-annual) basis, and, if not, what additional actions would be necessary. Based on Council direction, the HMSMT will develop a preliminary set of alternatives or proposals for the Council to consider and adopt for public review at a future Council meeting.

### **Council Action:**

**Consider statutory changes and pending IATTC action that may affect the Council's response to yellowfin tuna overfishing, and provide guidance on the next appropriate steps to address the issue.**

### **Reference Materials:**

1. Agenda Item J.4.a, Attachment 1: Summary – Inter-American Tropical Tuna Commission's February 2007 Meetings.
2. Agenda Item J.4.a, Attachment 2: Document AH-05, Review of IATTC Management Measures for Tunas in the Eastern Pacific Ocean, and Current Management Options.
3. Agenda Item J.4.a, Attachment 3: Document AH-04, Catches of Yellowfin Tuna in 2006.

Agenda Order:

- a. Agenda Item Overview Kit Dahl
- b. Reports and Comments of Advisory Bodies
- c. Public Comment
- d. **Council Action:** Identify a Course of Action to Address Yellowfin Tuna Overfishing

PFMC  
03/19/07

## **Summary – Inter-American Tropical Tuna Commission’s February 2007 Meetings**

The Inter-American Tropical Tuna Commission (IATTC) held an ad hoc meeting of the Commission, February 5 and 6, 2007. Subsidiary meetings rounded out the week and included the Working Group on Finance, and the Bycatch Working Group. (Current IATTC information may be found on the Commission’s website at: [www.iattc.org](http://www.iattc.org).)

### **Ad Hoc IATTC Meeting:**

The focus of this meeting was to explore future options for the conservation and management of bigeye and yellowfin tunas. The Secretariat (Dr. Allen) made a presentation based on preliminary 2006 yellowfin tuna catch data. Yellowfin tuna catches are in significant decline and possible reasons for this include low average size of fish caught, lower recruitment, overfishing, and decreased catchability. The United States put forward a proposal of conservation measures for analysis (Appendix 1). Though many management options were discussed, the Commission concluded that in-depth discussion and proposals of resolutions should wait until after the round of stock assessments due in May, 2007. In the end the Plenary recommended that the IATTC Scientific Staff provide the following information and analysis:

- Work to refine critical areas for juvenile bigeye tuna and juvenile yellowfin tuna and consider the conservation value of closing these areas to purse seine fishing periodically or year round;
- Produce estimates of Total Allowable Catch (TAC) limits both on a single year and a multi-year basis;<sup>1</sup>
- Compile the practical and administrative issues raised regarding potential use of per country catch allocations or Individual Fishing Quotas (IFQs) for vessels;
- Update on statistics from fishing year 2006 in light of the current management Resolution;
- Consider the current fishing capacity in the eastern Pacific Ocean (EPO) and examine the relationship to conservation measures needed at current capacity to the conservation measures that would be necessary if the Commission implemented the Capacity Plan and reduced the purse seine fleet to the target capacity levels;
- Prepare a report of implementation of VMS requirements by Parties;
- Research fishing methods and gear that may increase escapement of small fish;
- Investigate the impact of fishing effort on adult stocks of yellowfin tuna (this is a part of the IATTC scientific standard analysis); and

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<sup>1</sup> Several conservation scenarios were discussed contemplating using critical juvenile areas in concert with a TAC.

- Summarize available information on the impacts from planting of Fish Aggregating Devices (FADs), describe areas where FADs should not be placed because of the fish catching juvenile tunas, determine the increase in vulnerability of tunas since the development of the FAD fishery, and determine the number of FADs placed.

### **8<sup>th</sup> Working Group on Finance:**

The working group examined a series of factors regarding the formula which constitutes a contribution formula. Discussions included an expansion of the categories of Gross National Income (GNI) per capita in the formula to better express the differences between the different levels of economic development of the members. The delegation of El Salvador presented new categories for consideration, but this did not obtain consensus. There was recognition by the meeting that there was value in having the weighting factors be equivalent to GNI categories. A proposal was made to base the catch element on an average of several years instead of the most recent year, but no agreement was reached on this. While there was consensus that the expansion of GNI categories was a step forward, discussion at the meeting revealed that there remain some issues to be resolved before it could be agreed. Some members believed that the expansion of the range of GNI categories should be associated with an increase of the base fee, or a reduction or elimination of the weight given to utilization as currently defined. Other members, while supporting an expansion of the GNI categories, stressed the importance of retaining the element of utilization as a significant factor in the formula. Some of the alternatives were examined using a model spreadsheet.

The balance in the formula between the weight given to base fees and operational fees was also an issue that needed further attention in considering the entirety of the formula. There was also an understanding that, if a contribution formula could be agreed at this stage, it would be reviewed at such time as the entry into force of the Antigua Convention. The Working Group on Finance did not reach consensus on a formula to recommend to the Commission. The Working Group on Finance will meet again in June 2007.

### **6<sup>th</sup> Bycatch Working Group:**

#### Sea turtles

Martin Hall presented a regional program to reduce sea turtle bycatch. Preliminary statistics suggest that use of circle hooks reduces turtle hooking rate by about 2 turtles per 1000 hooks. Additionally, that use of polypropylene line produces more entanglements than monofilament. Martin noted that contrary to the results in the rest of the region, circle hooks have a significantly reduced catch rate in the Peruvian and Ecuadorian mahi-mahi fisheries, so efforts to introduce circle hooks into those mahi-mahi fisheries are unlikely to be successful.

Spain reported that their swordfish fishery results in an average of 8 sea turtle mortalities per million hooks. They also noted that with respect to bait, turtles tend to swallow hooks more deeply when hooks are baited with squid versus other baits.

The United States reminded the Bycatch Working Group (BWG) that the Resolution regarding a *Program to Mitigate the Impact of Fishing on Sea Turtles* (C-04-07) will expire this year. The United States also stated that they would resubmit their Sea Turtle Resolution in June 2007.

#### Seabirds

The BWG recommended that the Stock Assessment Working Group continue progress on developing an assessment of the impact of incidental catch of seabirds resulting from the activities of all the vessels fishing for tunas and tuna-like species, in the EPO. This assessment should include but is not limited to the following: collaborations with various seabird experts, such as BirdLife International and the Agreement on the Conservation of Albatrosses and Petrels (ACAP) and its advisory bodies; identification of fisheries and areas of overlap with breeding and foraging seabird species where incidental catch may potentially occur; available information from CPCs on the levels of incidental catch of seabird species in its IATTC fisheries.

The BWG recommended that the Stock Assessment Working Group consider what appropriate and cost-effective seabird mitigation measures might be for pelagic longline vessels fishing in the IATTC Area. This consideration should include coordination with the Western and Central Pacific Fishery Commission (WCPFC), which recently adopted a binding conservation measure for seabird mitigation measures. This coordination with WCPFC should include its Scientific Committee and Technical and Compliance Committee, which are charged with arriving at minimum technical specifications for these measures.

Further the BWG recommended that the Stock Assessment Working Group work with other Region Fishery Management Organizations (e.g. WCPFC, ICCAT, CCAMLR, CCAMLR, IOTC) in establishing consistent approaches to the incidental catch of seabirds, such as in the areas of assessments, monitoring incidental catch, and the development and use of effective and practicable mitigation measures.

### Sharks

The BWG discussed the current *Resolution on the Conservation of Sharks Caught in Association with Fisheries in the Eastern Pacific Ocean* (C-05-03). The Secretariat reported that only the United States has submitted the required annual reports. The BWG asked that all Parties submit their required shark data and the Joint Working Group on Compliance review this delinquency.

### Other Bycatch

Spain presented results of research on numerous experimental models of FAD construction. Because so many different designs were used, sample sizes were small, but results for some designs suggested a win-win result, producing more tuna and reduced bycatch (including only one tangled turtle and no mortalities.)

Spain presented initial results of research that attempted to use acoustic instruments to determine species and size composition of schools associated with FADs.

### Other issues:

- 2007 Meeting Venue- Mexico and Panama made a joint announcement that the 2007 annual meetings of the AIDCP and IATTC in June will take place in Cancun, Mexico. Panama will host the meetings in June 2008.
- Several sessions of the virtual working group on the selection of the next Director of the IATTC were held. Parties still have not completely agreed on the wording for a vacancy announcement, but expect the two parties with remaining issues to work toward a mutual

agreement in the immediate future. Parties would like to interview candidates before the annual meetings in June 2007.

- No decisions were made with respect to the selection of a Chair for the June 2007 Commission meetings. This issue was very contentious last year and accounted for a significant amount of lost meeting time. However, one of the two parties that competed for Chair last year will be the host of this year's meeting, which may reduce resistance to a Mexican Chair for the 2007 meetings.

**United States Proposal of Conservation Measures for Analysis**

*The goals of this proposal are to:*

- A. Control yellowfin total catch,*
- B. Reduce mortality of small yellowfin tuna and bigeye tuna.*

Proposal:

1. This proposal is applicable in 2008, 2009, and 2010 to all purse-seine vessels and large scale tuna longline vessels (LSTLVs) fishing for yellowfin, bigeye, and skipjack tunas.
2. The area bounded by 90°W meridian, 120°W meridian, 6°N parallel and 10°S parallel shall be closed to all purse-seine fishing for tunas in the eastern Pacific Ocean (EPO) for the duration of this proposal.
3. A total allowable catch (TAC) for yellowfin tuna in the Inter-American Tropical Tuna (IATTC) Convention Area shall be established at the recommendation of the Director.
4. When 75% of the TAC of yellowfin tuna catch is reached, the area(s) identified by the Secretariat as having increased small yellowfin tuna catches shall be closed to all purse-seine fishing for tunas and yellowfin tuna landings from outside the closed area will be limited to 15% of the total landings.
5. Current control techniques for longline fishing will be continued and the catch levels will be reviewed in light of current stock assessments.

INTER-AMERICAN TROPICAL TUNA COMMISSION  
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

**AD-HOC MEETING**

LA JOLLA, CALIFORNIA (USA)  
5-6 FEBRUARY 2007

**DOCUMENT AH-05**

**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 discretionary 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<sup>1</sup> 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<sup>2</sup> 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

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<sup>1</sup> CPCs: IATTC Parties and cooperating non-Parties, fishing entities or regional economic integration organizations

<sup>2</sup> 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 and bigeye are kept below acceptable limits.

## **5. OPTIONS FOR THE FUTURE**

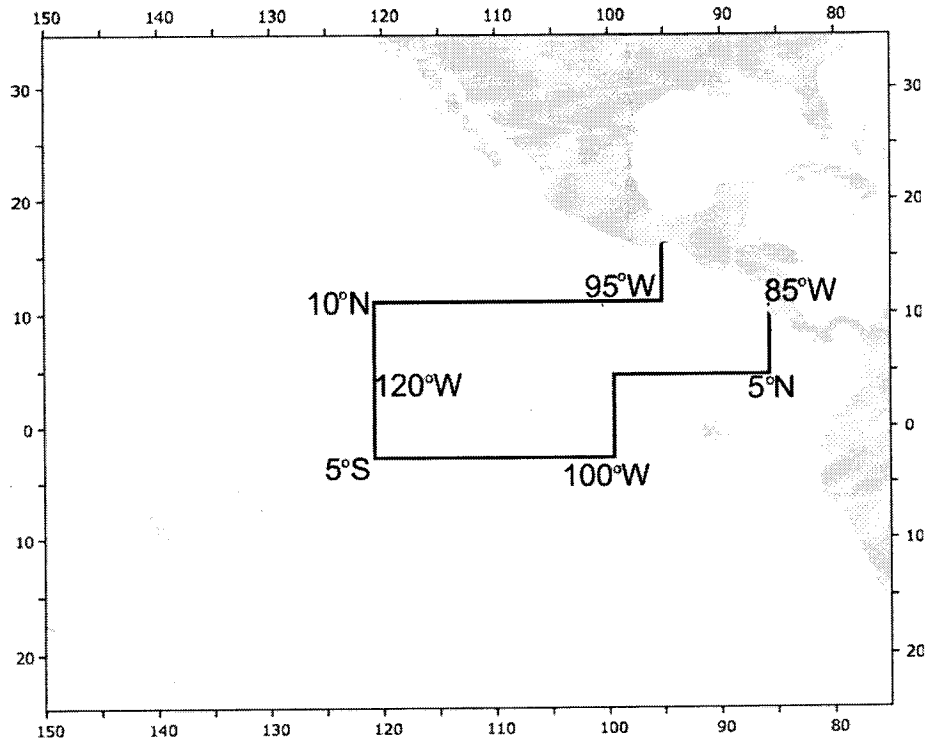
The Commission has adopted separate measures for longline fishing and purse-seine fishing because of the different nature of the fisheries. Because of the nature of the operation, the staff has no suggestions to modify the current method of quotas for each CPC used to limit longline fishing.

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.

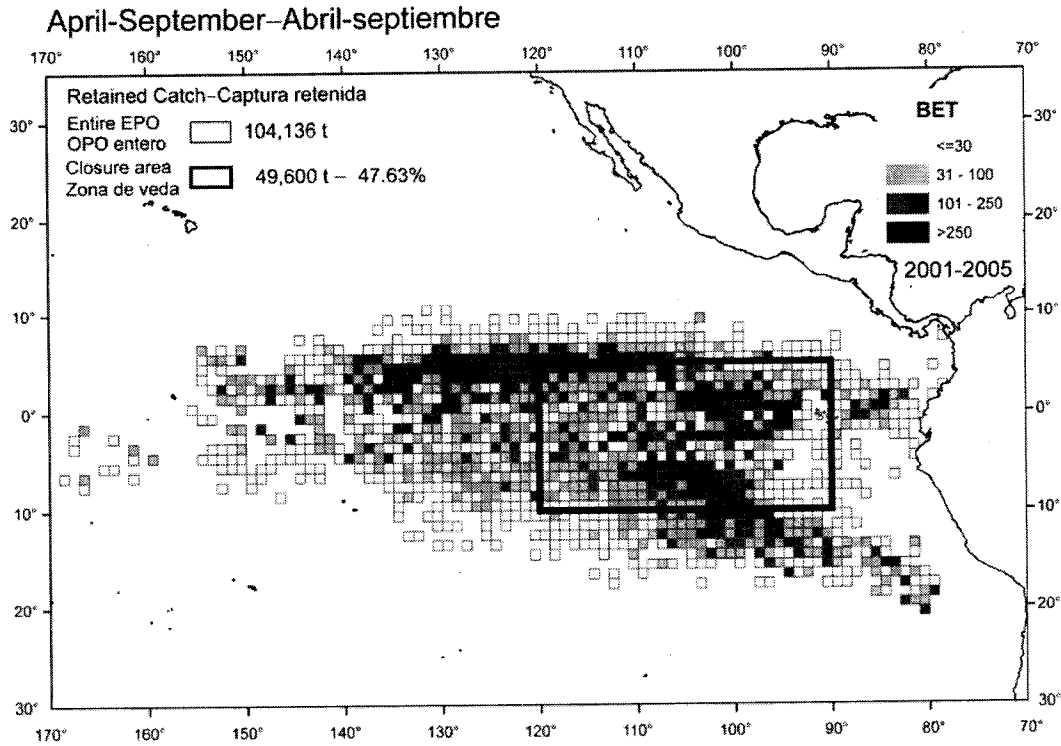
1. Continuation of the present system of closure of the EPO to purse-seining for a period of time during the year. This has been used during 2004-2007 in lieu of the previous TAC. It is based on estimates of target fishing mortality, and can be made more precise than target catches. However, the practice 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 6°N and 10°S and 90° and 120°W (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.

	<b>Base TAC</b>	<b>Increments in resolution</b>
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

**AD-HOC MEETING**

LA JOLLA, CALIFORNIA (USA)  
5-6 FEBRUARY 2007

**DOCUMENT AH-04**

**CATCHES OF YELLOWFIN TUNA IN 2006**

This report commenting on the decline in the catch of yellowfin tuna was sent to CPCs at the end of last year.

The catch of yellowfin tuna during the first half of 2006 was the lowest since the 1980s. The assessment presented at the 74th meeting of the IATTC in June 2006 indicated that the annual recruitment during 2002-2004 was close to the average for 1983-2004, and that the recruitment for 2005 was relatively strong. The estimates of recruitment for the most recent years are rather imprecise, however. On a quarterly basis, the recruitment was estimated to be relatively weak during the first and second quarters of 2005, but strong during the third quarter of that year.

The staff's advice was that, while the current fishing effort (taking account of the recent increase in the size of the purse-seine fleet) was greater than that that would produce the average maximum sustainable yield (AMSY), the stock was not overfished. It seemed then that the most likely explanation for the low catches of yellowfin during early 2006 was reduced catchability of the fish.

The analyses have recently been updated to include data for the first half of 2006. These updated estimates indicate weaker recruitment for the first quarter of 2003 through the second quarter of 2005 than had previously been estimated. However, the recruitment during the third and fourth quarters of 2005 appears to have been strong. The weaker recruitment during 2003, 2004, and the first half of 2005 appears to have caused a decline in the biomass of the stock, which is now below the level that would produce the AMSY.

In addition, the average size of yellowfin in the catch has been reduced as the fleet appears to be switching its effort from offshore areas, where larger fish predominate in the catches, to inshore areas, where smaller fish are more common. It also appears that some vessels that ordinarily direct their effort mostly toward yellowfin have been directing it more toward skipjack and bluefin. The change is illustrated in the table below, which shows the catches in the first semester of 2001-2006 by set type, and the average weights of yellowfin in those catches. The catch in the first semester of 2006 declined precipitously for sets on dolphin-associated fish offshore, moderately for sets on dolphin-associated fish inshore, only slightly for sets on unassociated fish, and not at all for sets on fish associated with floating objects.

Year	Floating objects		Unassociated		Dolphin, inshore		Dolphin, offshore	
	Catch (t)	Average weight (kg)	Catch (t)	Average weight (kg)	Catch (t)	Average weight (kg)	Catch (t)	Average weight (kg)
2001	47,332	9.3	58,037	12.4	45,252	17.8	71,392	30.4
2002	20,835	4.9	39,182	15.4	64,231	23.3	92,290	31.1
2003	15,184	5.2	52,357	8.5	65,619	13.2	86,193	29.3
2004	11,263	5.6	50,978	9.1	47,398	13.4	60,572	30.6
2005	11,880	4.2	50,925	5.9	45,772	14.6	63,574	20.3
2006	12,832	2.9	43,001	5.4	30,597	13.0	21,932	22.1

During the first two quarters of 2006, the average weights of the yellowfin from the two apparently strong

2005 cohorts (from the 3<sup>rd</sup> and 4<sup>th</sup> quarters) ranged from 2 to 7 kg. The fish were taken in sets on floating objects and unassociated schools, and comprised more than half of the catch of yellowfin in that time. Normally, most of the catch of yellowfin is taken in sets associated with dolphins. The cohorts from the 3<sup>rd</sup> and 4<sup>th</sup> quarters of 2005 will not become well represented in sets on schools associated with dolphins in inshore areas until the first quarter of 2007.

It is still too early to know whether the new 2005 cohorts are really strong, or whether they are being exploited at a high rate. This should become clear in the stock assessment performed in 2007. If those cohorts turn out to be only average, the outlook will be low catches and the risk that fishing effort will remain directed at young fish, leading to a long-term reduction in the abundance of larger yellowfin associated with dolphins.